Environment - LIFE Programme

HANDBOOK

LIFE+ Grant agreement reference n° LIFE 09 ENV/IT/000216

H2power

Hydrogen in Fuel Gas

Comune di Perugia

Green Consulting e Communication

Cgenera

UMBRIA MOBILITÀ

tamat

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PROJECT	H2POWER. Hydrogen in fuel gas
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The Project Handbook is an internal tool that every partner can consult to know the procedures for handling of documents and the progress of the Actions along the project lifetime. There are described information regarding objectives, vision, expected results, deliverable and milestones
It includes the description of any Action, its timing and involved partner.
In particular the handbook underlines the procedure for documents approval, internal rules for graphic image standards of communication tools and models for administrative and report tools compilation.

INTRODUCTION

The project will be completed towards the end of 2013, ha the objective of verifying and demonstrating a sustainable technical alternative to urban mobility, using alternative fuels to the traditional one: hydrogen from renewable sources.

The aim is to demonstrate the feasibility and applicability of the use of hydrogen as a fuel used in urban public transport to reduce pollutants, particularly greenhouse gases. The project aims to create a "demonstrator" as a minibus already in use in the urban transport network of Perugia. This type of vehicle, is in fact used for public transport in urban centres with technical prescriptions of practicability difficult due to the sudden twists and slopes.

The proposed methodology involves the preparation and development of a methane-powered minibuses to be prepared to use "demonstrator" to determine their feasibility for use in activities such as use of public transport. The implementation of power system combined with the hydrogen will be prepared by laboratory tests and on the road.

La finalità è di dimostrare la fattibilità e l'applicabilità dell'uso dell'idrogeno come combustibile utilizzato nel trasporto pubblico urbano per ridurre gli agenti inquinanti ed in particolare i gas serra. Il progetto prevede di realizzare un "dimostratore" come un minibus già in uso nella rete dei trasporti urbani di Perugia Questo tipo di veicolo, è difatti utilizzato per il trasporto pubblico nei centri urbani con caratteristiche di percorribilità difficili a causa delle repentine pendenze e tortuosità.

La metodologia proposta prevede la preparazione e lo sviluppo di un minibus alimentato a metano da allestire ad uso "dimostratore" per verificarne la fattibilità come utilizzo d'impiego nelle attività di trasporto pubblico urbano. L'implementazione del sistema di alimentazione combinata con l'idrogeno sarà preparata da test di laboratorio e su strada

DESCRIPTION OF THE PROJECT
Objectives

Technical:

1. attesting and verifying the feasibility of hydrogen-methane fuel on small public transport minibus vehicles such as Iveco Daily, in urban and extra-urban areas with a high degree of orographic complexity.
2. preparing and developing a demonstrator, consisting of a public transport vehicle provided with an hydrogen-methane fuel kit.

Strategic:

- Cleaner transport for a good quality air
To deliver and evaluate improvements in the efficiency and environmental performance of the mobility system.

- Innovation
To progressively create a local public transport fleet made up of eco-compatible vehicles and supporting researches, meetings and agreements with other local authorities

- Integration
To ensure the added value of each implemented activity through an integrated approach of the relevant city actors (policy makers, transport agencies, and the citizens) so to predict the potential impacts of implementing similar measures elsewhere in Europe.

- European policy relevance
To ensure that the project findings and outputs are
applicable to the European strategies and policies for sustainable urban mobility directly applicable to the needs and priorities of transport policy makers.

Actions and means involved:

Action 1. Management and Coordination Action
Action 2. Administrative monitoring Action
Action 3. General communication and dissemination Action
Action 4. Technical capitalization Action
Action 5. Know-How acquisition Mix Hydromethane Quantities
Action 6. Carburation Optimization Process on Engine Control Unit
Action 7. Adapting the Fuelling System Propulsion on the road
Action 8. Monitoring the system propulsion on the Road
Action 9. Statistical Cost –efficiency analysis

EXPECTED RESULTS

The project main output is the preparation and development of a vehicle provided with propulsion, injection system, tank fuels – which is a key requirement for an industrialization process feasibility study.

The hydrogen-methane propulsion complex will be supported by the operational feasibility analysis, that will be available for all the urban transport agencies, and thus without wasting resources for ad hoc evaluations and feasibility studies.

The project viability has a great potential in terms of industrial, scientific and environmental values. The project experimentation is implemented in a very sensible sector such as the air quality one, implying the reduction of emissions and thus aiming at achieving the Kyoto protocol objectives: the hydrogen combustion produces zero emissions.

The use of hydrogen-fuel in internal combustion engines provides an unlimited availability resource. The possibility of onsite production and of local storage, introduces a completely innovative notion about energy resources saving and planning. Thanks to the profits and benefices in terms of energy saving and CO2 reduction, the **H2POWER** experimentation is a guiding efficacy and feasible solution for contributing to the achievement of the Kyoto protocol.

ENVIRONMENTAL PROBLEM TARGETED

The use of hydrogen as a fuel seems to be the modern and inexhaustible energy source, with key features in support of environmental and economic sustainability.
The technologies for hydrogen production are well-known and easily available: it can be produced from water, the process is called electrolysis, and passes electricity through water in an ionic transfer device to separate water into its hydrogen and oxygen parts. Renewable technologies can generate electricity to produce hydrogen from electrolysis with zero greenhouse gas emissions.
This process can be entirely implemented on-site, and thus avoiding transport costs, which are typical of other kind of fuels and allowing a complete planning of the energy resources.
The **H2POWER** project proposes a new concept about the use of energies for mobility, by introducing a few efficacy elements for reducing the pollutant impacts of the traditional fuels implied in the transport sector.
The complete combustion of methane CH_4, produces carbon dioxide and water. While in the absence of oxygen may be numerous reaction generating different products, including, carbon monoxide, methanol, etc.
The stoichiometric ratio is: 1vol. of methane + 9,52 vol. of air. In practice the relationships methane: air is about 1:10.
If we analyse in particular the combustion of methane has the reaction of combustion is:

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

INNOVATIVE ASPECTS OF THE PROJECT

Hydrogen as a fuel

The use of hydrogen as a vehicle fuel **is not restricted** to fuel cells. Hydrogen is a perfect fuel for conventional Otto engines. This fact is proved through several experiments by engine manufacturers or operators. Consequently, some recent programmes at EU level foresee demonstration of hydrogen technology under actual operation conditions. This confirms that, due to the considerably lower costs of internal combustion engines compared with fuel cells, this solution it seems to be the most appropriate until future developments have considerably reduced the cost of procurement and operation of fuel cells. When used in internal combustion engines, hydrogen produces H2O. Mixtures of hydrogen and natural gas can also be an intermediate step.

So far the experimentations developed for the use of hydrogen in the public transport sector demonstrated the feasibility of mixed hydrogen-methane fuel up to a 8%. The H2POWER project extends the experimentation on the hydrogen-methane fuel to urban transport vehicles, and in territorial contexts with burdensome orography.
The supporting technologies that will be used (about sensors, electronic monitoring, hydrogen generator etc.) will be provided by market account activities. At this regard there wouldn't be any action aiming at developing new devices, but only to optimize the acquired devices thanks to ad hoc electronic and informatics tools. Within the European experimentations context, the H2POWER proposal foresees attractive innovative elements:
The use of hydrogen in the combustion phase as an alternative to the "fuel cell", whose advantages are:
a) Hydrogen may be used by the actual vehicle fleets;
b) Hydrogen may be produced by the user itself.

