



Geothermal Communities

www.geothermalcommunities.eu

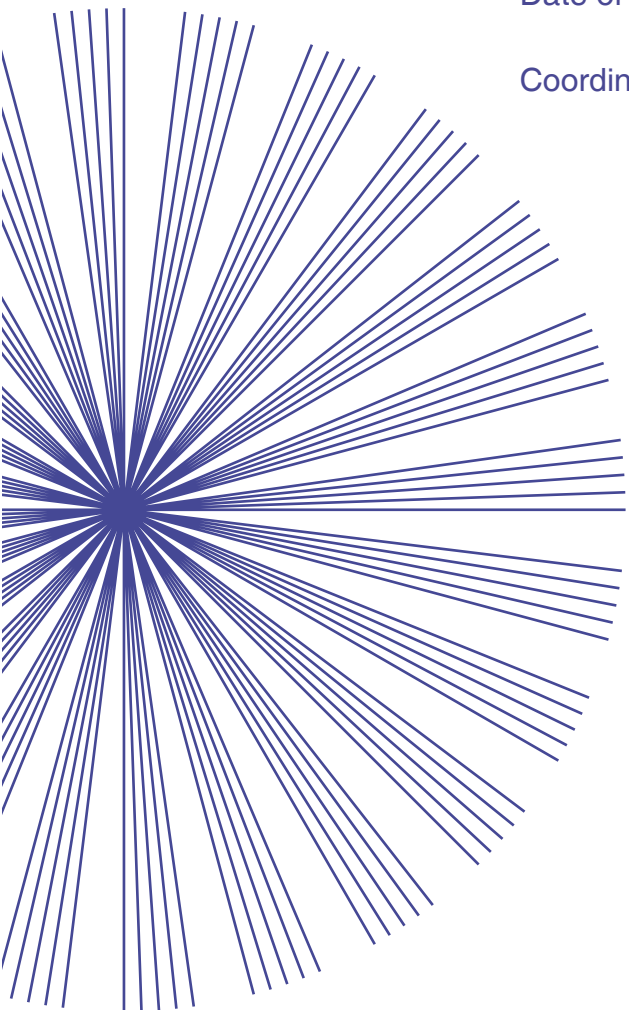
GeoCom – FP7 CONCERTO – 239515

Fourth Periodic Report

Final version

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Coordinator: Geonardo Environmental Technologies Ltd.



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PROJECT PERIODIC REPORT

Grant Agreement number: 239515

Project acronym: GEOCOM

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Funding Scheme: Collaborative Project – Large Scale Integration Project

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Periodic report: 1st 2nd 3rd 4th 5th

Period covered: from 1 January 2013 to 31 December 2013.

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¹ Usually the contact person of the coordinator as specified in Art. 8.1. of the Grant Agreement .

² The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: http://europa.eu/abc/symbols/emblem/index_en.htm logo of the 7th FP: http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos). The area of activity of the project should also be mentioned.

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2. Declaration by the scientific representative of the project coordinator

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate)³:
 - has fully achieved its objectives and technical goals for the period;
 - has achieved most of its objectives and technical goals for the period with relatively minor deviations.
 - has failed to achieve critical objectives and/or is not at all on schedule.
- The public website, if applicable
 - is up to date
 - is not up to date
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organizations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator: Mr. Gabor Kitley, Managing Director / Geonardo Ltd.

Date: Budapest, 17/04/2014 (submitted as DRAFT on 26/02/2014)

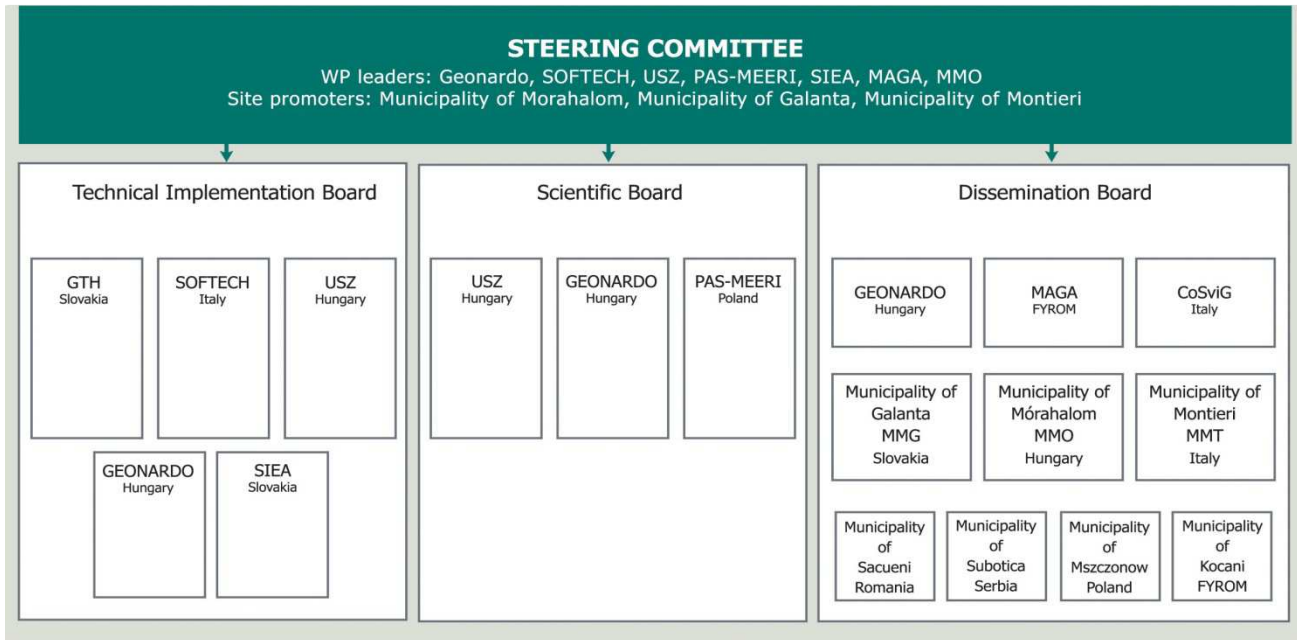
For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism.

³ If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

3. Publishable summary (max. 4 pages)

3.1 A summary description of project context and objectives

The **Geothermal Communities** project is a CONCERTO Phase III action that started in January 2010.



The project’s overall objective is to promote the utilization of geothermal energy and resources as a reliable renewable energy resource through demonstration actions in three cities involved in the project as CONCERTO Areas. Geothermal energy is the least known and least expanded RES in Europe, though its relevance and importance should deserve much more attention. **By using the practically unlimited internal heat of earth, geothermal energy has one of the highest potential of all RES.** When compared with other RES – like solar or wind – its main advantage is the practically constant energy and heat output it can provide. Besides the well known geothermal regions like Iceland or the region of Tuscany (Larderello) in Italy, **Central-Eastern European countries have exceptional geothermal resources.** These resources are either unexploited due to the lack of technological know-how or their use is carried out in an unsustainable way; geothermal district heating projects lack the energy efficiency component and the used thermal water is generally not re-injected but instead released to surface waters.

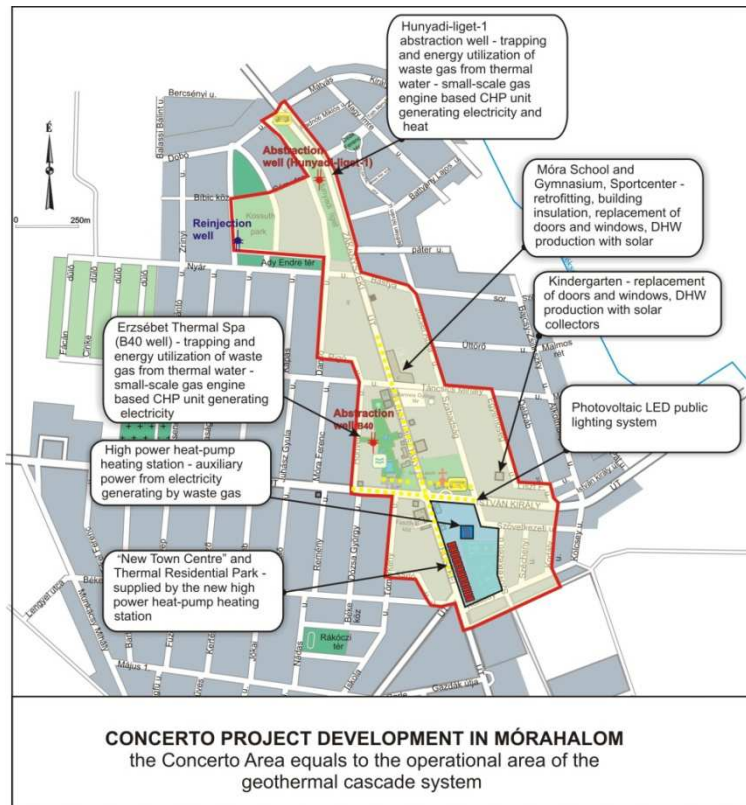
The Geothermal Communities project, joint action of 16 individual partners, demonstrates the best available technologies for the use of geothermal energy combined with innovative energy-efficiency measures and with the integration of other renewable energy sources in three different pilot sites (Hungary, Slovakia and Italy). Furthermore, the project integrates a large number of cities as project partners (from Serbia, Romania, Poland and Macedonia) that either already have ongoing geothermal initiatives and are keen on adopting the latest technologies (e.g. Oras Sacueni, Romania) or they would like to realise brand new systems by taking advantage of the project’s results and its competent consortium (e.g. Subotica, Serbia).

The project implements the following measures at the three demonstration sites:

Mórahalom, Hungary:

The Geothermal Cascade System of Mórahalom

(the core works were financed by the Hungarian Structural Fund („KEOP-4.1.0-2007-0006: Geothermal Cascade System of Morahalom (2008-) – EURO 2,147,000”). According the plans the proportion of renewable energy within the energy utilization of public institutions will grow from 0% up to more than 80% - resulting in saving 14,441 GJ of fossil energy sources per year. 2620 kW heat capacity is calculated to be provided through the geothermal heat supply system. By replacing the amount of 481,907 m³ of combusted natural gas per year; the annual emission of pollutants from energy utilization is expected to drop by 866 t of CO₂, 318 kg of N_xO_x and 605 kg of CO.



High power heat-pump station: The auxiliary power demand of 60 kW of the heat-pump heating station is going to be met by the trapping of methane production of the new abstraction well of the cascade system, while the electric power produced by trapping of the methane production of the B40 well at the spa will be used at the Thermal Spa. Currently this methane is directly emitted into the air (with a twenty-one times higher greenhouse effect than CO₂). Complex, so called combined energy utilization gas engine based CHP units are planned for the waste gases (CH₄: 65-98%) of the abstracted thermal water, which generates electric power, and supplies auxiliary power to the system. An average water amount of 30m³/h with a temperature of 30 C° arrives to the area of the “New Town Centre” (after cooling down in the cascade system), which is able to produce a thermal power of 450 kW in a heat-pump system with an average efficiency of 5 COP. This helps the full utilization of the complete energy of the thermal water (including its gas content) abstracted for the supply of the cascade system at a temperature of 65-70°C to a temperature down to 5-6 C° before reinjection. Currently there is no thermal water and heat pump combined system with similar efficiency either in Hungary or elsewhere in Central-Eastern Europe.

Retrofitting and RES integration: The area concerned in the development of the Mora Cultural Centre, School and Gymnasium (built in 1935 and 1972 respectively) is 1430 + 560 =1990 m², and uses an annual amount of 130-140,000 m³ natural gas for heating. By the GEOCOM measures, gas amount of approx. 122,000 m³/ year shall be replaced by geothermal energy. A solar collector system of 175 m² of vertical plate collectors and the related engineering are planned to accompany the retrofitting measures of these buildings. The solar system is able to produce a hot water amount of 17,500 l/day. An intelligent control unit will optimize the use of solar-thermal and geothermal in the building taking into consideration the peak demands and the usual school cycle (45 minutes class/15 minutes break) for ventilation

control. It needs to be mentioned that façade insulation and refurbishment measures will take into account the fact that the old building is part of the local cultural heritage and is under local protection. Wooden-framed custom made windows (triple glass with argon fills) will replace the old ones in a style that matches the building built in 1936.

Galanta, Slovakia:

City of Galanta has been operating a geothermal district heating system since the early '80s. The CONCERTO activities focus on the further utilization of the geothermal energy by retrofitting measures, connection of new areas to the district heating system and last, but not least by developing the possible reinjection techniques. The municipality's effort is to use this green energy widespread in the city and assure this energy for the next generations.



Well-head of the Galanta geothermal abstraction well

Retrofitting of three old, concrete-panel based multi-level housing units and of the elementary school and RES integration by photovoltaic system and comprehensive renewal of the lighting system and RES integration also by photovoltaic system:

The refurbished buildings and the elementary school need less geothermal energy, which can be used for longer DHW producing on the other main part of the CONCERTO area.

The retrofitting of the selected dwellings included:

- Facade insulation,
- Roof insulation,
- Change of the doors and windows at the common spaces,
- Reconstruction of the rising pipes
- Using of thermostats.

Insulation works included the change of windows and doors, which are in disrepair and in addition to poor thermal insulation attributes, are dangerous when handling them. The construction of windows is disrupted with cracks in the wooden frame. From the energy savings point of view, taking into account the current technical condition, the windows are the structure, which has the greatest impact on the wasteful heating of the building.

Photovoltaic panels shall provide enough electricity for the lighting of the common areas of multi-storey buildings included in the project. Photovoltaics and a comprehensive renewal of the lighting system is hoped to significantly decrease the electricity consumption of the retrofitted elementary school heated from the geothermal source.

Reinjection borehole research and project works, including full documentation, studies, permits and assessments to secure the geothermal capacity for the next generation recent system needs a reinjection well, which is injecting the non-used or waste geothermal water back to the reservoir. Now this “waste water” is pumped into river Váh in amount more than 500 000 m³ a

year. The implementation of a reinjection borehole needs a feasibility study, research and a comprehensive project documentation to set the technical specification of the well.

Geothermal network improvement at CONCERTO Area I by connecting several newly build businesses and residential buildings to the existing geothermal loop.

Connection of newly developed urban areas to the geothermal district heating system

Montieri, Italy:

Montieri is a small medieval village situated in the heart of the Tuscany Geothermal Region of Larderello, with 3 main CONCERTO activities:

Construction of a highly innovative geothermal district heating system by using high-enthalpy fluids: This may serve as a new, ambitious example for communities with similar geothermal characteristics (e.g. Central-Eastern European countries); In CEE higher temperature fluids (medium/high enthalpy) might also be recovered, though at significantly higher investment costs. Aided by innovative technological solutions the feasibility of tapping into medium enthalpy resources is going to be demonstrated here. This aspect of the project affects 425 dwellings which are to be connected to the district heating system. The total heated volume of these homes adds up to 110,000 m³, while the output of the geothermal system is estimated to be approx 5,500 kW (20,000GJ)



The village of Montieri

Retrofitting of selected dwellings **by using integrated approaches and techniques:** Montieri represents a challenging site for defining and testing a qualitative architectural integration of renewable energy technologies and retrofitting measures. In such an architectural heritage the potential for intervention at the building envelope level is quite limited. Only natural materials and methods are acceptable that are in conformity with the medieval city structure. 20% of the total dwellings in Montieri are subject to be retrofitted during the project.

The Energy Retrofit Strategy which will be introduced over 425 residential dwellings is part of the geothermal district-heating plan. It aims at reducing energy needs in conjunction with building renovation. In addition these buildings will make use of geothermal heating to become 100% fossil fuel free. The retrofitting demonstration will take into consideration the town's high cultural and artistic value.

RES Integration – on one hand a 8,5kW PV panels system will be installed to serve as the main power source of Montieri's renewed public lighting system. On the other hand a total of 42,5 m² solar thermal collectors will be set up to serve as primary heating and DHW source for dwellings too spread out to be linked to the district heating system.

The three CONCERTO cities in the project represent three completely different sites in terms of their climate, technological setting, population (Montieri: 1.200, Morahalom: 6.000, Galanta: 15.000), retrofitting techniques to be applied and the nature of the geothermal systems. This gives the project a unique added value where communities with different background can demonstrate the importance of geothermal energy.

