Advanced Solid Cycle with Efficient Novel Technologies

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Project Dissemination Plan

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Nomenclature

DEL	Deliverable Leader
IR	Internal Reviewer
IRT	Internal Review Team
PC	Project Coordinator
PDP	Project Dissemination Plan
PMT	Project Management Team
PSC	Project Steering Committee
WP	Work Package
WPL	Work Package Leader
WPT	Work Package Team

Deliverable abstract

The main objective of this dissemination plan is to encourage and stimulate a favourable environment for diffusion and sharing of knowledge of innovations (awareness building) internally to the consortium and from consortium members to external stakeholders in academia, government, the EU commission and industry. A number of driving forces, both internal and external to the consortium are important.
This document reports the dissemination plan for publications and outputs from the ASCENT project and comprises the main characteristics of the internal forces under control of the consortium, here named *dissemination-mix*, and the external forces, that is to say *dissemination environment*. The overall approach to the right dissemination strategy is the proper balance between internal and external communication.

Executive summary

Early dissemination to external stakeholders of the goals of ASCENT will increase its potential impact, improving exploitation of patents, know-how and other intellectual property developed in the project. The project management team has already presented the scope and main objectives of ASCENT in the first Australian–Europe ASCENT workshop, held in Sydney, in order to communicate and discuss the project's aims. The Australian partners attending also presented their contribution to the project. This event was a great success, fulfilling a key performance indicator for ASCENT, since the attendees comprised EU representatives, Australian government representatives and EU funded CCS-related project members.

Additionally, to harmonise the work amongst the consortium, a kick off meeting in Rome was organised. An important outcome of this event was to agree the details of the communication-related strategy, including management of the approvals of output. A template for project status reporting was also agreed between the consortium during the meeting, and to foster internal co-operation and information exchange.

A web site has been implemented to internally share documents such as deliverables and other project management materials (within a password-protected area reserved for consortium members) and for development of external dissemination materials. In addition, the web site will enable the registration of users in order to provide opinion leaders and potential stakeholders with public documents (e.g. new-letters, flyers, brochures, leaflets).

1. Introduction

1.1 Purposes of the document

This document is intended to provide the European Commission services and the consortium partners with information and advice about the knowledge management of the project foreground [1]. Particularly it gives details on the key elements of the Project Dissemination Plan (PDP): e.g. purpose, intended audience, messages to be disseminated and methods. Specifically, we outline plans to:

- Create preliminary awareness of ASCENT during the first months of the project;
- Disseminate results and expand upon key messages;
- Collate contacts and expressions of interests in a potential stakeholders database during the project lifetime;
- Create the basis for the exploitation strategy of the project foreground IP.

Since the ultimate objective is the diffusion and sharing of the project results to prepare the ground for the use of the innovation, the dissemination strategy is strictly linked to the exploitation plan of the project foreground. Dissemination activities will be used also to enhance awareness among potential industrial stakeholders to prepare the market to accept the novel technologies developed, including strategies to catalyse technology exploitation beyond the project lifetime. The synergy between the dissemination and exploitation strategies will be the analysis of the intended market and a shared list of the exploitable results.

For the PDP to be effective it will evolve along with the whole project. Consequently, this deliverable presents a dissemination plan as a living document that will be expanded upon during the project lifetime. Having selected key stakeholders to target, the plan will build up existing networks and develop new ones. The dissemination strategy as a crucial part of ASCENT has been agreed with the consortium partners and approved by the project steering committee.

1.2 Intended audience of this document

- European Commission: to inform about the dissemination strategy of the investigated technologies;
- Consortium Partners to communicate end-user and stakeholder analysis along with preliminary and long-term key messages to be disseminated.

2. Organisation and scope of the project

The dissemination activities will be divided among all the partners involved in the project. To collect all the information regarding dissemination works within the work packages, the work package leaders will inform the project coordinator via the project status report about the activities related to the diffusion of the project outcomes. The dissemination strategy will follow different steps: the first phase will be concerned with creating awareness and interest in ASCENT. This will include the creation of the consortium brand and a web site, maintained with timely and relevant material. The second phase will be dedicated to the generation of articles and press releases, together with event participation (e.g. workshops, conferences, see Chapter 5), and with update and maintenance of the web site. Subsequent phases are likely to focus on publicity and exploitation related activities associated with specific project results, and will be synchronised with the technical work package delivery plans.

As soon as experimental or theoretical results are developed, specific dissemination activities will be undertaken. They will be selected on the basis of an analysis of their potential industrial applications and academic interest. The ASCENT consortium will present these activities at events relating to CCS (for example, the IEA Greenhouse Gas Control Conference, or industrial meetings), and to specialist meetings concerning high temperature solid looping cycles (such as the biennial IEA HTSLC meeting). Success stories from the demonstration actions of ASCENT, with an end-user oriented message will also be published on the website.

The types of dissemination events, and reasons for choosing these particular routes include:

- Scientific conferences – in order to present the R&D and scientific work realised inside the project;
- Industrial events –thematic workshops to be attended/organised once the project has realised exploitable results. The target industrial sectors will be defined through an analysis of the applicability of the project outcomes;
- Thematic workshops will be attended in order to transfer the results of the project to the world of technology providers;
- Several members of the consortium are members of the EU ZEP and can disseminate and promote promising outputs to industry through this route;
- Annual project workshop for advisory panel members and other appropriate invitees from the contacts database.

When it is possible, articles in the specialised scientific press, or standard journal publications will be used as an additional method for awareness and dissemination. A database of key contacts made at the various events, or achieved through the web site or other media, is being collected. Interested people will be kept informed on project progress by a project e-newsletter. The main tasks, roles and responsibilities of the dissemination plan are below outlined below.

Definition of the preliminary dissemination and technology transfer plan – The dissemination strategy of the project (this document) has been agreed within the first six months of the project. This initial plan will help the consortium to agree with common key messages to be disseminated prior to development of significant project outputs, and will be updated as necessary throughout the entire project lifecycle. Contacts with other consortia of other EU project and research teams working on similar areas will be also considered. Synergies in dissemination actions, exchange of material, set up of links among websites and cross cooperation will leverage the efficiency of the

project outputs particularly in the benchmarking activities of ASCENT. This preliminary dissemination and technology transfer plan will then evolve:

Establishment of dissemination standards – Dissemination strategy and tools (such as power-point templates, reporting templates) for the whole duration of the project will be detailed in the dissemination and technology transfer plan. This will be a working document at the disposal of all partners. The whole document will be continuously updated following the life of the project. Contacts with other consortia and research teams working on similar areas will be also considered. Synergies in dissemination actions, exchange of material, set up of links among websites and cross cooperation will leverage the efficiency of the results.

Quality assurance procedure – A procedure to allow all dissemination material to be quality assured, including both the content and the layout, will be established at the beginning of the project. This will be done jointly by the project steering committee (PSC) and the Project Management Team (PTM) in order to ensure the quality of the dissemination material prepared by the project. The quality assurance procedure will be built up to check:

- Message to be transmitted, including the suitability of the message for the people addressed, the stress on the benefits and the relevance for the industry (when applicable);
- Technical contents control in order to ensure the quality of achieved scientific and research objectives of project brochures;
- Scientific papers and publications containing sufficient reference to the ASCENT project.
- Layout quality and suitability to the standard.

