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STORE&GO

Innovative large-scale energy storage technologies and Power-to-Gas concepts after optimisation

D4.12

Final report on dissemination activities for the Troia plant

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	PP	Restricted to other programme participants (including the Commission Services)
	RE	Restricted to a group specified by the consortium (including the Commission Services)
	CO	Confidential, only for members of the consortium (including the Commission Services)

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0.2	2019-11-21	Diego Arnone (ENG), Alessandro Rossi (ENG)	A first incomplete draft where some of the most important events are described but many others need to be considered and properly reported.
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Executive Summary

This Deliverable reports on all the dissemination and communication activities undertaken by the STORE&GO WP4 partners. A multi-channel, multi-stakeholder dissemination and communication strategy has been defined that leverages on the right combination of media channels and the most suitable mix of promotional tools and material at the right time within the STORE&GO Troia pilot lifetime.

After a preliminary identification of the target groups and the associated communication channels, the document reports a short description of all the dissemination, communication and training events occurred during the overall pilot lifetime. A relevant number of stakeholders have been contacted, invited to visit the plant or to attend meetings and workshops. The concept of power-to-gas as well as the technology developed in the Troia plant (modular micro-structured reactors) have been explained to and discussed with many experts coming from different institutions and companies: universities, research centres, private companies, public bodies as well as citizens and students.

Summarizing the results of all the dissemination activities, WP4 partners have produced 1 press release (that generated many press echoes), 3 on-site movies (for the ground breaking event and the inauguration ceremony), 1 animation video (that explains the concept of the overall project), and 4 posters. WP4 partners have been interviewed by 4 different (local, national and international) networks. The WP leader (ENG) has participated in 3 International conferences with 2 oral presentations and 1 invited talk but many other conferences and fairs have been an opportunity for the other WP4 partners to disseminate both the outcomes of their research work and the overall STORE&GO project.

1 Introduction

This document, titled D4.12 - *Final report on dissemination activities for the Troia plant*, is the report that summarizes the results of all the dissemination activities performed in the context of WP4. All the partners working in WP4 have been involved in the dissemination task, coordinated by ENG. Dissemination is a key activity necessary to increase the awareness of relevant stakeholders about the technology developed and demonstrated in Troia.

Troia is a small village with a long history dating back to the Middle Ages and of which its inhabitants are proud. In the last two decades, the surrounding area has been the subject of numerous installations of renewable sources: photovoltaic and wind power plants that have changed the appearance of the landscape. Citizens today need to understand the benefits they have gained from this transformation. Projects like STORE&GO must therefore show people that Troia is a laboratory and at the same time an incubator of innovative solutions with high technological content that can change the energy system and actively contribute to the energy transition.

So, the target audience for the dissemination of the Troia pilot site is essentially citizens and the expected impact is the acceptance of not only the methanation plant but also and mainly the acceptance of the number of plants of renewables installed in the surrounding territory.

But this is not the only expected impact because the availability of renewables makes that area an ideal environment to facilitate the adoption of the technology for methanation, as well as for the CO_2 capture and for liquefaction. Many investors, already owners of renewable plants, could be interested in the STORE&GO technologies that could really contribute to the decarbonization of the gas sector and open up new investment possibilities or distribution options for their RES, which could also be very interesting for the area and the people.

2 Definition of target group/visitors

To allow the project to effectively communicate with the external world, important key points have been defined, which helped in shaping a practical and successful dissemination action-plan:

- Identify the most promising potential groups;
- Define the underlying objectives of dissemination activities undertaken and planned;
- Raise awareness on the project's vision and outcomes, based on a continuous stakeholders' involvement aimed at creating significant liaisons with the most relevant communities and international and national initiatives;
- Identify and create dissemination materials tailored-made to each stakeholder group;
- Plan dissemination activities to promote and present the on-going results of STORE&GO Troia pilot and more generally the benefits of the proposed technologies and tools to stakeholders.

The primary stakeholder group has a direct connection with the project and was identified as:

- Citizens of Troia and surrounding area to make them understand that local renewables can be used also to decarbonize the gas sector.
- Representatives from gas production industries and gas distribution companies, because potentially interested in investing on plants like the Troia's one;
- Governmental bodies on local, regional, national and European level, whose administration and policy could have a relevant impact on the widespread adoption of the technologies under experimentation;

Alongside these three main groups of stakeholders, the consortium has also identified key stakeholders whose influence is systemic in relation to the STORE&GO ecosystem:

- Scientific and industry researchers and academics active within the subject areas of interest to the project such as power-to-gas, methanation;
- Associations of professionals/engineers, to make them aware of new technologies and related business;
- Students, coming from Upper Intermediate School, that could be interested in the technologies that the plant implements;
- Distribution System Operators and Transmission System Operators, that could be interested in the provision of flexibility services that a PtG plant could make possible by properly controlling the power adsorption of the electrolyser;
- Media specialized in the topics of STORE&GO (PtG, methanation, CO_2 capture from air, liquefaction) to disseminate to a wider audience.

The project's communication and dissemination activities capitalize on possible synergies between all the different perspectives corresponding to each target group. In this context, various dissemination materials have been professionally designed and new ones will be produced during the last months of the project according to the identified communication needs, various event typologies and,

of course, the evolution of the project. Dissemination tools and media channels that are currently used in STORE&GO (Troia Pilot) include:

- Branding strategy (logo, document templates, etc.),
- STORE&GO online presence including official project's website,
- Promotional material (posters, newsletters, flyers, brochures, etc.)

developed at the project level and inherited by the three pilots, and also:

- Press releases;
- Presentations;
- Participating in and organizing conferences, exhibitions, workshops, industry events, seminars or demo booths;

mainly focussed on the pilot in Troia.

The STORE&GO communication activities related to the pilot in Troia have been intended to stress the following positioning of the Project:

- a demonstrative project assuring its replicability;
- a project based on the convergence of technologies;
- a fruitful cooperation among a wide and diversified partnership;
- a process that generates a change (in the design, in the modes of collaboration, in the opportunities in terms of economic development of territories, in the general perception of possible use of renewable energy).

In this respect, five key objectives have been identified, as better outlined in the following table.

Table 1 - identified 5 main objectives of the dissemination and communication activities

Objectives	Targets	Tools	Style	Expected benefits
1. Promoting the knowledge of the project and of its goals towards the potential addressees of the project activities, both informing them and raising their awareness on the opportunities offered by the project and its results	Public authorities The city of Troia Public and private companies and agencies operating in the field of energy and gas production, energy and gas distribution Research	Corporate image Promotional materials Website Press office P.R. activities International and local events	Formal, technical	Contribution to the enhancement of the authorization procedures Better acceptance of the plant settlement Improved interest in the PtG technologies
2. Facilitating interaction and information exchange among relevant research, public authorities, to support potential technology transfers and facilitate the replication of the STORE&GO PtG technologies to other geographical areas	Research Public authorities Finance	Promotional materials Website International and local events Participation in thematic events (conferences, workshops, trade fairs, etc.) submitting technical papers P.R. activities	Formal, technical	Improved interest in the PtG technologies Development of new projects dealing with gas (hydrogen, CO2, methane) production from renewables Improvement of transnational tech-trans
3. Creating two-way communication channels with public stakeholders, research communities and industry for disseminating the project outcomes to a wider audience	Research Industrial communities Public authorities (policy makers, national energy agencies, representatives of other EU countries)	Corporate image Promotional materials Website Social media P.R. activities International and local events Participation in thematic events (conferences, workshops, trade fairs, etc.) submitting technical papers	Formal, technical, collaborative	Involvement of different stakeholders Dissemination of the project results to a wider audience
4. Promoting the knowledge of the project and of its aims towards the press and the public opinion, both in the territories directly involved (Apulia, the other regions/nations hosting the project partners) and in the other European countries	Public opinion Students Media	Corporate image Promotional materials Website Press office International and local events Participation in thematic events Social media Interviews	Essential, captivating	Better acceptance of the plant settlement Knowledge of the PtG technologies Raising of awareness on renewable energies issues

Objectives	Targets	Tools	Style	Expected benefits
5. Ensuring that the project results live on in a commercial/deployment phase in an EU wider context after the project completion (thus way assisting the exploitation of the project results)	Public authorities (policy makers, national energy agencies, representatives of other EU countries) European academia European industrial communities	Corporate image Promotional materials Website update with public Deliverables International final event Participation in thematic events (conferences, workshops) at the end of the project, submitting technical papers P. R. activities Press office	Formal, technical	Knowledge of the project and of its results by European stakeholders Knowledge of the project and of its results by further European Regions, academia, industrial communities

3 Dissemination Activities

3.1 Demo site patrons/matron

The project addresses power-to-gas not only from the technical point of view but also tries to identify the barriers to the adoption of this technology at the regulatory and then at the political level. Policy makers need to be aware of the potentialities and opportunities of this technology. So, since the beginning of the project, the idea to find the support of politicians even formally linked to the pilot sites has been considered as one of the more effective ways to promote the technology and to approach policy makers. One of the partners mainly involved in the pilot in Troia is the municipality of the small village. The mayor is not a simple administrator but a politician too and he spent effort to find a politician working in the same political party. A couple of names came out but the one that accepted to become the patron (matron) of the plant was Giuseppina Picierno.