DEMONSTRATION CHARACTER

The project has a demonstration nature. Indeed, its key objective is to demonstrate that the use of hydrogen as a fuel may be introduced and applied by using the available technologies.
The experimentation on the Daily Iveco vehicles will provide the necessary documentation to support those agencies and enterprises interested in adopting the proposed solution. Besides that, the project will provide to the transport vehicle manufacture companies with an optimized and tested vehicle using the hydrogen-methane fuel for the industrialization of the propulsion system.
The system will be developed on a new Iveco Daily bus, already in the fleet of the consortium managing the public transport in Perugia, and which meets the requirements imposed by historical centers such as the Perugia one.

The vehicle, called "demonstrator" will be revised in order to:

1. Get the maximum performance of the hydro-methane combustion system;
2. Monitor all the processes necessary for a complete evaluation of the system.

Both requirements will be satisfied through technologies already in use in the market, provided by Testing and calibration laboratory and National Accreditation Bodies.

ACTIONS

ACTION 1: Management Area

Responsible partner:
MUNICIPALITY OF PERUGIA

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Management and Coordination Action
Coordination & administration, secretariat, organization of general meetings

Task 1.1. Management, Coordination & Monitoring Activities
The management, the coordination and the monitoring of the project respond to the Project Management System established at the beginning of the project. The system will support the various and complex tasks within the overall project management in a secure and efficient way.

The Coordinator will be responsible for:
1. The financial and administrative coordination
2. Coordination of partner contributions
3. Organization, animation and documentation of the project meetings
4. Reporting to the project partners and European Commission
5. Project monitoring

Task 1.2. Attendance & Input to Partnership co-ordination meetings:
This action aims at ensuring quality project completion to time and budget and that performances are properly improved during the project development. It's intended to be a service to the project development. In parallel, it provides continuous assessment of the key criteria or requirements of project activities.

ACTION 2: Management Area

Responsible partner:
TAMAT ONG

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Monitoring action, Evaluation and Quality Control

Project Monitoring, Evaluation and Quality Control is a step-by-step process of collecting, recording and organizing information about project results, including short-term outputs (immediate results of activities, or project deliverables), and immediate and longer-term project outcomes (changes in behaviour, practice or policy resulting from the project).

To this scope an **Evaluation and Quality Plan** (Monitoring protocol) – internal working document - will be issued describing **guidelines on the day-to-day project quality assurance procedures** and on the practical aspects of the project development, including:
- reports editing procedures
- criteria for work progress.

The plan will cover two different aspects:
1) **Project quality:** referring to things like applying proper project management practices to cost, time, resources, communication etc. It covers managing changes within the project.
2) **Deliverable Quality:** refers to the 'fit for purpose' aspects (Does the deliverable do the job it was designed to do?). It covers things like how well it meets the user's needs, and the total cost of ownership.

Before submitting the document to the European Commission the deliverables will be approved by the **ExCo** on behalf of the reviewer.

This task will monitor the project developments and ensure that they are fit for purpose.

This task includes peer review activities ensuring a high quality of project deliverables. Both activities will be carried out on the basis of a detailed quality assurance plan in accordance with international QA standards.

The **quality assurance plan** will include:
- Description of standards,
- Description of tools,
- Quality checks of project Milestones and deliverables,
- Quality control on project deliverables and peer reviews involving at least one external expert for public, deliverables,
- Tracking of project management activities.

1) Evaluation and Quality Plan (Monitoring Protocol):
The QP is a key document for the management of the Project.
The QP seeks to establish the procedures and
standards to be used in the project and allocates responsibility for ensuring that these procedures and standards are followed. The QP is effective throughout the life cycle but it is open to review.

2) Monitoring Questionnaires/forms:
to be filled in on a monthly base by each project Beneficiary

3) Evaluation and Quality Reports (Monitoring Reports)

ACTION 3: Dissemination Area

Responsible partner:
TAMAT ONG

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General communication and dissemination

This action is concerned with all the internal communication and external dissemination issues, which are transversal to the project activities and whose target audiences are, therefore: the project partners and the general public.

The objectives of the action are:
- To offer a clear information on the project activities
- To inform the community about the project progress and achievements
- To raise awareness among local actors on the sustainable mobility issues
- To Improve dissemination and promotion actions at EU level

The strategy will identify target groups for communication; define activities and timelines for development of tools and products for dissemination, undertaking actions, evaluating impacts.
A common 'Dissemination Plan' will compile and integrate all planned activities.
At the end of the demonstration period, findings from the evaluation of outreach and impacts will be composed into an 'Awareness and wider societal implications report', which also will become an important document for the H2POWER evaluation.

COMMUNICATION, DISSEMINATION AND CAPITALIZATION PLAN (CDC)

The CDC plan has to contain all the communication and dissemination tools and guidelines. The CDC plan is a written document formalising an harmonised visual identity of the project and describing:

- what the project want to accomplish with your association communications (your objectives),
- ways in which those objectives can be accomplished (project goals or program of work),

- to whom the project association communications will be addressed (target audiences),
- how the project will accomplish the foreseen objectives (the tools and timetable),
- how the project will measure the results (evaluation).

The action foresees the following activities:
1. Presentation to the internal offices of the Perugia Municipality project H2POWER;
2. To present to the local community the objectives and the project activities
3. To encourage the local citizens participation to the identification of solutions for the achievement of the sustainable mobility

The H2POWER actions supporting sustainable mobility implies:
- a deep knowledge of the citizens about the activities implemented by the project and its objectives;
- sharing the benefits that this demonstration project will produce.

The Action Plan developed is based on the concern of sustainable mobility starting from public transport, as a progress in the research of an enhanced quality of life.

Three are the main stages for setting up the messages and the communication actions of theH2POWER project:
1. The project start up (from Month 1 to Month 8): development of the institutional image of the project. The activities concerns the knowledge and the awareness raising of the citizens of Perugia on the foreseen activities and on the project visibility at national level.
2. The operational project (from Month 9 to Month 31): the communication actions will follow and support the interventions on sustainable mobility and promotes the interest of local community.
3. The verification stage of the project (from Month 10 to Month 36): evaluation of the implemented experience and of dissemination of the project outputs and findings at local, national and international level.

The structures of both dissemination activities, the general and policy one and the technical one, are similar and involve the following levels:
- national and local governments for the policy implications;
- public transport operators;
- Media conference and press releases to present and describe the project progress, to communicate to target groups and to promote the project outside its action territo

ACTION 4: Valorization Area

Responsible partner:
I&TC

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Workshops and Training Technical capitalization Action
Reference Support Office

Workshop and Training will be realized guaranteeing the full dissemination and transferability of know-how across partners, stakeholders and empowering project results for non-participating but interested bodies.
The H2POWER is providing the platform to show that new and innovative "clean" fuels and mobility services can find a real breakthrough in the transport market.
Descriptions of products and services will be provided to activities carried out in the context of know-how transfer, exchange of experiences and best practice transfer.
A matching workshop will be organized to support the best practice replication and internationalization of the demonstrated products and mobility services for the key stakeholders. In addiction training sessions will be realised. They will be supported by trainers who have participated to the study: the training sessions will be based upon the latest research results, upon evaluation results within H2POWER.
The task will provide a training approach and methodology in which partners and stakeholders will learn best practices: i.e. indicators will be developed so that a best practice is something that can be replicated at multiple locations. Transferability does not simply refer to individual technical or operational features, but how a measure corresponds to the receptor.
Events, Workshop and Training sessions will be promoted through "Reference Support Office" (RSO), explained and described in the next paragraph.