Project web site – A web site of ASCENT has been set up at month 3 and it will be updated as new results are developed and would be updated when is necessary. ENEA will be responsible for the public and internal profile of the website, and will host it. Every six months, an electronic newsletter will be produced in order to inform interested parties regarding project status, news and achievements. The e-newsletter will be one of the main instruments to guarantee the dissemination and exploitation of the results achieved during the life of the project. Utilising the database of contacts the e-newsletter will be sent by e-mail to all the parties that have shown an interest in the project. An automatic subscription to the e-newsletter will be available via the web site pages.

European-Australian Workshop – In order to encourage and strengthen extra-European collaboration an Australian-European workshop has been scheduled in Europe for disseminating project outcomes with the Australian partners involved in ASCENT and promoting the exchange of ideas on a non-confidential basis. Other interested parties will be identified in both Europe and Australia to take part in the workshop. The consortium contains members (and ex-members) from the scientific boards of both the High Temperature Solid Looping Cycles Network Meeting and the International Chemical Looping Combustion conference; these contacts will be used to reach the target audience for these technologies in cooperation with the ASCENT exploitation team.

Role and responsibilities – ENEA is the leading partner of the dissemination work package (dissemination leader) which is responsible for keeping track of the dissemination activities. To this end a particular section of the project status report is devoted to collect the dissemination activities within each single work packages. The dissemination leader is also responsible to report to the European commission services the dissemination plan. Within month 24 (February 2016) an EU-Au workshop will be organised by ECN with the Australian partners of the project to further strengthen the links between the ASCENT and the twinned Australian projects and disseminate the main scientific achievements. Two project progress meetings at month 18 and 36 with two further technical meeting at month 9 and 27 are scheduled to verify the accomplishment of project tasks.

Finally each single member of the consortium is expected to participate in the dissemination activities by:

- Submitting scientific papers and presenting the project outcomes at appropriate conferences;
- Diffusing the project results in their own organisation;
- Identifying and updating the consortium about dissemination opportunities and events;
- Sharing existing dissemination resources within their organization;
- Selecting end-users, opinion leaders and stakeholders to be invited to the ASCENT workshops.

2.1 Definition of goal and scope of the project

At the base of an effective dissemination plan there is the determination of the overall goal of the consortium and the potential stakeholders which can be interested or affected by the project foreground. It is important to understand the main targets for receiving the project results and what are the most important messages the consortium wants to disseminate during the project lifecycle.

The goal of this project is to provide a robust proof-of-principle of three thematically-related high temperature processes; each will lead to a step-change in efficiency of carbon removal in three different pre-combustion capture processes for producing hydrogen, ultimately leading to highly efficient low-carbon power production. This will verify that the technologies are capable of reaching the following performance by 2020.
The essential feature linking the three technologies is the use of a high temperature solid sorbent for the simultaneous separation of CO_2 and conversion of other carbon containing gases (CO and CH_4) into H_2 and CO_2. The three technologies all have the potential to provide a step-change in efficiency because they all separate the CO_2 at elevated temperatures (>300°C) providing for more efficient heat integration options not available in technologies where the separation occurs at low temperature. The synergies between the three technologies are strong, allowing both multiple interactions between the different work packages and a consistent framework for cross-cutting activities across all the technologies. Each technology will be proven under industrially relevant condition of pressure and temperature, at a scale that allows the use of industrially relevant materials that can be manufactured at a scale needed for real implementation. This represents a necessary step to be taken for each of the technologies before setting out on the route to future demonstration level activities.

3. Dissemination strategy

Even if some scholars of the communication science claim a difference between diffusion and dissemination of innovations, in this PDP however, the diffusion or dissemination is intended as reported in Diffusion of Innovations by Everett M Rogers [2]. Here it is defined as 'the process by which an innovation is communicated through certain channels over time among the members of a social system'.
Then the definition of dissemination takes into account the innovation to be diffused and the communication process as well. In this PDP we also adopt the definition of communication as reported by Rogers [2]: 'a process in which participants create and share information with one another in order to reach a mutual understanding'. Other authors claim that communication is a one-way process as reported in Communication networks: Toward a new paradigm for research by Rogers E, Kincaid D, [3]. We consider the communication as a to-and-fro process where new ideas are sent from their source to their ultimate end-users or stakeholder in order to reach a shared knowledge. The concept of the dissemination strategy we use in the PDP is shown in Figure 3.1:

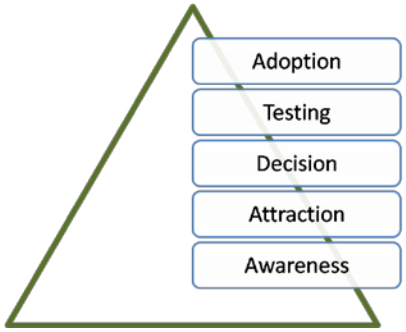

Figure 3.1 Pyramid of the dissemination strategy

The first process of the dissemination strategy is to increase the awareness of the selected audience about the innovation. During this stage potential end-users are informed about the existence of the innovation and actively gain awareness of the project, and a general perception of its goal and scope is developed. The dissemination strategy will be oriented toward the needs of the audience, using appropriate language and information levels. The awareness becomes attraction if the recipient of the information has a favourable attitude towards the new idea and he or she can evaluate whether the innovation can satisfy his or her needs. If the receiver of the key messages forms a positive evaluation and becomes interested on the new idea, the third stage (decision phase) of the dissemination process occurs. The potential end user can now take into consideration the possibility of analysing and testing the innovation. As a consequence the next testing phase will be focused on the activities with the aim to the implementation of the innovation and using the new idea. The receiver of the knowledge learns about the new concepts by implementing them. If during the testing process some practical problems are addressed then the innovation is ready to be adopted by the tester who becomes an actual end user of the new idea. Now the ultimate process of the dissemination strategy will occur with the final adoption of the end user. During the last process the decision of the individual to adopt the novel process has to be confirmed and reinforced by supporting key messages. As a consequence of these further effective messages, the attraction and the testing of the innovation convince the individual to continue to adopt the innovation.

3.1 Audience profiling

Once the goal is defined and shared among the consortium (see Chapter 2), the next part of the awareness step is the selection of the target audience to receive them. ASCENT stakeholders are not only the members of the consortium but also other interested groups including: (i) technology

testers; (ii) technology users and (iii) technology providers and (iv) decision makers. A second-level analysis of the stakeholders will results in the following groups of interest such as: utilities, power plant designers, oil and gas, sorbent manufactures and testers, cement industries, networks (e.g. European Energy Research Alliance EERA, European Technology Platform for Zero Emission Fossil Fuel Power plants ZEP, Carbon Sequestration Leadership Forum CSLF), research institutes, academia, socio-economic research, EU energy agency, EU parliament, national policy-makers, learned societies (including the IChemE), other NGOs.

The first step of the dissemination is based not only on the external awareness of the project towards the aforementioned potential stakeholder but also on the internal awareness among the consortium of those groups of interest. Detailed knowledge of the stakeholder communities is necessary in order to define their expected needs and anticipate the potential issues and scenarios during the large scale exploitation of the three investigated technology lines.