Figure 1 - Pina Picierno, matron of the italian pilot site in Troia

She is Member of the European Parliament for the Southern Italy constituency and of the parliamentary committees Women's Rights and Gender Equality (FEMM), Budgets (BUDG) and Internal Market and Consumer Protection (IMCO). She is also Vice-President of the EU-Mexico delegation and she chairs the informal group of friendship with the Cuban people in the European Parliament.
As politician particularly sensible to problems and opportunities of the southern part of Italy, Giuseppina Picierno perfectly knows how the most sunny part of the country contributes to the production of green energy from wind and sun and how the integration of renewables is one of the emerging issues of power transmission and distribution networks. She considers power-to-gas initiatives, like STORE&GO, as potential solutions for balancing the power grid where fluctuating and unpredictable amounts of energy are injected. That is the reason why she accepted to support as “matron” the Italian STORE&GO pilot.
The impact of her involvement was quite positive but mainly narrowed to make Apulian municipalities more aware about what has been done in Troia so that the mayor of Troia, L. Cavalieri, received many requests from many surrounding villages to have more details about this research initiative

and, in particular, about the social impact of it on citizens. So, this awareness came from the dissemination work done by Pina Picierno inside the party she is member of, but the consequent interest came also from the need to prove to citizens that all the RES plant installed in most of the Apulian Region can contribute to a real circular economy by producing net zero-emission methane.

3.2 Description of the most important on-site events

3.2.1 Ground-Breaking

The ground-breaking event of the pilot in Troia was held on November 28, 2017, at the Cineteatro "Vincenzo Cimaglia" in Troia (FG).

The initiative had the objective of illustrating the aims of the project to the citizens.

The project was presented as a spin-off of the INGRID project, which proposed an innovative solution to store in the form of solid state hydrogen, through magnesium disks, the surplus of electricity from renewable sources that, otherwise, would be dispersed.

The presentation was attended by: Leonardo Cavalieri, Mayor of the City of Troia, Massimo Bertoncini, Director of European Research Projects - Engineering Ingegneria Informatica s.p.a., Carlo Gadaleta Caldarola, project manager of ARTI Puglia (the Apulian public agency for Research, Technology and Innovation), representatives of the consortium STORE&GO, in particular the partners involved in WP4.

More than 40 people attended the event at the Cineteatro and 20 moved to the pilot site for the final part of the ceremony.

Figure 2 - The audience attending the ground-breaking event at Cineteatro Cimaglia

The audience included but was not limited to:

- Students coming from a couple of Upper Intermediate Schools;
- Academics coming from Politecnico di Bari;
- Representatives of some small and medium enterprises interested in the new technologies;
- Officials of the Municipality of Troia;
- Citizens.

Figure 3 – Speakers at ground-breaking event in Troia (Cineteatro Cimaglia)

Many questions were asked during the presentation of STORE&GO at the Cineteatro especially about the CO_2 capture module and the methanation process.
A relevant amount of the wrong news and information have been circulated during the INGRID project and again since the beginning of the STORE&GO initiative. The event was an opportunity to explain to the audience what the pilot was planning to do. People have been reassured that there are no dangers, that the project was a research initiative and that all the citizens could be proud to host the first real power-to-gas plant in Italy.
The most important result of this event was a better acceptance of the plant in comparison to the previous INGRID project when citizens called the law enforcement agencies to stop the erection phase. Thanks to the discussion held in Troia, most of the citizens became aware of the ongoing work and of the active participation of their municipality in a so interesting and innovative research initiative.

3.2.2 Inauguration

The inauguration ceremony of the plant was held in Troia on September the 27th, 2018. After the Full Project Meeting and the General Assembly held in Cineteatro Cimaglia (Troia), both project partners and the invited stakeholders moved to the plant where all the components had been installed and connected. More than 50 people attended the event. Even though the commissioning phase had not been started yet because of some delays in manufacturing and testing some of the modules, all the equipment was there and has been described to the audience.

ARTI Puglia, the Apulian public agency for Research, Technology and Innovation, already partner in the previous INGRID project, took part of the ceremony to underline that the Regional Government is really interesting in this kind of initiatives and proud to host in the Apulian territory a so innovative power-to-gas plant.

The Mayor L. Cavalieri (TROIA), the WP4 dissemination task leader D. Arnone (ENG) and the representative person of ARTI Puglia C. Gadaleta Caldarola told to the audience the history of the plant (from INGRID to STORE&GO), the strong involvement of the local municipality in the project and the regional strategy for the energy transition.

The inauguration ceremony attracted some newscasts, press, all-news and Web channels. So it was the opportunity to record several interviews as well as to shoot some videos that have been included in a couple of on-site movie that are reported in the sections that follow.

Figure 4 – C. Gadaleta Caldarola (ARTI Puglia), D. Arnone (ENG) and L. Cavalieri (TROIA) at the inauguration ceremony.

3.3 Guided Tours

The most effective (and appreciated, too) way to disseminate the results of the STORE&GO pilot in Troia was the participation to guided tours. The table below shows the list of the all the tours that have been held in Troia during which ENG, as leader of the dissemination task (T4.9 Dissemination activities around demonstration plant), told the history of the plant (from INGRID to STORE&GO), the context in which the two projects have been put in place (the huge amount of energy coming from renewables in the surrounding geographical area), and the overall process of methanisation from electricity and CO_2 captured from the atmosphere.

Table 3-1: List of guided tours

Dates	Participants	Number of attendees	Motivation	Feedback
2019-10-21	The Japan Gas Association	7	Interest in methanation technology.	Very positive since they had the opportunity to compare the initial results of the pilot in Troia to the results they achieved in Japan.
2019-06-28	Gas Technology Department of Tokyo Gas	2	Interest in methanation technology.	They showed interest in the small-scale dimensions of a plant capable of producing gases with chemical and physical characteristics that are also interesting for them, that allow a reusability and a use in much wider contexts of similar larger plants.
2019-05-22	Gas stakeholders attending the workshop in Bari	35	This visit was the final event of the Workshop that was held in Bari, also reported in section 3.4.	After the tour some partners stayed in contact with ENG in order to prepare research initiatives focussed in CO_2 capturing.

2019-04-04	ANIGAS	21	As Gas department of Confindustria, the Italian association of industries, they were very interested in visiting the most innovative methanation plant in Italy.	Most of the companies in the field of gas production and distribution in Italy have been made aware of the research work done in STORE&GO and, in particular, in the pilot in Troia. Some business links have been set up, especially between them and ENG and ATM (KHIMOD).
2019-03-20	INPEX Corporation	3	INPEX is investing in methanation plants that are under construction and commissioning in Japan. They went to Europe to get an overview of the STORE&GO technologies.	Positive feedback since they had the opportunity to discuss with ATM (KHIMOD) the initial results of the pilot in Troia and compare them to the results they had achieved in their projects in Japan.
2019-03-14	Students	55	They were interested in getting more details about the monitoring, control and, in general, automation of a methanation plant.	Students and accompanying teacher reported to ENG that the experience was quite positive, For ENG it was the opportunity to explain even complex concepts to an audience of non-professionals.

ENG has explained the technologies adopted in the pilot and has showed the graphical interface of the monitoring and controlling infrastructure, intended as starting point of the tour because it gives to the speaker the opportunity to introduce the components, how they are connected to each other, how much gas flows in which pipe, how much thermal or electric energy is consumed or produced and so on. After the general introduction, all the tours have been arranged starting from CO_2 capture module and electrolyzer (including the H_2 buffer storage), then proceeding with the methanation unit (including the thermal coupling between the methanation unit and the CO_2 capture module), and closing the tour with the liquefaction unit and the cryogenic tank. Enough time has always been devoted to questions and discussions and, in some of the cases, proper presentations have been discussed before or after the tour.

The sub-sections that follow briefly describe each single tour held in the demonstration plant.

3.3.1 Students

In March 2019, even though the plant was under commissioning, ENG received the request to visit the plant from a Technical Upper Intermediate School based in Florence interested in all the monitoring and control aspects of the plant. A group of 50 students (30 from Automation and 20 from IT) and 5 teachers, during a school trip in Apulia, decided to contact ENG because they were interested in visiting the plant.

Unfortunately, the weather was windy and rainy, and a visit of each single component was unfeasible. The students stayed in the Control Room where ENG explained the project, the process and then the most interesting part for them: the monitoring and control infrastructure. Details about the PLCs and the central server, the different protocols adopted to transfer data from the equipment to the central control and vice versa have been explained and discussed.

The visit lasted a little bit more than one hour and was a useful exercise for ENG (who tried to explain many technical details to a non-technical audience) and an interesting experience for students that left the plant with a greater awareness about the research initiatives like the STORE&GO's one.

3.3.2 INPEX Corporation

In March 2019, three representative people of the INPEX Corporation sent to the coordinator of STORE&GO the request to visit both the Solothurn and the Troia pilot. They planned a short trip to visit in few days both plants and attend two meetings, in Solothurn and in Troia, to discuss with some STORE&GO partners (especially the ones responsible for the CO_2 capturing and for the methanation) about what they are doing in Japan.

Figure 5 – P.Bucci (ATM), the three representatives of INPEX, D.Pomponio (BFP) and T.Melliti (ATM).