The objectives of this action are to:
- ensure internal and external communication, and implement a proactive dissemination strategy.
- develop a holistic impact methodology based on a comprehensive evaluation framework at project and local level;
- define transferability guidelines within national and European contexts;

- develop a methodology for translating findings into policy implications;
- ensure development and presentation of policy relevant results for target audiences.

Organization of Large dissemination Events/ Workshops

Public events:
two large events will be held that will target potential end users, stakeholders, bodies of research, private companies and specialized media.
The first will be a mid-term event that will have a dual aim of validating project findings and promoting the project. This will target around 60/80 external participants.
The second event in Perugia will present the final results of the project and will aim to attract external participants as a stand-alone event and/or as part of the LIFE+ Forum Conference, relevant project

Expected results:
1. Know How transfer to stakeholders
2. Promotion of the project among people, interested bodies and specialised press
3. Job opportunities for Young people
4. Project identity layout (logo and its application on the project material)
5. Web-site
6. After Life Communication project Plan: RSO_ Reference Support Office
7. After Life Conservation project Plan: RSO_ Reference Support Office
8. Layman's report
9. Realization of periodic training sessions during the development of the project
10. Realization of 2 main Events/workshops
11. Participation in international forum and Fairs
12. Video dossier

- One mid-term event: validating project findings and promoting the project. This will target around 60/80 external participants (target potential end users, stakeholders, bodies of research, private companies and specialized media)
- One matching workshop (60/80 participants) final conference:

to support the best practice replication and internationalization of the demonstrated products and mobility services
for the key stakeholders

- Two Training sessions (80/100)_ high schools and universities

ACTION 5: Know-how acquisition Area

Coordinator Partner:
EGENERA srl
Beneficiary partner:
UMBRIA MOBILITA' Spa

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Mixture quantities of hydrogen and methane and setting up of the propellers

This is the really engineering starting point of H2POWER for verifying the maximum limit of hydrogen that may be injected in the combustion room.
The verification of this parameter is essential since the higher is the hydrogen percentage introduced and the lower will be emitted CO2 in the pot and thus in the air.
The experimentation activity will be implemented at the supplier location that will be identified at the beginning of the Action.

Setting up the system for the digital engine control and regulation of the static distribution with multipoint intermittent and timed injection. The management of a possible turbo compressor (i.e electro-pneumatic Waste Gate with electric duty management and / or electric or pneumatic Dump Valve) shall be guaranteed by the Engine Unit.
Propeller start-up with commander ignition on microprocessor architecture. Candlepower ignition, fuel injection and combustive agents measuring. Setting up the system for the digital engine control and regulation of the static distribution with multipoint intermittent and timed injection. The management of a possible turbocompressor.
The experimentation may define some useful parameters for the automobile manufacturer companies, so to increase the compliance of the endothermic technology with the increasing level of hydrogen percentage.
The tank constructions for the storage of pressurized gas differ depending on the application and the required pressure levels.

Tests:

- Testing the vehicle on dedicated race for the collection of the required parameters in the nominal conditions

- *Test del veicolo su pista dedicata per la rilevazione dei parametri necessari in condizioni nominali.*

Parameter:

- Ignition candlepower phonic wheel, aspired air temperature,
- pressure of the aspiration manifold (and/or electronic debimeter),
- temperature of the cooling fluid,
- fuel rail pressure,
- throttle lever sensor location,
- brake pressure sensor,
- oxygen sensors on the exhausting pipe

- **Test on Engine Bench**
  During research and development will be assessed the possibility of using two separate tanks: one for hydrogen and one for methane.

- ***Test su banco motore***
  In fase di ricerca e sviluppo sarà verificata la possibilità di usare due serbatoi separati: uno per l'idrogeno e uno per il metano

Expected results

- Verification of hydrogen and methane fuel levels
- Report on the hydrogen and methane fuel mixture.

ACTION 6: Energy Area

Responsible partner:
EGENERA srl

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Study on the electronic optimization of the process using and Engine Control Unit (ECU)

The hardware set up of the ECU for the carburetion management with the hydrogen-methane fuel is the most sensitive action of the system development. This action will be implemented at the supplier location. The experimentation will define all the useful parameters for the vehicle automobile sector enterprises for conciliating the endothermic technology with the increased level of hydrogen use.

The Engine Control Unit needs an ad hoc hardware to guarantee the controls implementation to be sent to the numerous devices for the endothermic engine functioning, such as ignition candlepower; fuel injectors, electrovalve, etc.
Several analogical and digital inputs shall be set up for the proper management of the endothermic engine, such as the ignition candlepower phonic weel, aspired air temperature, pressure of the aspiration manifold (and/or electronic debimeter), temperature of the cooling fluid, fuel rail pressure, throttle lever sensor location, brake pressure sensor, oxygen sensors on the exhausting pipe, etc.

Expected results:

- Fuel management optimization (electrovalve, injections, fuel level)
- Report containing relevant endothermic compressure parameters
- Manual for the implementation of the ECU configuration

Indicator of progress:

- Setting up and finalization of the electronic mixture device
- Identification of the carburetion value

Action 7: Processing Area

Coordinator partner:
EGENERA srl
Beneficiary partner:
UMBRIA MOBILITA' spa

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Structural works for adapting the hydrogen-methane fueling system to the vehicle and for allocating the fuel tanks

Usually stationary tanks have a lower pressure level and therefore are cheaper. The requirements for mobile applications, for example in a motor
vehicle, are different, the space for tanks is limited and the storage has to be light. The volumetric energy density of hydrogen gas under ambient conditions is much lower than that of gasoline or diesel. Hydrogen is therefore compressed in order to reduce the size of the filling station storage, to keep space requirements onboard the vehicle at a reasonable level, and to ensure enough range for daily bus operation. For this project, which is mainly oriented to check the feasibility of use of hydrogen in gas phase, we do not expect any type of tanks but only the use of gas cylinders.
This action foresees the study of the supplementary fuel tanks al location as well as of the vehicle electric plant and of the electronic devices for the management of the new system.
The location of the additional fuel tanks shall meet the need of reducing the fuelling distance up to the fuel mixing unit. This will make more efficient and safe the vehicle. The structural holding of the vehicle will provide the most suitable allocation areas. The management system of the new fuel will introduce adjustments and new devices that shall be located for conciliating the available useful spaces and their functionality.

- **Testing** the vehicle on dedicated race for the collection of all the required parameters
- **Evaluation** of implementation and testing of system security

- ***Test*** *del veicolo su pista dedicata per il rilevamento di tutti i parametri necessari*

- ***Valutazione*** *delle implementazioni sistema attuate e test di sicurezza del*

Parameters:

- Ignition candlepower phonic weel, aspired air temperature,
- pressure of the aspiration manifold (and/or electronic debimeter),
- temperature of the cooling fluid,
- fuel rail pressure,
- throttle lever sensor location,
- brake pressure sensor,
- oxygen sensors on the exhausting pipe

Expected results:

- Optimization of the fuel tanks allocation, of the electronic devices, including wiring.