3.2 Key messages and ASCENT logo

After the goal and the audience have been selected and profiled, an important step in the awareness is the definition of the key messages to disseminate. These must demonstrate the importance and the relevance of the issues addressed by the project [2-5]. Since the ASCENT project aims to provide a robust proof-of-concept of low carbon technologies using industrially relevant materials under industrially relevant conditions, key messages to disseminate could be the following set of themes and information:

- Industrially relevant materials can be manufactured at the scale needed for real implementation, in terms of both physical/chemical characteristics and process requirements;
- Industrially relevant conditions are those to be expected in an actual operational environment;
- The proof-of-concept phase increases the progress of the technologies up the Technology Readiness Level (TRL) scale toward demonstration;
- The project will improve resource efficiency for the production of H_2;
- To address the pressing challenges of security of supply and climate change through a clean use of fossil fuel;
- To enhance the competitiveness of European industry, including through a better involvement of SMEs.

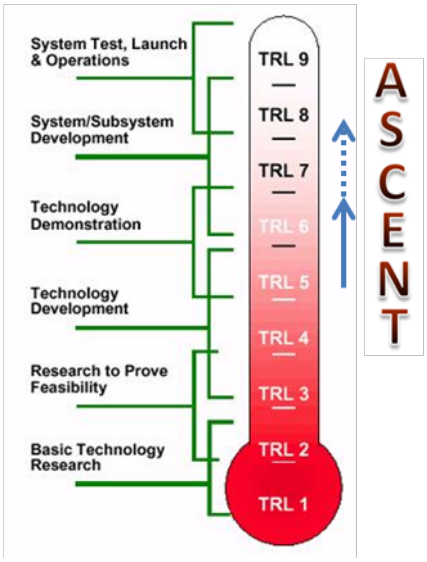

Figure 3.2 Technology Readiness Level scale of the ASCENT innovations.

For the above key messages to persuade the audience they will be based on the novelty of the project outcome and meet the needs of potential stakeholders. In addition, the stakeholders should understand the novelty of the innovation. Particular key messages related to the novelty of the investigated processes are summarised below:

- Each process has been shown feasible under mild (non-industrial) conditions with finely-tailored (industrially less relevant) materials;
- Each process can provide synergistic insights into the operation of the other processes through the common features of the processes;
- Each process will have a proof of concept demonstration at the minimum scale required to ensure that these processes work under industrially relevant conditions;
- Each process has the potential to make a step change in terms of performance and efficiency compared to currently proposed CO_2 capture technologies.

The aforementioned statements could become the key talking points of the ASCENT project and they could develop into some slogans of the project in order to make it more attractive for the expected stakeholders. The key slogans should be selected and conceived to motivate the different groups of interest to change their act and form their attitude more favourable towards ASCENT foreground.

Other key messages are listed below:

- Most serious analysts state that, given the prevalence of cheap fossil fuels, carbon emissions reduction will require CCS;
- CCS technologies for main power production are developing and reducing in cost. ASCENT will make a big contribution to this;
- Wide implementation of these technologies needs emissions restrictions or a carbon price of $30—40 per tonne;

- High temperature sorbents enable lower efficiency degradation and have no noxious by-products
- CCS has been cleaning gas in Norway, Algeria and the US for many years. It is now needed on power generation;
- CCS technologies unlock a less expensive decarbonised power grid, allowing a high penetration of renewables with a low overall cost.

3.2.1 ASCENT logo

In order to highlight the synergies between the three different but related solid loop cycle technologies, the logo has been conceived as three swirling arrows pointing at the same target: hydrogen production.

Figure 3.3 Logo of the ASCENT project

3.3 Dissemination channels and activities

Successful completion of the project will be followed by a careful dissemination of the results obtained, in order to widespread the RTD and demonstration potential of ASCENT and fully exploit R&D results. The dissemination channels are a mixture of the usual, i.e. participation in conferences and seminars (in particular international S&T events such as GHGT, CO_2 capture conferences), publications in international journals and website directly aimed at enhancing the visibility of the R&D activities of ASCENT. Along the project, two work packages (WP7 and WP8) will organise dissemination and exploitation of the results. Different activities will be used to give both specialists and the public access to the project work and results. These will be detailed in the chapter 5 of this document which will be updated every six months and the undertaken dissemination activities will be reported in the progress report. Among other issues to be considered in the definition of this Project Dissemination Plan, the following activities are already planned or proposed. In summary, the dissemination strategy will be built around the following activities:

- Presentation of the R&D activities in scientific peer-reviewed journals and other publications (given the size of the consortium and the lines developed in ASCENT an estimate of at least 30 journal publications can be made).
- Participation in scientific conferences and workshops,
- Organisation of science communication for young students and the general public,
- Electronic dissemination via the ASCENT website [6]

More details are given in Chapter 5. At any appropriate stage of the implementation, the consortium will endeavour to make best use of the project outcome, in particular those with a commercial potential, through its own resources, CORDIS or other external services as Imperial Innovations Limited. This may include proof of concept outside the laboratory, identification of market potential and opportunities, the evaluation of competing technologies, the assessment of the cost for up-scaling from lab scale to industrial application, the development of a business plan and the protection of intellectual property rights: further details are reported in Chapter 6.

4. Conditions for deliverable and dissemination documents: quality plan

A procedure to allow all dissemination material to be quality assured, including both the content and the layout, has be established at the beginning of the project during the kick off meeting of the project. This will be done by the Project Management Team (PMT) in order to ensure the quality of the dissemination material prepared by the project.
The quality assurance procedure will be built up to check:

- Message to be transmitted, including the suitability of the message for the people addressed and the relevance for the industry (when applicable);
- Technical contents control in order to ensure the quality of achieved scientific and research objectives of project brochures;
- Scientific papers and publications containing sufficient reference to the ASCENT project;
- Layout quality and suitability to the standard.
- Deliverable documents to submit to the Project Officer and the European Services.

4.1 Quality plans

In order to have a proficient quality plan for deliverables and dissemination material, it is necessary to implement efficient approval procedures of the restricted and publishable documents produced as the project proceeds. To this end a project management structure and an internal review procedure have been proposed and approved by the general assembly during the kick off meeting of the project.

4.1.1 Approval procedure for deliverables

In order to exploit the synergy of the three technology lines investigated in the project, an internal review process has been envisaged for the approval procedure of deliverable documents..

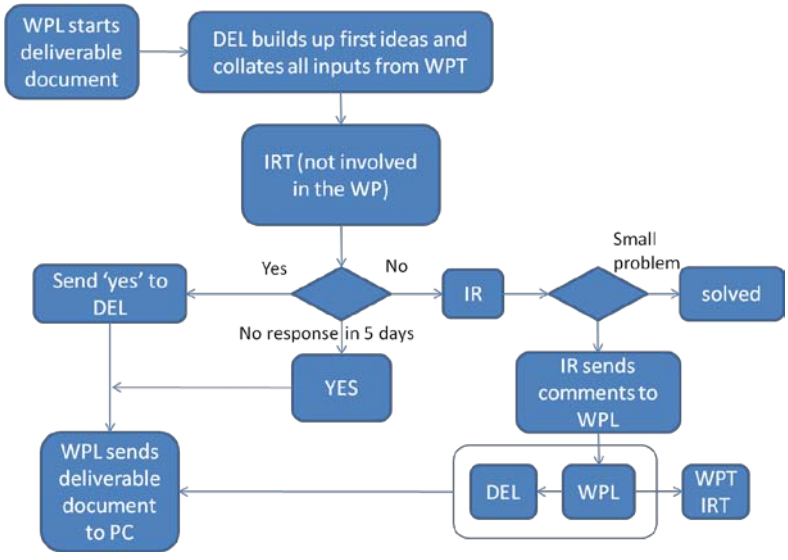

Figure 4.1 Approval procedure for the deliverable documents.

