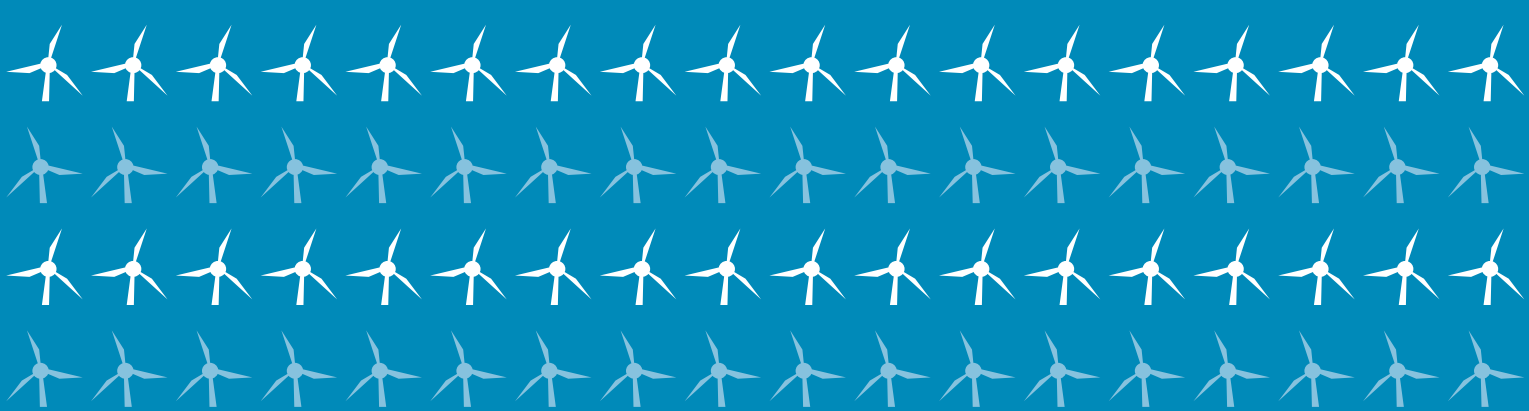
NORTH SEA
SUSTAINABLE ENERGY PLANNING

THE FINAL COMPENDIUM

CHAPTER V –
HOW TO INFORM AND TEACH ENERGY EFFICIENCY?