After the visit in Solothurn, they went to Troia where ENG prepared both a tour to see all the components of the plant and a meeting in the main building of the Troia Municipalty during which they met ENG and ATM (KHIMOD). The agenda of the meeting was structured as follows:

1. Introduction to Methanation project in Japan
    - Process Flow (incl. reactor and catalyst)
    - Economics
    - Roadmap
2. Introduction to STORE&GO project
    - Process Flow (incl. reactor and catalyst)
    - Economics
    - Roadmap
3. General discussion on Methanation
    - Business model and strategy
      revenue (methane, oxygen, heat), cost, carbon tax, subsidy by govern.
    - CO_2 capture
      location, concentration, cost

- Injection into gas grid
  criteria, national or EU regulation
- CO_2 reduction amount & cost calculation (compared with other CCUS)

The experience was very positive. INPEX disseminated in Japan what was discussed in Troia, rising more interest about the project. Other gas companies, interested in the STORE&GO technologies, decided to plan another trip to Europe to allow more people to visit the plants. Few months later, some representatives of the Japan Gas Association and, among them Dr. T. Wakayama from INPEX, visited the plant (see section 3.3.6).

3.3.3 ANIGAS – Associazione Nazionale Industriali Gas

Anigas, the National Association of the Gas Industry, represents all the companies, regardless of their constitution, that are engaged in one or more of the following activities: storage, transportation, distribution, sale of natural gas on the consumer market, wholesale, trading and regasification of liquefied natural gas. The association is a member of Confindustria (Confederazione Generale dell'Industria Italiana) and protects and supports the interests of member companies, conducts labour union activities, promotes and fosters understanding and creates consensus on economic aspects. Anigas includes 70 companies, which have a workforce of 11,500 employees. Among the members are the largest industry players, as well as small and medium-sized companies, which together represent more than 60% of the Italian gas market. Member companies distribute over 50 billion cubic meters of gas each year for public use, small crafts, commercial and industrial applications. The same member companies that serve 13 million customers throughout Italy, are present in more than 4,000 municipalities both large and small, including several provincial capitals such as Rome, Naples, Turin, Florence, Taranto, Venice, Piacenza, Rimini and Avellino[1].

Figure 6 – Companies and academic institutions that are members of ANIGAS and attended the tour in Troia

In April 2019, Dr. L. Baratto, as representative person of ANIGAS, contacted ENG because, together with many stakeholders in the gas production, distribution and sale domain, he was very interested in a guided tour of the plant in Troia. He grouped 26 managers and technicians coming from different companies and academic institutions (see Figure 6) and collected a number of questions about many different topics concerning the plant and the research initiative. The questions, concerning scientific,

[1] Most of this information has been taken from the English version of the ANIGAS web site (https://www.anigas.it).

technical and economic aspects of the demonstrator and the project, were forwarded to ENG before the guided tour to properly prepare the visit.

Figure 7 – 23 Representative people of ANIGAS

After the visit, during which many questions were answered, the group of visitors was accompanied to the municipality main building (in Sala Consiliare) were the delegation of ANIGAS met L. Cavalieri, mayor of Troia.
Most of the participants are still interested in the potential evolution of the plant after the end of the project. So, ENG expects to be contacted after February 2020.

3.3.4 Gas stakeholders attending the Workshop in Bari

As described in section 3.4, a Workshop titled ”From Power to Gas: the STORE&GO plant in Troia” has been held in Bari on 20th and 21st, May 2019. In the program of the workshop a tour of the plant was included too. So, all the stakeholders attending the workshop (professionals, small enterprises in the energy and gas sector, academic institutions as well as big actors in electricity distribution and transmission) have been invited to take part of the guided tour of the plant that was held on 22nd.

The number of attendees was 35: Terna, Enel, Enea are some of the most important stakeholders that attended the tour. Among the guided tours, this one was probably the most appreciated because some of the key technological partners, who were speakers during the workshop, were available to answer attendees’ questions by providing many details that usually are not given during guided tours held by the WP4 dissemination task leader (ENG).

Figure 8 – P.Bucci (ATM) is explaining the main components of the methanation unit

The impact of this initiative is very difficult to estimate but the heterogeneity of the audience has ensured the dissemination of the project technologies to a wide variety of stakeholders.

3.3.5 Tokyo Gas

In June 2019, two representative persons from Tokyo Gas Co., Ltd., Dr. Takaya Iseki and Mr. Toshiji Amano, general manager, attended a tour that ENG arranged for them. Tokyo Gas is the leading natural gas supplier of Tokyo and several major cities in Japan, and the largest utility of natural gas in Japan.

Figure 9 – A. Rossi (ENG), T. Iseki (Tokyo Gas) and T. Amano (Tokyo Gas)

The meeting lasted a couple of hours in which ENG presented the system in all its aspects, from the physical components to the process that underlies it, to finish with the data network and ENG's SCADA, and a forecast of system operation for the project. Tokyo Gas has been impressed by the

technology and the great technical work carried out by the WP partners, in particular for the small-scale dimensions of a plant capable of producing gases with chemical and physical characteristics that are also interesting for them (even if they did not know too much about LNG before coming there), that allow a reusability and a use in much wider contexts of similar larger plants.

They already knew about the CO_2 capture and the innovative milli-structured methanation thanks to previous meetings with CW and ATM, and very well understood and appreciated the advantages of not increasing the net quantity of CO_2 in the atmosphere in the whole process of production-consumption of the gas the plant will produce. They were impressed by the small dimensions of the core reactor, which was correctly perceived as an added value for its exploitation.

3.3.6 The Japan Gas Association

As consequence of the guided tours held on March 2018 for the delegation of INPEX and on June 2019 for the delegation of Tokyo Gas, the Japan Gas Association became aware of the work done in the STORE&GO project and decided to send a group of representative people to Europe with the goal to visit the pilot plants, to share the results of their research activities and to create business links to the key technology partners of the project.

Figure 10 – 7 representative people of The Japan Gas Association, T.Melliti (ATM), D.Arnone and A.Rossi (ENG), G.Francese (BFP)

The 7 representative people (2 from R&D of the Japan Gas Association, 2 from Tokyo Gas, 1 from Osaka Gas, 1 from INPEX Corporation, 1 from Toho Gas) collected more than 45 questions that they sent to ENG a couple of weeks before the guided tour that was held on October 21st, 2019. So, during the visit, the description of the plant was structured with the aim to answer as many questions as possible.
After the visit of the pilot site, the delegation of the Japan Gas Association visited the main building of the Municipality where they met the Mayor, L. Cavalieri. It was also the opportunity to discuss with ATM (KHIMOD) about the results achieved so far by the plant and their achievement in Japan.

The visit was appreciated very much by them so that they anticipated to ENG that they could be interested to visit the plant again in the next future.

3.4 Educational Training Programme

In the context of the educational program of the STORE&GO project, led by EDI (Energy Delta institute), ENG organized a Workshop to explain, disseminate and promote the main results of both the STORE&GO project, in general, and the pilot plant in Troia, in particular. All the key partners of WP4 were invited to attend and asked to prepare presentations for a detailed explanation of many different aspects of this research initiatives (scientific, technical and economic/business aspects).

The workshop was held in Bari (Hotel Palace) on May 20th and 21st, 2019. The workshop involved 39 participants on 20th, 33 on 21st.

As can be seen in the program of the event reported in the figure below, the event was structured in three different sections to allow people to attend only to what they were really interested in:

- 20th afternoon – an overview of the project and history of the Troia pilot as follow up of INGRID[2];
- 21st morning – a deepening on the core technologies of the plant;
- 21st afternoon – impact, sustainability, exploitation, business models, regulatory framework.

[2] INGRID - High-capacity hydrogen-based green-energy storage solutions for grid balancing (http://www.ingridproject.eu/) was a FP7 co-funded project (start 2012, end 2017) coordinated by ENG.

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organize the Workshop entitled

"From Power to Gas: the STORE&GO plant in Troia (FG)"

Hotel Palace

Via Francesco Lombardi, 13 - 70122 Bari

Monday 20th, Tuesday 21st and Wednesday 22nd May 2019

The decarbonization of the energy production sector implies the need to increase the amount of energy coming from renewable resources, such as wind and sun. But when a relevant percentage of the electricity comes from renewables, like photovoltaic plants and wind turbines, stability and reliability of the power network can be threatened because of the intrinsic uncontrollability and unpredictability of these sources. Many different solutions, like demand response, demand side management, energy storage etc., must be put in place and properly and synergistically managed to safely operate the grid and ensure the compliance of power parameters with the thresholds established by the current regulatory framework. The power to gas (p2g) technologies can be a viable solution to store significant amount of energy on a different carrier: gases, like hydrogen and methane. The H2020 STORE&GO project aims at demonstrating that methanation, that is the production of methane from hydrogen and carbon dioxide, can support the balancing of the power grid and, at the same time, produce a zero net-emission fuel. Troia, a small town in the province of Foggia, has hosted the pilot demonstrator of the FP7 INGRID research Power to Hydrogen project, that today has evolved into one of the three pilot sites of the STORE&GO Power to Methane project.

The Workshop will explain in detail the context, the scope, the technologies and the economic aspects that now characterize the most innovative Power to Methane plant in Italy.