In addition to the demonstration components through the **parallel implementation of three ambitious development works**, there is also a strong complementary research aspect to the project focusing on making geothermal projects more cost efficient and technologically sound. Research work includes:

- **Integration of the geothermal energy with other RES** to outline ways of more efficient and sustainable green-energy production (e.g. solar energy, biomass, wind) in Europe – with special emphasis on trapping CH₄ and other combustible gases and energy production;
- **Trans-boundary issues** of the utilization of geothermal energy (4D modelling of geothermal reservoirs along the Hungarian/Serbian border);
- **Socio-economic modelling** of geothermal investments, with special focus on the public perception and understanding of RES/RUE measures.

Results of the project activities have been widely disseminated via common dissemination channels combined with traditional and electronic training programs and workshops organized for municipal-level decision makers. Besides the dedicated dissemination work-package, the demonstration activities are expected to have a solid impact on the environmentally-focused thinking (i.e. by having done retrofitting and system integration projects over buildings of various educational institutions such activity would provide local students the opportunity to get familiar with the RES/RUE measures and to understand their importance). Finally, the unique **Mayors' Geothermal Club** is planned to be set up to continue operating even after the project is over as a permanent network of city mayors and municipal-level decision makers who are interested in the sustainable utilization of geothermal energy. It is expected that with the help of such **high-visibility pilot actions** combined with the research and dissemination efforts investment into geothermal systems can be boosted in Europe and **these investments** are going to take place **in a sensible, environmentally aware and economically sound way**.

3.2 Description of work performed since the beginning of the project and the main results achieved so far.

Year 1

The planned duration of the project is 60 months (01/2010 - 12/2014). During the first 12 months of the project, mainly administrative, management and preparatory works have been conducted; however, the retrofitting measures in Galanta at the 3 multi-level dwellings were also implemented ahead of schedule.

The project's kick-off meeting was held on 27-29 January 2010 in Budapest with site visits to the Morahalom and Galanta demo sites. An interim project meeting was held in June 2010 in Montieri, Italy, with most of the partners present. These were followed by several bilateral meetings between the coordinator and the demo sites representatives later on.

Galanta decided to bring the retrofitting measures forward by a year since Bysprav Ltd. had finished completing the retrofitting measures of the 3 multi-level dwellings in the primary CONCERTO area. This has put the project ahead of schedule.

The project website was also launched at www.geothermalcommunities.eu. This website is regularly updated and all relevant information and results are made available.

Year 2

Due to the very slow legislative processes, most of the legal issues commenced in the first year of the project were still ongoing during the last reporting period. Public procurement and procedures for compliance with local regulations presented major hurdles (and they still do) for the actual implementation of the proposed and funded actions.



The second interim meeting was held in Kocani (Macedonia) on 27-28 April 2011. After a brief summary of the first-year activities (results achieved, delays and bottlenecks experienced) the upcoming tasks and deliverables were discussed. This session was followed by a detailed

description of the first-year results of the three demonstration sites. Interim results of the relevant research WPs were also shared with the consortium.



The indoor sessions were complemented by site visits related to the Kocani geothermal infrastructure (geothermal heated elementary school, greenhouses, abstraction well etc.)

At the demo sites, the municipalities have been working hard on overcoming all legal obstacles and obtaining relevant permits and documentation required to commence the investments. As a result of all of these efforts, many aspects of the GEOCOM initiative started to get realized in 2012.

The preparatory works, energy audits, planning and public procurement procedures were also in the pipeline at the two other CONCERTO cities. The actual retrofitting and construction works started in 2011, as planned.

Preliminary steps regarding the launch of WP7-Monitoring have been taken during bilateral talks between relevant partners.

Year 3

Some of the planned activities of the third project year were hindered by a slow and time-consuming legislative issue which resulted in unavailable interim payments needed for project implementation purposes and which is briefly described below.

During the GA negotiation phase back in 2009, the Commission informed the GEOCOM consortium that the unit-scale flat-rate cost reporting option was not available, so the budget, based on the actual costs of the demonstration activities planned to be realised at each of the demo sites, was re-calculated in close cooperation with DG ENER. The costs were reported in this way in the first two periods (2010 and 2011), and DG ENER has accordingly accepted the cost statements and paid the interim instalments.

In February 2012, GEOCOM's Project Officer Mr. Royer-Dupre forwarded Geonardo (the coordinator) a letter from DG Energy's legal department mentioning that using the actual costs for the demo activities was a mistake. As a result, Geonardo had to initiate a GA amendment procedure to include the unit-scale flat-rate costs and ANNEX D into the GA. This procedure took more than 6 months, although all of the requested documentation was submitted promptly. Officially, the Grant Agreement of the GEOCOM project was amended only in September 2012 – till that point the project was in “suspended” status.

In November 2012, DG ENER informed Geonardo that all reported and previously accepted costs on DEMO activities were rejected due to lack of hand-out certificates, meaning that the GA modification had a retroactive effect on GEOCOM's activities, resulting that in spite of all financial reporting took place in accordance with the valid GA during period 1 and period 2, the amendment procedure of the GA (which replaced the old GA) rendered all the reported DEMO actions of the first two project years ineligible.

This unpleasant situation (namely no interim payment received in 2012) hit the small communities (less than 15.000 inhabitants) of the demonstration sites hard due to their limited financial capacities when it comes to pre-financing major cost items of already ongoing or planned project implementation.

The consortium was informed on this topic during the 3rd interim meeting, which was held in Budapest on 30-31st May 2012. The whole consortium was represented and all the progress achieved as well as plans for 2012 were presented, discussed and agreed upon.

Despite these unfortunate set of administrative shortcomings, the project implementation was not fully halted during this period as a result of all the preparatory work which had earlier been commenced. There was a number of implementation components in the pipeline waiting to be realised in 2012 and as it is listed further below the occurred financial hurdles did not necessary coincided with the lack of progress.

Year 4

The financial issues which affected some the project activities of the third period (as described in detail in the previous periodic report) were lingering on for the full duration of the fourth reporting period too. As a result of these financial constraints and due to the difficulties occurred during the implementation of the district heating system in Montieri (affecting some related project components, eg WP6) it was concluded after several meetings and discussions with Mr Dionisio (PO) that the project can be prolonged by 12 months in order to provide enough time mainly for the monitoring duties to take place, which could not be started without the system to be monitored in place. Thereby the new end date of the GEOCOM project is 31/12/2015.

In spite of the rather unfortunate financial issues the project was being carried on over the course of 2013 bringing the following results.

The Municipality of Mórahalom has technically finished the delivery of the contracted CONCERTO components by installing the high power heat pump station and completing the solar PV-based LED-public lighting system. Monitoring data is continuously being gathered and forwarded to SIEA (P4) for evaluation and assessment.

The CONCERTO activities in Galanta have also drawn nearer to their completion by finalising the replacement of doors and windows at the local elementary school leaving only one component to be delivered. The initial concept of upgrading the lighting system at the same school under current market circumstances does not seem to be a cost and energy efficient intervention any longer. Instead of this aspect a different solution was drafted in close cooperation between the project management board and the Municipality yielding far better energy results at a much lower cost. The details of this intervention are described in detail in the updated Annex I providing sound calculations supporting this deviation from the initial plan but improving the Municipal level Concerto goal in Galanta.

The year of 2013 saw a great improvement in Montieri, where the core of the geothermal district heating system was deployed under the streets of the village. The photo documentation attached to this report guides you through each step of the intervention. While the delivery of the works is progressing well, it cannot make up for the lost time which was occurred during the preliminary phase of the project back in between 2010 and 2012. It is quite obvious that implementing such a complex and brand new system literally from nothing takes a lot of time, and the delay suffered in the preliminary phases can affect the final deadlines. For this reason it was decided that the duration of the full project will be extended by 12 months. this extra time will allow all those project components (WP6, WP7) linked to this activity and which couldn't be delivered on time to be finalised and submitted in due course.

After thorough internal discussions the initially proposed retrofitting actions on the historic building stock in Montieri have been revised and an alternative set of actions were suggested which will allow the satellite communities of Montieri to benefit from the GEOCOM actions.

The research (WP5 and WP6) and miscellaneous (WP9) work packages were carried on with some tangible results, however it must be expressed that especially in the case of WP6, some elements, those which are tied with the progress at the demo sites are lagging behind schedule. After some discussions between the PO, the project management team and the respective WP leaders a constructive plan was drafted featuring the mitigation actions that provide solutions to overcome these issues.

4. Core of the report for the period: Project objectives, work progress and achievements, project management

4.1 Project objectives for the period

According to FP7 reporting requirements, a short overview of the project objectives relevant to the 3rd period of the project (year 2012) is given below. As mentioned earlier, the first and the second years of the project have been dedicated mainly to preparatory works especially at the demo sites regarding the investment aspects, however some of the demonstration tasks (e.g. retrofitting in Galanta) have started and partly finished while the RTD and dissemination activities are on schedule and despite the previously mentioned financial hurdles, the third year brought about some tangible results at the Morahalom demonstration site as well.

In line with GEOCOM's Description of Work, during the fourth year of the project the following seven WPs have been running:

WP1 – Management, Month 1 – 60

WP2 – WP3 – WP4 – Demonstration activities at the 3 CONCERTO Cities; Month 1-60

WP5 - Technological Research Month 1-60

WP6 – Socio-economic research Month 25-60

WP7 – Monitoring Month 31-72

WP8 – Dissemination. Month 1-72

WP9 – Training Month 31-72

WP1: Management

Work-package leader: Geonardo

Objective: As of DoW

WP 1.1 Internal Consortium Affairs

- Effective communication and flow of information between partners, Preparation of Internal Consortium Agreement.
- To organize progress meetings: yearly management meetings and workshops.
- IPR Management, declaration of Background IPR, monitoring and management of Foreground IPR.
- Project reports (annual, mid-term and financial) as outlined in the Grant Agreement.
- To monitor Critical Paths, SWOT assessment, alternatives for crisis management. Identification and strategy for any correction of potential risks and dispute, which may occur.

WP 1.2 Liaison with External Parties

- Representing the Consortium towards the European Commission and the Scientific Officer.
- Liaising with other relevant Directorate Generals (including DG JRC) of the European Commission.
- Liaising with the CONCERTO Premium initiative and contact establishment with other CONCERTO projects.
- Monitoring other RES/RUE-related European initiatives (including EIE).

- Monitoring national and international initiatives liaising with International end-users and Stakeholders,
- Developing uniform guidelines for press and media appearance

WP 1.3 Geothermal Communities Engineering Project Office

- Supervision of design and implementation works at all test sites (WP2, WP3, WP4 and WP7). There are sub-teams responsible for each the relevant test site, lead by SOFTECH (for Montieri), USZ (for Morahalom) and MG (for Galanta)
- Keeping records and supervising of tendering procedures (lead by project engineering office)
- Help desk, consulting and engineering service for the involved municipalities (including associated cities).
- Supervising the compliance with standards and regulations.
- Acceptance and take-over of project works, in-situ supervision and documentation.
- Development of financial and legal conditions and elaboration of a plan for the sustainability of the project results.
- Identification and strategy for any correction of potential risks and dispute, which may occur.
- Maintaining and monitoring links with the industry ensuring that adequate competition is generated among the subcontractors.
- The project office is located in Budapest at Geonardo HQ, with input from 3+2 key partners who provide expert consulting and supervision of local activities: USZ (Morahalom site), SOFTECH ((Montieri Site); MG (Galanta site); and GEONARDO (WP1/4) and SIEA (WP7).

WP 1.4 Elaboration of a plan for the sustainability of the project results (also in WP 10)

- Development of financial and legal conditions description and technical guidelines for the long-term operation of the network
- Maintaining and monitoring links with associated cities and other interesting stakeholders

WP2-WP3-WP4: Demonstration activities at the CONCERTO Cities

Though the demonstration activities are split into three separate work packagers (WP2 - Geothermal System Development, WP3 - Retrofitting and Energy Efficiency Measures, WP4 – System Integration), the objectives (and the achievements in the next chapter) of these WPs are discussed together, using separate description by CONCERTO Cities. These WPs are the main activities of the GEOCOM project, so special attention is paid on their introduction as well.

CONCERTO City: Morahalom, Hungary – Objectives of DEMO WPS

WP 2.1 Within the framework of the CONCERTO element a heat-pump centre is planned. A gas turbine that is planned to utilize the methane content of the thermal water currently produced at the city's wells will power the heat pumps. Another element is the integration of a solar-thermal system providing DHW for the Mora Ferenc Primary School, Kindergarten and Sports Hall complex.

WP3.2 Two public buildings are subjects of retrofitting. The Mora Primary and Secondary school currently spends 82% of its annual budget on heating (natural gas) due to extremely poor qualities of the external walls and windows. For both buildings an intelligent system is to be installed in order to control ventilation and shading (during the summer). Higher-grade high-school students to be involved in the planning and implementation of retrofitting measures is hoped to raise awareness and understanding among young people regarding the principals of energy efficiency in general..

WP4.2 A combined solar-thermal and geothermal system taking into account cost-efficiency and reservoir management are assumed at the pilot site. The insulation techniques to be applied at the school and the sports hall are beyond national and EU standards. The intelligent ventilation systems will consider the usual school cycle. The combusted methane content of the Hunyadi-liget thermal well is going to power the heat pump centre producing heating and water for the new housing area in the city: At the same time energy generated by the same process at the B-40 thermal well is expected to be used at the thermal spa.

Scheduled for this reporting period at the Mórahalom demonstration site:

- delivery of the high power heat-pump station
- solar PV-based LED public lighting system deployed

CONCERTO City: Galanta, Slovakia –Objectives of DEMO WPs:

At Galanta, three local partners are involved in the project activities: P11 - Municipality of Galanta (Mesto Galanta), representing the Municipality, P6 - Galantaterm s.r.o, the company (owned by the municipality) representing the Geothermal district heating operator, and P17 Bysprav s.r.o, another municipal-owned company responsible for the retrofitting actions of the multi-storey buildings.

WP 2.2 Geothermal System Development

In order to improve environmental performance of the existing system full documentation and related studies of a reinjection borehole will be compiled. For further development of geothermal heating in Galanta, it is key to determine the viable options and their extent regarding reinjection into sandstone reservoirs. Such complexity must be preceded by a set of geological surveys, which happen to be also part of the project. From the perspective of sustainability and environmental suitability reinjection may prove to be an important step, due to the fact that nowadays over 500 000 m³ a year of waste geothermal water is released to the nearby river Váh. According to preliminary estimates and studies, reinjection could return 60 - 80% of the abstracted water back into the reservoir (exact value to be determined by the proposed study). This activity aims on securing the complete research and project documentation required for the implementation of the reinjection borehole.

Three new housing estates, a biotechnical-accessories producing company and an elderly home are under construction in close proximity to Galantaterm Ltd. creates a sufficiently dense heat market at CONCERTO Area I. The investors announced their interests to use renewable energy sources for heating of their properties. This presents a great opportunity for the GEOCOM project to provide a year-round heating and DHW supply from geothermal sources on the spot, instead of limiting such capacities only to produce DHW during the summer period on the initial CONCERTO II area. Request for changing the original work plan have been approved by the Commission within the frame of the amendment procedure.

WP 3.3 – Retrofitting and Energy Efficiency Measures (Mesto Galanta)

Insulation works include the change of windows and doors, which are in disrepair and in addition to their poor thermal insulation attributes, are dangerous when handling them. The window structures are disrupted by cracks running in the wooden frame. From the energy savings point of view, taking into account the current technical conditions, the windows have the greatest impact on the wasteful heating of the building. Replacing them can achieve a saving up to 30 % on the heating bill.

WP 3.3 - Retrofitting and Energy Efficiency Measures (Bysprav)

Three blocks of flats were selected for retrofitting where the applied external wall insulation technologies demonstrate the standard insulation systems often used in the country and which are in accordance with the dwellers' decision.. Further elements of retrofitting include insulated doors and windows at the common areas; fully renewed rising pipes and the use of thermostats in the apartments.

WP 4.3 – System Integration (Mesto Galanta)

The local elementary school has high electricity consumption due to the need of continuous lighting during the day. The project includes the integration of renewable energy sources through the installation of photovoltaic panels performing up to 5 kW with a total annual energy output of up to 5300 kWh (calculation based on the records of annual solar radiation in the Slovak Republic). Furthermore, to enhance the efficiency of this measure, a comprehensive upgrade of the school's lighting system is scheduled to be carried out, making it possible to achieve an average saving of up to 25% on the power bill.

In addition to saving power, the upgrade of lighting fixtures contributes to the improved conditions of teaching, reduces the number of lamps, increases total light output (in terms of technical standards) and it will cast a less harmful shade of light for the eyes of children.

WP 4.3 – System Integration (Bysprav)

RES integration is committed through the future deployment of photovoltaic panels on the provision of electricity for lighting common areas of the housing units. On the top of each insulated housing unit a photovoltaic system with a total power up to 1.5 kW will be mounted, which is sufficient to cover the energy needs of the common areas at the 48-flat housing units.