After the WPL starts the implementation of the deliverable, the DEL of this document will act as an editor and will collate first ideas and inputs from the WPT. An initial draft will be forward to internal review team (IRT) from the other two technical WP to get first impressions and recommendations. If the IRT approves the deliverable or there are only small changes to the original version there is no need to produce a second draft of the document. The WPL will

therefore send the reviewed draft to the PC who will submit it to the European Services. On the other hand if an IR has comments to the draft a track change version will be sent to the WPL who will interact with the DEL informing WPT and IRT about the changes to be performed. After an agreement has been achieved the final draft will be sent to the PC who will submit it to the European Service.
The internal approval procedure as depicted in Figure 4.1 recognises that interaction between the technologies of ASCENT exist.

4.1.2 Approval procedure for dissemination material

In order to avoid leakage of restricted information the partner who wants to publish materials, he/she shall submit an initial draft to the PMT which jointly with the PSC will check whether the document is compatible with the protection of intellectual property rights, confidentiality obligations and the legitimate interests of the owner(s) of the foreground [7-8].

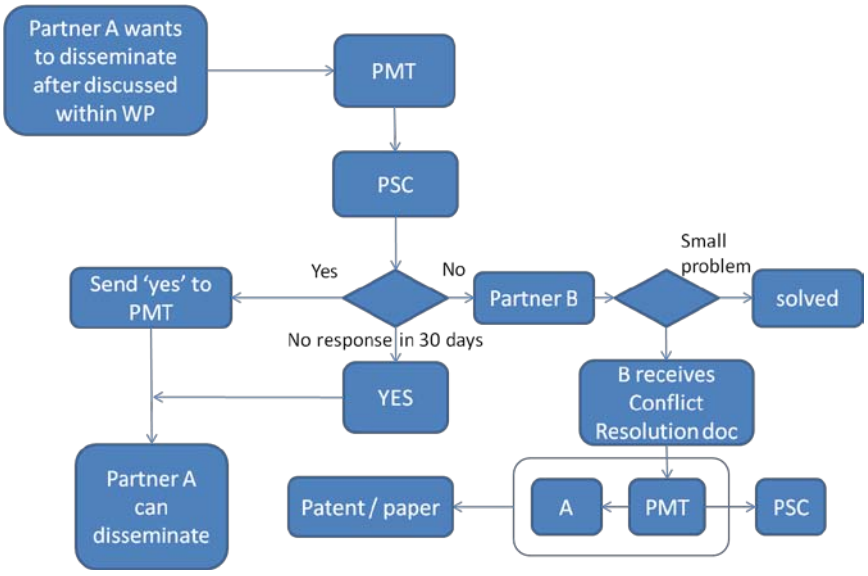

Figure 4.2 Approval procedure for the documents to disseminate.

According to the consortium agreement, at least 45 days prior to the dissemination event, notification shall be given, e.g. from partner A who wants to disseminate, to the consortium's other members, including sufficient information about the data envisaged to be externally communicated. Following this dissemination notice, there is a 30-day (see Figure 4.2) period where partners (let say partner B) may express their objections to the dissemination activity. If PMT is not informed of substantial objections to the dissemination material and partner B agrees with this decision, the issue will be solved and partner A can disseminate the document. Otherwise if partner B claims that its interests could suffer damage from dissemination of these data, the PMT will send a resolution document to partner B in order to indicate and explain its reasons. In addition partner B will propose also amendments to the document. If the PMT considers the objections valid the issue shall move forward for resolution and dissemination activity will not take place if appropriate agreement is made between PMT and partner A in order to defend the interests of partner B. As reported in Figure 4.2 during this agreement process PSC will be constantly informed about the evolution of the approval procedure. The objecting member shall not unreasonably withhold agreement to publish. The result of the interaction between partners A and B could be issue of a patent for the intellectual property of the innovation (see Chapter 6 for further details). Should a party request delay of dissemination, and this delay is agreed, they must demonstrate that they are actively progressing protection of IP generated, or that their own existing IP will be damaged by the dissemination. Should a partner object to dissemination of new results developed by another consortium member, and then fail to then take steps to protect IP within six months, dissemination

of the concept or data under dispute shall be allowed. Any publicity and press release must also highlight that it reflects only the author's view exempting the European Union from any liability. As anticipated earlier, according to the Article II.30.4 of the Grant agreement an acknowledgement section will be foreseen which shall include the following statement:

The research leading to these results has received funding from the European Union Seventh Framework Programme FP7/2007-2013 under grant agreement n° 608512.

4.2 Communication flowchart within the consortium

The Project Steering Committee, composed by the Project Coordinator (PC) and one person for each member of the consortium, will supervise the implementation of the whole programme and will decide about the project strategy and management issues. The management also ensures that adequate levels of communication are maintained and promotes scientific discussion among partners in order to achieve expected levels of scientific and technical outputs. The Committee will be chaired by the PC.

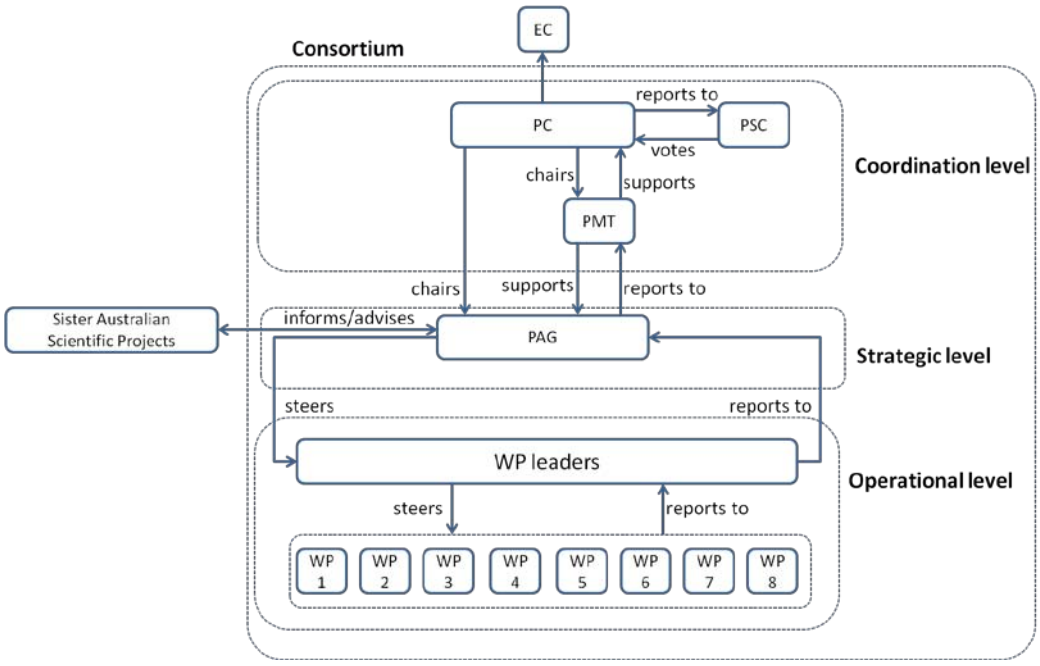

Figure 4.3 Communication flowchart within the consortium

The PC will be responsible for the co-ordination of the EC contract and the corresponding work plan. The WP Leaders will be responsible for achieving the objectives related to the respective Work Package (e.g. planning, timing, costs) and for targets and deliverables defined by the programme for the WP concerned and the dissemination activities within the work package.