ENGINEERING STORE&GO ENERGY DELTA INSTITUTE ENERGY BUSINESS SCHOOL

Program

Monday 20th May afternoon – Overview of the project and the workshop	
13:45 – 14:00	Welcome coffee
14:00 – 14:15	**Introduction to the event** G. Cafaro (AEIT), F. C. Ertem-Kappler (Energy Delta Institute) D. Arnone (Engineering I.I.)
14:15 – 15:00	**Enabling new flexibility resources to support the power grid of the future** M. La Scala, S. Bruno (Politecnico di Bari),
15:00 - 15:45	**The hydrogen as an additional fuel for gas turbines** S. Camporeale, M. Torresi, A. Saponaro (Politecnico di Bari)
15:45 - 16:30	**From INGRID to STORE&GO** D. Arnone (Engineering I.I.)
16:30 - 17:15	**STORE&GO methanation plant: the design of the overall process** S. Bensaid (Politecnico di Torino)
17:15 - 17:50	**Layout of the plant - civil works and authorization procedures** D. Pomponio (Studio BFP)
17:50 - 18:00	**Recap of the first day** D. Arnone (Engineering I.I.)

Tuesday 21st May – Inside the technology	
8:45 – 9:00	Welcome coffee
9:00 - 9:45	**Design of a millistructured reactor for methanation** G. Geffraye (Commissariat à l'énergie atomique - CEA)
9:45 – 10:30	**CO2 capturing module** L. Kaufman (Climeworks)
10:30 – 11:15	**Methanation unit** P. Bucci (Atmostat Alcen)
11:15 – 12:00	**Liquefaction unit** A. Saldivia (Hysytech)
12:00 – 12:45	**Monitoring, Security and Control infrastructure** A. Rossi (Engineering I.I.)
12:45 – 14:00	Lunch break
14:00 – 14:45	**Impact of the plant on the power grid** A. Mazza (Politecnico di Torino)
14:45 – 15:30	**Regulatory Framework** A. Saldivia (Hysystech)
15:30 – 16:15	**Techno-economics and regulation of power-to-gas** D. Parra Mendoza (Université De Genève). P. Bucci (Atmostat Alcen)
16:15 – 16:30	Coffee break
16:30 – 17:50	**Open discussion and feedback collection** Moderator: D. Arnone (Engineering I. I.)
17:50 – 18:00	**Recap of the second day** D. Arnone (Engineering I.I.)

Wednesday 22nd May morning – Visit of the plant	
8:45 – 9:00	Briefing of the visit D. Arnone (Engineering I.I.)
9:00 -10:30	Trip from Bari to the pilot site in Troia by bus
10:30 – 11:00	Welcome brunch
11:00 – 12:30	Visit of the plant and closing of the event
12:30 – 14:00	Trip from the pilot site in Troia to Bari by bus

Figure 11 - Program of the Workshop in Bari

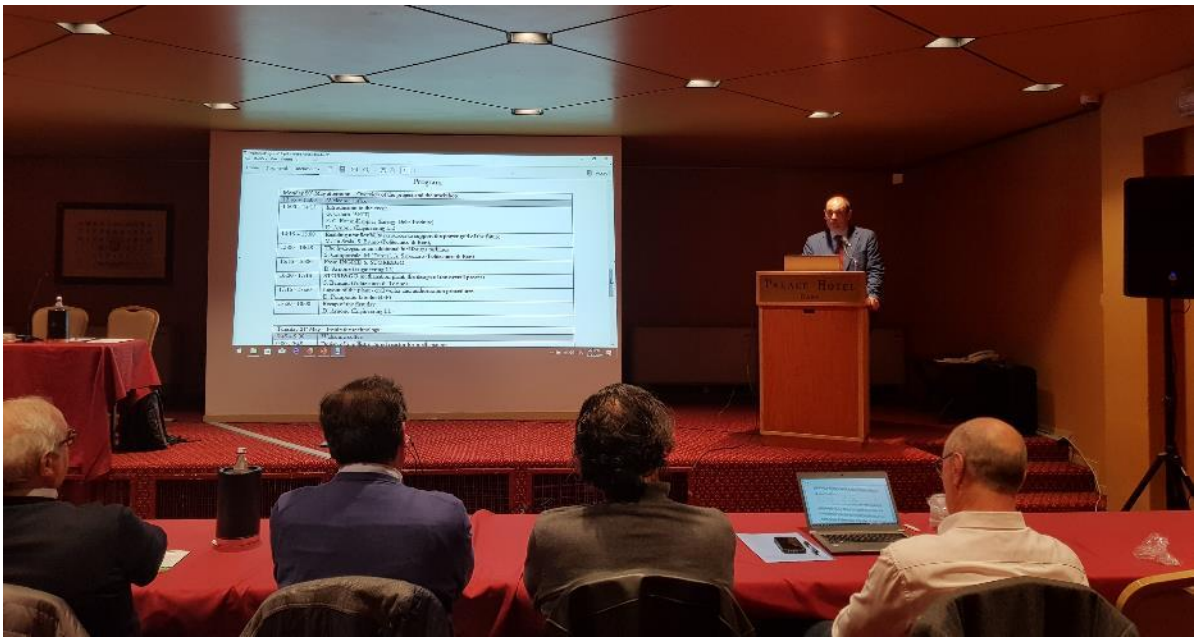

Figure 12 - Workshop in Bari. D.Arnone (ENG) is illustrating the program of the event

The workshop was an important opportunity to discuss about many aspects of the project: from the methanation process to the business aspects, from the regulatory barriers to the impact of such a plant on the electricity grid etc. Among the participants, most of whom were professionals, important companies attended the event such as TERNA (the Italian TSO), ST Microelectronics, ENEL and ENEA.

3.5 Media inquiries

Radio France	
Interviewer: Mathilde Imberty, Radio France journalist, correspondent for Radio France in Città del Vaticano	
Date: 27 November 2018	
Motivation: Radio France was very interested in the technology for capturing CO_2 from the atmosphere. Most of the questions were focussed on the Climeworks technology but during the interview the interviewer understood how CO_2 captured is used to create liquid methane.	
Impact: Radio France audience numbers proved that it is one of the most important radio networks in France: at the time of the interview the average audience was 8 million. The interview explained to a wide audience what the pilot in Troia aims to demonstrate, even though a particular attention has been paid to the CO_2 capturing technologies.	**Figure 13 –** R. Albach (ATM) interviewed by Mathilde Imberty

TV7	
Interviewer: Igor Staglianò, journalist and reporter for RAI and one of the main contributors of TV7, weekly transmission for TG1, the main newscast in Italy.	
Date: 29 April 2019	
Motivation: The interview was done to explain to common citizens that some technologies already exist that can reduce the amount of CO_2 in the atmosphere and that the captured carbon dioxide can be used to decarbonize the gas sector.	
Impact: the numbers related to the audience of TV7 is between 500k and 800k of viewers. Many requests for information came after that the interview was aired.	**Figure 14 –** M. Bertoncini (ENG) interviewed by Igor Staglianò

Immediato TV	**Immediato TV**
Interviewer: a journalist from Immediato TV	
Date: 27 September 2018	
Motivation: Immediato TV is the YouTube channel of L'Immediato web newspaper. They are interested in many types of news, not only the ones related to the renewables, CO_2 capture or methanation. They went to the plant during the inauguration ceremony and interviewed D. Arnone (ENG).	
Impact: Immediato TV is a YouTube Channel that basically reports on the news related to the province of Foggia. Hundreds of people have been informed about the research activity in Troia.	

Figure 15 D. Arnone (ENG) interviewed by ImmediatoTV

1A	**L'Attacco TV**
Interviewer: a journalist from L'attacco TV	
Date: 27 September 2018	
Motivation: L'Attacco TV is a YouTube channel. They are interested in many types of news, not only the ones related to the renewables, CO_2 capture or methanation. They went to the plant during the inauguration ceremony and interviewed D. Arnone (ENG) and P. Bucci (ATM).	
Impact: L'Attacco TV is a YouTube Channel that reports on the news related to the Apulian region and more. Hundreds of people have been informed about the research activity in Troia.	

Figure 16 D. Arnone (ENG) and P. Bucci (ATM) interviewed by L'AttaccoTV

TG Norba 24
Interviewer: Pietro Loffredo, a journalist from TeleNorba
Date: 27 September 2018
Motivation: TG Norba 24 is an Italian all-news television channel published by Gruppo Norba. The information transmitted by the all-news is national in scope with particular interest for the news concerning the south of Italy, especially for the regions where Telenorba radiates its signal and has its main offices. They showed interest in the research initiative.
Impact: This television channel has an important share: 0,06 of the overall Italian audience. In 2017 the average number of viewers was more than half a million. So, a relevant impact can be assumed provided that a very high number of people has been reached.

Figure 17 – L. Cavalieri (Mayor of Troia) interviewed by TeleNorba

3.6 Press releases and echoes

Climeworks is responsible for having prepared all the press releases that, refined and reviewed by ENG, have had relevant impact in terms not only of articles and citations but also in term of dissemination of the concept and attraction of any kind of stakeholders.

In September 2016, Climeworks released a press release announcing its involvement in three European projects, including STORE&GO.

- Press release German:

  http://www.climeworks.com/wp-content/uploads/2017/07/160908-PM-DE-Climeworks-Horizon-2020-Kopernikus.pdf

In September 2018, Climeworks released a press release announcing the successful commissioning of its DAC-3 plant in Troia, Italy as part of STORE&GO.