- Plan describing the most suitable tank allocation to guarantee the respect of the regulation on safety ECE/ONU 110 - 67/01

Indicator of progress:

- Fuel tank assembled and allocate

Action 8: Processing Area

Responsible partner:
EGENERA srl

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Monitoring of the propulsion, electric and exhausting systems through microcomputer based devices with distributed sensors

The action consists in acquiring and collecting the sensitive parameters through the sensors network that will be positioned in key locations, and thus allowing a complete analysis system both in statistical data than in road tests. The experimentation will define some useful parameters for the automobile manufacturer sector in order to enhance the compliance of the endothermic technology with an increased use of hydrogen percentages.
The action objective is to check the efficacy of the hydrogen-methane system and the examination about the system validity in terms of supplying enough power during the bus regular functioning.
The acquisition of the parameters will be developed through a sensors network positioned in the strategic locations of the system and transferred to the console monitors.
Data may be collected in telemetry and sent to remote console.
The analysis and the study of monitored data will serve for the following evaluation of the system efficacy.

- **Testing** the vehicle on the road for the collection of all the required parameters
- **Evaluation** of implementation and testing of performance system

- ***Test*** *del veicolo su strada per il rilevamento di tutti i parametri necessari*
- ***Valutazione*** *delle implementazioni attuate e test di resa del sistema*

Parameters:

- Ignition candlepower phonic weel, aspired air temperature,
- pressure of the aspiration manifold (and/or electronic debimeter),

- temperature of the cooling fluid,
- fuel rail pressure,
- throttle lever sensor location,
- brake pressure sensor,
- oxygen sensors on the exhausting pipe

Expeted results:

- Monitoring process of the parameters necessary for the overall evaluation of the power supplied to the engine.
- Technical Monitoring Report

Indicator of progress:

- Identification of the sensors location

Action 9: Processing Area

Responsible Partner:
UMBRIA MOBILITA' Spa

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Comparative statistical cost-efficiency analysis, provision times for hydrogen, hydrogen storage and refueling during the vehicle functioning

This action consists on monitoring the vehicle performances through road tests following the engine test bench and rolled bench simulations, which are indeed required and sufficient to face a possible technical and prescriptive process for the vehicle homologation, even considering the ongoing prescriptive evolutions of this propulsion category.
The most suitable refueling system will be identified during this Action.

The bus will be equipped for the test implementation with hydrogen-methane mixture at different percentages, in compliance with the already implemented engine test bench and rolled bench simulations.
Professional drivers will implement the test routes with the support of technicians able to implement the measurements and the calibration of the most significant parameters, in order to verify the correspondence between the results achieved during the laboratory experimentation action and those collected through the road tests.
The vehicle will be than equipped for the collection of the motor parameters, of the emission, consumption and comfort ones, which are considered to be essential for the following analysis and technical / economic developments and elaborations to allow the efficiency evaluation of the adopted system. The route test modality will be, when possible in compliance with the European rules currently under development and in compliance with the laboratory experimentation.

Expected Results

- Guidelines for the implementation of the hydrogen-methane fuelled minibus

Indicator of progress:
- Percentage of hydrogen-methane mixture
- Vehicle capacity of tackling with the different routes conditions
- Gas emissions values

KEY MANAGEMENT

The key management figures of the project have been reduced to three. Indeed, besides the overall coordination activities of the project coordinator and the dissemination and capitalization activities of the Communication and Capitalization Supervisor, the efficient implementation of the **H2POWER** project requires the supervision of the Scientific Manager. The partnership is indeed a complementary one in terms of partners' skills and competencies, so to guarantee and cover the expertise and know-how requested for the implementation of all the project actions.

The Project Coordinator : Municipality of Perugia

- General coordination of the project
- Obligations fulfillment as stated under the Grant Agreement with the European Commission
- Interaction with the European Commission officials and third parties about the project, including the submission of deliverables to the European Commission
- Official representative of the project towards the European Commission and other third parties, although is not entitled to act on behalf of any other partners.
- Reception, compilation and distribution to the partners of documents, reports, statements of expenditures and other official documents of project concern.
- Facilitation of daily management of the project to the partners in coherence with the Grant Agreement provisions and the ExCo decisions, focus of the project relevant information exchanged among the partners.
- Perform active planning and progress monitoring of the implementation activities at project level in conjunction with the project needs and activities and with the support of the Monitoring Officer.
- Execution of control over the management activities; if issues cannot be solved directly, the issues should be channeled to the Project Coordinator and handled by the ExCo.

- Organization of the ExCo meetings.
- Supports the development of the Monitoring Protocol for the timing and administrative compliance of the project actions with the Grant Agreement and its annexes, as well as development of the framework for the Quality Check process of the project activities and outputs.
- Support and supervision of the Scientific Manager activities.

Project Manager:

The Project Manager is the general coordinator of the project and he will verify the project progress through a set of check tools and indicators:

Indicators of inputs

to measure the financial, administrative and regulatory resources being applied, such as expended budgets, or the staff time applied through the use of common arrangements set in the project handbook.

Indicators of outputs

Results-oriented frameworks - to measure the immediate and concrete deliverables achieved with the inputs, such as the respect of the deadlines, the consistency of the output with the development guidelines and with the initial plan.

Indicators of results

to measure the results at the level of beneficiaries, in management terms, such as the level of knowledge of European funding tools and programmes.

Indicators of impact

to measure the overall impact on the project management, such as the level of implementation, the level of efficacy in the project management, the level and promptness in solving problems, the level and the capacity in identifying risks and constraints and in finding solutions.

The Scientific Manager: Egenera srl

- Interaction with the Project Coordinator, and the ExCo components about the project work-plan, including the actions development, implementation and integration.
- Support to the project coordinator in finalizing the templates of the activity reports to be filled in by each project.
- Coordinates the activities of all the technical actions of the project, planning of technical interventions, supervision of the technical external assistances tasks.

The Communication and Capitalization Supervisor: Umbria Mobilità Spa

- Interaction with the Project Coordinator, and the key officers of the partnership about the key strategic issues concerning dissemination of the project actions and capitalization measures.
- Interfaces with the key partnership officer about the development of all the actions and issues dealing with dissemination, communication and capitalization and more in general with the "project identity".
- In cooperation with the Project Coordinator, representation of the project towards the European Commission and other third parties about dissemination relevant activities.
- In charge of all the capitalization aspects of the project.
- Responsible for the development of the project identity.
- Responsible for the development of the website and for all the multimedia activities finalised to spread H2POWER outputs and findings
- Supervises the setting up the RSO that represents the key structure for the sustainability of the project outputs and findings.
- Reception, compilation and distributions to the partners, of capitalization reports and documents.
- In charge of developing the guidelines for the dissemination of the project activities.
- Responsible for the development of all the activities finalised to raise awareness and information about the project activities and the issues dealt: improvement of air quality, sustainable urban mobility, clean fuels, innovation.

All the above mentioned key roles and staff will be supported in each partner organization by internal administrative officers. Besides, another administrative role will be set up during the project implementation by the coordinating beneficiary, whose role is to:
- Act as a partners contact point for the meeting and events organisation.
- Act as a partners contact point for the submission of the reports.