Scheduled for this reporting period at the Galanta demonstration site:

- Final documentation about the reinjection borehole and relevant feasibility studies
- replacement of doors and windows at the elementary schools to be finalised.

CONCERTO City of Montieri, Italy – Objectives of DEMO WPs:

There are three legal entities involved in GEOCOM that are responsible for the demonstration actions at Montieri: P2 - SOFTECH Ltd, an engineering and architect-planning SME, responsible for the sensitive retrofitting measures of the medieval village of Montieri, P8 - CoSviG, a regional public body responsible for the geothermal district heating implementation and P12 Municipality of Montieri, the local government responsible for the implementation of all works, especially coordinating the retrofitting measures.

WP 2.3 Geothermal District Heating System of Montieri

The main objective is to set a new, ambitious example for Central-Eastern European countries, where higher temperature fluids (medium/high enthalpy) may also be recovered (although at significantly higher investment costs). With the help of innovative technological solutions the feasibility of tapping into medium enthalpy resources is demonstrated. Challenges include HPHT conditions (high pressure (15-20 bar) and high temperature (200-215 °C). Given the elevation difference between the steam/hot water heat-exchanger at 530 m above sea level and the central exchanger at 700 m a.s.l., in order to keep the circulating superheated water at a pressure of 2 bars it is sufficient to pressurize the circuit at the central exchange, where jars of expansion are subjects to be installed.

Plant Technical Features

- Total energy output: 19,800 GJ
- Total power output: 5330 KW
- A double primary and secondary circuit, with use of heat exchanger plates with two thermal plants (primary heat steam / water boiler and secondary overheated water / hot water) and intermediate pumping stations.
- Utilization system: based on heat exchanger plates
- Primary thermal plant location: geothermal well
- Central location secondary heat: municipality of Montieri
- Length of distribution network: 5600 m (times 2, return) of pipes, excluding the connection to users.
- Inlet primary circuit temperature: 200 °C
- Primary circuit overheated water temperature: 120 °C
- Secondary circuit water temperature: 80-90 °C

To maximize the economic efficiency a specific planning targeting the intervention was elaborated, without precluding any possibility of scattered units to be connected, where the distance and the cost is within the parameters of depreciation schedule. According to calculations, the total volumes to be heated were 110,000 m³, while total power output reaches 4850 kW.

Having noted the almost **uniform architectural features of the selected buildings**, a building types-based calculation method had been implemented. This has allowed a careful assessment of the differences in energy requirements related to the heating demand of similar buildings. The development shows that the analytical energy requirements for the buildings shall be increased by 10%, and therefore it sums up to approximately 5330 kW.

WP3.4 Retrofitting at Montieri:

Montieri represents a challenging site for defining and testing a qualitative architectural integration of renewable energy technologies and retrofitting measures because in such an architectural

heritage, the potential for intervention at the building envelope level is quite limited. Only natural materials and construction methods are acceptable that are in conformity with the medieval city structure. The climatic conditions here are similar to that of the Western Balkan thus results are going to be directly applicable to South-Eastern European countries while taking into account the different socio-economic conditions.

20% of the total dwellings will be retrofitted, having an enormous effect on the energy balance and setting an example for similar future projects.

Energy audit of the 425 dwellings selected for retrofitting and micro-scale RES integration will be carried out. Retrofitting and RES integration comply with the special local conditions.

The innovative retrofitting technologies to be used at Montieri are as follows:

Day lighting:

- Central skylights opening;
- Careful selection of the skylights glass (light transmission/solar gains/light reflectance coefficient);
- Opening of skylights in order to allow the natural light to reach the lower levels of the building;
- Special care concerning the spatial distribution at each floor.

Building envelope:

- Application of thermal insulation at the roof levels and partition walls, and floors;
- Selective covering of the massive walls from inside in order to optimize comfort conditions and thermal inertia of the building;
- High quality double glass, wooden frame vertical windows;
- High quality skylight glass (low solar gains – low reflectance).

Natural ventilation:

- Utilization of of the buildings' high natural ventilation potential;
- Opening of skylights to increase the natural ventilation (free-cooling, night cooling in summer);
- Keeping infiltration rates at low levels, during winter.

WP4.4 System Integration at Montieri

A catalogue of applications, integrally estimated on each technological/typology crossing is suggested to be worked-out, in order to predict the most appropriate technology and configuration for any of the various building types. The result yields a matrix of technologies, components, equipments and materials to be tested in the whole town centre, qualified and quantified in terms of energy benefits, environment impact reduction, and gas emission control.

The main area of RES integration includes the modernization of the complete public lighting of the town centre by changeover to solar-powered LED lighting system. Photovoltaic modules will be adopted reaching a total amount of 8.5 kW to provide the electricity needs for street lighting. The current power demand for the public lighting is 15 kW and it is estimated that with the energy efficient street lighting system to be adopted by the Municipality, the 8.5 kW of PV output could cover the whole energy needs for such a public use. The use of central panels and closed circuit networks is planned. Apart from the occasional cleaning of the panels, the system does not require any maintenance. It is completely automatic with dusk-to-dawn solution. This system reduces the energy demand by 35-50%, and its utilization results in a 100% energy saving compared to the replaced system.

The other area of RES Integration is to use a total of 42,5 m² solar thermal collectors. Such a limited capacity derives from the population's uniform satisfaction over the community's thermal needs covered by the geothermal source. Only a few dwellings decided not to be served by the district heating (due to their distance from the pipeline), including domestic hot water. In such dwellings, at the periphery of the geothermal loop solar thermal panels shall be installed to provide solar hot water all year round.

Scheduled for this reporting period at the Montieri demonstration site:

- installation of the piping for the Geothermal District Heating network and all related infrastructural development (heat exchangers etc)

WP5: Technological Research

Work-package leader: University of Szeged

Objective: As of DoW

WP5 is one of the two research work-packages of the project. Its main objective is to set-up a technological guideline on future geothermal energy investments and to give a clear and transparent picture on the possible outcomes of similar projects. It has four sub-WPs in order to cover all relevant research and horizontal topics. The leading partner is P9 – University of Szeged, with strong cooperation and involvement with all the project partners (local data input, research and legal issues, etc.)

WP5.1 Integration with other RES

The main scope of this sub-WP is to outline ways of integrating geothermal energy with other RES (e.g. solar energy, biomass) in Europe, and evaluation of integration methods.

In this WP, available experience on integrating different RESs into a cascaded facility is studied, with a special emphasis on environmental improvements and broadened operational time and spectrum of use for such facilities. At present most of the experience available is confined to general cascading utilization such as health spas, space and greenhouse heating in a low temperature geothermal environment. There are very few examples regarding the cascading other RES. The results will provide blueprints of innovative cost-effective solutions for geothermal investments in the enlarged Europe. The following activities are planned: 1) Investigation of the economic factors that influence the integration of GE into energy systems. 2) Investigation of other factors that influence the integration of GE into energy systems. 3) Identification of integrated systems potential layouts. 4) Studies for the improvement of geothermal energy utilization in CEE.

WP5.2 Trans-boundary issues of utilizing geothermal energy

The most significant thermal water resource in the Carpathian Basin resides beneath the Hungarian-Serbian border, in the Szeged-Morahalom-Subotica triangle. The abstraction for extensive and complex utilization is currently being started on both sides of the border. For the safe and sustainable abstraction, and its international monitoring, it is necessary to determine the hydrogeological-hydrodynamic features of the common thermal water base, and to elaborate a two-phase 4D model of the water base for the mapping of the water resource and its gas content. Geology doesn't follow country borders, thus no surprise that the Upper Pannonian reservoirs of the Great Plain stretch to the mountains of Serbia and Romania. This strengthens the necessity of basic research, since the set up of international abstraction monitoring systems and abstraction

agreements will eventually become a necessity targeting a reasonable and sustainable bilateral production.

WP5.3 Reinjection monitoring and modeling

Sandstone reservoirs in the Pannonian-basin and other similar sedimentary basins all over Europe pose a significant challenge for geothermal related reinjection. To comply with the mandatory reinjection procedure of the geothermal waste water back to the reservoir high performance pumps are necessary (with high power demand) – occasionally up to 50% of the total heat power of the source. That may destroy the whole economic viability of the geothermal system. Different methodologies are under investigation, which aim is to define technical solutions, partially or totally eliminating the problem and by doing so increasing the economy of such geothermal systems. The recently commissioned reinjection borehole in Morahalom is used for simulations, model calibrations and for detailed optimum reservoir management studies which enable reinjection with minimum energy consumption.

The aim of the work package is to collect data and information under production conditions that clarify the relation between wellbore construction and well-geophysical relations of abstraction-reinjection wells drilled into Upper Pannonian sandstone reservoirs as well as the actual abstraction-operation methodology. The research activity seeks answers to various questions such as: from which location how much water can be abstracted, what technological circumstances have to apply for successful reinjection to take place thus ensuring a sustainable, long-term water production.

WP5.4 Integrated utilization of waste gases of thermal wells

Waters abstracted from a large number of thermal wells of the Great South Plan Region have high gas (predominantly methane) content. During water abstraction (both in the case of spa uses and energetic utilization) novel technologies are available to separate and utilize the energy-content of these gases (as well as heat content of the CHP units while combusting these gases) reducing greenhouse effect and increasing system effectiveness through integration. In WP2.1 Morahalom serves as the first Hungarian pilot site for such action, as combined heat and power from the CHP units mounted on two abstraction wells shall be utilized in an integrated system. In Wp5.4 researchers of the USZ involving the leaders of the other test sites aim to carry out an in-situ study of the Morahalom site, to assess the results of integrated use, to do benchmarking, to analyze the needs and potential of other possible sites and to outline suggestions for wider applications.

The following activities are planned:

- Investigation of the economic factors that influence the integration of waste gas energy in RES.
- Investigation of other factors that influence the integration of waste gas energy in RES.
- Assessment of waste gas energy integration in RES potential and technologies for the South Great Plan Region.
- Building a database of South-Great Plan sites with potential in waste gas energy integration in RES.
- Providing technology transfer to projects proposing waste gas energy integration in RES.

WP6: Socio-economic research

Work-package leader: PAS-MEERI

Objective: As of DoW

WP6.1 Public perception of geothermal energy: This sub-WP aims to compile a cross-national, comparative analysis of public understanding and attitudes towards geothermal energy in general. The work targets the evaluation and assessment of the society's perception regarding the function and role of geothermal energy in energy systems and everyday use. Research includes both quantitative and qualitative methods (e.g. internet-based surveys, questionnaires, and analysis of statistical data that has been gathered for other purposes. Relevant project partners will gather domestic data that characterizes their home country).

WP6.2 Public perception and understanding of RUE measures (*pilot-site case studies*).

To determine user satisfaction (with the implemented measures, information, energy advice, feedback-systems on consumption) and user involvement related to the project activities analysis of different stakeholders / inhabitants perceptions about changes in the affected communities and acceptance of the CONCERTO measures will also be performed.

WP6.3 Overview of market drivers, fiscal measures and subsidies: Issues such as financial constraints (on capital investment, flow of capital, and other); environmental constraints; land concessions; water rights; taxation; etc. is planned to be thoroughly investigated in the aspect of their handling through the relevant existing legislative and administrative framework, as well as financial incentives, fiscal measures, market incentives, analysis of economic viability and cost-effectiveness in relation to reduction of CO₂ emissions, environmental and sustainability issues, reinjection, etc.

WP7: Monitoring

Work package leader: SIEA

Objective: Technical and non-technical monitoring of the pilot actions based on a synchronised methodology. Besides the data and measurements performed on each demo-sites, the results of technical aspects (WP5) and socio-economic aspects (WP6) are also key-elements to the Monitoring WP.

WP7.1 Ambient monitoring:

- daily value of ambient air temperature and hour global solar radiation are important data for energy balance calculation, for examine an operation of the solar renewable sources.
- Daily rainfalls, wind speeds, evaporation and humidity could be optional data or information could be obtained from the weather services.

WP7.2 Technical monitoring of RES systems:

- projected data and technical specifications to be used for boreholes (yield, temperature, chemistry, depression curves), for chemical composition determination and for environmental impacts.
- daily pumped geothermal water, average temperature of water,
- thermal energy delivered in the summer period from the geothermal sources to the area of the heating plant (i.e. K12, K16 (Concerto area II of Galanta.) in GJ)

- monthly non-RES auxiliary energy input and heating, cooling and electrical or fuel energy.

WP7.3 Technical monitoring of CONCERTO building performance

- Domestic water usage.
- Space heating usage (separately metered in the units).
- Electricity usage (meters).
- Information will be collected on auxiliary electricity usage for heating and cooling and also waste heat estimation
- For the photovoltaic system, the amount of the energy (electricity) delivered directly by the panels to the primary circuit.
- For building blocks (in Galanta) the units will be separately metered and the common areas (staircase, corridors, laundries, storage rooms) will also be metered separately.

WP7.4 Non-Technical Monitoring – in cooperation with WP6

- Annual socio-economic data will be collected monitored and compared to the baseline (three surveys altogether). Salaries (average income level of households) will be collected and GDP/inhabitant will be estimated within the CONCERTO community.
- Share of household income spent on energy will be calculated on a sqm/per capital/per household basis.
- Qualitative indicators will be defined to evaluate the real/perceived impact of the CONCERTO measures.
- Quantitative indicators will use per capital income related to the per capital expenditure on energy services normalised with a coefficient used to evaluate the level (quality) of energy services (continuity of district heating provision, feeling of comfort after the retrofitting measures, etc).
- The public awareness concerning the CONCERTO measures (and the impact of those measures) will be monitored on a community level.

WP7.5 Real-time on-line monitoring of system performance:

Real-time on-line monitoring of system performance is one of the main dissemination interface of the project towards the public and the stakeholders. Also it allows having an immediate alert when an anomaly occurs and to rapidly intervene if necessary. Telemonitoring system will be implemented at all the CONCERTO areas and will be available through the GEOCOM website. The data received will make it possible to assess the global performances of the installations. The entire CONCERTO areas have to be demonstrative, so the telemonitoring equipment used will be as simple as possible in order to increase the replication potential.

WP8: Dissemination

Work-package leader: Geonardo

Objective: Dissemination of information about the project in general, its objectives, the approaches and results through electronic and traditional methods. All beneficiaries have important role in dissemination, like translations, publications, content developments, conference and workshop participation, etc.

WP8.1 The first task under dissemination was to develop the project’s website available starting from the first month (January 2010.) and serving as the main platform of the project.

The website contains:

- Consortium structure, list of partners and contact points
- Private communication forum with a restricted access to the partners, for communication / discussion
- Links to stakeholders and other websites (e.g. other CONCERTO projects) with relevant information of interest
- Appropriate links to the Mayor’s Club and Monitoring, as and when it becomes available

The website is regularly updated with:

- New versions of the brochures and newsletters
- Occurrences of dissemination of the project by its partners to conferences and meetings
- Announcements of relevant future meetings that a partner intends to attend
- Reports/Minutes of the kick-off, interim and final meetings (accessible only to partners)
- Results from each work package as they are released by the partners (accessible only to partners)
- Public presentation of final deliverables

WP8.2 Common Dissemination Activities

- Dissemination activities were planned in order to improve the market for development of geothermal energy and integrated geothermal/RUE/cascading RES projects in EU countries
- General dissemination of information about the project, its objectives, the approaches and results through publications and leaflets and the project Newsletter
- A project logo to be created and used in all publications and leaflets
- Brochures to contain the overall aim of the project and the planned actions (WPs) that would be undertaken to achieve this aim. Additionally, International and National Press and Media Releases from each partner within its home country are forecasted.
- Project **electronic newsletters** to be issued on a yearly basis containing above all the information found in the most recent brochure the following:
 - Summary of progress of all WPs, including all the deliverables produced since the last edition of the newsletter
 - Reports of activities of each partner since the last edition of the newsletter
 - Information on relevant forthcoming conferences / meetings, where GEOCOM is presented
 - Announcement of forthcoming project meetings

WP8.3 Presentation and participation at high-profile events

Provisional activities planned in general and for the period:

- European Technology Platform on Renewable Heating & Cooling conference

- Presentations and publications in international conferences (such as the European Geothermal Congress 2013) that are related to the objectives of the project
- Participation at CONCERTO Plus/Premium meetings and activities
- International Press and media releases.
- National Press and Media releases from each partner within its country

WP9: Training

WP leader: MAGA

Objective: To convert project results into a digital training material and implement a series of trainings for municipal decision makers and the research community

WP9.1 Practical training for decision makers

One day interactive workshops for municipality and national administrative staff who are to take initiatives and organization of projects development and completion. Practical training shall particularly consist of a summary of the local source on disposal, possibilities for sustainable and economically justified incorporation in the local economy development and, improving the life conditions and environment. Necessary administrative procedure for development of concrete geothermal (or combined) projects shall be summarised in a practical table, with necessary information for related administrative units where to get necessary permissions and support. Finally, a locally based proposal shall be given in order to illustrate how to organize an initiative, of what is composed and how should be organized a concrete project development.