- Press release English:

  http://www.climeworks.com/wp-content/uploads/2018/10/Climeworks_PressRelease_StoreGo_ENG.pdf

- Press release German:

  http://www.climeworks.com/wp-content/uploads/2018/10/Climeworks_Pressemitteilung_StoreGo_DE.pdf

The latter press release was uploaded onto the Climeworks corporate website & accompanied by a blogpost: https://www.climeworks.com/climeworks-launches-dac-3-plant-in-italy/

Combined, these press releases triggered **228** articles in which STORE&GO was mentioned. Links to some of the articles (the ones related to Troia pilot) can be found in the Annex “STORE&GO Troia Pilot related press clippings”.

Other very important press echoes are listed in the table below.

Table 2 - Some of the most relevant press echoes related to the plant in Troia

ANSA	Le opportunità del Power to Gas [Transl. *The opportunities of Power to Gas*]	link
CORRIERE DELLA SERA DIGITAL EDITION	Meno CO_2 e più metano, in Italia l’impianto pilota contro il “global warming” [Transl. *Less CO_2 and more methane, in Italy the pilot plant against "global warming*"]	link
CORRIERE DEL MEZZOGIORNO PUGLIA	Metano trasformando l’acqua [Transl. *Methane by transforming water*]	link
FOGGIATODAY	A Troia ecco 'Store&go', il progetto per la centrale di produzione e stoccaggio di metano liquido [Transl. *In Troia is 'Store&go', the project for the liquid methane production and storage plant*]	link
FOGGIATODAY	Nasce a Troia la centrale di metano liquido mediante l'elettrolisi dell'acqua [Transl. *The liquid methane plant is born in Troia through the water electrolysis*]	link
PUGLIAPOSITIVA L’orgoglio di un territorio	Nuovo passo in avanti per l’impianto di produzione di metano liquido. [Transl. *A new step forward for the liquid methane production plant*"]	link
DAUNIANEWS.IT QUOTIDIANO ONLINE DELLA PROVINCIA DI FOGGIA	Troia, domani la prima pietra dell’impianto store&go. [Transl. *Troia, tomorrow the ground breaking event of the STORE&GO plant*"]	link
metanoauto.com	Inaugurato il 1° impianto italiano che produrrà metano liquido da energia eolica [Transl. *Inauguration of the first Italian plant for production of liquid methane from wind energy*"]	link
l’Immediato	Metano Liquido ricavato dall’acqua, nel Foggiano primo impianto in Italia. Ecco STORE&GO. [Transl. *Liquid methane from water, in Foggia the first plant in Italy*]	link
GreenCity Per un futuro sostenibile	In Puglia l’avvio di un impianto per l’estrazione della CO_2 dell’aria [Transl. *In Apulia the launch of the plant for CO_2 capturing from air*]	link

Climeworks continues to maintain strong relationships with most of the major media outlets worldwide and is working proactively to expand this network. The Climeworks press list currently comprises 865 international journalists.

3.7 On-site movies

3.7.1 Ground-breaking movie

The ground-breaking event held in Troia on November 28th 2017 was aimed, as already reported in section 3.2.1, at illustrating the project to the citizens. But it was also an opportunity to create an on-site movie. Thanks to BitGlue, a group of communication, dissemination, marketing material designers of ENG, many videos were shot and then properly worked to create an on-site movie that explains in 3 minutes the main goal and results of the event.

Bitglue operators filmed the event both at the Cineteatro and at the demo site intended for the erection of the plant, also including interviews, to M. Bertoncini (ENG) and L. Cavalieri (mayor of Troia), to better explain the concept of the project. The movie is in Italian since the main target audience is the citizens.

The movie was created to be used for dissemination activities but was not published on a public website. It can be downloaded from Dropbox.

Figure 18 - Picture of the ground-breaking event

3.7.2 Inauguration ceremony on-site movie

The inauguration ceremony was held on September 27th, 2018. As reported in section 3.5, many interviews were done during the event to different partners of the project. Anyway, in order to exploit the event as an opportunity to promote their own technologies, CW and HST engaged communication professionals and video shooters to take pictures and shoot videos that, after few days, were published as video (see figure below).

Figure 19 – F. Graf (DVGW), coordinator of the STORE&GO project, in the inauguration ceremony video, created by HST

The video is available on http://www.hysytech.com/Video/apertura-impianto-rinnovabile.

3.7.3 On-site movie for micro liquefier

Another high-quality video was created by HST.

Figure 20 - A screenshot taken from the video created by HST to promote the technology of micro liquefier

They combined some images and videos taken on the pilot site with images and videos taken in their premises and factory. The resulting movie is basically focussed on the technology adopted by the liquefaction unit and on the company (HST) responsible for that. The video (see Figure 20) is published on http://www.hysytech.com/Video/il-nostro-impianto.

3.8 Movies

In order to explain the concept of STORE&GO to a wide audience, the Project Dissemination Task Force decided to design and create a movie, in the format of a cartoon, that explains the main ideas at the basis of the project. ENG took the responsibility of this activity.

Figure 21 - A screenshot of the Movie created by the Bitglue team (ENG)

Indeed, a team of experts in communication and marketing inside ENG (Bitglue is the name of the group) has taken the responsibility to design a storyboard on the basis of a first questionnaire that the Dissemination Task Force was asked to fill in, to find the text that briefly explains the project (as well as the power-to-gas concept), to create an animation, synchronized with both the text on the screen and the speech.

A relevant amount of effort and time was spent for the movie because several requirements, and needs, and constraints, and points of view have been taken into account to write proper text, to draw proper pictures, to represent proper ideas.

The result was accepted by the project coordination team as representative of the overall project and published on the public project website.

3.9 Posters

During guided visits and tours of the plant, visitors usually request more details about the technologies adopted as well as some numbers about the process and the performance. In some cases, questions can be answered only by a specific partner that usually does not attend the guided tours. So, in order to provide as much information as possible to the visitors as well as to promote the work of all the involved partners, ENG has decided to coordinate the creation of proper posters. Key partners have been provided with a simple template where to include content (picture, text, diagrams) explaining the work done in the plant, the challenges addressed, the solutions implemented as well as the most significant results, when available.

The posters will be printed and hung up into the control room that is usually the first stop of the guided tours. Thanks to the posters, more details can be given to the attendees who can take a picture of the poster or simply read what they find particularly interesting.

The figures that follow show the posters that have been created so far:

- The monitoring and control infrastructure, created by ENG, which provides details about the ICT infrastructure and the monitoring and control application developed by ENG and deployed in the server of the control room.
- The CO_2 capture module, created by CW, that explains the concept of capturing carbon dioxide from the atmosphere.
- The methanation unit, created by ATM (KHIMOD) and CEA, that explains many details about the methanation, starting from the Sabatier reaction and describing the reactor, the very art of the methanator, and the final equipment currently installed in Troia.
- The Integrated conditioning and Liquefaction unit, created by HST, that explains the last step of the overall process: the liquefaction of methane.

Each poster includes information about the role played by the partner in the project as well as a profile of the company.

Monitoring and Control of the Italian Plant in Troia

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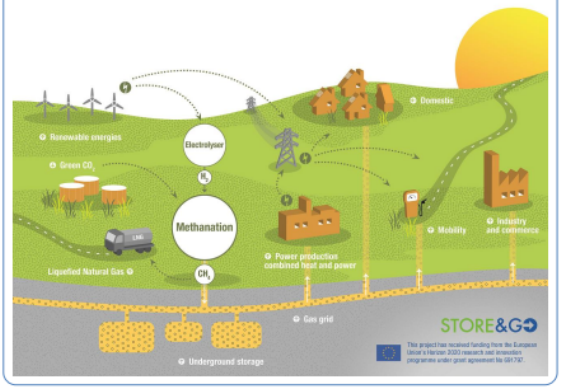
www.eng.it

Engineering Ingegneria Informatica SpA, Italy

Supported by the State Secretariat for Education, Research and Innovation under contract no. 15.0333

Co-funded by the European Union under Grant Agreement no. 123456



Introduction and objectives

The STORE&GO project aims at demonstrating the potentiality of the so-called PtG ("Power-To-Gas"). The Italian demonstration site realized in Troia (FG) is one of the three pilots built inside STORE&GO. It implements a small scale (300kW) PtG solution to convert and move surplus of renewable electricity from the power grid to the LNG distribution network.

The main objectives of the demonstration site in Troia are to realize and demonstrate:

- ✓ The conversion of renewable electricity into a storable gas by water electrolysis and methanation;
- ✓ The CO_2 capture from the atmosphere and its usage as feed to the process;
- ✓ The small-scale liquefaction as a viable way to store and transport the gas to the final user.

Along with the issues concerning the process engineering of the overall demo site, the data integration and unified control has been a challenge, as well. Engineering, as responsible of the ICT infrastructure, designed and developed an integrated solution for data monitoring and control in order to:

- ✓ Provide reference operation data by performing a thoroughly elaborated test program;
- ✓ Elaborate data, findings and operational experiences for horizontal cross-cutting activities;
- ✓ Utilize the demo site with the obtained results as platform for dissemination and training activities.