The PC will establish communication flows among partners (a list of at least two contacts from each partner will be always kept up to date and made available to the partners) and with the Commission Services. The PC will submit to all legal entities participating in this project a draft of a Consortium Agreement, to deal with matters like use of knowledge resulting from the project (foreground), exploitation of jointly owned results, access to pre-existing know-how (background)

A reciprocal knowledge of respective expertise and work methodology will be therefore built up with time, which represents a strengthening point for efficient project management, and will also favour a fruitful integration in the research activities of all other members of the consortium. This communication flowchart jointly with a robust agreement between the partners will help the consortium to avoid any accidental leakage of intellectual property to potential competitors.

4.3 Contractual regulations of the grant agreement

In order to ensure confidentiality and loyalty among the partners and avoidance of unprofessional or counter-productive behaviour, this section of the dissemination plan is focused on identifying a number of actions with respect to the dissemination and exploitation of project results and management of intellectual property rights. Ownership, use, dissemination and access rights are regulated in the general conditions of the grant agreement:

- Any dissemination action concerning foreground must include a section reporting the acknowledgement of the European Community. Any publicity concerning the project must also display the EU emblem and report the following disclaimer: '**This *[publicity] [document]* reflects only the author's view, and the EU is not liable for any use that may be made of the information contained therein**';

- Any dissemination activity shall be reported in the plan for the use and dissemination of foreground, including sufficient details/references to enable the Commission to trace the activity. With regards to scientific publications relating to foreground published before or after the final report, such details/references and an abstract of the publication must be provided to the Commission along with an electronic copy of the published version or the final manuscript accepted for publication; According to special clause 39 of the EC grant agreement, consortium members are encouraged to make their best efforts to ensure that an electronic copy of papers becomes freely and electronically available to anyone through an open access repository.

- The beneficiaries shall report on the expected use to be made of foreground in the plan for the use and dissemination of foreground. The information must be sufficiently detailed to permit the Commission to carry out any related audit.

4.4 Management of the Intellectual Property Right

The Consortium Agreement (CA) signed by the parties states or defines how the consortium agrees on the use and dissemination of the project outcome. No background is specified at the time of signature of the signed CA. Those partners who make available background during the course of the project will specify any conditions for access in the CA. The intent is to facilitate the open access dissemination of the project foreground. Nevertheless, in case of joint foreground (i.e. patents), a separate agreement shall be concluded among the co-owner parties who have carried out the work from which it resulted in order to define the allocation and terms of exercising such joint foreground. Partners working in the same work package (WP) shall have access rights to the foreground needed for carrying on the activities within the WP. In order to facilitate the synergies among the consortium, participants from other WPs shall grant the same access to foreground if these form part of a deliverable or are necessary for the execution of the integrated research.

4.4.1 Patents and protection

Dissemination of foreground by members is granted with the approval of the project steering committee (PSC), in order to make sure that the period of secrecy needed for a successful patent application is respected (see Figure 4.2) Patent application relating to the foreground, filed by or behalf of a beneficiary must include the following statement to indicate that said foreground was generated with the assistance of financial support from EU:

The work leading to this invention has received funding from the European Union Seventh Framework Programme FP7/2007-2013 under grant agreement n° 608512.

All patent applications relating to foreground filed shall be reported in the plan for the use and dissemination of foreground, including sufficient details/references to enable the Commission to trace the patent. Any such filing arising after the final report must be notified to the Commission

including the same details/references. Partners have to inform the project management team (PMT) of its intention to publish on foreground of other partners (see above). Where the foreground is capable of industrial or commercial application and its owner does not protect it, the Union may, with the consent of the beneficiary concerned, assume ownership of that foreground and adopt measures for its adequate and effective protection.

5. Dissemination channels and activities

As reported earlier in the first chapters of this document, the main goal of the dissemination plan is to catalyse and stimulate a favourable environment for the diffusion and sharing of an innovation through a number of channels over time among the members of a social system. This section is devoted to the channel used in this project to disseminate and communicate the project foreground. The usage of channels will change as the strategy of the project foreground will proceed towards the top of the dissemination pyramid. At the beginning of the project the website and thematic related workshops are used to disseminate the aims of ASCENT and promote the messages of the project to a wide community of potential end-users, decision makers and stakeholders. As the project proceeds other channels will be used like newsletters, scientific papers, targeted conferences and formal and informal face-to-face meetings in order to present the main results obtained among peer networks.

5.1 Dissemination channels

ASCENT website – A project web-site has been be set up and the following domain name has been chosen www.ascentproject.eu. It was developed by using several technologies (e.g. HTML5, PHP, JAVASCRIPT, AJAX) whereas the server database has been implemented in MYSQL. It describes to the general public the scientific and technical content of the project, and its impact, in relation to present technologies, to the increase of efficiency in CO_2 capture, in a cost effective way; this section of the web-site will be periodically updated to include outlines of major results obtained. The web-site will also include a section with access restricted to partners, to help communications flows necessary to the activities performed in each WP and to the implementation of the programme as a whole. With these features, the web-site will be an important tool for project management, either in terms of promoting relations among partners, and in terms of disseminating the objectives and the major results within a much larger circle of scientists, technologists and decision-makers. The presence of both, an open and a restricted-access section, will allow to deal properly with the issue of protection of knowledge and know-how. Details of this communication channels are reported in deliverable document already issued D6.2 "*Implementation of the ASCENT project website*" [6]. In order to make the audience well aware of the project, stakeholders and decision makers have to be informed and involved at the very beginning of the project. The website enables the consortium to publish information, ideas and documents in a public area and keep it updated to inform potential individuals interested of the project. To favour frequent visit and use of the website, it has been made to fit mobile devices as smart phones and tablets and linked to the main social networks. As ASCENT is based on a common framework of three technology lines, the website has been designed as a dissemination channel for aggregating end-users and potential stakeholders around nuclei of interest represented by the work-packages and other sections which can be dynamically created by the PC acting as administrator. In this area the administrator will upload the news and the material which can be openly disseminated. In fact, the web site permits the registration of users in order to provide opinion leaders, potential end users and stakeholders with public documents (e.g. new-letters, flyers, brochures, leaflets and deliverable documents).

The website is used also as a tool to internally organise the workflow management where a restricted section devoted to the administrative and scientific documents and reports has been implemented. Indeed, the members of the consortium will be provided with username and password in order to use the website to track each single document and upload or download the latest draft of the documents in the restricted work area. This area represents an internally communication between the consortium of the project and will permit to have a common and shared database of documents and reports. The structure of the website is outlined below:

- Home – in this section a summary of the website is showed: titles of the work-packages, link to the restricted area and to the latest news;
- The project – this web page reports the a brief abstract of ASCENT;
- Consortium – information about the members of the consortium;
- Project sections – this page report title and a brief description of each single work package and other section of the project as the collaboration with the Australian projects;
- News – in this section description of the latest news related to the project;
- Forum – a section which permits to have a relationship between the consortium and opinion makers, stakeholder. It could represent a potential tool to collect needs from the audience;
- Photos
- Links
- Contacts

Finally the website implementation has included domain registration, hosting and account for all technical aspects of its maintenance.

Partner website – Partners are invited to distribute and inform their own organisation through their company/institution website via a devoted page or news about the activities and the progress of ASCENT. A short description of the project has been published in the common area of ENEA website where the link to the ASCENT website has been reported. Particularly, the partners should disseminate the project foreground and how their organisation will benefit from being a partners of the ASCENT project.