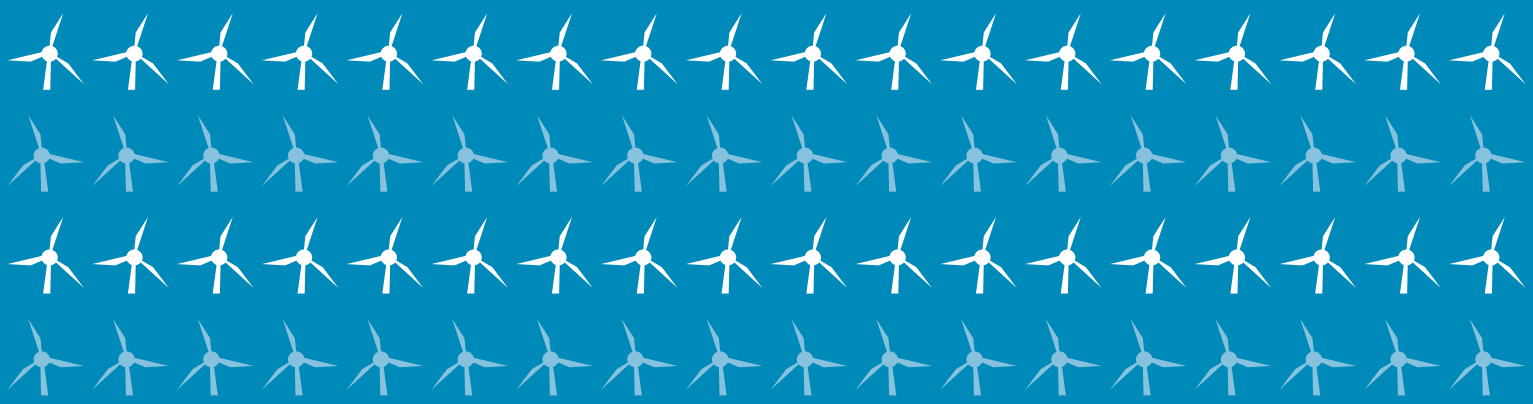


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TABLE OF CONTENT

1 Introduction 3

2 Dissemination: A precondition for successful local energy strategies 4

2.1 Introduction 4

2.2 What is dissemination all about? 4

2.2.1 Definition 5

2.2.2 People involved in dissemination 4

2.2.3 Good reasons for dissemination 4

2.3 The level of participation 5

2.4 The two types of dissemination 7

2.4.1 Type 1: Member oriented dissemination 7

2.4.2 Type 2: Target group oriented dissemination 9

2.5 Dissemination activities 9

2.6 Setting up a communication and dissemination plan 11

2.7 Communication roadmap 12

3 E-learning as an approach for raising energy know-how 14

3.1 Raising energy awareness and know-how 14

3.2 General e-learning preconditions 14

3.3 The North Sea – SEP e-learning solution – main aspects 15

3.3.1 Challenges for setting up and running an e-learning platform 15

3.3.2 Using technology to ensure quality 15

3.3.3 Target groups 16

3.3.4 The content 16

3.3.5 Content management 17

3.3.6 Technical details 17

3.4 The e-learning Knowledge Base 18

3.5 e-Learning Academy 18

3.6. The e-Learning Gateway 20

3.6.1 The Energy Trail 20

3.6.2 The Energy Isle 22

4 List of figures and tables 23

1 INTRODUCTION

The creation of public awareness concerning renewable energy sources (RES) is a very important factor for reaching the overall goal of minimising carbon emissions. It is the level of public understanding and positive implications of the implementation of RES. It can be differentiated between two kinds of public awareness. Firstly, general public awareness involves widespread understanding and acknowledgement of the issues. Secondly, self-awareness occurs when individuals understand how the concept of RES affects people personally. High public awareness occurs, when a significant proportion of the society agrees that the energy transition is an issue, which is of great importance to all citizens. Therefore, the project partners have introduced several activities to increase the level of public awareness concerning this topic.

Firstly, dissemination activities concerning energy saving and efficiency have been accomplished by the project partners. These activities are the basis for a dissemination profile determined for each partner afterwards. The project partners have focused their activities on dissemination concerning the members of their networks or on the information of external parties. Different approaches concerning the involvement of the public, business and political decisionmakers show the variety of methods for participation. Therefore, meetings and workshops were held in order to increase energy related knowledge. Furthermore, brochures, flyers, information sheets were developed. Next to these activities, information events and training seminars about energy saving for households were organised. In addition, the project partners facilitate a network for facility managers of public buildings.

Secondly, teaching people should be accomplished through the raise of energy know-how. Therefore, workshops for process optimising were held which dealt with concepts related to regional planning and supply chain development. Furthermore, e-learning should be used to increase people's awareness and willingness to participate. Therefore, the use of an e-knowledge base, the e-learning Academy, which houses specific training and education modules and the e-learning Gateway, which houses e-learning games for the schools network are being widely used amongst the range of e communities. In particular, three curricula were elaborated for online trainings. Those trainings are customised to the different target groups. The modular curricula consist of seven modules. These principles are a set of recommendations for the question »how best to shape mass public communications« aimed at increasing concern about climate change and motivating commensurate behavioural changes. In addition, the Energy Trail was established as a tool with the purpose to engage the full attention of senior primary school pupils through active and interactive learning, whilst they are discovering how to save energy and lower carbon emissions in the school and their home. Another activity to increase awareness through the use of knowledge is the creation of a wiki-system, which should be retrievable for all interested target groups. All relevant information concerning the topic should be added by the participants of the project. A further step towards more information should be increased through the development of a new North Sea Region foundation on regional development. The aim of the foundation is to push the goals forward beyond the project lifetime.

2 DISSEMINATION: A PRECONDITION FOR SUCCESSFUL LOCAL ENERGY STRATEGIES

2.1 Introduction

Energy changes our landscape rapidly. Energy issues are often in the focus of heavy debates and sometimes even split communities into »opponents« and »supporters«. Communication, awareness and knowledge of energy issues will thus always play a big role when setting up energy strategies. This paper provides a guideline for making the right choices in communication with the stakeholders and target groups. Starting with basic information on the aims and possibilitites of dissemination, concrete types of dissemenition, examples for dissemination acitivities, a rough example of communication and dissemination plan and a general roadmap for initiating dissemination activities are presented.

2.2 What is dissemination all about?

2.2.1 DEFINITION

The term dissemination describes »the diffusion of knowledge with a purpose towards others«. Dissemination in terms of renewable energy planning is related to the knowledge concerning energy saving, energy efficiency, renewable energy and the meaning of those issues to others. The purpose can range from raising awareness to getting other actors actively involved in the project. The aim is to spread knowledge within the network and discuss findings and results with the other members. The purpose could be further collaboration between partners, learning from each other, knowledge building and to create new projects or actions. Furthermore, dissemination activities can help to spread information among the public about the benefits of alternative energy systems.

2.2.2 PEOPLE INVOLVED IN DISSEMINATION

In general, there are two main groups of people involved in dissemination: the initiators and the target groups.

- Initiators of dissemination
  Dissemination activities are predominantly initiated by public authorities and NGO's. They are usually the ones responsible for sustainable energy planning. In the case of North Sea – SEP, it is mainly the regional authorities or municipalities; but also universities and environmental groups take up dissemination events.
- Stakeholders and Target Groups
  Stakeholders are actors who have an interest in the local process of energy planning. It can be persons, groups, organisations or members having an interest on the outcome. This can include local companies, citizens, and leaders of industry or environmental groups. There is a two way benefit in exchange of knowledge.