Executive Committee

The above objectives will be achieved through the setting up of an Executive Committee (ExCo). ExCo's decisions are made about the joint activities, strategic directions, project identity, and coordination services for the co-operative activities of the participating partners. Members of the ExCo are the project coordinator, the scientific manager, the communication and Capitalization supervisor.
The ExCo is the body in charge of internal evaluation and project quality
Six ExCo-meetings will be realised to:
A) assess and evaluate project activities implemented in the previous period;
B) monitor and follow-up on-going project activities;
C) plan and organise project activities to be undertaken.

Reference Support Office (RSO)

Coordination **"Reference Support Office":** I&TC Group

An ad hoc "Reference Support Office" (RSO) has been setting up during the project implementation, that has been composed by representative of partner involved in Communication and dissemination area. In particular the staff is composed by expert in marketing, ITC, and meeting organization as well as on the technical issues dealt by the H2POWER project, in order to provide ad hoc consultancies and support to the companies and agencies willing to implement the developed technologies.
The RSO will make available the acquired know-how, all the data and information required for facilitating the stakeholders interested in the eco-friendly propellant introduction.

The Office contributes to the elaboration of technical/methodological guidelines of the project for the implementation of public transport vehicles using hydrogen-methane fuel and for guaranteeing the transferability also on a large scale of the demonstrator.

RSO realizes an interaction activity with the technological partners and identify key stakeholders in order to plan ad hoc outputs and findings transferability also to other sectors, such as mobility applied to economic and commercial activities as well as civil mobility.

"Reference Support Office" promotes all the initiatives for advertising the obtained results and findings through meetings (conferences, symposia, debates, round tables, etc.), publication of articles on specialized press at national and international level.
The Office will provide an ad hoc support towards all the partners of the project in order to promote meetings, stand spaces in forums and fairs in order to make the proposal more efficient. Also documents on digital, multimedia and paper support will be elaborated.
Other supports of the RSO are: Web site; mailing list and download area of produced material.
All the documents will be available on digital support PDF and open source.
RSO will be operational for at least 12 months after the end of the project completion, while the website will be guaranteed on line for 5 years after the project completion.

EFFORTS FOR REDUCING THE PROJECT'S "CARBON FOOTPRINT"

Making reference to the project actions, the partnership will make use of those technologies providing a greater efficiency in terms of production and with a lower impact: the evaluation on the EROEI scale (Energy Returned on Energy Invested) will identify how much energy has been used for the production of a particular device. To this is linked the calculation of the footprint: indeed, having used a less quantity of energy for the system production, a lower quantity of CO2 would have been produced.
The project aims directly to the reduction of petrol and its by-products, by substituting them with a gas emitting only water as a combustion waste.
The association of the above mentioned indicator to the renewable energy production system, gives as a result an energy with a very limited footprint impact and thus allowing a reduction of gases derived by carbon.
The proposed solution, indeed, doesn't include the "fuel cells", which are characterized by the optimization of the CO2 reduction process, but at the same time introducing an additional EROEI parameter such as their own production.
In the H2POWER proposal, the use of hydrogen in the combustion phase, doesn't need any more the production intermediaries thanks to the direct process from the water to the fuel.

The assessment of CO2 equivalent per capita for those involved in project activities (mission, activities for work, etc.) will be made during the implementation. In support of a

careful accounting of containing the carbon footprint, the partnership will use an energy manager to identify strategies and more effective solutions to reduce emissions of CO2 equivalent.

Action 3 _ Communication and dissemination

In this phase the partnership will measure the CO2 emitted in relation to the material used for the action implementation:

- CO2 eq. X Cdrom/DVD = 120g/each
- CO2 eq. X page (color, coated, 80g) 50g/each
- CO2 eq. X T-Shirt (natural color) = 2,8Kg/each
- CO2 eq. X panels (120g) = 110g/each

Cdrom/DVD 120g CO2/each 120Kg CO2
Pages and papers 50g CO2/each 75Kg CO2
T-Shirt 2,8Kg CO2/each 2800 Kg CO2
panels 110g CO2/each 17Kg

Reference:
(htt://www.davisrubin.com/ecodisc.htm)
(htt://heinzhome.heinzctrinfo.net/publications/PDF/08014_Time_1to51.pdf)
(htt://ecofx.org/wiki/index.php?title=T-shirt)

In order to clarify the H2POWER partnership efforts for reducing the project carbon footprint, it is necessary to outline the main outline the main phases of the project H2POWER:

a) **Action 5 Action 6**

The daily energy consumption forecast is: 15Kwh p. day to use computer systems and electronic equipment and lighting systems for use 3Kwh = 360Kwh/mounth. Power for plants for cooling and heating 25KBTU/day = 140kwh/month

Power plants 360Kwh/m 200 CO2/m
Cooling and heating 140Kwh/m 80 Kg CO2/

b) Action 7 Action 8

Static phase – Workshop: workshop's power plants = 15KW/day, consumption for lighting 5Kwh/day = 400Kwh/month;

Power plants for cooling and heating 27KBTU/day = 160Kwh/month
Workshop 400Kh/m 230 Kg CO2/m
Cooling and heating160Kwh/m 92 Kg CO2/m

c) Action 9

This phase will test the MiniBus in distance track and road. Average distance of 4000 km / month.

Track and road 4000km/m 1550kg CO2/m

Besides, to contain CO2 emissions the provision H2 to be used in the mixture with methane, the project partnership will identify a supplier producing H2 from renewable sources.

DELIVERABLE PRODUCTS OF THE PROJECT

It's compulsory to insert this phrase in all documents produced:
With the contribution of the LIFE financial instrument of the European Community.

And the following disclaimer for public documents:
This publication reflects the views only of the author and the Commission cannot be responsible for any use which may be made of the information contained.

Official typeface used: Futura BK TB

REPORTS

Contractors are required to produce administrative reports to update and inform the European Commission on the progress and findings of EU projects. They may also be used to inform governments of the progress of EU projects.

It's required to add an EU style front cover together with the project name and submission date to all administrative reports you submit concerning your EU project or programme

Each associated beneficiary will make a **periodic report** to the coordinator inclusive of both financial and technical details, in order to allow the coordinator to draft all the required reports to be submitted to the EC and in order to further check and evaluate the implementation of the project in each partner organisation.

LAYMAN'S REPORT

Towards the end of a LIFE project, beneficiaries are obliged to produce a Layman's report in paper and electronic versions.
This is a concise report, of 5 to 10 pages in length, in English and the coordinating beneficiaries' language, targeted at anon-specialist audience, including political decision-makers, and outlining the main results of the project.
Specific objectives of the project, including specific targets where appropriate
• The methodology used. This is of particular interest to your reader, as it explains how the project's objectives were achieved
• Results, including key data presented in an easily-understood format e.g. a simple table. Also, be sure to mention what didn't work as well as what did. This can provide useful lessons for other interested parties.
• Long-term environmental benefits and/or socioeconomic impacts.fic
LIFE and Natural 2000 requirements
There are three specific requirements with regard to the Layman's report. Namely, the report
should:
• Be produced in both print and electronic format
• Be published in the coordinating beneficiary's language and in English
i.e. clearly reference LIFE financial support and include the LIFE logo.