Networks and workshops – The partners are all well renowned internationally, having a wide range of contacts both in academia and industry and being directly involved in a large number of permanent networks at European, national and local level, which all promote research and novel technological applications in the relevant fields. The consortium will therefore have the unique opportunity to rely on all these links when implementing the strategy for dissemination and/or exploitation of the results. The project steering committee (PSC) will, however, review the commercial relevance of results disclosed in all dissemination actions to ensure that the intellectual property rights and especially the filing of patents are not disadvantaged by premature leakages during workshops.

Conferences and papers – Dissemination of the project results to a large scientific and technological community will be carried out by means of publication of papers in international scientific journals and through presentations at international conferences. Particularly appropriate in the latter context will be conferences held regularly on subjects like '*powder technology*', '*new power generation technology*' and '*high-temperature solid cycles for CO_2 capture*'. Conferences organised by the Commission will be given priority.

5.2 Analysis SWOT of the dissemination channels

This section is devoted to the analysis of strengths, weaknesses, opportunities and threats (SWOT) of the dissemination channels. The result of this analysis is useful to detect the internal and external factors which are helpful or harmful to reach the objective of the dissemination plan.

Table 5.1 Main results of the analysis SWOT applied to the dissemination channels.

	Internal factors		External factors	
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Website	Interactive Create expectation Dynamic	Important planning needed Limited information published Moderate cost (*) Specific skill for the implementation	Involvement of large audience Potential sharing in social media Collection of information about stakeholders	Cost could grow Periodic maintenance required
Workshops, seminars (as organisers)	Awareness of large audience	Important planning needed Important logistics needed High cost (*)	Potential large audience Network of similar projects Building of interest in the project outputs	Low number of attendees Low interest of attendees
Workshops, seminars (as visitors)	Low planning needed Low cost (*) Awareness of large audience	Important logistics needed Important planning needed	Potential large audience Network of similar projects Building of interest in the project outputs	Attendance issues Low number of attendees Low interest of attendees
Conferences	Present scientific results Awareness of different group of interest	Important logistics needed Important planning needed	Potential large audience Network of similar projects Building of interest in the project outputs	Attendance issues Low number of attendees
Papers and press releases	Present scientific results Low cost (*) Awareness of different stakeholders	Limited information published	Potential large audience Building of interest in the project outputs	High time for publication and reviewing

(*) **Low cost: below 1000 €, moderate cost: below 5000 €, high cost: greater than 5000 €.**

In addition the results of the SWOT analysis is useful to address any decision-making situation with regards to the diffusion of the project outcomes. The main strengths and opportunities as reported in table 5.1, indeed, can be used in order to decrease the impact of both potential threads and weaknesses associated with selected dissemination channels in order to reach the objective of the dissemination and communication plan.

5.3 Dissemination activities

Every dissemination activities shall be measurable: the associated metrics are presented in section 5.4. This feature will provide the project coordinator (PC) with a shared framework in order to

evaluate the effectiveness of the diffusion plan with regards to the project goals. Project status report will be used to track any dissemination activities. Measurable dissemination actions can be can be grouped in the following categories:

- **Open access dissemination activities –** The project web-site as a dissemination tool will be used to diffuse the newness of the project by periodically publishing newsletter and producing brochure/flyer to present objectives, activities, partnership of ASCENT. It will be updated with relevant results when available. An area of the website will be implemented and used as repository to maintain a list of the partners' pre-print papers for open access dissemination and available to the web-site visitors. If the partners decide to publish in an 'open access' journal, he/she should be made available immediately an electronic copy to upload in the website repository, otherwise if the journal is not an open access publisher, within six months of publication, though most likely as a final version after review but before typesetting by the journal.
- **Standardisation activities** – The concept of the different ASCENT technologies will be verified at the facilities of ENEA, CSIC, University of L'Aquila, ECN, Imperial College, TUe and IFE. These infrastructures are distributed in various member states of the EU and Associated Countries. In addition, each of these infrastructures operated by research institutes and enterprises (Calix) will represent a significant benchmark for the innovative technologies with a high potential for dissemination. Most of the partners are members in the European Energy Research Alliance (EERA) and in different International organisations. Their participation in the ASCENT consortium offers opportunities to disseminate the technical content of the project both at institutional and industrial level in the EU and non EU countries. Such a liaison with the EERA will provide ASCENT with the opportunity to make different but thematically related technologies compatible each others.
- **Training activities** – The three main technology lines will be demonstrated at the prototype scale in the laboratories of IFE, TUe, and Imperial College. These represent the ASCENT platform for comparing the performances of the three different technologies. Provided that the know-how of each single participant is adequately protected, and the laboratories themselves agree, the facilities will be open for visits of academic, industrial and administrative bodies from European and developing countries. Moreover members who are active in submission, examination, publication and defence of any dissertation or thesis for a degree which includes project foreground are subjected to the confidentiality and publication provisions agreed in the consortium agreement.

Table 5.2 Classification of audience and dissemination activities

Audience	Dissemination action	Channels of dissemination
General public Private or public organizations	Local dissemination of the project results	ASCENT Website Press releases Meetings Dissemination workshop
SME (system integrators, end users) Development agencies in Europe Public sector service	Dissemination of general applicability world wide	Printed materials Technical reports ASCENT Website Dissemination workshop Personal contact
Venture capitalists SME (systems integrators and end users) Public sector service organizers	Dissemination of commercial potentials	Exploitation workshop Distribution network of the SMEs/IND taking part in the project E-newsletters Personal contact Meetings.
Scientific community Companies interested in the developed products/technology	Dissemination of the scientific results	Scientific papers International conferences Patents

5.4 Assessment of dissemination activities

In order to monitor and keep track of all dissemination, the project status report has a section devoted to the summary of the diffusion activities. Partners shall report a brief description of the communication activities, particularly on the oral events (conferences, meetings and workshops) including general information of the event (e.g. content of the event, information on participants) and its nature. Analysis of the project status report will help the PMT to recommend potential future dissemination activities. Moreover partners will be provided with a further section in the project status report where they shall briefly describe the written communications (e.g. scientific paper, conference proceedings): partners will be encouraged also to report a graphical abstract of the work to highlight the main results promoted via oral or written communication. A comprehensive assessment is done to measure the project's overall result.

5.4.1 Metrics associated to the dissemination via the website

To this end the ASCENT website is tracked by means of the hosted service Google Analytics to measure the baseline data (e..g new visitors, returning visitor). Figure 5.1 shows the positive effect of the publication of a brief summary in the newsletter of the website of ENEA (on the first of June) in term of relative increase of new visits.

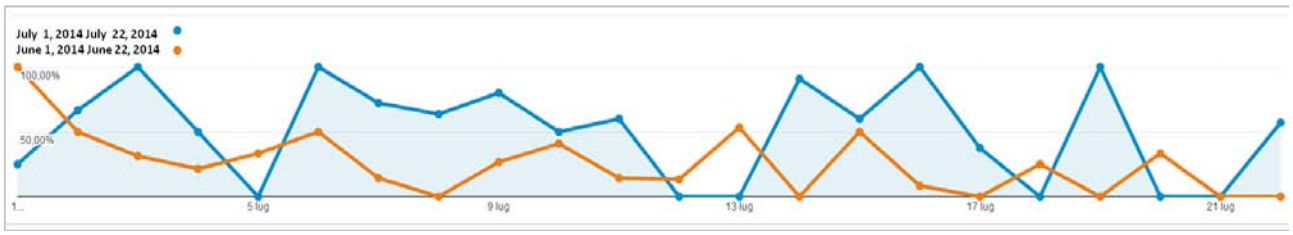

Figure 5.1 Percentage of the new visits with the time.