WP9.2 Research based international workshops

Target group includes professionals on identification of positive possibilities of energy efficiency measures in the municipalities with application of geothermal energy and locally on disposal RES for composition of integration projects. Three special international workshops is planned, i.e.:

- In Hungary, with a special focus on WBC countries: to present possibilities of direct and indirect application and power/heat production of geothermal energy, composition of technologies applied and possibilities for further improvement based on the reached experience. Organization of scientific investigations by collaboration of the national scientific and business sector.
- In Italy; the same as above but for different technologies and under different natural, organizational and economy conditions. Italy was the country where modern development of geothermal energy use was initiated and where interesting technologies have been invented, applied and modernized.
- In Poland, with particular attention to the introduction of energy efficiency improvement technologies and increasing human environment conditions. The project in Zakopane, Poland consists very interesting technical solutions, unique incorporation in a specific natural and economic environment and particular improvement of the environmental conditions.

WP9.3 Development of an e-learning and information base and collaborator network:

The project will take advantage of Moodle (Modular Object-Oriented Dynamic Learning Environment), which is a course management system (CMS) - a free software package using sound pedagogical principles, to help educators create effective online learning communities (www.moodle.org). Work will integrate photo and video archives with input from virtually all WPs (including research WPs 5&6) into a multimedia-based digital learning material. Content of the different services and their IT support system shall be developed. Services: Information service and

helpdesk - E-learning course with different modules for city planners experts (focus on energy efficiency and geothermal integration) but also available for students and researchers.

4.2 Work progress and achievements during the period

WP1: Management

According to the FP7 reporting guidelines, the achievement and progress of the Management WP is discussed in the next chapter (*3.2.3 Project Management during the period*).

WP2 – WP3 – WP4 activities for the 3 demonstration sites

Just like in the previous chapters, the periodic report of GEOCOM describes the achievements of the DEMO WPs as a whole, by splitting the actual results into three subchapters, according to the CONCERTO Cities.

CONCERTO City of Morahalom

By the fourth year of the project only a handful of components were still to be implemented as most of the many project elements had been delivered earlier. The prolonged pending status of the project financials fortunately did not leave its mark too heavily on the development components and allowed them to be finalised.

WP 2.1 Within the framework of the CONCERTO element a heat-pump centre was planned to provide heating for the New Town Center and the future Thermal Residential Park. The public procurement has been completed and the contractor was selected early on in 2013 which was followed by the installation of the hardware.

After having it thoroughly tested commissioning took place in order to make this source available for the Municipality. Unfortunately the very mild temperatures at the end of 2013 did not make it possible to fully exploit all the benefits this heat pump could deliver for the community. Monitoring of data over 2014 and 2015 will generate a solid database for the CONCERTO record.



The engineering components of the high power heat pump station at Mórahalom

WP4.2 Solar PV-based public LED lighting system

Specifications of the source PV component:

- 42 poly-crystal PV panel with 240W output/each
- IG Plus-120V 10kW inverter

There are two separate and distinct public lighting loops installed with various lamp designs and features.

Specifications of the first loop are as follows: Total: 2168W

1./ NANO2 24 type. Lensoflex 5000lm/56W/4200K LED fixtures installed on existing posts

2./ PANNONLED type fixtures installed at three different locations on 7 and 10 m high lamp posts (these lampposts to fit into their environment:

4 pc PANNONLED 24 (Lensoflex 5500lm/60W)

8 pc PANNONLED 32 (Lensoflex 7400lm/80W)

4 pc PANNONLED 32 (Lensoflex 7400lm/80W)

3./ KECSKEMÉT LED (8LED 2500lm/29W) type fixtures at three different locations with a total number of 16 new steel lampposts (4m tall each)

Specifications of the second loop are as follows: Total: 540W

1./ PANNONLED type fixtures installed at three different locations on 7 and 10 m high lamp posts:

9 pc PANNONLED 24 (Lensoflex 5500lm/60W) mounted on single-armed 7m tall steel post

LED system installed at the local bus terminal: 11x22W (Total: 242W)

11 pc of old fixtures to be replaced by LED (PHILIPS WT460C LED22S/840 PSU WB TW3 L1300 type)

4x12W grid independent posts with installed PV panel and battery system



Different types of public lamp post accommodating the LED lighting fixtures at Mórahalom



Solar PV panels before and after installation to supply the LED public lighting system

CONCERTO City: Galanta, Slovakia –Objectives of DEMO WPs:

At Galanta, three local partners are involved in the project activities: P11 - Municipality of Galanta (Mesto Galanta), representing the Municipality, P6 - Galantaterm s.r.o, the company (owned by the municipality) representing the geothermal district heating operator, and P17 Bysprav s.r.o, another municipal-owned housing association company responsible for the retrofitting actions of the multi-storey buildings.

WP 3.3 – Retrofitting and Energy Efficiency Measures (Mesto Galanta)

Over the course of 2013 the second stage of replacing the windows at the local elementary school was carried out, which concluded the retrofitting works at Galanta as per the Annex 1 to the Grant Agreement.

The basic concept for the CONCERTO retrofitting components in Galanta was driven by the intention of delivering the highest possible standards for the selected buildings with a complete work-over, rather than making smaller-scale interventions on a larger number of buildings. For this reason the upgrade of the lighting system at the elementary school was planned to complement the replacement of the doors and windows. Unfortunately there have been some major changes in the past several years especially from the markets’ perspective since this project component was first conceived and some doubts arose within the professional advisory board to the municipality whether the current market conditions allow to deliver an intervention of such magnitude in a cost and energy efficient way or not.

After having delivered most of the project components in Galanta - on time or way ahead of schedule - except for the replacement of the lighting system at the elementary school, there have been an audit along with some accurate estimates and calculations made on this subject recently, summarized in the table below.

<u>Current power requirement</u>	<u>82650 W/year</u>
<u>Calculated power requirement after retrofitting</u>	<u>54544 W/year</u>
<u>Expected reduction of power requirement</u>	<u>28106 W/year (-34%)</u>
<u>Annual energy consumption for 2013</u>	<u>34700 kWh</u>
<u>Annual cost of energy</u>	<u>8200 €</u>
<u>Calculated energy consumption after retrofitting</u>	<u>22900 kWh</u>
<u>Calculated energy cost after retrofitting</u>	<u>5430 €</u>
<u>Planned total annual savings achieved</u>	<u>2800 €</u>
<u>Estimated total cost of retrofitting</u>	<u>128300 €</u>
<u>Return on investment</u>	<u>46 years</u>

The projected overall costs of the replacement of the lighting system is estimated to be in the range of 130.000 Euros + VAT (a preliminary quote from a potential contractor included) which translates to approximately **46 years** return on investment (ROI) based on the fiscal amount of annual savings included in the table above. The high costs of the investment coupled with the prolonged disturbance it may present to the school’s usual routine topped by the very long return of investment period triggered the need of seeking an alternate option where a smaller effort - larger impact action could be realised with significantly lower rate of return and much more favourable financials.

Next door to the subject elementary school there is also a kindergarten/nursery facility which – similarly to the other buildings in the neighbourhood – benefits from Galantaterm’s geothermal district heating network. However, huge savings cannot be achieved even by utilising green energy for the general condition of the doors and windows simply do not fit for their purpose, namely to isolate the inside from the outside. The pictures below can give an idea about their current state and about their efficiency when it comes to insulation. This building came first on the municipality’s list when they started to look for a higher impact action with lower capital costs.

Some preliminary calculations have also been made for this job, which are summarized in the table below.

<u>Current heat consumption</u>	<u>322438 kWh/year</u>
<u>Annual heating cost</u>	<u>16025 €</u>
<u>Calculated heat consumption after retrofitting</u>	<u>273532 kWh/year</u>
<u>Calculated heating cost after retrofitting</u>	<u>13600 €</u>
<u>Expected reduction of heat demand</u>	<u>48900 kWh/year (-15%)</u>
<u>Planned total annual savings achieved</u>	<u>2430 €</u>
<u>Estimated total cost of retrofitting</u>	<u>59450 €</u>
<u>Return on investment</u>	<u>24,5 years</u>

According to the presented values and prices the approximately 60,000EUR +VAT intervention would reduce the annual energy consumption of the building by 15%, generating approximately 2,400 EUR saving on heating costs per year which could yield a **24 year** return on investment. It is also worth mentioning that it is not only about figures and savings but also about the thermal comfort of the children and nurses spending most of their days within those walls.

The following pictures are to demonstrate the current condition of the windows to be replaced.



This table is to compare the main aspects of the two retrofitting scenario:

	Lighting upgrade (school)	Replacement of doors and windows (kindergarten)
Current annual consumption	34700 kWh (el)	322.450 kWh (heat)
Current annual cost	8230 €	16025 €
Estimated annual consumption after retrofitting	22900 kWh (el)	273.500 kWh (heat)
Calculated annual costs after retrofitting	5430 €	13600 €
Reduction of annual demand	34% / 11800 kWh	15% / 48950 kWh
Total annual savings achieved (€)	2800 €	2430 €
Total cost of investment	128.275 € +VAT	59.450 € + VAT
Return on investment	46 years	24,5 years

In the highlight of the comparison between the two potential scenarios it is evident that extending the retrofitting actions into the kindergarten would result 4 times greater energy savings and benefits for less than half price compared to delivering the initially planned action of the lightning upgrade.

WP5.3 – Reinjection monitoring and modeling

After the contractor was selected for the job the whole project work (D2.1 and D2.2) of the reinjection well have been divided into the following studies:

- Geothermal project tasks including technical project of reinjection borehole,
- Feasibility study of a reinjection borehole in Galanta,
- Comprehensive project documentation of surface technology of waste-water pumping (pipelines, technology, construction, electricity connection, driveway) in order to obtain building permission,
- Detailed total budget including both surface and subsurface works

The official presentation of the completed work was held at the City Hall in Galanta on the 9th December , 2013. Representatives of the contracted engineering office presented the results to the audience. The coordinator and researchers from the University of Szeged also attended the event to get a better insight into the work done and ask further questions which may help their research too.



Presentation of the reinjection borehole study at the City hall of Galanta on 9.12.2013.

CONCERTO City of Montieri, Italy – Objectives of DEMO WPs:

There are three legal entities involved in GEOCOM that are responsible for the demonstration actions at Montieri: P2 - SOFTECH Ltd, an engineering and architect-planning SME, responsible for the sensitive retrofitting measures of the medieval village of Montieri, P8 - CoSviG, a regional public body responsible for the geothermal district heating implementation and P12 Municipality of Montieri, the local government responsible for the implementation of all works, especially coordinating the retrofitting measures.

WP 2.3 Geothermal District Heating System of Montieri**2.3.1 Work progress in the construction of the geothermal district heating**

Works started at half of November 2012 and are following a very tight schedule that will lead to end the construction phase by June 2014 with the first put in operation of the district heating plant. The test for the correct operation of the district heating will be done on October 2014 to let the necessary time for putting into service the whole system.

- In December 2013 took place the 5th working progress check (SAL, Stato di Avanzamento Lavori) that declared an expenditure of about 2.800.000 €.
- The official test memoranda signed by the members of the Test Board specify the steps of the construction progress up to 20 November 2013.
- The main steps of the realisation of works are summarised below and follow the sequence (and dates) of above mentioned test memorandum.

10th January 2013

- Civil works for heat exchanger plants A and B started. Certifications for concrete and steel structures are under elaboration
- Excavation and construction of the distribution pipeline for geothermal district heating started in the upper part of via Verdi (large street) and in Vicolo del Romito (narrow paved street) to define the operating protocol into two typical situations of Montieri town centre.

19th February 2013

- Civil works for heat exchanger plants A and B are upgrading: load bearing structures, external walls, roof structure with rain water collection system, some internal partitions are done.
- Excavation and construction of geothermal district heating pipeline in Via Verdi is almost completed, in Vicolo del Romito is completed, in Vicolo del Castello and Vicolo del Poggio started.
- The excavation of the first part of public street (strada provinciale) started, it will connect heat exchanger plant B and the town centre

15th April 2013

- Civil works for heat exchanger plants A and B are almost done: just external and internal finishings have to be provided (rendering, plasters, floors and windows). After those, the mechanical plant installation will follow.
- Apart from bitumen layer Via Verdi is concluded and covered, in Via and Vicolo di Castello, Vicolo del Romito, via del Poggio (180 mt) works are concluded and all pipelines (of district heating, water main, sewer system and electrical system) are laid and covered (“a rustico”).

- About 300 mt of the connection between heat exchanger plant B and the entrance of the town centre, are concluded and water main ducts were added too.

20th May 2013

- Civil works for heat exchanger plants A and B are almost done: just external and internal finishing have to be provided (rendering, plasters, floors and windows). After those, the mechanical plant installation will follow.
- Via Verdi is concluded, the screed in light concrete was laid in Via and Vicolo di Castello, Vicolo del Romito and Via del Poggio are almost concluded just screed and pavement are missing (“a rustico”), excavation works in Via della Ruga and Via delle Capanne just started.
- About 400 mt of pipeline of the connection between heat exchanger plant B and the entrance of town centre are done, some problems to existent sewer system were found therefore it was substituted with a new pipeline.

18th September 2013

- Civil works for heat exchanger plants A and B are done, and the structures were certified. Internal and external finishing works are suspended until mechanical parts of the plant are installed.
- Via Verdi is completed; Via delle Capanne, Via della Ruga, Via di Dogana, Via dell’Orto, Via del Fosso and Via del Poggio are almost concluded just screed and pavement are missing (“a rustico”); instead works are in progress in Via and Vicolo delle Fonderie, Via della Guarnelluccia and a part of Via Roma.
- The connection between heat exchanger plant B and the town centre is done up to the main square Piazza Gramsci. The connection between heat exchanger plants A and B is in progress.

Three working progress checks (SAL: Stato Avanzamento Lavori) were done up to September 2013 to which correspond the financial expenditures:

1st S.A.L., total expenditure at 30th June 2013: 378352.53 €

2nd S.A.L. total expenditure at 09th July 2013: 940886.05 €

3rd S.A.L. total expenditure at 08 August 2013: 1113388.74 €

20th November 2013

- Civil works for heat exchanger plants A and B are done, and the structures were certified. Internal and external finishing works are suspended until mechanical parts of the plant are installed.
- Via Verdi, Via delle Capanne, Via della Ruga, Via di Dogana, Via dell’Orto, Via del Fosso, Via del Poggio, Via and Vicolo delle Fonderie, Via della Guarnelluccia are completed (“a rustico”), just screed and pavement are missing. Paving works are starting in Via dell’Orto. In the area between Piazza Gramsci and Via Roma, excavation, laying of pipes and covering with soil are done. Works are started in Salita del Vicinatino, in the square beside, in a small street that connects Via Garibaldi and Via della Ruga, and in Vicolo di Villa.
- The connection between heat exchanger plant B and the town centre is done up to the main square Piazza Gramsci. The connection between heat exchanger plants A and B is almost concluded: in some sections of the pipeline. A pre-strain method was adopted by heating up a section of the pipeline to 70°C by the use of electricity. This solution avoided the installation of too many mechanical compensation sections (the so called omega).

A further working progress check (S.A.L.) was done at the beginning of October:
 4th S.A.L., total expenditure at 08th October 2013: 1959750,5 €

The following maps highlight the sequence of excavation and construction yards in the village and along the network path.