External target groups are considered to be important for a successful implementation of energy planning measures. In order to create energy awareness of the gross of the population, policies and measures have to be addressed to this group. Sometimes they need to be informed or even convinced about their interest in energy planning. Furthermore, it is important to explore the needs and interest of the target group to »talk their language«.

2.2.3 GOOD REASONS FOR DISSEMINATION

There are several reasons for paying attention to dissemination activities in the process of establishing sustainable energy planning and initiating and implementing energy efficiency and renewable energies projects. The most common reasons are:

- Raising awareness and interest
  Cooperation is a strong feature of sustainable energy planning. There is a need for partners who are well aware of climate issues and aspects of energy savings. It is important to provide adequate information about possibilities to give the target group »good arguments« for participating in this process. In order to create a degree of trust and collaboration there is a need for dissemination.
- Create enthusiasm
  Dissemination activities bring people together. A well planned activity can create enthusiasm that might help the process of energy planning. People start talking about the topic. In practice, events or

workshops may be interesting for the local press or for local politicians to meet.

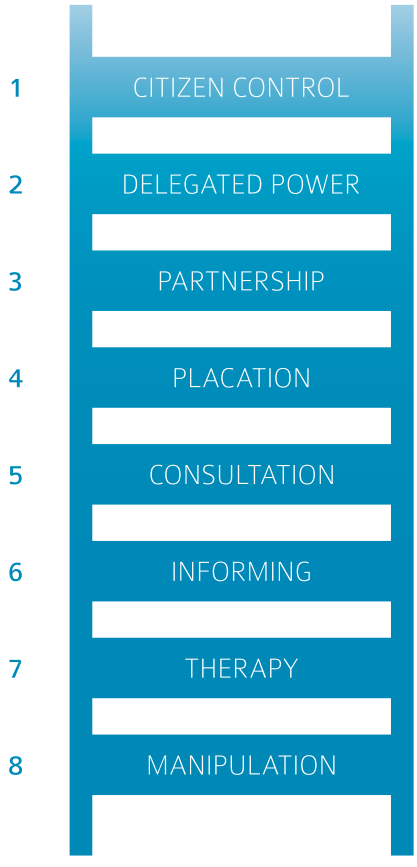
- Get information from target groups and stakeholders
  Interactive forms of dissemination activities can help policy makers to gain information about the target group. By letting people freely form opinions, they get access to important sources of knowledge and creativity. If the needs and interests of the target group (companies, households and policy makers) are known they can be used for the strategy.
- Form opinions and exchange ideas
  To empower and involve stakeholders, it is important that they can »translate« energy issues into their own situation and form an opinion. Dissemination activities contribute to that if they are specifically designed for target groups.
- Connecting different parts of the process
  Dissemination is therefore a central issue, which connects different efforts in the field of energy planning. In fact, dissemination can be seen as the key to activate the biggest renewable source of energy: the people and the community.
- Dissemination as integrative activity
  It is claimed that some types of dissemination activities are an intrinsic part and output of the process of building roadmaps and strategies and the development of business models. The involvement of stakeholders[1] within the planning process[2] increases the energy knowledge amongst these stakeholders and actors.

2.3 The level of participation

Dissemination activities are related with the issue of participation of different target groups. There are different levels of participation, which can be categorised by the Ladder of Participation, developed by Sherry Arnstein (Arnstein, 1969)[3]. The ladder distinguishes different levels of participation. The higher up the ladder, the more control for citizens. It is important to note that for most projects in the field of sustainable energy planning, the focus is not only on citizens, but on a broader definition of stakeholder, also including interest groups, associations, enterprises, public employees etc. In energy planning, governments generally take the lead. Participation and ultimately concrete action – not only from citizens but also from companies and NGO's – is necessary. In order to make the idea of the Ladder of Participation applicable and understandable for energy planning issues, an adapted version can be considered (see Figure 2), distinguishing between the level of participation (i.e. the role of single actors / target groups) and the type of management (i.e. how is the participation and thus the dissemination steered).

[1] target groups, local/regional governments and other public or private parties with an interest in sustainable energy
[2] networking & cooperation, building energy models, energy strategies, financing models, roadmaps and planning instruments
[3] Arnstein, Sherry R. (1969): A Ladder of Citizen Participation. In: JAIP, Vol. 35, No. 4, July 1969, pp. 216-224 (http://lithgow-schmidt.dk/sherry-arnstein/ladder-ofcitizen-participation.html) 27/05/2012

2 DISSEMINATION: A PRECONDITION FOR SUCCESSFUL LOCAL ENERGY STRATEGIES



The bottom rungs of the ladder are (1) manipulation and (2) therapy. Their objective is not to enable people to participate in planning or conducting programs, but to »educate« the participants. (3) Informing and (4) consultation are often preferred instruments of participation: citizens and stakeholders may hear and be heard. (5) Placation allows citizens and stakeholders to advice or plan ad infinitum but retains for power holders the right to judge the legitimacy or feasibility of the advice. Citizens and stakeholders can enter into a (6) partnership: Planning and decision-making responsibilities are shared e.g. through joint committees. (7) Delegated power and (8) citizen control, have-nots handle the entire job of planning, policy making and managing a programme.