This positive effect should encouraged the consortium members to publish short descriptions of ASCENT in their institution website to increase awareness of the project. The percentage of new visit has increased from 31.2% in June up to 64.9% in the first 22 days of July with a relative increase of almost 110% (see Figure 5.2)

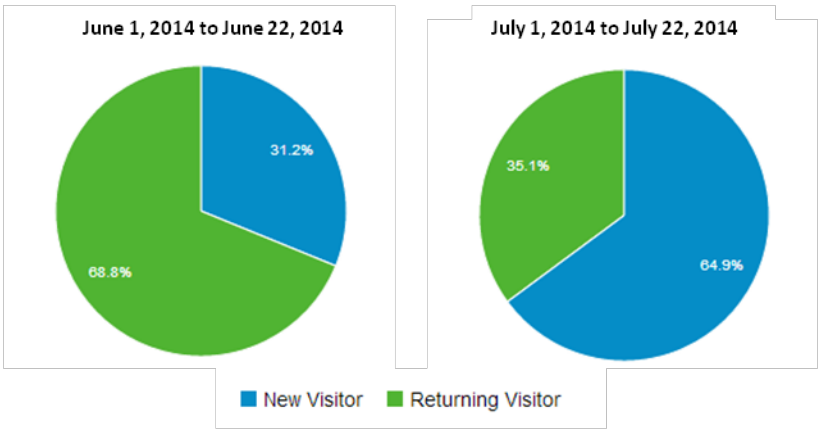

Figure 5.2 Increase of new visitors of the ASCENT website

Since the website has been conceived as a multipage website another important parameter to take into account is the bounce rate defined as the ratio of total number of the visitor viewing just one page to the total entries. It helps to evaluate the effectiveness of the website as dissemination tool of the project. This metrics can help to evaluate the performance of the website to generating interest and curiosity of the visitors. Basically, high bounce rate means that the website does not catalyse the curiosity of the visit who leaves the site after viewing the first page. The bounce rate of the

ASCENT website has an average value of 24.5%. This mean that almost 3 visitors out 4 will continue their viewing of the website after the first page.
Other key performance indicators of the website are listed below:

- number of web pages requested and viewed by the user;
- number of visits to the ASCENT website made by users;
- number of single users that have visited the site;
- time spent in minutes and seconds while navigating or viewing the website
- number of pages of the site or using a digital application.

5.4.2 Other dissemination metrics

This section of the dissemination plan is devoted to other metrics associated to the measurable dissemination activities presented earlier.

- 'open access' dissemination: diffusion of the scientific and technical foreground of the three technology lines; papers which involve more than one ASCENT partner are a measure of the synergy and integration of the consortium.

Metrics:
  - Number of scientific peer-reviewed papers published in journals, and impact factor of the journal;
  - Number of conference proceedings;
  - Number of patents;
  - Number of events (e.g. symposia, seminars workshops) involved as participants and/or organiser;
- Technology diffusion to the industry

Metrics:
  - Instances of collaboration on technology transfer with industry;
  - Number of industrial related events involved as participants and/or organiser ;
- Training activities to support and strengthen the dissemination objective;

Metrics:
  - Number of professor, post-doc and Ph.D. student exchanges;
  - Number of Ph.D. and post-doc students involved in ASCENT project;
  - Number of Ph.D. and post-doc students participating in ASCENT research meetings;
  - Number of visits per year at the ASCENT premises;
- Coordination with other EU research projects

Metrics:
  - Number of joint and benchmarking research meetings with other EU projects;
  - Number of documents jointly produced with other EU projects

6. Synergies between dissemination and exploitation plans

This section of the dissemination plan is focused on the synergies between the dissemination and exploitation of the project foreground. The main contact point between the two activities is the profiling of the intended market. Exploitation of the project result, indeed, is achieved by informing the customers of the industrial partners about the innovations and by developing winning and positive messages. A preliminary discussion on this topic has been approached in Chapter 3. Finally this chapter will gives an overview of the links between the dissemination and exploitation plans. Additional measures on dissemination and use of knowledge resulting from the project (foreground), and intellectual property rights (IPRs) exploitation of jointly owned results, access to pre-existing know-how (background), etc. will be discussed in this section, assuring coherence with general FP7 directives dealing with matters. In general, restrictions on transfer of ownership and access rights have been loosened in FP7 rules (in comparison with previous framework programmes), in order to encourage use and dissemination of results: this will greatly help the consortium to safeguard the rights of all partners, industrial actors, research centres and universities.

6.1 Intended market

To further profile and detail the needs of potential stakeholders, we should know the expected impact of ASCENT results on social, technical, and economic aspect of the stakeholders. For each of the aforementioned groups of interest, it is important to know what they are influenced by and what could catalyse its change. For an example the risk analysis could help policy makers to support incentive to large projects related to the investigated carbon capture technologies. The sustainability and safety impacts play an important role in the policy making for the deployment of innovative and clean energy technologies at large scale level. Moreover, the risk analysis outputs can be useful for industrial stakeholders to know potential threats that would be addressed in order to facilitate the testing and implementation of the ASCENT technologies in the pyramid of the dissemination strategy. In fact, information about the needs of the audience will provide the consortium with a valuable knowledge of the stakeholder attitude which must be changed in order to successfully accomplish the attraction step towards the final adoption of the investigated technologies.

The key audiences are expected to be:

- Academics working in CCS;
- Power industry professionals in operations, planning and strategy;
- Civil servants involved in power industry planning and policy and in environmental policy;
- Environmental groups with concerns about climate change and mitigation;
- Shareholders of power companies who will have to approve their board's actions;
- Academics working in climate modelling;
- Power industry professionals in equipment design and manufacture;
- Power industry professionals in consulting firms , constructors and contractors;
- Carbon storage operators.

Industrial partners and SMEs of the ASCENT consortium and its business can benefit from the participation to the ASCENT project by establishing synergies with the academia. As a consequence they can exploit directly the project outcome and acquire know-how of the three technologies to reduce the time from getting the results to their exploitation. SMEs and industrial partners can accelerate their introduction in new markets based on next generation technologies taking advantages over competitors.

6.2 External dissemination and exploitation of the project foreground

External exploitation of the project foreground will be based on a detailed exploitation plan to be developed in WP7 (Exploitation of the developed sorbent technologies). This project targets to develop products that partners such as Johnson Matthey, Array Industries, Calix Europe, and Marion Technologies would be ready to commercialize as extension of the actual portfolio (Johnson Matthey, Marion technologies) or as new lines (Array Industries, Calix Europe). These companies will then organize the exploitation roadmap coordinated by partner company Calix Europe. The plan to be developed in document deliverable (D7.2) will consider:

- Market analysis and expected impact of the ASCENT solutions, in terms of catalysts, sorbents and reactors prototypes.
- Exploitation Business Plan for ASCENT solutions.
- Issues related to the management of intellectual property rights.
- Specification of the contracts for exploitation of the ASCENT solutions.