LIFE+ Grant agreement reference n° LIFE 09 ENV/IT/000216

LAYMAN'S REPORT

N.1

DATA

SUMMARY

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Didascalia dell'immagine o della fotografia

TITOLO BRANO PRINCIPALE

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Determinare innanzitutto il tipo di lettori, ad esempio dipendenti o persone interessate all'acquisto del prodotto o alla richiesta di un particolare servizio.

È possibile creare un elenco di indirizzi utilizzando moduli di risposta o iscrizione e biglietti da visita raccolti in occasione di fiere o altri eventi. Questo tipo di elenchi di indirizzi può essere acquistato presso aziende specializzate.

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Definire infine la quantità di tempo e denaro che si desidera investire nella realizzazione del notiziario. Questi fattori consentono di determinare la frequenza di pubblicazione e la lunghezza del notiziario. È consigliabile pubblicare il notiziario almeno a scadenza trimestrale in modo che i lettori lo considerino un appuntamento regolare.

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TITOLO BRANO SECONDARIO

> Per attrarre l'attenzione del lettore scrivere qui una frase o citazione tratta dal testo

Questo brano può contenere 75-125 parole.

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Deve infatti rappresentare in modo conciso il contenuto del brano e attirare l'attenzione dei lettori. Creare il titolo prima di scrivere il testo. In questo modo sarà possibile avere un punto di riferimento durante la stesura del brano.

In definitiva, il titolo deve essere incisivo e breve.

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INTERNAL MEETING REPORT

Perugia,.....(date)

MEETING SUBJECT:
OGGETTO RIUNIONE

WORKING GROUP:
GRUPPO DI LAVORO

MODERATOR:
MODERATORE

AGENDA:
ORDINE DEL GIORNO

MINUTES OF MEETING:
VERBALE DELLA RIUNIONE

MISCELLANEOUS:
VARIE ED EVENUALI

ATTENDANCE:
PRESENZE

IDENTIFICATION PANEL

Identification providing information on EU participation in the financing of investment should be erected on the sites of all projects in which EU participation amounts to 50 % or more.

You may wish to produce a display panel with which to promote your EU project at an exhibition or event, or at the entrance of a training centre or office reception. The shape, size and dimensions of panels vary depending on the amount of information that needs to be conveyed, and whether the panel is intended to be portable or permanent. Low-cost panels can be made using self-adhesive lettering and a well-positioned EU logo in the upper left hand corner. When you consider it appropriate to add the emblem of a partner organisation on the identification panel, it should be positioned in the upper-right hand corner. Futura Std Book typeface should be used for the text.

BROCHURE

LEAFLET

Leaflets are simple means of informing an audience of the purpose, progress or findings of an EU project, or an event launch etc.

It has to show the basic elements of the visual identity and the logo both of the prject and the LIFE+
Official font: Futura BK BT
It's compulsory to insert this phrase: **With the contribution of the LIFE financial instrument of the European Community,** and the following disclaimer: **This publication reflects the views only of the author and the Commission cannot be responsible for any use which may be made of the information contained.**

Project details, contact name, address, telephone, fax and email details.


For more information
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This project is funded
by the EUROPEAN UNION.
The European Union numbers 15 Member States: 15 different nations determined to shape their future closely together. Over a period of enlargement of 40 years, they have, together, built a zone of peace, stability, progress and solidarity. The European Union is a model for overcoming conflict and promoting reconciliation through close cooperation to achieve common goals, while respecting national sovereignty and territorial integrity. But the EU is not focused on itself: its ambition is to share its achievements and its values with countries and peoples beyond its borders.
The European Commission
is the EU's executive body.
This project is cofunded by the
EUROPEAN UNION
Industrial
development
programme
A project implemented by
IMPLEMENTING AUTHORITY


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EUROPEAN UNION
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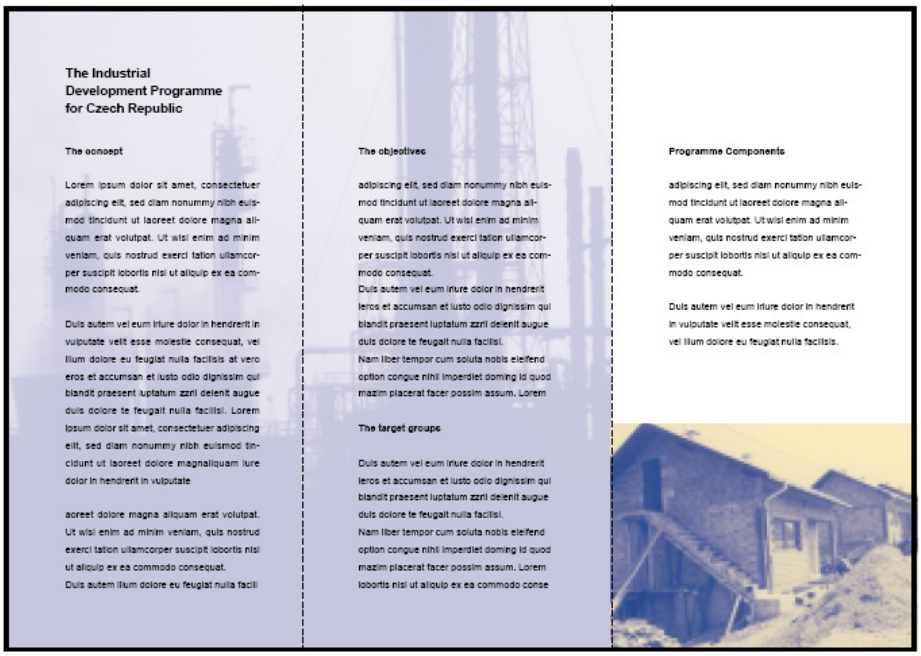
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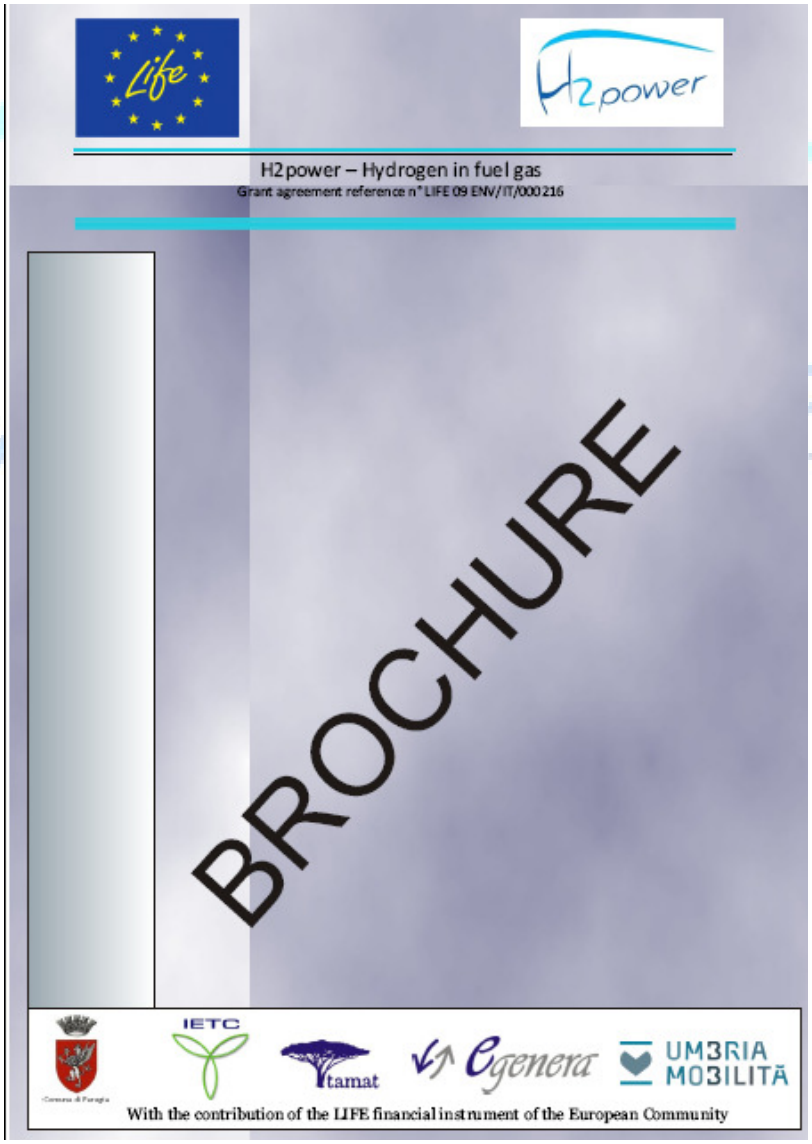
A4 BROCHURE