The demonstration site in Troia consists of a methanation plant including an innovative methanation reactor based on milli-structured catalytic modules, a CO_2 adsorption, a novel LNG liquefaction unit applied to SNG, including the necessary purification for LNG quality (mainly CO_2, H_2 and water content) needed before the liquefaction unit. The plant exploits the hydrogen produced by the electrolyser inherited from the INGRID Project (http://www.ingridproject.eu/), connected to the MV power grid and able to be controlled with the aim to provide balancing services.

Data network and integration

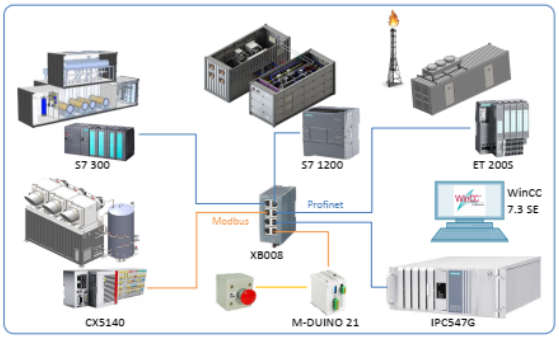
The demonstration site in Troia offers an innovative solution integrating four different prototypes working together. ENGINEERING designed and developed the overall data network, with the objective of integrating all the devices together, each provided with its own PLC, protocol and data format, and create a centralized repository, with a unique interface, for the real-time monitoring and historical data storage.

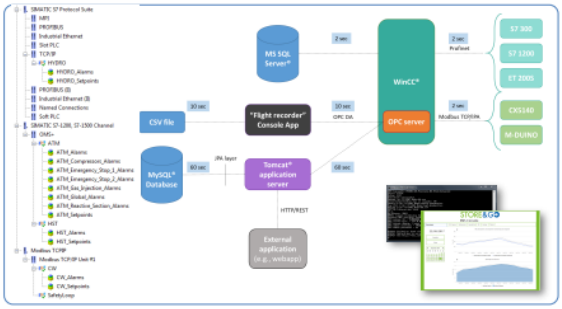
Three different networks have been implemented:

- ✓ Profinet, for the integration of Siemens-based PLCs, in particular a S7300, a S71200, and an ET200S;
- ✓ Profibus converted into Modbus TCP/IP, for a Beckoff PLC, the CX5140;
- ✓ Modbus TCP/IP, for the integration of the Arduino connected to the so called "safety loop" of the plant.

For the integration of the data network, an industrial switch have been used, the SCALANCE XB008. The data collected by the devices are sent to the main server, a SIMATIC IPC547G, an Industrial PC by Siemens, powered by two suppliers with rack UPS and industrial hard disks with RAID 1 and 5. WinCC 7.3 SE has been used as software platform for the collection of data and the implementation of the centralized SCADA.

The "safety loop" of the plant consists of an electrical circuit which can be opened automatically by the devices in case of out-of-service events to put the whole plant in a standby condition. A mushroom button has been integrated into the loop, in order to let the operators manually interact with the control loop.

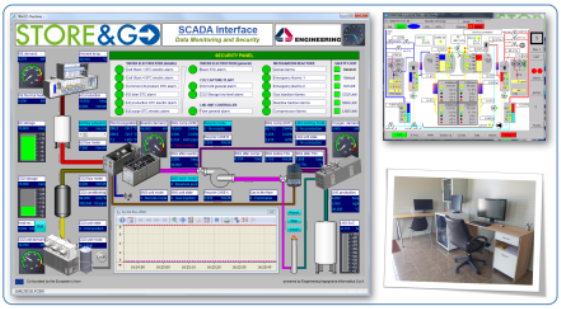




The software architecture and the applications

A unified control of the entire process has been one of the main requirements for the operations of the plant. For this reason, ENGINEERING has built a modular software architecture, for the monitoring and the control of the entire demo site. The software developed is able to collect and store in an efficient way all the monitoring data received by the devices as well as their alarms, and to send set points to the different equipment in order to start and stop the plant operations, control the recycles, the heat valorization, and to provide the main paraments to configure the process, such as the hydrogen pressure and flow to the methanation system.

All the monitoring data, alarms and set points have been categorized to be efficiently stored and made available to external application and for post-processing. A strong importance has been given to the reliability of the software, without losing the focus on its performance. The core of the system is the centralized OPC server configured and programmed to monitor the equipment at high rate. Three levels of redundancy have been provided for the availability of real-time data and for the storage of historical series: a MS SQL DB, for the raw data storage, populated every 2 seconds; a CSV file, for the collection of monitoring and calculated data, populated every 10 seconds; a MySQL DB, for the provisioning of aggregated data to external application, populated every minute. One of this external application, developed by Engineering, provides also the fully-automatic automation of the flare.



The integrated SCADA interface and the control room

The core of the monitoring and control of the system is the SCADA interface, designed and developed by Engineering, and made available for the plant operators. All the single devices have their own HMI, available on board, and via VNC inside the server in the control room. All these interfaces have been developed to permit the fine-grained monitoring and control of each single device, without an overall vision.

The centralized SCADA was built with the purpose of giving a unique visual reference for all the main important indicators and alarms of the overall system. In this way, the operators can check all the devices and their main functionalities directly in one place, every time, everywhere. The SCADA interface is available also online for the authenticated users, to allow remote monitoring of the plant, as well.

The main trends of the plant (gas flows and compositions) are available in the same home page, as well, along with the buttons and input boxes to command the set points, directly from the same interface. The flow of gas is highlighted in different colors indicating the presence of gas and its composition.

The SCADA interface is enriched with secondary pages for all the devices of the plant, to allow monitoring, at high level, the process values of each of them.

ENGINEERING

Engineering Ingegneria Informatica S.p.A. is the head company of the ENGINEERING Group. Engineering was founded in 1980, and it is currently the first IT group in Italy, among the top 10 IT groups in Europe, with approx. 11.000 employees and 65 branch offices in Italy and abroad, with an established presence in Belgium, Germany, Norway, Republic of Serbia, Spain, Sweden, Switzerland, South America (Brazil and Argentina) and United States. Engineering has a consolidated presence on all vertical markets and operates through its 4 business units - Public Administration & Healthcare, Telco & Utilities, Industry & Services, Finance - supported by cross-business unit centres of competence and by the Research and Innovation Department which, with its 420 resources, has the dual role of promoting research on software at an international level and transferring R&D Department, have been participating in several National and European research initiatives co-funded by EC and the Italian Research Ministry. The R&D Department is located across six different locations in Italy and in Europe. In STORE&GO Engineering is leader of WP4 *Demonstration of a 200 kW Power-to-Methane energy storage based on CO2 from the atmosphere in Troia/Italy*, responsible for the monitoring and control system and leader of the dissemination activities related to the Italian pilot in Troia

Figure 22 – Monitoring and control of the Italian Plant in Troia – poster by Engineering I.I. SpA