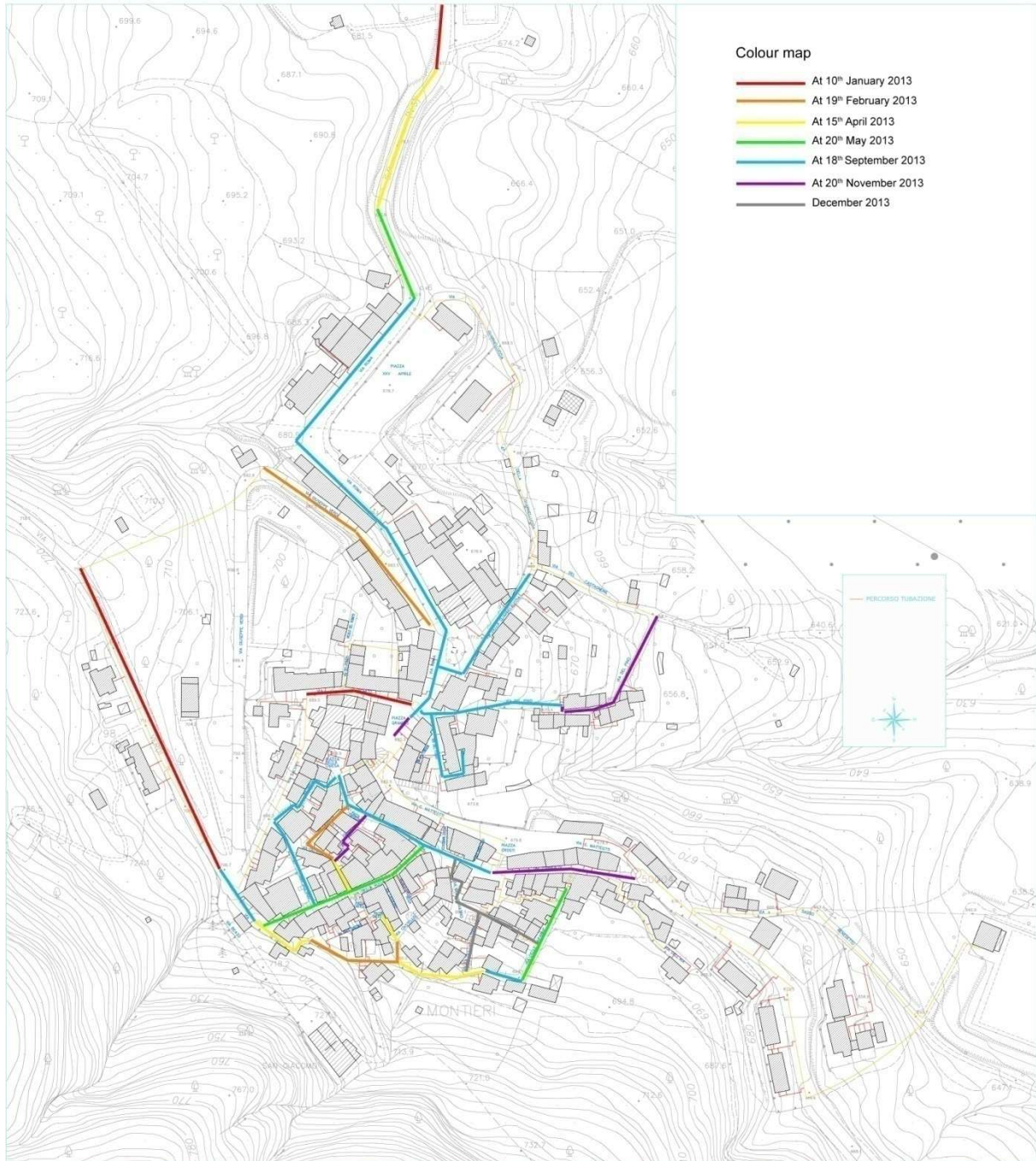


Image 1. Construction of the network path inside town centre

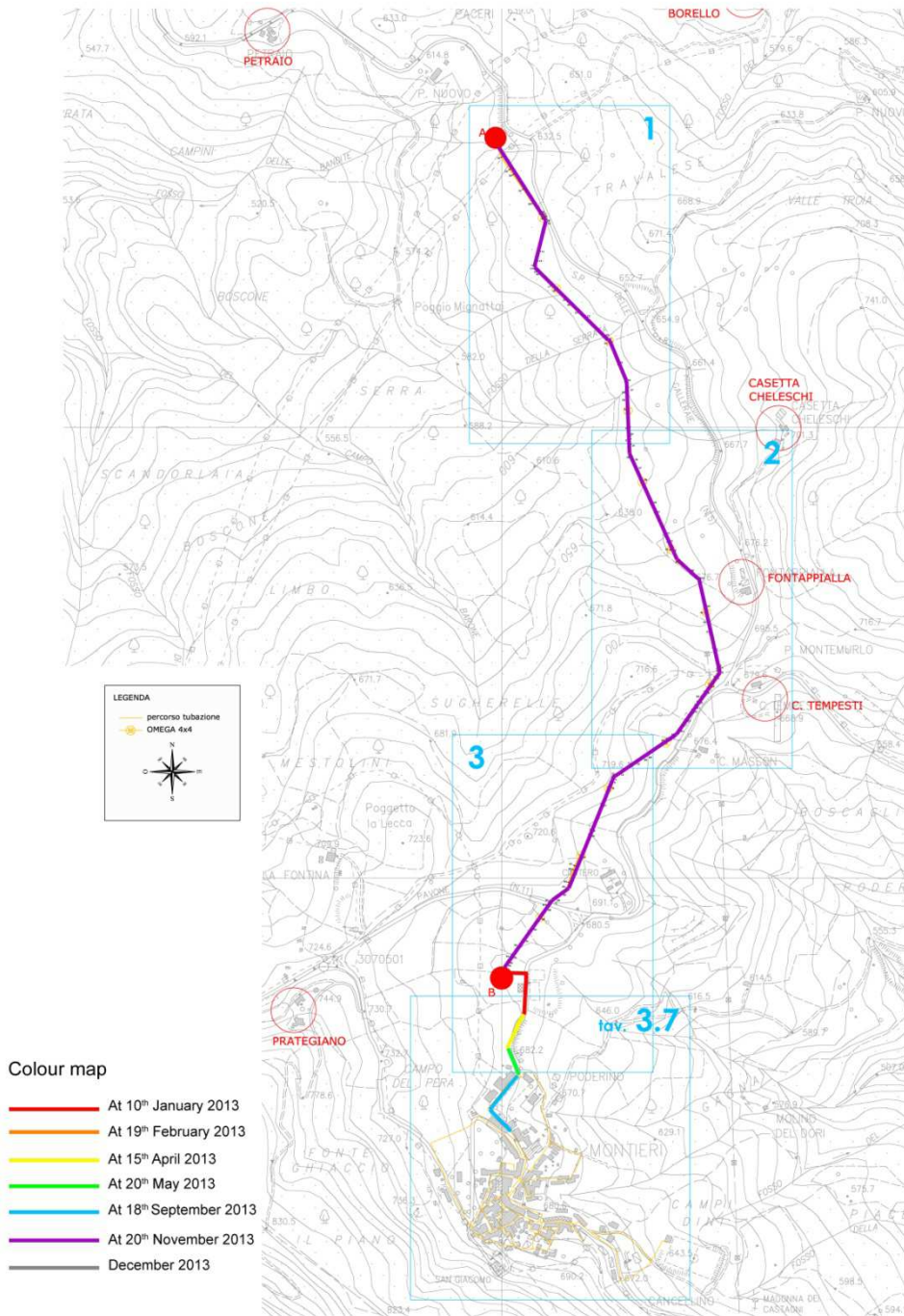


Image 2. Construction of the network path between heat-exchanger A and B and town centre

2.3.2 Dwellings connection to the geothermal district heating

On the 30th December 2013 was published the public call for funding addressed to all inhabitants and homeowners of Montieri to cover the cost of heat exchangers and pipeline connection at dwelling level, the tender will close on 30th June 2014, the total funding set for the call is 160000€. The connection of dwellings to geothermal district heating together with the purchase and installation of domestic heat exchanger for heating and hot water are part of the eligible expenses covered by CONCERTO contribution.

WP3.4 – Retrofitting and Energy Efficiency Measures (based on the draft version of D3.4)**Evaluations of two selected case studies for energy retrofit intervention in Montieri demo-site**

The proposed case studies define key interventions to be adopted in Montieri demo site to reach retrofitting objective.

Selected measures consider respecting architectural value of historic built environment, reducing energy demand of building fabrics by interventions able to enhance positive characteristics of stone massive envelopes, and covering the whole energy need for winter heating and DHW with renewable energy sources and biomass, 100% free from CO₂ emissions in the atmosphere.

The intervention will be able to reduce current energy demand by at least 30%.

During the design of each retrofit intervention only those key measures consistent with cultural characteristic of the building fabric will be integrated in the project and specifically measured in respect of threshold of thermal transmittance indicated on BEST data sheet. Moreover the whole retrofit project will be evaluated as:

- reduction of current energy demand (%)
- increase in the share of RES use in the building (%); RES power installed (kWp); TOE/year produced by RES
- ton CO₂/year saved

On each case study technical measures will be chosen according to the criteria of cost/efficacy of investment, respecting CONCERTO initiative's eligibility criteria of 100€/m² to which corresponds a contribution of 50€/m²

In the following part of the document two examples of retrofit interventions are proposed for two public buildings: Montieri town hall and Primary School in Boccheggiano.

Technical and economical feasibility of retrofit measures on historic built environment of Montieri

For each case study the current energy demand is presented and a feasible energy retrofit scenario follow, highlighting energy and costs savings and reduction of CO₂ emissions.

1. Montieri town hall

A building from 1902 designed by local famous architect L. Porciatti. It is made up of thick load bearing masonry walls decorated with stone on the main facades.

Tab. 1 Current state

Volume	1313 m ³
Current energy demand	53391.43 KWh/anno
Current building envelope	<p>Current thermal transmittance of building envelope: loft floor: 2.7 W/m²k external walls: 1.6 W/m²K windows: 3.2 W/m²K</p> <p>Heating and DHW system: GASOIL heater One heating zone</p>
Energy demand in TOE	4.59 TOE/year
CO ₂ emissions	14.51 tonCO ₂ / year

Tab. 1.1 Retrofit of Montieri city hall

Retrofit measures	<p>Thermal transmittance of building elements: Loft floor: 0.23 W/m²k New windows: 1.8 W/m²K Installation of automatic glazed doors at each level</p> <p>Heating and DHW system: - Connection to geothermal district heating - Installation of heat exchanger for heating and DHW - Improvement of efficiency of existent plant</p>				
Design energy demand	33117 kWh /anno				
Primary energy saving	38%				
TOE saving	Retrofit measures on building fabric: 1.74 TOE/year				
	Energy produced by RES (geothermal district heating): 2.85 TOE/year				
CO ₂ savings	14.51 tonCO ₂ / year	GHG emission reduction	100%	RES share increase	100%
Cost	52857.6 €	Eligible cost (100 €/m ²)			48220 €
		CONCERTO contribution (50 €/m ²)			24110 €

2. Primary school in Boccheggiano

Tab. 2 Current state

A building from 1920-30s made up of load bearing masonry walls. During XX century the building underwent several renovation works both structural and maintenance oriented. It is a very simple volume with no decoration on external facades.

Volume	4754 m ³
Current energy demand	156368.57 kWh/year
Current building envelope	<p>Thermal transmittance of building elements: Loft floor: 0.36 W/m²k External walls: 1.64 W/m²K Windows: 3.5 W/m²K</p> <p>Heating and DHW: LPG heater Radiators One heating zone</p>
Global energy demand in TOE	13.45 kWh/year
CO ₂ emissions	33.54 tonCO ₂

Tab. 2.1 Retrofit of Primary School and Kindergarten in Boccheggiano

Retrofit measures	<p>Thermal transmittance of building elements: Loft floor insulation: 0.23 W/m²k Externally insulated wall: 0.298 W/m²K New windows: 1.6 W/m²K</p> <p>Heating and DHW generation: New pellet heater Subdivision of the building in two heating zones</p>				
Design energy demand	59754.14 kWh/year				
Primary energy saving	61.8 %				
TOE saving	Retrofit measures on building envelope: 8.31 TOE saved				
	Energy produced by RES (Pellet Biomass): 5.14 TOE				
CO ₂ saving	33.54 tonCO ₂ /year	GHG reduction	emission 100%	RES share increase	100%
Cost	127806 €	Eligible cost (100 €/m ²)			122000€
		CONCERTO contribution (50 €/m ²)			61000€

Results and discussion

As a summary of previous analysis, the following tables highlights a confrontation among several parameters useful to define design retrofit results: energy demand, operating costs, CO₂ emission, at current and design stage

Montieri town hall	Current state	Design state
Energy demand [KWh/m ³ year]	40.66	17.76
Energy demand [TOE/Year]	4.59	2.01
Reduction of initial energy demand [%]	-	56.33
Fuel	GAS OIL	GEOHERMAL DISTRICT HEATING
Heating and DHW cost [€/year]	7688.37	1885.42
Emissions [tonCO ₂ /anno]	14.51	0.00
Retrofit cost [€]	-	74261.46
CONCERTO contribution[€]	-	24110

Primary School in Boccheggiano	Current state	Design state
Energy demand [KWh/m ³ year]	32.89	12.57
Energy demand [TOE/Year]	13.45	5.14
Reduction of initial energy demand [%]	-	61.79
Fuel	GPL	PELLET
Heating and DHW cost [€/year]	36359.11	3734.63
Emissions [tonCO ₂ /year]	33.54	0
Retrofit cost [€]	-	125090
CONCERTO contribution [€]	-	61000

Both retrofit case studies lead to an important reduction of current energy demand and of operating costs, and to excellent environmental benefits.

The assessment of cost/effectiveness of technical solutions, as indicated on European Directive 2012/27/EU of 25th October 2012, has led to the choice of those interventions that bring higher energy saving at affordable costs in relation to eligibility criteria of CONCERTO initiative (100 €/m²).

The case study of the School in Boccheggiano represents the best practice for a cost-effective energy retrofit of a building that doesn't show any architectural peculiarity on facades, condition that allows the integration of external wall insulation. The reduction of heating load by insulation and substitution of windows reduce the size of the heater needed and avoid the need of upgrading the internal heating distribution and emission systems, reducing the total cost of intervention.

The retrofit intervention proposed for Montieri town hall takes care of the architectural value of the building and the impossibility of intervening on decorated facades. This situation is very common among stone buildings of Montieri Municipality (Montieri chief town and its hamlets). The overall intervention of substitution of window, insulation at roof level and substitution of existent heater, represents a set of key energy efficiency measures widely applicable in Montieri, on private households and historic buildings as well.

Therefore setting a target of reduction of current primary energy demand at 30% represents a suitable objective for enhancing retrofit activity among private homeowners of CONCERTO community.

Overall retrofit interventions proposed for town hall building, measured as outlined in this document, represent an interesting retrofit system because widely applicable on large part of Italian and south European historic built environment. These retrofit measures are suitable for pre-industrial building fabrics because they allow the preservation of local built identity. At the same time, proposed measures avoid installation of indoor ventilation and cooling systems to provide summer cooling, that, instead at this climate, may be necessary with the use of super-insulating measures. The proposed measures allow the exploitation of thermal inertia of stone and brick masonry buildings to balance indoor thermal comfort in a passive way.

Eventually the integration of RES (geothermal district heating and pellet biomass) to provide winter energy demand remaining after retrofit intervention, reduce by 100% CO₂ emission during operating phase with consequent environmental benefits.

WP5: Technological Research

WP-Leader: University of Szeged

WP5 is one of the two research work-packages of the project. Its main objective is to set-up a technological guideline on future geothermal energy investments and to give a clear and transparent picture on the possible outcomes of similar projects. It has four sub-WPs in order to cover all relevant research and horizontal topics. The leading partner is P9 – University of Szeged, with strong cooperation and involvement with all the project partners (local data input, research and legal issues, etc.)

WP5.3 Reinjection monitoring and modeling

D5.3: Reinjection to sand stone reservoirs technology showcase

Sand stone reservoirs in the Pannonian and similar basins in Europe are a difficult medium for reinjection. To apply requested reinjection of the geothermal waste water back to the reservoir large pumps are necessary, resulting with high power consumption. That can destroy the whole economy of the geothermal system. Different methodologies were investigated with the aim to define technical solutions, which should partially or totally remove the problem and, in that way increase the economy of such geothermal systems.

Reinjection boreholes in the South Great Plain region of Hungary were used in simulations and model calibrations of the most prospective technologies -and studies in detail for optimum reservoir management and enabling reinjection with minimum energy consumption. The aim of the work package was to collect data and information in production conditions that clarify the relation between well construction and well-geophysical relations of abstraction-reinjection wells constructed on Upper Pannonian sandstone reservoirs and the actual abstraction-operation methodology. The research addressed question about the location, the amount, abstraction and technological circumstances of the injection in order for the abstracted water to be injected, and for the abstraction to be plannable and sustainable on a long term. Findings and research results have been combined in a scientific volume available in English.