Obviously, the eight-rung ladder is a simplification, but it helps to illustrate that there are significant gradations of citizen participation.

Figure 1: The Ladder of Participation (Sherry Arnstein (Arnstein, 1969)[4])

The project and process oriented dissemination always has to define an individual approach towards participation of actors. This includes active and passive methods as well as dissemination towards target groups or within a defined network (= two types of dissemination). The Participation Ladder is a model to understand the different degrees of participation. Since this will affect the choice of dissemination activities, it is important to realise which level of participation is suitable to a specific local situation and how it fits to the management style of a certain organisation.

[4] Arnstein, Sherry R. (1969): A Ladder of Citizen Participation. In: JAIP, Vol. 35, No. 4, July 1969, pp. 216-224 (http://lithgow-schmidt.dk/sherry-arnstein/ladder-of-citizen-participation.html) 27/05/2012

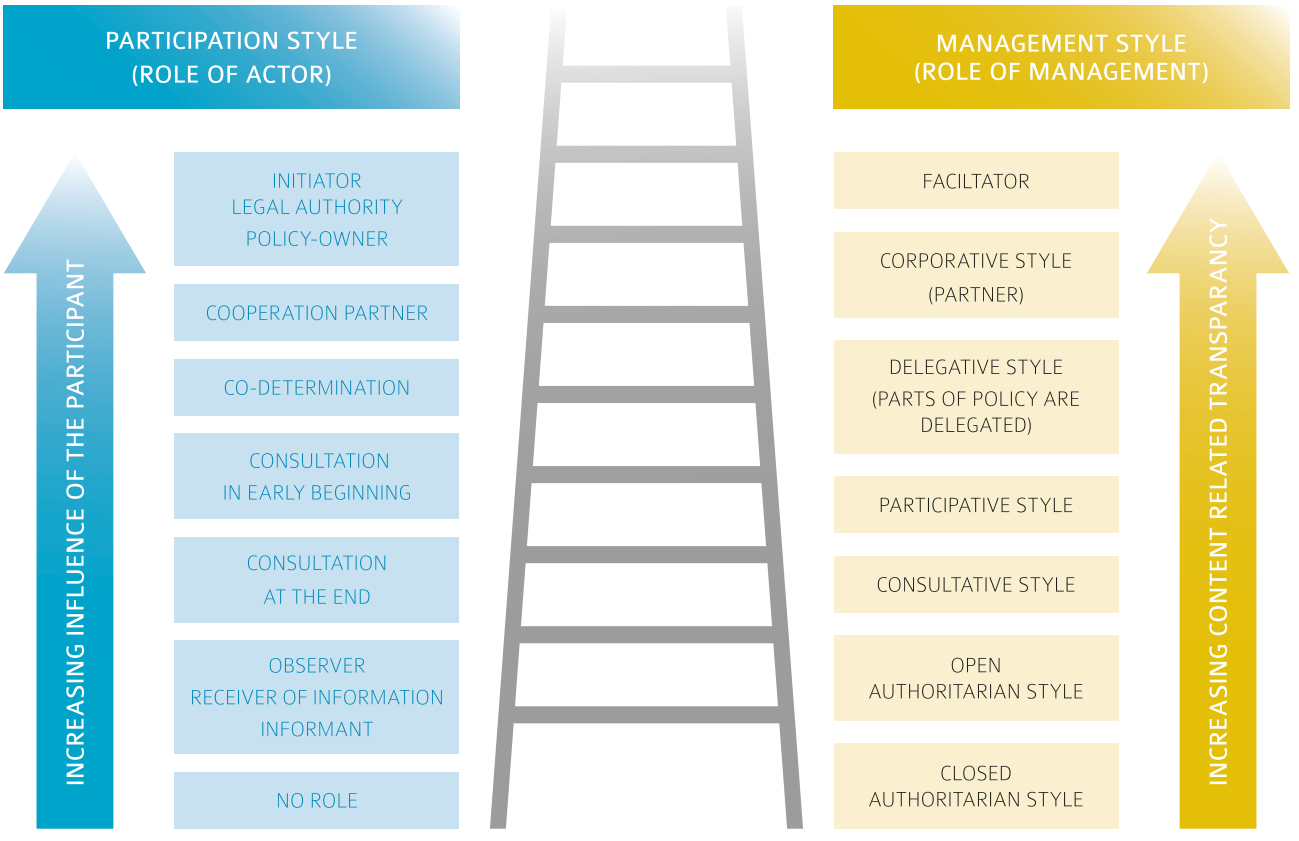


Figure 2: Ladder of Participation1

2.4 The two types of dissemination

When planning a dissemination event or when setting up a communication plan, it is necessary to consider the different ways to use dissemination. There are two theoretical types of dissemination activities, which have to be distinguished:

- Type 1: member oriented dissemination. The aim is to involve stakeholders and members into the project. Activities are conducted within the networks.
- Type 2: target group oriented dissemination activities. This type is primarily used to increase knowledge and awareness of energy issues of external parties. The two types of dissemination can be linked with the ladder of participation. Whereas the first type includes dissemination activities in order to consult or involve stakeholders, perhaps even to delegate power, the second type of dissemination focuses on sharing of information and influencing the opinion of citizens and stakeholders concerning sustainability and renewable energy issues. For both sender and receiver, it is important to be aware of the different rungs of participation.