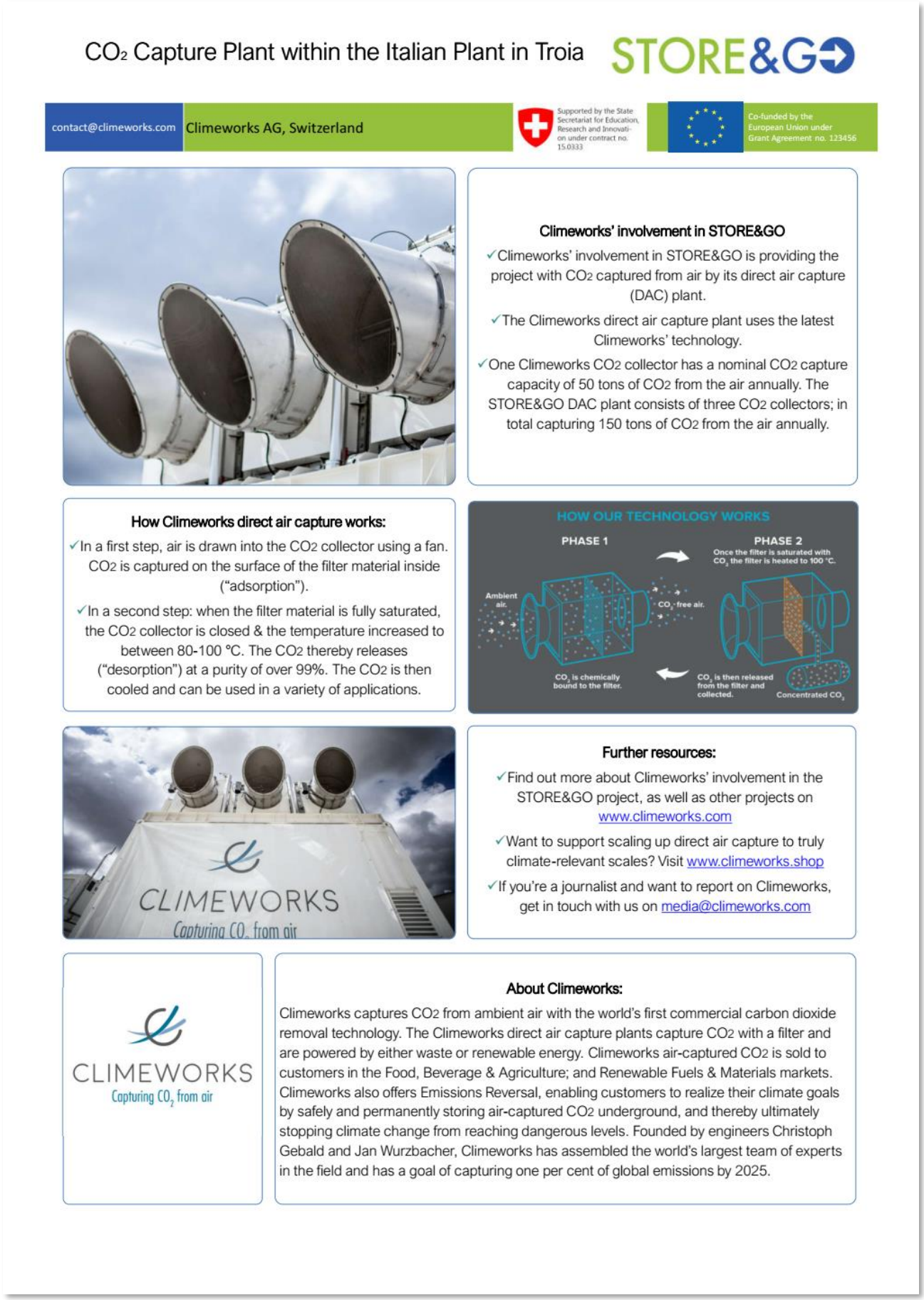


Figure 23 - CO_2 Capture Plant within the Italian Plant in Troia – poster by Climeworks

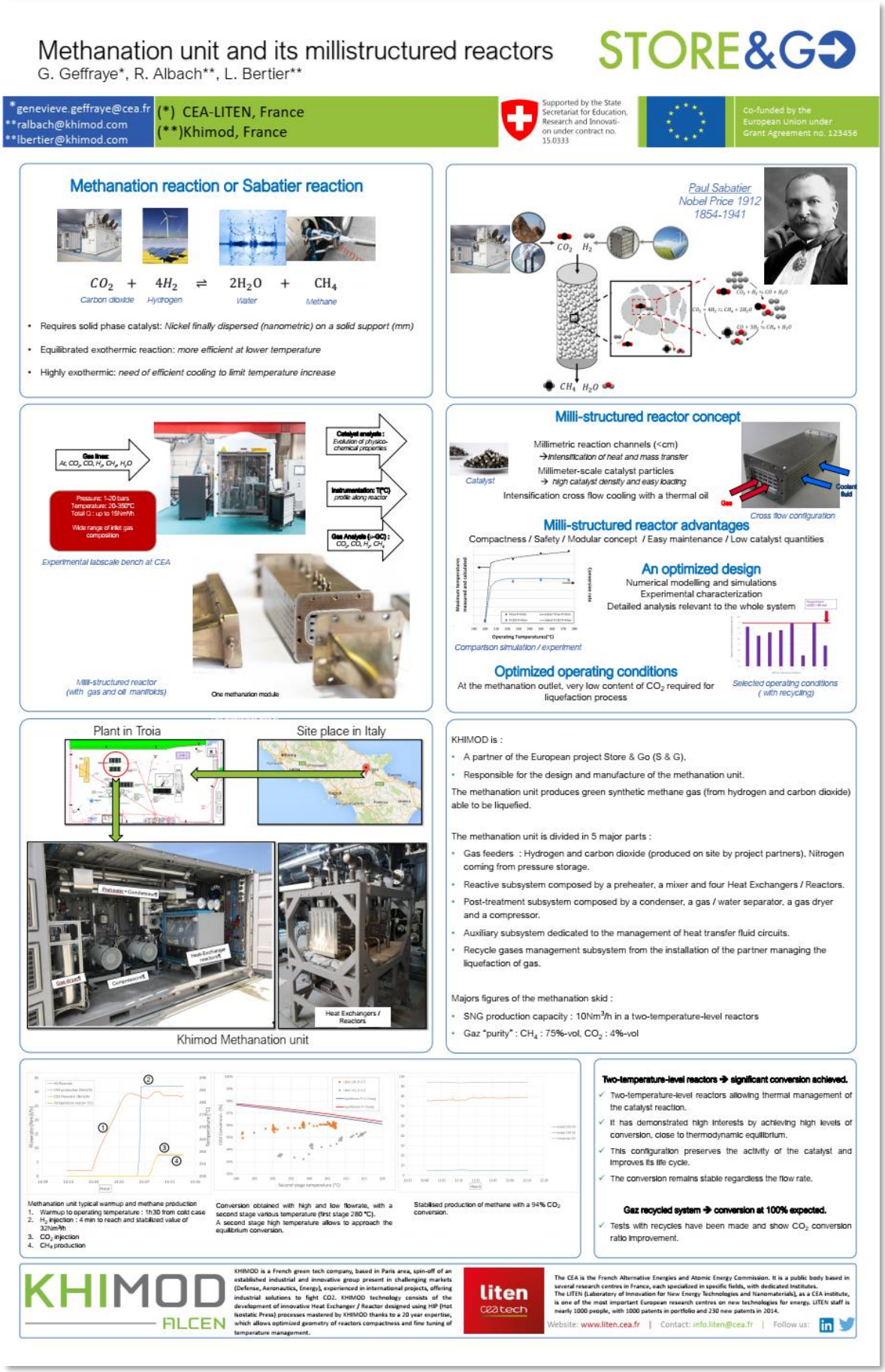


Figure 24 – Methanation unit and reactors of the pilot plant in Troia – poster by ATM (KHIMOD) and CEA

Bio-LNG integrated conditioning and liquefaction unit

STORE&GO

Yeidy Sorani Montenegro Camacho, Marco Energico, Andrés Saldivia*, Massimiliano Antonini

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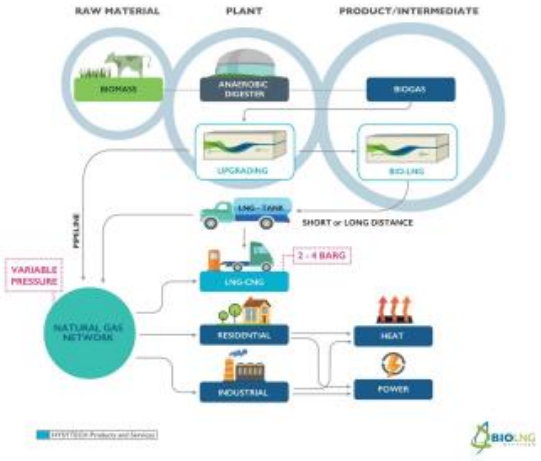
Hysytech S.r.l

Supported by the State Secretariat for Education, Research and Innovation under contract no. 15.0133

Co-funded by the European Union under Grant Agreement no. 123456



Concept

Within the STORE&GO project, Hysytech has developed the liquefaction unit. This is an integrated system with the conditioning of the Biomethane and with the cooling cycles necessary for liquefaction. Liquefaction technology, supplied by STIRLING CRYOGENICS BV, makes it possible to produce Bio-LNG at low pressures, even in the presence of lighter gases (e.g. N_2, O_2, H_2), up to a temperature of 77K.

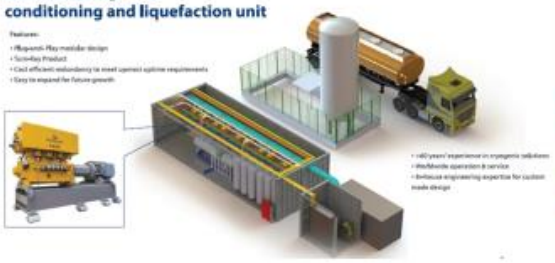
Issues and opportunities

- LNG can quickly extend Natural Gas users
- LNG is a Clean fuel
  - <CO_2 emissions
  - <NOx emissions
  - <particles
- LNG Low cost: depending local prices
- Small Scale or (micro): is required for broad distribution
- No available LNG solutions on the market;
- 40-60% of Biogas plants does not have access to an existing Natural Gas pipeline.

Main characteristics

- 1 ton/day Bio-LNG
- Energy Efficiency: down to 0.69 kWh/kg
- Operating pressures: 10 to 12 barg
- Delivering LNG product pressures: LNG @ 4 barg or lower
- LNG Quality: Automotive: MN>80, other applications MN>90
- Scalable, "Plug and Play" and Modular design

Bio - LNG Integrated conditioning and liquefaction unit



The LNG unit is an integrated system that ensures the gas conditioning. Its purpose is to continuously liquefy the bio-methane produced in the CH_4 Production Unit. This unit includes the following sections:

1. **Gas conditioning:** impurities (H_2, CO_2, H_2O..) are separated otherwise those will frost and compromise the proper operation of the LNG unit.

2. **Liquefaction and separation:** conditioned gas is fed into a cooling system to further decrease the fluid temperature and liquefy it at constant pressure. Incondensable gases (i.e. hydrogen) are separated by flashing. The liquid phase (LNG) is obtained at low pressure (<4 barg), compatible with LNG industry common practices.