Planned activities for 2014 and the list of respective deliverables

WP5.4 Integrated utilization of waste gases of thermal wells*D5.4: Study on integrated utilization of waste gases of thermal wells**D5.5: Regional database of geothermal sites with waste-gas utilization potential**D5.6: Guidelines on waste gas energy integration in RES technologies*

Waters abstracted from a large number of thermal wells of the Great South Plan Region have high gas (predominantly methane) content. During water abstraction (both in the case of spa uses and energetic utilization) novel technologies are available to separate and utilize the energy-content of these gases (as well as heat content of the CHP units) reducing green-house effect and increasing system effectiveness through integration. In WP2.1 Morahalom will serve as the first Hungarian pilot site for such action, as heat and electric power from the CHP units mounted on two abstraction wells will be utilized in an integrated system. In WP5.4 researchers of the USZ involving the leaders of the other test sites will carry out an in-situ study of the Morahalom site, assess the results of integrated use, do benchmarking, analyze the needs and potential of other possible sites and outline suggestions for wider applications.

The following activities are foreseen:

- Investigation of the economic factors that influence the integration of waste gas energy in RES.
- Investigation of other factors that influence the integration of waste gas energy in RES.
- Assessment of waste gas energy integration in RES potential and technologies for the South Great Plan Region.
- Building a database of South-Great Plan sites with potential in waste gas energy integration in RES.
- Providing technology transfer to projects proposing waste gas energy integration in RES.

WP6: Socio-economic research

WP-Leader: PAS MEERI with contribution from SIEA

WP6.2. “Public perception and understanding of RUE measures (pilot-site case studies)”

WP6.2 research aims at three GEOCOM pilot-sites (Galanta, Montieri, Morahalom).

Initially, the Questionnaire surveys and some related activities were planned for 25th – 36th Project months (2012). They were intended to give an insight into the level of public perception and understanding of applying rational energy use (RUE) measures in three listed particular localities, i.e.:

- User’s satisfaction (with the implemented measures, with information, energy advice, with feedback-systems on consumption, etc.),
- Users’ involvement (investing in energy efficiency measures, organized in local agencies, tenants’ organizations),
- Analysis of different stakeholders/inhabitants perception about changes in the affected districts / communities and acceptance of the GEOCOM measures.

The scope of Questionnaires and other related actions were prepared, moreover – an additional preliminary questionnaire survey was conducted (as given in former Periodic Reports) by 2012.

In 2013 however, due to delays in realization of investment works in the pilot-sites (specially in Montieri, partly in Morahalom) also in 2013 they did not progress far enough to conduct the planned WP6.2 research survey (no sufficient input data and experience material were not yet available – they will partly come in 2014). Therefore it was necessary to shift the remaining

WP6.2 activities to next project period beyond 2013). Once all the investment components will be done (or at least most of them) the WP6.2 basic survey (questionnaires) and related works can start.

Following the given situation, only minor work related to WP6.2 was done in 2013, i.e. modification of the scope of WP6.2 Questionnaire and splitting it into two parts addressing two groups of respondents (as discussed and agreed at IM in Nov 2013).

WP6.3. “Overview of market drivers, fiscal measures and subsidies”

Scope of WP6.3 works in 2013 in brief:

- Questionnaire on Financial constraints / measures and other selected constraints for geothermal uses’ projects in the GEOCOM countries (1 questionnaire per country filled in by an appointed expert)
- Essential descriptive information (open opinions) by the experts related to all GEOCOM states (several aspects)
Matrix of Influences (input to Foresight method survey)
- General Matrix indicating market drivers, fiscal measures and subsidies existing or absent in particular Project partner countries and their role.
- Matrix shall give an overview of the state-of-the-art in the Partner countries and will form a basis to indicate the best measures and the best practises which shall be recommended or transferred to other countries.
- General Matrix will base on above-listed works (1-3) plus some more contributions from Partners
- The realization of the above works forms a basis for the Deliverables:

Detailed WP6.3 scope and works done in 2013:

1. Questionnaire on Financial constraints/measures and other selected constraints for geothermal uses’ projects in the GEOCOM countries (1 quest. /country filled in by an appointed expert):

- Preparation of the scope of Questionnaire on Public financial constraints / measures and other selected constraints for geothermal uses’ projects in the GEOCOM countries (to be filled in by appointed experts) – PAS MEERI
- Collecting, summarizing the data from particular countries given in this Questionnaire in a form of general table (serving as one of inputs to prepare General Matrix and D6.2) – PAS MEERI,

2. Essential descriptive information (open opinions) related to all GEOCOM states (several aspects)

- Preparing the scope of input qualitative information that characterize various types of basic constraints / circumstances for geothermal energy and RUE measures deployment in all Geocom Project countries.* This data serve for interpretation of data / results obtained via other WP6.3 research and also as input to D6.2
- Collecting, analyses and summaries of inputs as above from particular Partners - PAS MEERI,
- Framework, subsidies, feed-in tariffs, payback regulations and tax regulations, such as: flexible depreciation of geothermal investments. Favourable tax treatment for third party

financing. Start-up subsidies for new production plants, SMEs and new job creation. Fiscal measures for consumers to purchase geothermal equipment and systems. Market incentives in order to help increase market share of geothermal energy. Analysis of economic viability and cost - effectiveness in relation to reduction of CO2 emissions (carbon footprint reduction). Environmental considerations. Sustainability issues in a financial context, especially with regards to the need for reinjection vs total environmental costs of releasing used thermal waters in surface water streams.

* the information embraced: financial constraints (on capital investment, flow of capital, and other); environmental constraints; land concessions; water rights; taxation; etc. also in the aspect of their handling through the existing legislative and administrative

3. Matrix of Influences (input to Foresight method survey)

- Preparation of the scope of the input Matrix of Influences (for the Foresight method survey), consultations with the Project partners, decision as to its final scope – PAS MEERI,
- Filling up of the input Matrix of Influences by some experts from PAS MEERI,
- Collecting, summarizing, preliminary analysis and interpretation of the results of the Matrix of Influences based on 14 individual responses (This analysis serves as one of inputs to prepare General Matrix and D6.2)

4. General Matrix indicating market drivers, fiscal measures and subsidies existing or absent in particular Project partner countries and their role – PAS MEERI

- Matrix shall give an overview of the state-of-the-art in the Partner countries and will form a basis to indicate the best measures and the best practises which shall be recommended or transferred to other countries.

5. Elaboration of D6.2 “WP6.3. “Overview of market drivers, fiscal measures and subsidies”

- *D6.3. Handbook on Best practices (incl. WP5 results)* – draft scope and contents prepared (and discussed with Project coordinator) as well as some texts selected and prepared (initially planned for 2013 as D6.3, however - due to delay in Geocom investment works’ realization - the realization of Handbook was shifted to 2014 (at least) (the examples of which are planned to be given in this Handbook) – this follows the discussion and decision taken at IM on 7 Nov 2013 PAS MEERI

Activities planned for 2014:

WP6.2. Public perception and understanding of RUE measures (pilot-site case studies)

- Continuation of WP6.2 research questionnaire survey and related works addressing the beneficiaries and pilot sites (based on sufficient input observation /experience gained after investment projects realization).

WP6.3. “Overview of market drivers, fiscal measures and subsidies”

- Continuation of works on Overview of market drivers and best practices (D6.2)
- Continuation of works on Handbook of best practices (D6.3)

SIEA’s (P4) contribution to the WP6:

WP6.1/ Study on public perception and understanding of geothermal energy (incl. questionnaire 1, comments and completing the information/ data)

WP6.3/ Overview of market drivers, fiscal measures and subsidies, incl.:

- comments and proposals added to the List of factors, which may have an impact on geothermal energy utilization
- working out Matrix of influences
- questionnaire 2
- collecting and summary of essential descriptive information

All activities have been done in collaboration with appointed external experts and members of Municipality of Galanta, Galantaterritory and Regional Energy Agency /REA Šaľa/.

WP7: Monitoring

WP-Leader: SIEA

Following activities had been planned and were carried out in 2013:

- mapping the situation in two demo-sites in order to define a minimum monitoring requirements based on the technical specification determined/ sent by the representatives of MUNMOR and technical specification identified during the site-visit in Montieri (in June 2013/ 4th Interim meeting),
- collecting data and all relevant information from the representatives of each demo site
- experts discussions focused on development of a common database application (managed by SIEA)
- D7.1/ “Methodology specifications of energy flows monitoring” was done in September 2013 with the contribution of representatives of all demo-sites
- clarification of some issues regarding the economic aspects and technical specification to be monitored during the 5th Interim meeting in Krakow (November 2013)
- D7.2/ “Analysis of data on energy flows in demo-sites” is under preparation

Next steps in 2014:

1. Finalization of D7.2/ Analysis of data on energy flows in demo-sites (requirement for submission of missing data from demo-sites)
2. Development of common database application
3. Data collection and evaluation

Evaluation will be performed on two interrelated levels: 1. on the country level, this includes individual demonstration areas (Galanta, Mórahalom and Montieri) where should be created a local workplaces for the data collection, archiving and transmission through the real-time on-line monitoring system installed in each demo-site, and 2. on the Geothermal Community level through the common application database in order to evaluate, analysis and compare results/ outputs achieved from three demo-sites. For the purpose of carrying out the evaluation on the CONCERTO area level, the minimum monitoring requirements were defined in accordance with the CONCERTO Technical Monitoring Guide. Additional technical specification will be determined after the analysis of energy audits and archived data collected before refurbishment and integration of RE system.

WP8: Dissemination*WP leader –GEONARDO***GEONARDO (P1)**

The Coordinator attended a number of high profile, geothermal related events in 2013 promoting the project and briefing those who are interested about its aims, goals and status.

- 15-18 April 2013 – Training course on geothermal electricity, Potsdam, Germany within the frame of the GEOELEC project (<http://www.geoelec.eu/geoelec-training-course-poznan-germany/>)
- 22-23 April 2013 – 4th European Conference on Renewable Heating and Cooling, Dublin, Ireland
- 3-7 June 2013 – European Geothermal Congress, Pisa, Italy

At the events in Dublin and in Pisa, GEOCOM featured a mobile rollup banner on the project and also high number of brochures was distributed among the participants.



The GEOCOM roll-up banner in Dublin (left) and in Pisa (right).

SIEA (P4)

Participation in trade fairs and exhibitions is the main activity for dissemination and communication of the SIEA. The international trade fairs take place regularly every year for general public, researchers, students, engineers, investors, etc. These trade fairs are focused on heating, measurement, control, energy savings, environmental technology and protection, sustainability and utilization of Renewable Energy Sources. We usually distribute leaflets, brochures, magazines and provide advisory services.

GEOCOM project is indicated on a poster concerning international projects. The poster is displayed within SIEA's stand during Trade Fairs. In 2013 SIEA's representatives participated in:

- AQUATHERM Nitra, 11.2. – 14.2. 2013
- CONECO Bratislava, 9.4. – 13.4. 2013
- ELO SYS Trenčín, 15.10 – 18.10.2013

GEOCOM leaflets were distributed during above-mentioned trade fairs.

PAS-MEERI (P5)**WP8** – Dissemination on the local level (online and printed articles, publications, events, etc.)*Publications:*

Kasztelewicz A., Kępińska B., 2013: Energia geotermalna w projektach unijnych „GEOCOM” i „GeoDH” („Geothermal energy in the EU Projects ”GEOCOM” and ”GeoDH”). Technika Poszukiwań Geologicznych. Geotermia, zrównoważony rozwój”. IGSMiE PAN Pbs, No. 1/2013, p. 181-191 (in Polish, English abstract), ISSN 0304-520X

Events:

- Poster presentation ”Energia geotermalna w projektach unijnych „GEOCOM” i „GeoDH” („Geothermal energy in the EU Projects ”GEOCOM” and ”GeoDH”) – A. Kasztelewicz, B. Kępińska (POZE IGSMiE PAN). 4th Polish Geothermal Congress, Zakopane, 30.09-2.10.2013
- The Geocom Project, its objectives and importance was mentioned by the PAS MEERI team’s member during the talk at the Opening plenary session of the 4th Polish Geothermal Congress, Zakopane, 30.09-2.10.2013 (ca. 180 attendees)

Other:

- The Geocom Project, its objectives and importance was mentioned by the PAS MEERI team’s member at the Meeting of the Parliamentary Permanent Committee for Natural Resources and Energy (Polish Sejm), Warszawa, 17.11.2013 (ca. 70 attendees)

Dissemination of printed materials:

- Translation into Polish the 2013 Geocom Brochure – PAS MEERI
- Dissemination of the 2013 Geocom Brochure among all participants (ca. 200 prs) during 4th Polish Geothermal Congress, 30.09 – 1.10.2013 (in a set of Congress materials)
- Dissemination of the 2013 Geocom Brochure by the PAS MEERI team’s members during the meetings with representatives of public and private stakeholders interested in geothermal / other RES projects in Poland

Internet:

Information on the Geocom Project and link to the Project website are placed on the main page of the PAS MEERI website

MAGA (P7)

- Energy Efficiency in Buildings, 5-days training for local consultants, Sanja Popovska-Vasilevska training module M2-Modules EE in buildings (Architecture and Mechanical Engineering Systems): M2-1Macedonian Rule-book on EE in buildings, M2-2 Solar Energy in buildings and houses, M2-3 Principles to implement EE in buildings, M2-4 Building envelope and EE façades, M2-5 GSHP (Ground Source Heat Pumps), M2-6 Use of Biomass in EE buildings; Skopje 23-29 January 2013.

- European Geothermal Congress 2013, Pisa, Italy, 3-7 June 2013 / Geothermal Energy Use, Country Update for Macedonia, Authors: Sanja Popovska-Vasilevska, Slave Armenski / Annual Utilization Factor – Prerequisite for Feasibility of Direct Geothermal Energy Use, Author: Sanja Popovska-Vasilevska.
- Workshop Europe in my region 2013, Make your city smarter with local RES: Implementing Geothermal in Cities, Organized by EGEN for REGEOCITIES, 10th October 2013, Renewable Energy House, Brussels, MAGA-Sanja Popovska-Vasilevska has participated as representative of GEOCOM to learn and share experience on Geothermal Training Schemes.
- Submitted two abstracts for WGC2015 Melbourne, Australia / Macedonia – Country Update 2015, Authors: Sanja Popovska-Vasilevska, Slave Armenski / Hybrid Geothermal Systems – Potential Application in Macedonia, Authors: Sanja Popovska-Vasilevska, Slave Armenski



CoSviG (P8)

detailed excel sheet on P8 extensive dissemination activity is attached to the report

University of Szeged (P9)

List of publications over 2013:

- János SZANYI, Balázs KÓBOR, Tamás MEDGYES, Attila CSANÁDI (Editors): **Cross border reservoir research towards sustainable use of geothermal energy**, Szeged: University of Szeged, Department of Mineralogy, Geochemistry and Petrology, 2013. p. 386. ISBN: 978-963-306-237-1
- Sándor KISS., András BÁLINT: **Development plan of Szentes region based on hydrodynamic modeling**, 4th European Geothermal PhD day, 5-7 May, Szeged, Hungary, 2013, p.23. (abstract)
- Zsolt VADKERTI, Márton PAPP, Imre CZINKOTA, János SZANYI, Balázs KOVÁCS: **The effect of the thermal water aeration and water-rock interaction**, 4th European Geothermal PhD day, 5-7 May, Szeged, Hungary, 2013, pp.53-54. (abstract)

- Gábor Kitley, István PÁRI, Tamás MEDGYES, Balázs KÓBOR, József PÁSZTOR: **Exploiting the geothermal potential of Central-Eastern Europe; The GEOCOM Project**, 4th European Geothermal PhD day, 5-7 May, Szeged, Hungary, 2013, pp.64-68. (*abstract and fieldtrip*)



MORAHALOM (P10)

The local coordinator has attended the PIMES International Conference organised within the framework of the fellow CONCERTO III funded *CONCERTO communities towards optimal thermal and electrical efficiency of buildings and districts, based on MICROGRIDS* (PIMES) project in Szentendre, Hungary on November 21th, 2013. Among the many speakers Mr Pasztor briefed the attendants in a comprehensive and detailed presentation on the objectives of the project and the actual status of the project implementation at the Morahalom demo site.