2.4.1 TYPE 1: MEMBER ORIENTED DISSEMINATION

This type of dissemination aims at members in a specific network. It is likely, that they will participate to some extent in the project. The involvement of target groups, local/regional governments and other public or private stakeholders within the processes of networking and cooperation, building energy models, strategies, roadmaps and financing models increases the energy knowledge among these stakeholders and actors.

2 DISSEMINATION: A PRECONDITION FOR SUCCESSFUL LOCAL ENERGY STRATEGIES

This type of dissemination is a strong means for the future development and implementation of energy strategies, capacity building and the creation of awareness. Member oriented dissemination runs diagonally through other activities concerning energy planning (see figure below) and implies a high level of participation. Thus, dissemination processes for this type are often interactive. In energy planning, active involvement of target groups and commitment to the regional energy strategy is an important condition for success. This means it is important that stakeholders and local actors are involved during the process of building an energy plan.

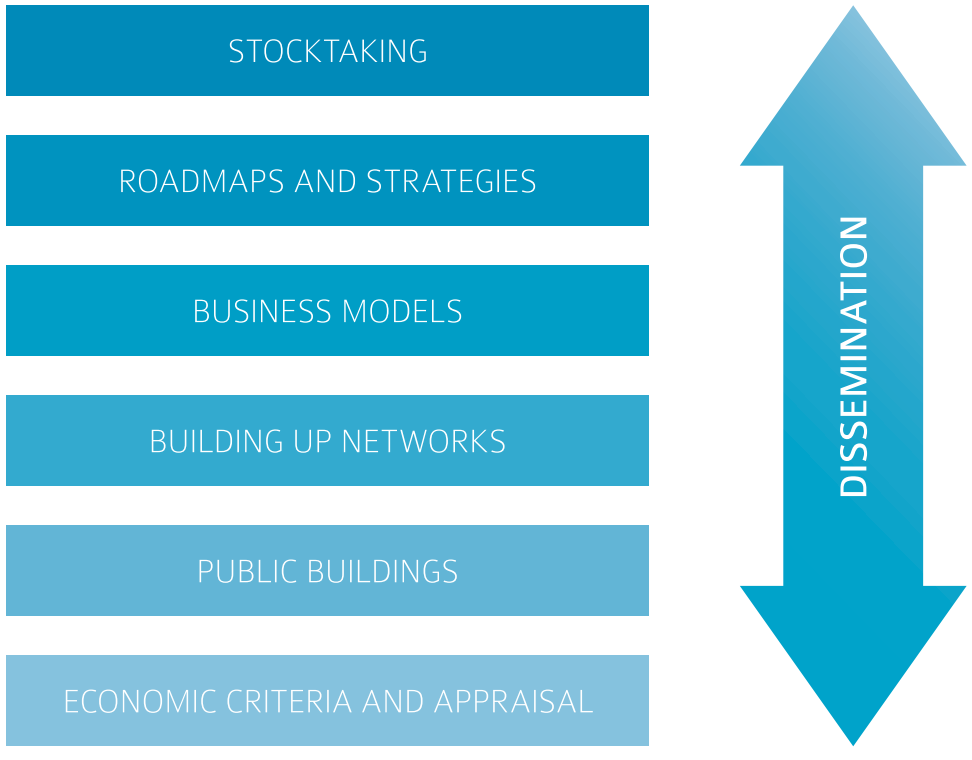


Figure 3: Dissemination integrated in other processes

Dissemination activities can be part of other activities, and run parallel. Two examples illustrate that:

Example 1:
When building roadmaps and strategies, regional stakeholders like SMEs, citizens, public authorities, project developers or planners can be involved during a participation process. They can discuss the different options within the roadmaps. This process could involve different workshops or discussion tables. For preparation, the workshop invitees are introduced in the relevance and the principles of regional energy planning.

Example 2:
Considering the activity on public buildings, the partner can establish a regional working group of the regional public property managers sharing knowledge inside their municipality with the neighbouring municipalities. They can exchange experiences on new experiments and know-how. Experts can be invited in this regional working group to explain new green energy possibilities and combined heat and power for different types of public.