HYSYTECH

HYSYTECH is an engineering company, specialized in the design, development and industrial implementation of new turn-key process technologies and equipment.
Our skills start from the know-how in chemical and process engineering, up to commissioning, monitoring and maintenance. Hysytech operates mainly in the field of generation, treatment and recovery of industrial gases, organic liquids and energy, according to the best engineering practices, also through the implementation of our technologies. The main role of Hysytech within the STORE&GO project was the design, development and manufacturing of the LNG unit. Hysytech also was the responsible of the overall plant integration (engineering design and BoP).

Figure 25 - Liquefaction unit of the pilot plant in Troia – poster by HST

3.10 Further Activities

Table 3 - List of further relevant dissemination events

Dates	Event	Presenter, title	Type
2017-09	ERIG Conference & Workgroup Summit 2017, Brussel (Belgium)	ENG as leader of Italian Pilot and other STORE&GO partners	Industrial conference
2018-06	18th International Conference on Environment and Electrical Engineering, Palermo (Italy)	ENG, Energy prosumers flexibility for future smart grids	IEEE Conference, Special Session chair
2018-09	4th International Forum on Research and Technologies for Society and Industry, Palermo (Italy)	ENG, Smart solutions for balancing power grid with high penetration of renewable	IEEE Conference, Invited speaker
2019-05	Workshop on Possible national hub for strategic national multi-gas research plan, to reach the goal of decarbonization of the energy sources in a circular economic view	IREN, innovation in the gas sector and the role that the power-to-gas could play as connecting technology between networks of different energy carries as a solution for the integration of the not-programmable renewable energy sources	Workshop, speech
2019-06	7th Sustainable Places 2019 Conference, Cagliari (Italy)	ENG, Improving power grid stability through a power to methane plant	Conference, presentation
2019-08	NZZ Global Konferenz "Klima und Nachhaltigkeit", Zurich (Switzerland)	CW, company presentation that includes the description of the STORE&GO project and, in particular, the Italian pilot	Conference
2019-09	CADFEM ANSYS Forum, Lausanne (Switzerland)		Forum
2019-09	Swiss Climate Summer School 2019, Ascona (Switzerland)		Summer School
2019-09	BlueYard Conversation: Manhattan Projects against Climate Breakdown, Berlin (Germany)		Conference
2019-09	Tage der Technik, Dübendorf (Switzerland)		Workshop
2019-09	VSV Herbstevent: Onlinehandel klimafreundlich, Glattfeldern (Switzerland)		Workshop
2019-09	Sunrise: SWISS Stakeholder Workshop, Dübendorf (Switzerland)		Workshop
2019-09	Energie-Stiftung SES Fachtagung 2019, Thema: Ausstieg aus den fossilen Energien, Zurich (Switzerland)		Symposium
2019-10	Towards a common understanding of the impact of CO2 valorisation technologies: From Life Cy-cle and Techno-Economic Assessment to Guidance for Policy makers, Brussels (Belgium)		Workshop
2019-10	Porsche Supplier Innovation Day, Stuttgart (Germany)		Workshop
2019-10	DECHEMA PRAXIS-Forum Power-to-X, Frankfurt am Main (Germany)		Forum
2019-10	Power2Gas Conference, Marseille (France)		Conference
2019-11	Innovative Netzwerke als Chance für KMU, Hinwil (Switzerland)		Workshop

3.11 Future activities

Most of the guided tours of the plant were done when the plant was not in operation. This happened because the first tours were held before the commissioning of the plant but, after commissioning, ENG set up guided tours in periods when the plant was not operational both for safety reasons and to allow STORE&GO technicians to exploit their time only for technical activities on the plant. This decision was explained well to the visitors, most of whom asked to visit again the plant after the first period of operation and experimentation (especially the execution of tests for the evaluation of the dynamic behaviour of the plant), that is, during the regime operation. At the time of writing the plant is being operated to execute stress tests and no guided tour has been planned. Starting from January 2020, when the plant will be full operational, ENG will be available to set up new guided tours that will probably involve again some of the stakeholders that have already visited the plant but would like to visit it again during the production of methane.

In order to facilitate the plant visits, the posters created by some of the WP4 partners, described in section 3.9, will be printed and hung on the control rooms internal walls.

Among the ones that have sent ENG the request to visit the plant, it is important to report about Simone Turchetti, video journalist, and a representative person of S.G.I. (Società Gasdotti Italia).

The former works for RAI DUE, the second main national TV channel in Italy: he is interested in solutions for the reduction of CO_2 emission, global warming and circular economy. So, he asked to have a tour of the plant during the production of methane.

The latter, as gas stakeholder, asked ENG to have more details about the methanation technology.

Last but not least, even though no plan has been defined yet, some tours will be set up by ENG to involve students of intermediate uppers schools and from academic institutions (e.g. Politecnico di Bari).

4 Conclusions

This document reports on all dissemination and communication activities done by STORE&GO WP4 partners. ENG, as leader of the dissemination task (T4.9), defined a multi-channel, multi-stakeholder dissemination and communication strategy by using the right combination of multimedia channels and the most appropriate mix of promotional tools and materials at the right time throughout the life of the demonstration pilot in Troia.

Proper target groups have been identified and associated to specific communication channels, and on the basis of the defined approach, several training, dissemination and communication activities have been undertaken during the pilot's overall life time. Many stakeholders were contacted, invited to visit the plant or to attend meetings and seminars. The concept of power-to-gas and the technology developed in the Italian plant (micro-structured modular reactors) were explained and discussed with many experts from different institutions and companies: universities, research centres, private companies, public bodies as well as citizens and students.

As already mentioned in the executive summary, the results of all dissemination activities are:

- 1 press release (which generated many press echoes),
- 3 films on site (for the revolutionary event and the opening ceremony),
- 1 animation video (explaining the concept of the whole project),
- 4 posters.

WP4 partners were interviewed by 4 different networks (local, national and international). The WP leader (ENG) participated in 3 international conferences with 2 oral presentations and 1 invited talk. Other WP partners (CW, HST, IREN etc.) attended several dissemination events.

As conclusion, it is worth to say that all the dissemination and communication activities performed have really increased the awareness about the Italian pilot as well as about the overall project both in Italy and at international level. This attracted several important stakeholders and potential investors.

Annex – STORE&GO Troia Pilot related press clippings

04-Oct-2018 03:46PM	Climeworks has opened a plant capturing carbon dioxide from the air	link
04-Oct-2018 03:46PM	Climeworks has opened a plant capturing carbon dioxide from the air	link
04-Oct-2018 09:29AM	İKLİM DEĞİŞİKLİĞİ - Climeworks havadaki karbon dioksiti emen tesis açtı	link
04-Oct-2018 09:23AM	İklim Değişikliği - Climeworks Havadaki Karbon Dioksiti Emen Tesis Açtı	link
04-Oct-2018 09:22AM	İklim Değişikliği - Climeworks Havadaki Karbon Dioksiti Emen Tesis Açtı	link
04-Oct-2018 09:21AM	Climeworks Havadaki Karbon Dioksiti Emen Tesis Açtı	link
04-Oct-2018 09:21AM	İKLİM DEĞİŞİKLİĞİ - Climeworks havadaki karbon dioksiti emen tesis açtı	link
04-Oct-2018 09:21AM	İKLİM DEĞİŞİKLİĞİ - Climeworks havadaki karbon dioksiti emen tesis açtı	link
04-Oct-2018 09:21AM	İKLİM DEĞİŞİKLİĞİ - Climeworks havadaki karbon dioksiti emen tesis açtı	link
03-Oct-2018 01:24PM	Climeworks launches new DAC-3 plant in Italy	link
02-Oct-2018 02:03PM	Climeworks ermöglicht die Produktion von Treibstoff aus CO2	link
01-Oct-2018 04:26PM	Climeworks: CO2 wird Rohstoff für grüne Methan-Erzeugung	link
01-Oct-2018 04:24PM	Climeworks launches latest DAC plant in Italy	link
01-Oct-2018 12:51PM	Climeworks launches third direct air CO2 capture plant	link
26-Sep-2018 10:44PM	Nasce a Troia la centrale di metano liquido mediante l'elettrolisi dell'acqua	link
21-Sep-2018 01:36PM	Renewable energy promotion: From wind to green gas	link
21-Sep-2018 12:15PM	Renewable energy promotion: From wind to green gas	link
17-Sep-2018 04:00AM	Le CO_2 devient une matière première	link
22-Aug-2018 12:23AM	Lagring er en pallette af teknologier	link
15-Aug-2018 12:40PM	Lagring er en pallette af teknologier	link
23-Jul-2018 04:00PM	Ein Energieträger mit Zukunft	link
03-Jul-2018 05:06PM	“Green” Methane Pilot Plant Starts Up	link
01-Jul-2018 12:56AM	[Comunicato stampa Giunta regionale Puglia] EMILIANO INAUGURA SEDE “ENGINEERING” DI BITRITTO (BA)	link
29-Jun-2018 07:00AM	June 26, 2018: DVGW e.V.: Linke: Climate Protection Potential of Gases	link
28-Jun-2018 10:52AM	Power-to-gas: A key enabler for a CO2-neutral energy system	link
15-Nov-2019 12:52PM	Bio-idrogeno per la mobilita' sostenibile - la tecnologia di HYSYTECH	link
15-Oct-2019 07:21AM	Energie rinnovabili: qual è il futuro del petrolio? E il nostro?	link
24-Jul-2019 04:11PM	Biometano dalla metanazione della CO2	link