The quality plans as discussed in Chapter 4 guarantees the favourable external exploitation of project related to IPRs of consortium member. Figure 6.1 show how the quality plans reported in Chapter 4 are integrated in the high level plan of dissemination and use of project foreground, detailed in the other chapters of this document

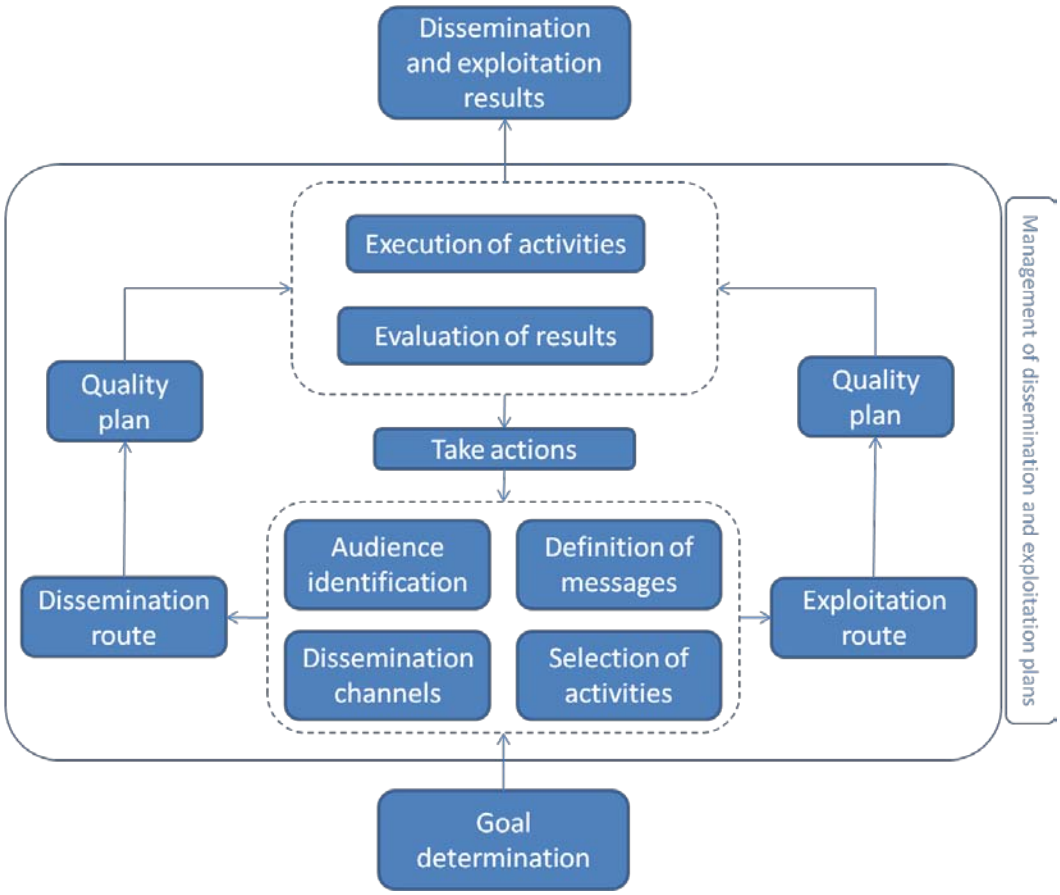

Figure 6.1 High level overview of the synergies between exploitation and dissemination plans

The main target of the exploitation plan is the implementation of new technologies for already existing or new markets. Participation in ASCENT project will provide the industrial partners and SMEs with results to the three forthcoming proof of concepts, in order to ensure an early adoption of the innovation within the research networking established in the consortium, as a solid

foundation for future European research. Below, an overview of exploitation plans of SMEs and industrial partners is reported [9]:

Johnson Matthey – Johnson Matthey will collaborate with some of Europe's leading research groups to develop and evaluate next-generation carbon capture technologies. In the process of doing so JM will develop materials and manufacturing IP that may be protected as patents or maintained as know-how, along with valuable process technology insights. A successful project would create a new market for JM selling oxygen carriers; this new product line could be produced at one of JM's existing (predominantly European) catalyst manufacturing operations.

Marion Technologies – In the ASCENT project, Marion Technologies is going to acquire knowledge in the field of CO2 capture, reforming technology, and better understanding of the properties of the new required materials involved. In addition to these results, Marion Technologies will be able to strongly cooperate with SME (parts suppliers) or public laboratories who want to try to work (with) or manufacture such ceramics. In international conferences, Marion Technologies will describe its experience in the field of ceramics and powder technology. Cost-efficient energy production is one of the goals defined in ASCENT as well as for European Economy whose leitmotiv is reduction of costs linked with high added value. The success of this project will lead Marion Technologies to continue being involved in business like environmentally friendly materials and energy systems. The development of innovative materials in CO_2 capture and fuel cell systems can lead us to enter very strategic energy markets. Nevertheless, despite the maturity level of materials and processes developed up to now in CO_2 capture/reforming technology it is too early to estimate a positive impact on the reduction of CAPEX and OPEX. These expected impacts and economic benefits brought by the ASCENT approach (e.g. optimization of material properties and reliability, reduced cost of industrial working processes) could contribute in the mid-term to position these new materials as the next generation ones. Additionally, Marion Technologies will enter the market of materials for CO_2 capture/reforming technology, manufacturing powders to SME and public body. The increasing of turnover will enable Marion Technologies to increase its manpower and contribute to a positive economic growth.

Quantis Sàrl – The impact foreseen for Quantis is to develop expertise in life cycle assessment (LCA) applied to CO_2 capture and storage (CCS) sector. LCA consulting and services (from LCA studies to communication web-based tools development) are expected to grow in the following years due to the ASCENT project. It is supposed that LCA practitioners, mainly at European level, will be attracted towards the ASCENT project and its dissemination. The LCA tool developed by Quantis, named Quantis SUITE 2.0, will be promoted via the LCA activities during the ASCENT project.

Array Industries – Array Industries mission is to make a positive contribution towards efficient power generation and effective disposal of the by-product emissions produced during its generation. Array aims to play a leading role in the development of new technologies and their applications. Array continues to invest in the acquisition of knowledge and expertise across a variety of disciplines. In Array's opinion CLC is one of the most promising processes to achieve CO_2 capture at the lowest cost and therefore the most important technology to achieve Array's mission, and the combination with in situ regeneration offered by the Ca-Cu process will allow us to extend the usefulness of our reactor systems to other processes, bring us closer to market launch of these innovative products.

Calix Europe – Calix Europe has a detailed plan for the exploitation of the Endex carbon capture reactor which will be demonstrated in 2013 using normal lime catalyst. The prospective performance figures of the Calix carbon capture process from analytical work are very encouraging and we anticipate efficiency losses for carbon capture and compression of less than 1 %.The ASCENT work is likely to provide advanced sorbents which can further enhance the performance and the unit cost of Calix carbon capture. In addition there is a significant demand for carbon capture from high CO_2 natural gas and here sorbents which work at lower temperatures than lime

are particularly appealing. Calix expects to derive a significant business acceleration from the ASCENT work.

ZEG Power – For ZEG Power, the main impact will be information and access to test results of new solid sorbents that can be suitable for further development in the ZEG-technology. IPR strategy is an important part of ZEG Power's business strategy for further technology development, where both new patent applications and definitions of trade secrets are on the agenda. Efforts are dedicated for further development of IPR within existing and new activities, and with respect to new ZEG related ideas.

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