2.4.2 TYPE 2: TARGET GROUP ORIENTED DISSEMINATION

The second type of dissemination aims at informing target groups outside relevant regional networks for energy planning. This unites all types of activities to convince the general public and government officials/ professionals of the benefits of alternative energy systems. In this type of dissemination the level of participation is lower (respectively lowest), but more oriented towards central aspects of communication. These activities create an added value through the specific ways and means of dissemination, e.g. through developing specific types of instruments or objects for dissemination like educational centres, toolkits, eco-services or mobile exhibitions. Goals of this type of dissemination can be:

- Inform about possibilities to participate in the process or take concrete action
- Inform about advantages of energy savings
- Create a common level of knowledge
- Create a basis for involvement of stakeholders and citizens
- Create public awareness at stakeholder level.
- Create awareness on the relevance of energy planning

These activities bear partly upon the objectives of the North Sea – SEP project, but create added value through the specific way the dissemination takes place. Here is one example:

The North Sea – SEP partner IMOG developed an energy-mobile: an exhibition on wheels informing about the energy saving potential and renewable energy options. It is used to demonstrate in schools, municipalities and all types of associations. The energy mobile is built in a trailer that can easily be hooked to a car/transporter and thus be moved to any site. Interested target groups (schools, municipalities, fairs, energy consultants, etc.) can book the energy mobile for their individual events. It is possible to guide the energy mobile by an energy-ambassador.
There seems to be a certain sequence of dissemination activities concerning the two types identified and described above. In general, the number of people reached through dissemination activities rises as the project proceeds. While in the beginning only a few actors are involved and informed, the orientation usually shifts from only experts to public audience in energy planning and implementing projects. However, this is not true for all projects and occasions – differences need to be made according to the project's aim and nature. A general idea of how to find out who needs to be involved to which extent can be found in chapter 2.7.

2.5 Dissemination activities

Concrete dissemination activities are essential if information needs to be spread and target groups of any identified type shall be addressed. Activities are closely and directly linked with the level of participation that is intended for the special dissemination purpose. Thus, dissemination activities can be active or passive, directly involving target groups or simply informing them. There are general types of dissemination activities. Table 1 summarises the most common activities for the four categories active/internal, active external, passive/internal and passive/external dissemination.

2 DISSEMINATION: A PRECONDITION FOR SUCCESSFUL LOCAL ENERGY STRATEGIES

	INSTRUMENTS			
	ACTIVE		PASSIVE	
TYPE 1: MEMBER	Collective, aiming at Involving: stakeholders: · Events, · Fairs, · Information markets	Collective aims at discussions: · Events, Meetings, · Energy forums, · Bilateral discussions	Direct, printed: · Newsletters · Papers · Formal invitations	Direct, digital: · Email · E/newsletter
	Personal contacts: · Face to face meetings · Phone calls, · Kitchen-table talks	Collective aims at learning by experience: · Study visits · Seminars	Sharing: · Online sharing of · Documents and information	Implementation
TYPE 2: TARGET GROUP	Group or individuals, aimed at learning by experience: · Company visits, · Guiding tours · Mobile · Compost mobile	Aimed at forming a target group: · Facebook, Twitter, Linked in	Topic based: · Brochures · Flyers	News: · Discussion papers · Press releases
	Collective, aimed at increasing knowledge: · Courses, Lectures, · Workshops	Elective aimed at gathering · Conference	Indirect · Press releases	

Table 1: Various instruments to be used in different dissemination strategies

Altogether, the two types of dissemination (member or target group oriented), combined with the two types of activities (active and passive) lead to six parameters that define the dissemination profile of the North Sea – SEP partners. The parameters are:

1. Dissemination of information between members. The network members mutually share information. The aim is to build know how within the network and discussions take place with network members. The purpose could be further collaboration between partners, learning from each other, knowledge building between partners, to create new projects or actions.
2. Dissemination of information towards (external) target groups. Here a single way communication can be observed: mostly the network shares information but does not retrieve feedback. The purpose could be to inform people: citizens, industry, but also decision makers and other stakeholders. It mainly concerns the information or results of a finished project or program.
3. »Active« techniques linked with dissemination of information between members (e.g. meetings, events, talks, discussions, workshops, study visits...).
4. »Passive« techniques linked with dissemination of information between members (e.g. E-newsletter, press releases, newsletters, E-Mail).
5. »Active« techniques linked with dissemination of information towards target groups (e.g. training courses, conferences, lectures, workshops, company visits, energy mobile, and events).
6. »Passive« techniques linked with dissemination of information towards target groups (e.g. brochures, press releases, newspapers, and website).