Publications about EU programmes or similar measures financed or co financed by the EU should, on the title page, contain a clear indication of the EU's participation through the use of the EU logo in the top left hand corner

Where such publications include a preface, it should be signed by both the partner coordinator and, for the Commission the Delegate of the Commission to ensure that EU participation is made clear.
Such publications shall refer to the national and regional bodies responsible for informing interested parties.



PRESS RELEASE

The release should be dated at the top. Then you should indicate when the information can be released. Generally, journalists prefer to be able to use the release immediately, so put 'For immediate release'.
A newsworthy story should retain a spiral shape:

- Headline - snapshot summary
- First paragraph - summary of essential facts
- Next 2-3 paragraphs - repeat story in more detail
- Final paragraphs - background, quotes, general info.

After the 'End', the press release should provide at least one person whom the journalist can contact for further information. Where possible, there should be email address and telephone number.

LIFE+ Grant agreement reference n° LIFE 09 ENV/IT/000216

PRESS RELEASE

N.1

DATA

SUMMARY

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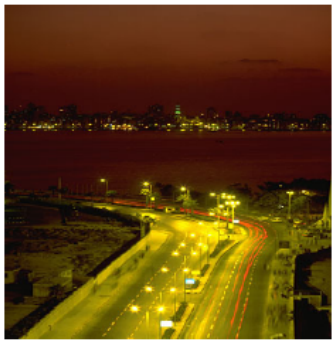

Didascalia dell'immagine o della fotografia

TITOLO BRANO PRINCIPALE

Questo brano può contenere 175-225 parole.

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Determinare innanzitutto il tipo di lettori, ad esempio dipendenti o persone interessate all'acquisto del prodotto o alla richiesta di un particolare servizio.

È possibile creare un elenco di indirizzi utilizzando moduli di risposta o iscrizione e biglietti da visita raccolti in occasione di fiere o altri eventi. Questo tipo di elenchi di indirizzi può essere acquistato presso aziende specializzate.

In Publisher sono disponibili numerosi stili di notiziario adattabili alle più diverse esigenze.

Definire infine la quantità di tempo e denaro che si desidera investire nella realizzazione del notiziario. Questi fattori consentono di determinare la frequenza di pubblicazione e la lunghezza del notiziario. È consigliabile pubblicare il notiziario almeno a scadenza trimestrale in modo che i lettori lo considerino un appuntamento regolare.

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TITOLO BRANO SECONDARIO

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DISSEMINATION FACTSHEET

The DFS will be produced at months: 4, 12, 18, 24, 30 and 35, summarising what the project is doing, on a double level for general public and for a technical one.
Dissemination factsheets gives also the contents for media conferences and press releases.

The document will contain:

- Headline - snapshot summary
- First paragraph - summary of essential facts
- Next paragraphs - repeat facts in more detail
- Final paragraphs - background, quotes, general info
- Contact for further information: email address and telephone number

LIFE+ Grant agreement reference n° LIFE 09 ENV/IT/000216

FACTSHEET H2POWER N.1

DATA

SOMMARIO:

BRANO INTERNO 2
BRANO INTERNO 2
BRANO INTERNO 2
BRANO INTERNO 3
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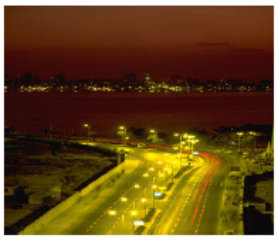

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1

WEB SITE

www.h2power.it

The website has been realized in Italian and English with the LIFE logo shown in every page.

It contains different sections describing each partners and a section where the project is explained in detail (objectives, actions, activities, events and main documents). All the sections will be updated following project progress.

There is a reserved area in which each partner can enter created to be a repository and for the exchange of internal documents and file.

The main deliverables and the final Layman's report will be published on this web site. Each partner will put a specific link to this website in their own official web page. The website will be kept for at least five years after the end of the project.

MONTTHLY TIMESHEET
Compilation

It's necessary to insert data of the partner beneficiary of reference and staff member, specifying if staff member is employed Full-time or Part-time and indicating number of working hours per day and cost of Personnel or External Assistance.
In the compilation some parameters are different for every beneficiary and his staff member, in particular as for number of hours working per day 7,12 or 8,00 that are specified in the Company's employment contract and for the cost of personnel (or external assistance) that is specified in the Financial application form tab. F1: Direct Personnel costs.

It's compulsory to insert also the hours worked on further LIFE-project indicating project reference and hours worked for other activities. Finally every cell referred to a day has to be filled also indicating absence or holidays.

Monthly time-sheet

Project Reference	Life09 ENV/IT/000216 H2POWER
Name of Beneficiary/ Partner	
Beneficiary/Partner number code	
Name of staff member	
Is staff member employed Full-time or Part-time?*	
Cost (Personnel or External Assistance)	
Calendar Year	2011
Calendar Month	Febrary

*indicate number of working hours per day, week or month

Calendar Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Tot
In case of absence, indicate one of the reason codes below					WE	WE						WE	WE						WE	WE						WE	WE					
Hours worked on this LIFE-project			8.00	8.00				8.00	8.00					4.00																	12.00
Hours worked on other projects*																																0.00
Hours worked on other projects*																																
Hours worked on other projects*																																
Hours worked on other projects*																																
Hours worked on other projects*																																
Other activities																						8.00	8.00						8.00	8.00		8.00
Total hours (including overtime)	0.00	0.00	8.00	8.00	0.00	0.00	0.00	8.00	8.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	8.00	0.00	0.00	0.00	0.00	0.00	8.00	8.00	0.00	20.00
Action																																

*indicate project reference(s)

Absences	
Weekend	WE
Sick leave	SL
Public holidays	PH
Annual holidays	AH
Other absence	OA

Summary for this month	
Hours worked on this LIFE-project	12.00
Hours worked on another LIFE-project	0.00
Hours worked on another LIFE-project	0.00
Hours worked on another LIFE-project	0.00
Hours worked on another LIFE-project	0.00
Hours worked on another LIFE-project	0.00
Other activities	8.00
Total hours (including overtime)	20.00
Calcolo di Days in h2power - Hours →	36,00
media ore/giorno	8
numero di giorni	4,50

Trascrivere le ore lavorate con la virgola e suddividere il totale giorni per azione

Action								
1	2	3	4	5	6	7	8	9

Date and signature of staff member

Date and signature of Project Manager/ Coordinator/Responsible

TIMETABLE FOR COMMUNICATION MATERIAL APPROVAL

Every textual and graphic new document has to be approved by the interested partners. According to the different type of material, there are two approval deadlines: 3 days for Graphic material and dissemination factsheet, 5 days for Textual documents and video.
RSO and TAMAT will produce drafts of communication and dissemination documents, that will be sent to the interested partners and Project Coordinator – The Municipality of Perugia, they will have 3 or 5 days (in accordance with the list below) to approve or to demand changes. If, after the deadline, one of the partners or all the partners will not have demanded changes or replayed at the request of approval, the draft will be considered automatically approved.