GALANTA (P11)

The local coordinator and mayor have attended the PIMES International Conference organised within the framework of the fellow CONCERTO III funded *CONCERTO communities towards optimal thermal and electrical efficiency of buildings and districts, based on MICROGRIDS* (PIMES) project in Szentendre, Hungary on November 21th, 2013. Among the many speakers Mr Bergendi briefed the attendants in a comprehensive and detailed presentation on the objectives of the project and the actual status of the project implementation at the Galanta demo site. The mayor, Mr Ladislav Mat’ášovský also attended the panel discussion on energy efficiency and renewable energy in cities: the future challenges and opportunities



MONTIERI (P12)

Please refer to the summary table compiled by CoSVig, attached to this document)

D8.3 Brochure #3

The third brochure (ready in M38 – February 2013) contains the overall aim of the project, introduces the consortium (list of participants) and the demonstration activities planned in three demonstration sites. It was updated with the achievements of the project performed mainly in the

reporting period at the demo-sites. Its translation is still in progress and the translated versions will be available for download at the project’s web site as soon as they will be finalised. The third (latest) brochure has also been printed in English and in 200 copies similarly to the previous edition. In line with the common practice for the previous brochures it is to be distributed at the various high profile events over the course of the next reporting period.



Geothermal Communities
As FP7 Concerto Project

Demonstration Sites and Partners:
Municipality of Mórahalom
Municipality of Galanta
Galantáren Ltd.
Bystrax Ltd.
Municipality of Montieri
Setteck Ltd.
Cooviv Ltd.

Research Partners:
Slovak Energy Agency
Polish Academy of Sciences
Macedonian Geothermal Association
University of Szeged

Associated Communities:
Municipality of Oras Saccenti
Municipality of Subotica
Municipality of Kocani
Municipality of Muzconow

Research work covers:

- Socio-economic modelling of geothermal investments, with special focus on the public perception and understanding of RES/R&E measures
- Integration of the geothermal energy with other RES to outline ways of more efficient and more sustainable green-energy production
- Trans-boundary issues related to the utilisation of geothermal energy, Online monitoring system

Work plan:

- WP 1 Coordination
- WP 2 Geothermal System Development
- WP 3 Retrofitting & Energy Efficiency Measures
- WP 4 System Integration
- WP 5 Technological Research
- WP 6 Socio-Economic Research
- WP 7 Monitoring
- WP 8 Dissemination
- WP 9 Training
- WP 10 Mayors' Geothermal Club

Project Coordinator:
Geanozor Ltd.
Contact: Mr. Istvan Pali
Address: 7 Zahony Street, Budapest 1031, Hungary
Phone: 00 36 1 350 3703
Fax: 00 36 1 436 9038
Web: www.geothermalcommunities.eu
Contact: coordinator@geothermalcommunities.eu

Geothermal resources are one of the least known renewable energy resources, despite the fact that both their potential and engineering qualities are among the best of RES. In the meantime, Central-Eastern European countries (new EU members as well as Western Balkan Countries) have exceptional geothermal reserves, although the traditional investment-heavy procedures are difficult to apply in these countries. The innovative solutions and demonstration actions implemented in the Geothermal Communities project provides a new opportunity for these markets and Europe as a whole. The Geothermal Communities project, joint action of 18 individual partners, demonstrates the best available technologies for the use of geothermal energy combined with innovative energy efficiency measures and with the integration of other renewable energy sources in three different pilot sites (Hungary, Slovakia and Italy). The project is one of the only 4 Concerto – II projects funded under FP7.

Coordinator: Geanozor Ltd. Hungary
Web: www.geothermalcommunities.eu
Contact: coordinator@geothermalcommunities.eu



Mórahalom HUNGARY

As part of the CONCERTO Project Elements, the future cascade system (under development), will be complemented with a new component (demonstrating total utilisation of geothermal energy – like CHP plants on methane gas) and supplemented with energy efficiency/retrofitting measures that geothermal projects in Central Eastern Europe lack at the moment.

A high-performance heat-pump heating station, in which the buildings of the "New Town Centre" can be connected through secondary heating circuits, will be realised through the project. In addition, the auxiliary power demand of 60 kW of the heat-pump heating station will be met by the trapping of methane production in the new abstraction well of the cascade system; the electric power produced also by CH4-trapping will be used at the Thermal Spa.

Retrofitting of the local elementary school and the day-care kindergarten complex will be carried out by using innovative solutions in order to maximise efficiency and to harmonise the energy need with the geothermal heat supply. In addition, the public lighting system will be replaced by PV-driven LED lights to demonstrate the advantages of RES integration.

For more information about the Mórahalom site please contact:
Mr. József Fácser - facszer@morahalom.hu

Montieri ITALY

Montieri is located in the heart of the Larderello Area where the very first geothermal energy utilisation was implemented. The core part of the Concerto activities at the Montieri pilot-site is to build a highly innovative geothermal district heating and power generation system by using high-enthalpy fluid. This may serve as a new, ambitious example for communities with similar geothermal characteristics. This aspect of the project will be funded by the Tuscany Regional Development Fund.

In addition, 20% of the total house stock will be retrofitted applying integrated approaches and techniques. Montieri represents a challenging site for defining and testing a qualitative architectural integration of renewable energy technologies and retrofitting measures due to architectural regulations, which allow only natural materials, and methods to be employed which are in conformity with the medieval city's historical structure. A total of 42,5 m² solar thermal collectors will be set up to serve as primary heating and DHW source for dwellings too spread out to be linked to the district heating system.

Finally, RES integration will feature a 8,5kW of photovoltaic panels system which is to be installed as the main power source for Montieri's renewed public lighting system. The latter two stages of the project are funded by the FP7 Concerto budget.

For more information about the Montieri site please contact:
Mr. Amanda Bergazzi - a.bergazzi@setteck.it

Galanta SLOVAKIA

The geothermal based district heating has been used in parts of Galanta since the 1980s, acting as one of the first examples of RES in the former Eastern-Block Countries. Presently, the dual use of geothermal energy includes heating and production of domestic hot water in the concerned areas of the town. The aim of the project on this site is to optimise and enhance the capacity of the geothermal power plant by developing a reinjection borehole and by connecting new residential areas to the district heating system. A total of three residential buildings (6-8 floor blocks of flats), a hospital, an elderly home, a nursery, a primary school, and two greenhouses are heated by geothermal energy.

The CONCERTO activities will also include the following initiatives:

- RES integration of three residential buildings by photovoltaic system
- Retrofitting of the elementary school, its RES integration by PV system and comprehensive renewal of the lighting system
- Reinjection borehole research and project works, including full documentation, studies, permits and assessments
- To expand the existing geothermal district heating loop in order to connect more, mainly newly built public and private buildings in the neighbourhood.

For more information about the Galanta site please contact:
Mr. Tomáš Berganec - berganec@galanta.sk

Project activities so far include:

- Classification of dwellings to categorise their different energy performances,
- Payback time of each possible retrofitting technology is determined
- Digging of streets of the village and laying down of the pipeline of district heating
- Technical survey done in order to identify excellent structural conditions on the subject houses that could cause further problems during excavation in the affected area.
- The two heat exchange stations of the district heating system "A" and "B" are under continuous improvement and construction

Project activities so far include:

- Two new multi-storey houses and a newly built elderly home were connected to the city's existing geothermal heating network of which (DHW) distribution capacity had to be improved and extended for this reason. The total newly installed capacity at Galanta within the frame of the project is 1230 kW.
- Retrofitting of the residential buildings and the first stage of retrofitting of the elementary school is done (second stage to come in 2013).
- Deployment of photovoltaic panels at the previously selected demonstration sites; the overall installed PV capacity is 11,08 kW.
- Parties involved agreed on the parameters and the methodology of the monitoring (MPT) process.
- A public tender was launched to find an appropriate contractor capable of carrying out the reinjection monitoring and modelling tasks (to be done in 2013).

Third issue of the GEOCOM project brochure

WP9 – Training

- Co-organization (with the Mszczonów Municipality) of WP9.1 and WP9.2 training activities in Poland, Mszczonów, 20 – 21 May 2013;
- Co-organization (with the Municipality of Montieri) of WP9.1 training activities in Italy, Monterotondo Marittimo, 10 December 2013;

POLAND

WP9.1. Practical training for decision makers (20.05.2013) :

Scope: Training Workshop for employees of local governments and national administration on basic issues of initiation and implementation of geothermal projects in conjunction with other renewable energy sources (RES)

WP9.2. Research based international workshop (21.05.2013):

Scope: Training Workshop for employees of local governments and national administration, representatives of business sector on how to research and implement integrated energy efficiency projects to local geothermal resources and other RES

- The Workshops were held as a *Conference on the use of renewable energy sources in the European „GEOCOM” Project: „Geothermal Communities – demonstrating the cascading use of geothermal energy for district heating with small scale RES integration and retrofitting measures”* FP7 THEME 6 – ENERGY, 239515. Patronage: Marshal of the Mazovia Voivodship
- Preparation of WP9.1 and WP9.2 Workshops thematic scopes and programs
- Co-operation with Mszczonów Municipality on defining the target groups of Workshops’ participants and lecturers, setting up the lists of potential participants, lecturers. Preparing the invitations, contacts with the invited participants and lecturers.
- Preparation of several particular presentations by PAS MEERI team members (in Polish) lectured during the Workshops, i.e.:

WP9.1, 20.05.2013 (agenda)

- Project GEOCOM – introduction – Beata Kępińska (MEERI PAS)
- Geothermal energy in Poland – characteristics, current state and prospects for use - Beata Kępińska (MEERI PAS)
- State and development prospects for geothermal district heating systems in Poland – Wiesław Bujakowski (MEERI PAS)
- Economic aspects of the use of geothermal energy in the Polish conditions. The use of geothermal energy in hybrid systems with other RES – Leszek Pająk (IGSMiE PAN)
- The main administrative and legal procedures in the implementation of renewable projects – an example of geothermal energy – Barbara Tomaszewska (MEERI PAS)
- Organisation of project embracing geothermal energy in integration with other RES – examples:
- Galanta demo-site –GEOCOM Project – Leszek Pająk (PAS MEERI)

WP9.2, 21.05.2013 (agenda)

- Project GECOM – introduction – Beata Kępińska (MEERI PAS)
- Resources, the state and the possibility of geothermal energy uses in Poland – Wiesław Bujakowski (MEERI PAS)
- Ability to integrate RES with existing systems, technology implementation and measures to improve energy efficiency – Leszek Pająk (MEERI PAS)
- Examples of best practice projects – from concept to implementation (technical, energy and economy aspects) - Demo-sites of the GEOCOM Project – Leszek Pająk (MEERI PAS)
- Translating into English the presentations delivered by the PAS MEERI team’s members at the WP9.1 and WP9.2 Workshops in Poland, 20-21.05.2013 (intended to place at GEOCOM website as e-learning material; WP9.3. Development of e-learning course (leader: MAGA),

- Collecting lecture materials (ppts, written material – in Polish and in English) delivered at WP9.1 and WP9.2 Workshops in Poland and forwarding them to MAGA to be placed as e-learning material (in frame of WP9.3. Development of e-learning course)

Monterotondo Marittimo, ITALY (10.12.2013)

- Greetings from Monterotondo Marittimo Mayor, Alessandro Giannetti and CoSviG President, Piero Ceccarelli
- Geothermal Situation in Italy: Electrical use and Direct Uses. Giancarlo Passaleva, UGI, (Italian Geothermal Union)
- Geothermal Law: local, regional, national and european. Criticalities and perspectives. Dario Bonciani, CoSviG
- District Heating diffusion and future scenarios. Roberto Amidei, General Manager GES
- A practical case: Montieri district heating. From project to implementation. Alessandro Vichi, Montieri Administration Public Works and Energy Area Supervisor
- RES as development opportunities in area projects. Peter Schutte, CoSviG
- Energetic efficiency as virtual RES. Actual methods for increase building efficiency. Valentina Marino, Advisor Politecnico di Torino/Softech
- Next public financing opportunities about energy: from Horizon 2020 towards the new european funds. Loredana Torsello, CoSviG
- RES integration in wide urban district heating. Roberto Raneri, HERA District Heating-Pianification and Development
- RES integration: a practical case. Solar, geothermics and energetic efficiency in Montieri project. Alessandro Vichi, Montieri Administration Public Works and Energy Area Supervisore and Valentina Marino, Advisor Politecnico di Torino/Softech



From left to right: Roberto Raneri, Alessandro Burgassi, Valentina Marino and Alessandro Vichi having their presentations during the workshop

4.3 Project management during the period

GEOCOM have been implemented an efficient and reliable internal management system ever since the start of the project. The activities in the 4th period followed this best practice, and were strictly in line with the Grant Agreement and with the Consortium Agreement. In principle the project has been completed the following way:

The Coordinator's responsibilities:

- Monitoring progress: encompassing general coordination activities, devoted to keeping the project on track and on schedule, and the exploitation related activities.
- Collection and review financial and technical reports from all partners. Each team has been directing their own work, but discussed all administrative and technical aspects with the Coordinator. Individual financial reports have been the responsibility of the administrator of each partner, but for the overall management the Coordinator has been in charge.
- Organization of the theoretical aspects related to the objectives of the particular Work Packages and of the project as a whole.
- Supervising the information provided to the partners through the website. The website serves as the main platform of the project, but it is also an instrument to keep partners in permanent contact.

Some of the legal and financial difficulties encountered by in 2012 (as described in detail in the 3rd periodic report) were still causing delays and unforeseen management problems early in 2013 as well. In March 2013 GEOCOM had a meeting with the newly appointed project officer Mr. Dionisio, on which it was agreed to report on the new hand-out certificate as soon as possible, but not later than early April of 2013. The final version of the 3rd periodic report was submitted 13th May 2013 fully in line with all the previously discussed. and agreed.

The Steering Committee has continuously monitored the project's progress, defined project standards and agreed on project policies. This period of the project did not see any event that would have required the intervention of the Steering Committee.

In conjunction with the compilation of the fourth periodic report the Coordinator surveyed the partners regarding their performance and gathered information on the status of the soon-due deliverables. The results revealed that not only some deliverables were too ambitious in terms of their proposed delivery date at the proposal preparation stage of the project but the regulatory framework and also market conditions have changed in the past years which seriously affect the delivery and economy of some proposed components. For this reason in late 2013 re-evaluation of project components in Montieri and in Galanta were taking place which brought the conclusion of filing for an amendment of the Grant Agreement in order to meet the proposed goals and within the frame of the current legal frame and available budget. Earlier in this report both the cases in Galanta and in Montieri have been described in a detailed manner.

On the other hand, and to make up for this unfortunate situation the consortium is happy to announce that most of the demonstration site activities, especially at Galanta and Morahalom are ahead of schedule and apart from miniscule details they could be considered almost fully done. This is due to the dedicated local managers and the momentum which was build up previously which did not allow the implementation to stop when the due payments were not transferred in time and carried the project components over this crucial stage for the whole consortium's biggest satisfaction. Also some research aspects, mainly WP6-related were also carried out before their due deadlines. Please refer to the deliverable summary table further below.

Meetings and Communication

The communication between the consortium members has been excellent with regular updates and communications via e-mail, Skype, telephone, and personal meetings during the various (joint) events. One project meeting took place during the reporting period where all consortium members were represented (except for the Municipality of Oras Sacueni):

- **March 2013:** bilateral meeting with Mr Dionisio to discuss the issues about the handout certificates and to get some update on the prolonged financial problems.
- **10-11 June 2013, Montieri, (Italy).** *The fourth progress meeting* and site visit to Montieri. All of the project partners' key personnel were present. The main scope was to get a first hand experience on the district heating development in the village and also to deal with the number of parallel running and cross linking work packages to ensure smooth interaction and quality contribution to the WP leaders by the partners. The meeting was organized by the Municipality of Montieri (P12)) and all eligible costs (excluding the partners' related travel and accommodation costs) were paid by the lead partner.
- 21-23rd October 2013 - Brussels - CONCERTO Coordinators meeting and final CONCERTO conference; Introduction of GEOCOM, discussion of experiences so far, meeting with all CONCERTO projects' coordinators.
- 22 October 2013 – DG Energy, Brussels: Meetings with PO Mario Dionisio and Michel Vitucci (topic: potential modification of plans related to the retrofitting actions to be conducted in Montieri), present: Roberto Pagani, Valentina, Marino, Alessandro Vichi, Emi Macrini and Istvan Pari. The subject of the meeting was the retrofitting issues occurred in Montieri as a result of the local regulatory framework and some technological aspects which couldn't deliver the needed CONCERTO specifications. The meeting concluded that additional information is needed to paint a much clearer picture on the situation and it was also discussed that as a direct result of the delayed implementation of the district heating system in Montieri the project will be granted 12 extra month in order to be able to comply with the mandatory one year monitoring duties for the delivered engineering components and systems.
- 7 November 2013 – Krakow, Poland *The fifth progress meeting.* All of the project partners' key personnel were present. The partners were informed about the latest results in terms of project management and about the second amendment of the GA. The meeting was organized by the PAS MEERI (P6)) and all eligible costs (excluding the partners' related travel and accommodation costs) were paid by the lead partner.
- *Several bi- and tri-lateral meetings* were held between the Demo-site representatives and the project's EO staff during the fourth year of the project.
- *There is one interim meeting scheduled for 2014. The 6th interim meeting is scheduled to take place in September 2014 in the observer community of Subotica, Serbia.*

Overall status of project management: the project has been on track with minor delays of initially set targets and deliverables related to these targets. The partner performance and commitment have exceeded all expectations. The consortium did not experience any problems concerning project management and implementation and no changes occurred in partnership or partner status during the reporting period.