2.6 Setting up a communication and dissemination plan

A communication and dissemination plan is inevitable for a professional and effective dissemination that supports a regional strategy for sustainable energy planning and connected projects. In general a communication plan includes the following topics:

1	Background	For the strategy and the communication/dissemination measures in regional or content related context (»Why?«).
2	Aims and objectives	Clearly defined targets for dissemination activities (»What should be reached?«).
3	Message	Clear and self explaining core message, summarising the project, to be used as a claim (e.g. »Self-sustaining energy regions by 2050«).
4	Principles	e.g. transparency, consistency, inclusion, simplicity, targeted, interactive, innovative, sustainability, cooperative, accountability
5	Target audience and their involvement	Clearly defined participation approach and identification of relevant target groups (»Who should know about the project?«).
6	Actors and their role	Identification of supports and actors for all dissemination activities, defining roles and individual tasks (»Who should give information?«)
7	Timeframe and measures	Identification of project phases, related dissemination activities and frequencies (»What should when be done and how often?« closely linked to 9).
8	Methods	List of methods appropriate for reaching the intended targets (see 2), e.g. web page, print material, events, advertising, etc..
	Measures	Definition of concrete measures (activities) such as Kick-off conference, 1st stakeholder workshop, Final results brochure, etc.
	Budget	Realistic definition of financial means available and possible funding – directly influences methods and measures.
	Evaluation	Definition of monitoring means to ensure quality and consistency of dissemination process.

Table 2: General topics for a communication plan

2 Dissemination: A precondition for successful local energy strategies

In general four project phases can be identified (project preparation, start, implementation, finalisation) that call for different dissemination measures. A non-exhaustive list of general measures includes:

STEPS / ACTIVITIES	EXAMPLES FOR PR MEASURES
PHASE 1: PREPARATION	
· Defining aims · Checking for feasibility · Assessing project	· Workshop with potential actors
PHASE 2: PLANNING	
· Cost estimation · Planning resources · Planning activities · Time and cost planning	· Ideas competition · Workshops · First press releases · ...
PHASE 3: IMPLEMENTATION	
· Establishing necessary levels / instances · Controlling and monitoring · Handling all subtasks · Documentation	· Press releases and press events · Newspaper and magazine articles · Website, newsletter, flyer, brochures, guidelines / handbook/reports · Events for project team · Public events · ...
PHASE 4: FINALISATION	
· Evaluation (aims reached?) · Lessons learned · Final documentation / report	· Final conference / event · Newspaper and magazine articles · Final report / brochure

Table 3: Project phases, tasks and corresponding PR and communication activities (examples)

2.7 Communication roadmap

A roadmap is developed to find a dissemination approach that fits to local needs. If customised dissemination is one of the PR aims, at least the following questions need to be answered:

- Who are the stakeholders and target groups?
- How much time is available to work out an activity?
- To what extent will actors be involved and able to participate?
- Is dissemination only targeted at external groups or should it also reach internal groups?
- Are personal meetings important and which groups can be formed (e.g. residents, neighbours, colleagues, youngsters, seniors, council members, experts, companies)?
- Which actors are hardly to be reached and what can be done to improve that?