3 DAYS:

- **Graphic material**
  - Panel
  - Brochure Design
  - Poster
  - Banner
  - Sticker
  - Graphic Format for documents
  - Monitoring questionnaires and forms
- **Dissemination Factsheet**

5 DAYS:

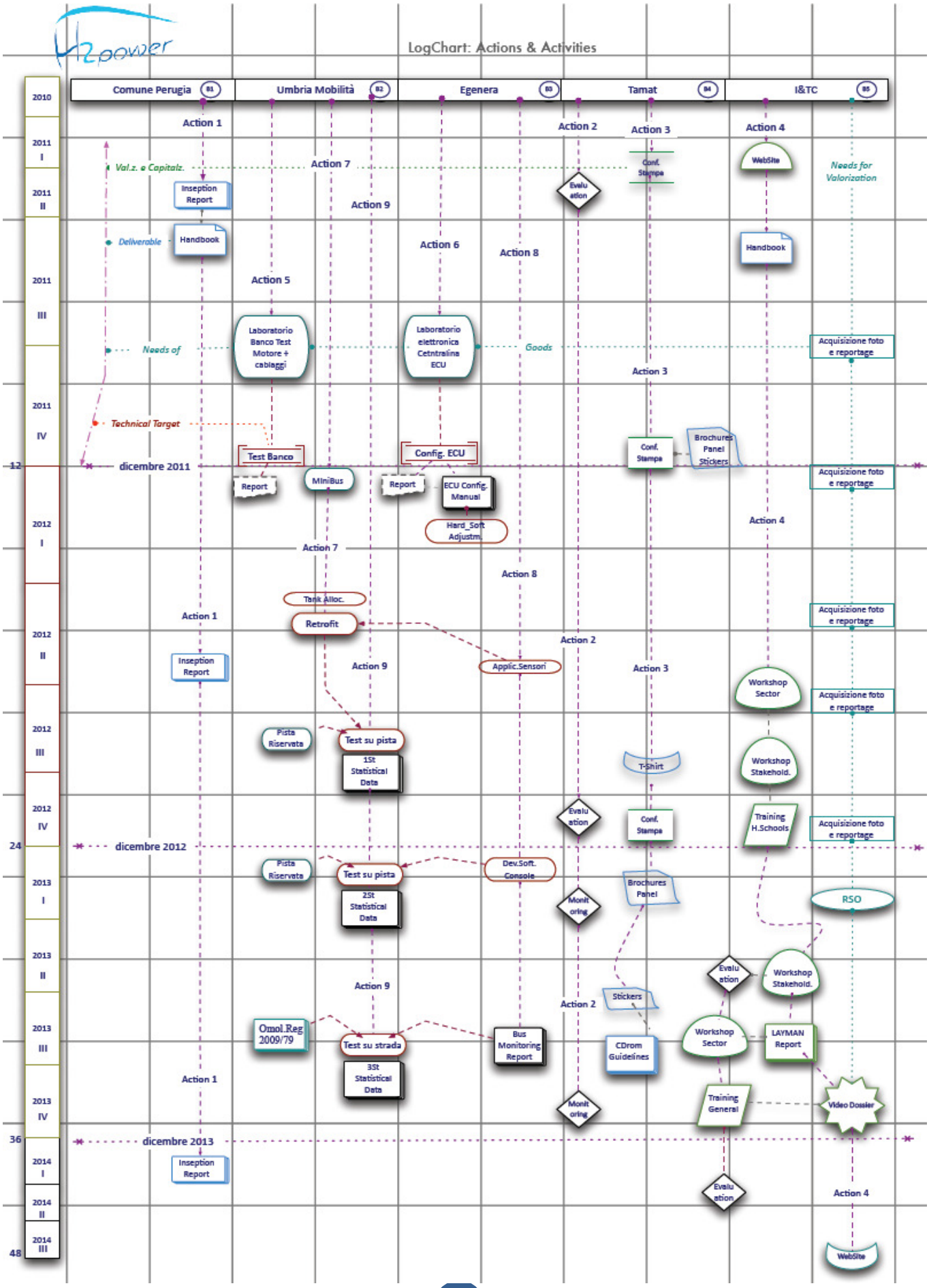
- **Textual Documents**
  - Brochure
  - PPT Presentation
  - Press Release
  - Newsletter
  - Report
  - Guidelines
  - **Video**

3 GIORNI:

- ***Materiale prettamente grafico***
  - *Pannello*
  - *Brochure impostazione*
  - *Poster*
  - *Banner*
  - *Sticker*
  - *Format grafici per documenti*
  - *Monitoring questionnaires and forms*
- ***Dissemination Factsheet***

5 GIORNI:

- **Documenti testuali**
  - Brochure
  - Presentazione PPT
  - Comunicato stampa
  - Newsletter
  - Repor
  - Guidelines
  - **Video**


LogChart: Actions & Activities
Comune Perugia
Umbria Mobilità
Egenera
Tamat
I&TC
Action 1
Action 2
Action 3
Action 4
Action 5
Action 6
Action 7
Action 8
Action 9
Val.z. e Capitalz.
Deliverable
Needs of
Technical Target
Needs for Valorization
Goods
Inception Report
Handbook
Laboratorio Banco Test Motore + cablaggi
Laboratorio elettronica Cetntralina ECU
Conf. Stampa
Evalu ation
WebSite
Acquisizione foto e reportage
Brochures Panel Stickers
Test Banco
Config. ECU
Report
MiniBus
ECU Config. Manual
Hard_Soft Adjustm.
dicembre 2011
Tank Alloc.
Retrofit
Applic.Sensori
Workshop Sector
Workshop Stakehold.
Training H.Schools
Pista Riservata
Test su pista
1St Statistical Data
T-Shirt
dicembre 2012
Dev.Soft. Console
2St Statistical Data
Monit oring
Brochures Panel
RSO
Omol.Reg 2009/79
Test su strada
3St Statistical Data
Bus Monitoring Report
Stickers
CDrom Guidelines
LAYMAN Report
Training General
Video Dossier
dicembre 2013
2010
2011 I
2011 II
2011 III
2011 IV
2012 I
2012 II
2012 III
2012 IV
2013 I
2013 II
2013 III
2013 IV
2014 I
2014 II
2014 III
12
24
36
48