5. Deliverables for the fourth period

Del. no.	Deliverable name	Version	WP no.	Leader	Nature	Dissemination level	Delivery date from Annex I	Actual / Forecast delivery date	Status	Comments
D8.10	Science publications	N/A	8	ALL	O	PU	Cont.		Ongoing	
D8.11	Presentation at high-profile events	N/A	8	ALL	O	PU	Cont.		Ongoing	
D2.7	Montieri geothermal district heating works		2	2	D	PP	M30	M59		Construction suffered a delayed start due to legislative issues
D5.3	Reinjection to sand stone reservoirs technology showcase	Draft	5	9	R	PU	M30	M55	Draft version submitted	Final version to be issued and submitted by July 2014
D5.4	Study on integrated utilization of waste gases of thermal wells		5	9	R	PU	M30	M60		
D2.4	Methane utilisation system Morahalom	Final	2	10	D	PP	M32	M39	Submitted	
D4.2	RES/RUE strategy update for Galanta		4	11	R	PU	M32	M46	Submitted	
D4.3	RES/RUE strategy update for Montieri		4	8	R	PU	M32	M46	Submitted	
D4.4	RES/RUE strategy update for Mórahalom		4	10	R	PU	M32	M46	Submitted	
D3.9	Retrofitted city centre Montieri		3	12	D	PP	M33	M60		
D7.2	Analysis of data on energy		7	4	R	PP	M36 - cont	M46		certain project elements haven't been delivered yet to provide input for this

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	flows in demonstration sites									analysis
D2.5	Heat-pump heating station Morahalom		2	10	D	PP	M36	M46	Submitted	
D3.10	Report on the completed retrofitting measures		3	2	R	PU	M36	M60		
D5.5	Regional database of geothermal sites with waste-gas utilization potential		5	9	O	RE	M36	M60		
D5.6	Guidelines on waste gas energy integration in RES technologies		5	9	R	RE	M36	M60		
D8.4	Brochure #3	Final	8	1	O	PU	M36	M38	Submitted	
D7.3	Real-time on-line monitoring system – system planning and implementation		7	4	D	PP	M37	M58		
D9.1	Training for decision makers		9	7	O	PU	M37 - cont			
D9.2	International workshops		9	7	O	PU	M37 - cont			
D9.3	e-learning system development		9	1	O	PU	M37	M56		
D8.8	Newsletter #3		8	7	O	PU	M37	M49		
D1.5	Minutes of the Project Meeting #4		1	1	R	PP	M38	M42	Submitted	
D3.7	Retrofitting Elementary School & micro-scale RES integration (Galanta)		3	11	D	PP	M42		Submitted	see amendment for details

D4.5	RES Integration in Mórahalom		4	10	D	PU	M42	M50	Submitted	
D4.6	RES integration in Galanta		4	11	D	PU	M42	M50	Submitted	
D4.7	RES integration in Montieri		4	12	D	PU	M42	M60		
D4.8	Study on suitability criteria for integrated systems in Eastern Europe		4	1	R	PU	M42	M60		
D2.1	Reinjection borehole Galanta - planning and feasibility studies		2	6	D	PP	M45		Submitted	
D2.2	Reinjection utilities Galanta - planning and feasibility studies		2	6	D	PP	M45		Submitted	
D6.2	Overview of market drivers and best practices		6	5	R	PU	M48	M62		
D6.3	Handbook on best practices of Geothermal resources management		6	5	R	PU	M48			
D9.4	e-training curriculum		9	7	O	PU	M48	M56		

6. Explanation of the use of the resources

6.1 Summary

All costs reported by the partners to the project were analysed and cross-checked by the Coordinator and were found needed for the implementation of the activities of the 4th period. The Coordinator established an efficient and transparent financial reporting system at the kick-off meeting of the project, where all partners were trained to the special accounting criteria of the FP7. Frequent updates on the financial rules were communicated internally. Though the Consortium consists of many partners from all over Europe, some of them from new member states, many never participated in any Community Programs, all of them understood the reporting requirement and the requested proofs of costs.

6.2 Certificates on the Financial Statements

The Coordinator (Geonardo Ltd) and Partner 10 (Municipality of Morahalom) exceeded the "CFS threshold", meaning that the requested EC contribution by these partners went over 375.000 EUR over the first 4 reporting period of the project.

6.2.1 Summary of the CFS findings for GEONARDO:

During the CFS process at Geonardo Ltd, the Auditor carefully analysed all costs, expenditures and exchange rates used, and small adjustments were necessary due to exchange rates (Actual exchange rate is used by the Coordinator) for Reporting Period 1, 2 and 3. These adjustment Form Cs are submitted together with this report. For the current Period 4, the Form C was already monitored by the Auditor, therefore no adjustment is needed.

6.2.2 Summary of the CFS findings for Municipality of Morahalom:

The personnel costs calculation of Morahalom was corrected by the external auditor during the CFS procedure, and the corrections are submitted as adjustments for the Period 1, 2 and 3, respectively. However, we have to highlight, that over 95% of the Partner 10's costs were charged based on unit-scale flat-rates and therefore reported by Hand-out certificates.

6.3 Unit-scale flat-rates

The Coordinator hereby declares, that all direct subcontracting costs reported in the Form Cs of GEOCOM Year 4 are based on unit-scale flat-rates!

6.4 Major other direct costs

During the fourth year of the project the main cost items at each partners were the following:

- Personnel costs (based on time-sheets and actual salaries) related to WP1 (MGT), WP2/3/4/7 (DEMO), WP5/6 (RTD) and WP8/9 (OTH)
- Travel costs to project meetings (detailed in Chapter 4.3)

- March 2013: bilateral meeting with Mr Dionisio
- 10-11 June 2013, Montieri, (Italy). *The fourth progress meeting* and site visit to Montieri.
- 21-23rd October 2013 - Brussels - CONCERTO Coordinators meeting and final CONCRTO conference
- 22 October 2013 – DG Energy, Brussels: Meetings with PO Mario Dionisio and Michel Vitucci
- 7 November 2013 – Krakow, Poland *The fifth progress meeting*
- Other costs – dissemination, printing of general and local publications, webpage development, etc.
- Other costs – participation fee at certain conferences and events
- Subcontracting – costs related to the project implementation actions at Galanta, and Morahalom - based on unit scale flat-rate costs with Hand-out certificates - as foreseen in the amended GA/DoW

6.5 Exceptions

Some of the partners (mainly the associated cities bodies) decided to cover their personnel costs fully from their own budget and not charging it to the project due to administrative issues. The Coordinator discussed these issues with all relevant partners in details and finally accepted their standpoint at this.

Partner 13 - Municipality of Ores Sacueni charged no costs at all to Period 4, due to lack of activities and internal financial managerial issues. The Coordinator was informed on this, and P13 understood the consequences of not charging costs to the project

Partner 16 - Municipality of Mszczonow charged no actual overheads to the project. This is to confirm that P17 understood the consequences of this action.

6.6 Exchange rates

The exchange rates published by the ECB (www.ecb.eu) of the first day following the end of the reporting period for each Beneficiary outside the Euro-zone were used, except for the Coordinator, which used the actual exchange rates method of FP7.

6.7 Spending rates

The spending rate of the project is in line with the workplan and with the budget foreseen in description of work (DoW). All costs reported by the beneficiaries were needed and justified in reports to achieve the project's objectives. At this point there were no **budget reallocations** at partners' level or at project level between partners, but the SC continuously monitors the spending and the performed activities and will act if necessary.

All partners submitted the Form C to the Coordinator and the hard copies were sent to the Project Officer.

6.8 Use of resources tables

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 1 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personnel Costs	35.596,04 €	Personnel costs by Mr. Kitley, Mr. Pari and Mr. Ceylan for Managerial activities during P4
2/3/4/7	Personnel Costs	9.539,27 €	2 PM for demo activities by Mr. Bagi
8/9/10	Personnel Costs	14.439,13 €	Personnel cost for dissemination, training, networking and exploitation activities by Ms. Lovasz, Mr. Lisztes, Mr. Pal and Mr. Petik
5/6	Personnel Costs	19.114,17 €	Personnel costs for Research activities and supervising research by Mr. Pari and Mr. Gyuris
All	Travel costs	9.358,27	Travel costs to project meetings, bi-lateral meeting, supervisory activities, meeting with Project Officer, etc.
All	Remaining other direct costs	3.255,37	Other direct costs - printing, dissemination material, meeting costs (catering and room rent), etc.
INDIRECT COSTS		54.781,36	60% flat rate
TOTAL COSTS		146.083,60 €	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 2 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personnel Costs	12,800.00 €	Personnel costs by Mr. Bruno for Managerial activities during P4
3	Personnel Costs	15,600.00 €	Personnel costs for Research activities and supervising research by Mr. Pagani
All	Travel costs	655.00	Travel costs to project meetings, bi-lateral meeting, supervisory activities, meeting with Project Officer, etc.
INDIRECT COSTS		17,433.00	flat rate 60%
TOTAL COSTS		46,488.00	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 4 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personal costs	189,75	Personal costs by Ms Ďuricová for management activities
6	Personal costs	9471,035	Personal costs for research and supervising activities by Mr. Starinský, Mr. Magyar, Ms Ďuricová,
7	Personal costs	1134,82	Personal costs for demonstration activities Mr. Chocholáček, Mr. Uhrina, Mr. Takács, Mr Mikloš and Mr. Halás
8	Personal costs	1152,34	Personnel cost for dissemination, training, networking and exploitation activities by Mr. Starinský, Mr. Magyar, Ms Ďuricová
All	Travel costs	3099,99	Travel costs to project meetings, bi-lateral meeting, supervisory activities
	INDIRECT COSTS	3009,59	20% flat rate
	TOTAL COSTS	18057,53	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 5 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personal costs	652,08	Personal costs by Ms Kępińska for management activities
6	Personal costs	13.104,16	Personal costs for research and supervising activities by Ms. Hołojuch, Ms. Kępińska, Ms. Tomaszewska, Ms Kasztelewicz and Mr Pajak
7	Personal costs	876,20	Personal costs for demonstration activities Ms. Kępińska, Ms Kasztelewicz and Ms. Tomaszewska
8/9	Personal costs	2477,56	Personnel cost for dissemination, training, networking and exploitation activities by Ms. Hołojuch, Ms. Kępińska, Ms. Tomaszewska and Ms Kasztelewicz
All	Travel costs	968,42	Travel costs to project meetings, bi-lateral meeting, supervisory activities
All	Remaining other direct costs	2292,77	Other direct costs - printing, dissemination material, meeting costs (catering and room rent), etc.
	INDIRECT COSTS	12222,71	60% flat rate
	TOTAL COSTS	32593,9	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 6 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
2/3/4	Subcontracting	201.956,96	To deliver reinjection related studies and to finalise the investment components
TOTAL COSTS		201956,96 €	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 7 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personal costs	500,00	Personal costs by Ms Popovska-Vasilevska for management activities
5/6	Personal costs	2200,00	Personal costs for research and supervising activities by Ms. Popovska-Vasilevska, Ms. Elena Popovska, Ms. Gecevska and Mr Armenski
8/9	Personal costs	4488,13	Personnel cost for dissemination, training, networking and exploitation activities Ms. Popovska-Vasilevska, Ms. Elena Popovska, Ms. Gecevska and Mr Armenski
All	Travel costs	4200,73	Travel costs to project meetings, bi-lateral meeting, supervisory activities
All	Remaining other direct costs	273,02	Other direct costs - printing, dissemination material, meeting costs (catering and room rent), etc.
INDIRECT COSTS		2332,37	20% flat rate
TOTAL COSTS		13994,25	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 8 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personal costs	2991,40	Personal costs by Mr Burgassi, Ms Seravelli, Ms Delogu and Ms Macrini for management activities
6	Personal costs	6361,00	Personal costs for research and supervising activities by Mr Burgassi, Ms Seravelli, Ms Delogu, Ms Macrini and Mr Chiacchella
8/9	Personal costs	5593,80	Personnel cost for dissemination, training, networking and exploitation activities Mr Burgassi, Ms Seravelli, Ms Delogu and Ms Macrini
All	Travel costs	1904,01	Travel costs to project meetings, bi-lateral meeting, supervisory activities
All	Remaining other direct costs	720,52	Other direct costs - printing, dissemination material, meeting costs (catering and room rent), etc.
INDIRECT COSTS		3514,15	flat rate 20%
TOTAL COSTS		21084,88	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 9 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personnel Costs	1835.27 €	Personnel costs by Mr. Kobor and Mr. Medgyes for Managerial activities during P4
5	Personnel Costs	25,556.87 €	Personnel costs for Research activities and supervising research by Mr. Kobor, Mr Medgyes, Mr Szanyi, Mr Csanadi, Mr Schubert, Mr Bencsik, Mr Pal-Molnar and Mr Toth.
All	Travel costs	3774.50 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, etc.
INDIRECT COSTS		18.699,98	flat rate 60%
TOTAL COSTS		49.866,62	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 10 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
2/3/4	Personal costs	733,46	Personal costs for demonstration activities by Mr Pasztor
2/3/4	Subcontracting	556600,00	To finalise the implementation of the CONCERTO investment components (handout certificate submitted)
All	Travel costs	843,99 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, etc.
INDIRECT COSTS		315,49	flat rate 20%
TOTAL COSTS		1892,94	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 11 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
2/3/4	Subcontracting	778.841,00	To finalise the implementation of the CONCERTO investment components (handout certificate submitted)
TOTAL COSTS		778841,00 €	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 12 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
2/3/4	Personal costs	34.819,62	Personal costs for demonstration activities by Mr Vichi and Mr. Cigni
All	Travel costs	1534,64 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, meeting with the Project Officer, etc.
All	Other direct costs	1170,00 €	Other direct costs - printing, dissemination material, meeting costs (catering and room rent), etc.
INDIRECT COSTS		7504,84	flat rate 20%
TOTAL COSTS		45,029.11	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 13 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
TOTAL COSTS		0 €	no costs were claimed by P13 for the fourth reporting period

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 14 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
1	Personnel Costs	528,00 €	Personnel costs by Ms Milodanovic, Mr Stipic and Ms Sujic for Managerial activities during P4
All	Travel costs	3325.29 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, etc.
INDIRECT COSTS		770,66	flat rate 20%
TOTAL COSTS		4623,95	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 15 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
All	Travel costs	3224,23 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, etc.
INDIRECT COSTS		644,85	flat rate 20%
TOTAL COSTS		3869,08	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 16 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
8/9	Personal costs	1760,80	Personal costs for demonstration activities by Mr Vichi and Mr. Cigni
All	Travel costs	2045,50 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, meeting with the Project Officer, etc.
All	Other direct costs	992,94 €	Other direct costs - printing, dissemination material, meeting and workshop costs (catering and room rent), etc.
INDIRECT COSTS		959,85	flat rate 20%
TOTAL COSTS		5759,09	

TABLE 6.1 PERSONNEL, SUBCONTRACTING AND OTHER MAJOR DIRECT COST ITEMS FOR BENEFICIARY 17 FOR THE PERIOD 1.1.2013 – 31.12. 2013			
Work Package	Item description	Amount (€)	Explanations
All	Travel costs	434,34 €	Travel costs to project meetings, bi-lateral meeting, supervisory activities, etc.
INDIRECT COSTS		86,87	flat rate 20%
TOTAL COSTS		521,21	



Project Coordinator:



Geonardo Environmental Technologies Ltd.
www.geonardo.com

Demonstration Sites:

Municipality of Morahalom

Municipality of Galanta
Galantaterm Ltd.
Bysprav Ltd.

Municipality of Montieri
SOFTECH Ltd.
CoSviG Ltd.

Research Partners:

Slovak Energy Agency

Polish Academy of Sciences

Macedonian Geothermal Association

University of Szeged

Associated Communities:

Municipality of Oras Sacueni

Municipality of Subotica

Municipality of Kocani

Municipality of Mszczonow