2 DISSEMINATION: A PRECONDITION FOR SUCCESSFUL LOCAL ENERGY STRATEGIES

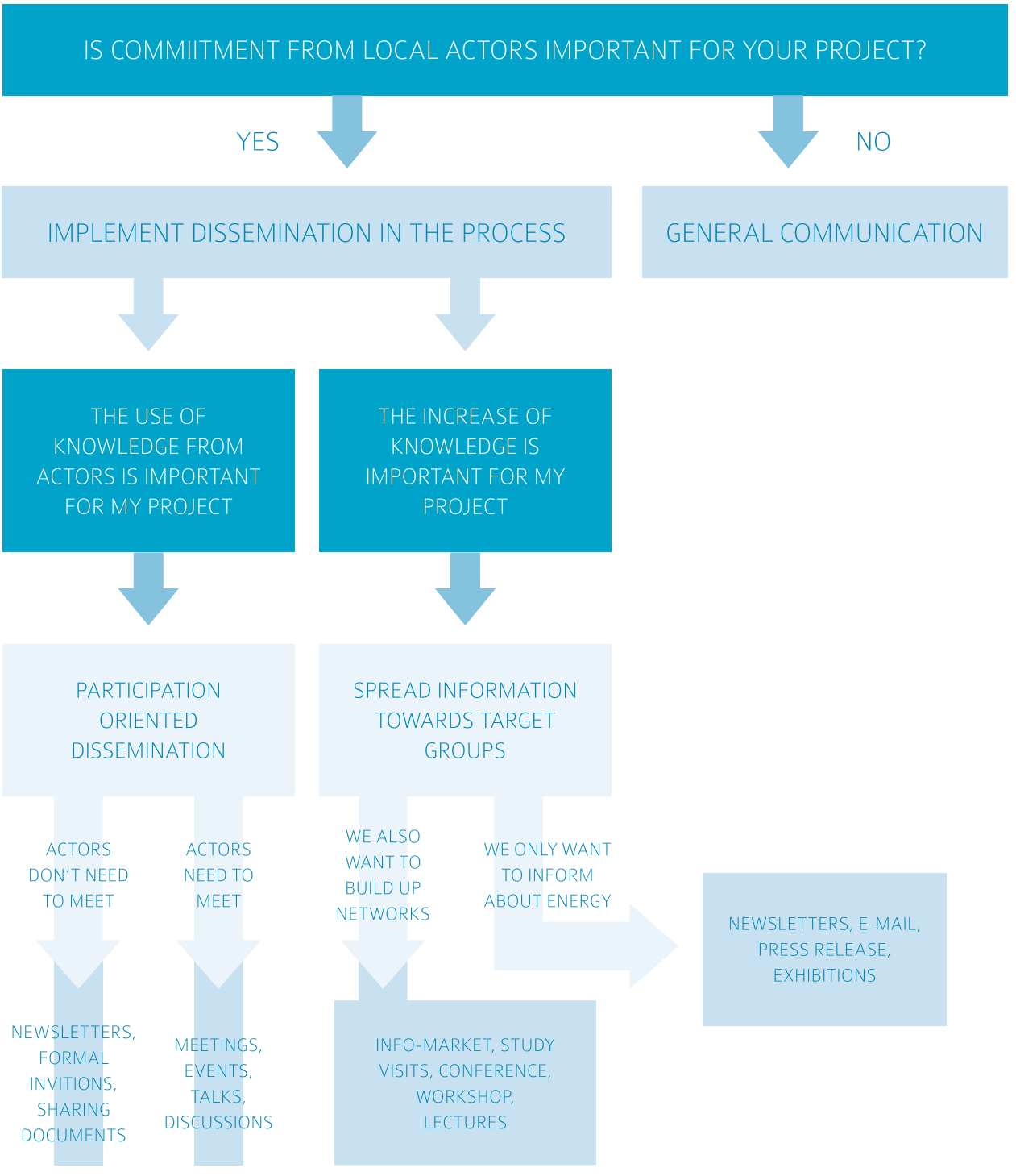


Figure 4: Dissemination Roadmap

2 DISSEMINATION: A PRECONDITION FOR SUCCESSFUL LOCAL ENERGY STRATEGIES

A roadmap is drawn at the beginning of a project, preferably at the planning phase. It will guide relevant actors (i.e. team members responsible for dissemination and PR) through the decision making process. Along the way, different questions need to be answered – depending on the answer the road will lead into different directions. A typical example of a roadmap is shown in figure 4. This roadmap is an example from the North Sea – SEP Project.

3 E-learning as an approach for raising energy know-how

3.1 Raising energy awareness and know-how

Dissemination is important to spread the message, to inform as many people and interest groups as seem to be adequate for the individual purpose. However, there are some target groups that need special attention, as they are difficult to be reached through normal ways of dissemination such as events and newspaper articles. School kids are almost a perfect target groups as they are right in the middle of learning how to act in and with their environment. They also act as so called multipliers – messages that reach the kids usually also reach their parents. This is of course especially true for smaller children. For this reason an online solution was developed, bringing together different approaches for know-how transfer for different target groups.

Through Dundee College's online educational solution, network building, networks and methods have and are being fostered and developed in order to raise energy awareness and know-how in different community groups. These range from schools, colleges and universities to private and public partnerships and businesses as well as the general public. Especially Dundee College supports the creation of e-communities and offers online training seminars, workshops and individual online training and e-Learning through the creation of interactive e-Learning modules and the use of games based on technology. The development work resulted in three interdependent tools: The e-Knowledge Base, the e-Learning Academy which houses specific training and education modules and the e-Learning Gateway which houses e-learning information for the focused networks are being widely used amongst the range of e communities.

3.2 General e-learning preconditions

The e-learning approach developed in North Sea – SEP places a greater focus on developing autonomy in the learning process and enhances the learner's capacity to learn and hence his or her employability and career progression prospects. It provides learners with experiences to equip them to adopt lifelong learning habits and to use e-learning throughout their careers. In this sense effective e-learning should:

- engage learners in the learning process,
- encourage the development of independent learning skills,
- develop learners' skills and knowledge and
- motivate to further learning.

On the other hand, e-learning will only be effective, if there are the right:

- type and amount of easily accessible resources,
- blend of delivery modes,
- appropriate content and context,
- learners who can be enthused by e learning and have or can develop the ICT skills to capitalise on it and
- an appropriate level of support from motivated and competent teachers where this is needed.

The Online Learning Solution has been designed for the best learning, but not necessarily for the best use of technology. The most suitable technology for the best learning needs to provide:

- Connectivity – access to information on a local and global scale through the web and partner web sites and properly meta tagging project materials
- Flexibility – learning at any place any time
- Collaboration – discussion forums supporting

collaborative learning beyond the traditional classroom
- Extended opportunities and contexts for learning – reinforcement and extension of classroom learning – all ECTP material can be used for this purpose and the project will provide staff training materials for this aspect of e-learning
- Motivation – providing interest, engagement and even fun – some but not all the learning materials are fully based on Games Technology and Virtual Worlds but all materials have interesting and colourful graphics. e-Learning packages and systems that have been developed in the context of this project are not just for distance or remote learning, but will form part of a conscious choice of the best and most appropriate ways of promoting effective learning including their incorporation into face to face delivery.

3.3 The North Sea – SEP e-learning solution – main aspects

Before actual planning and developing of the e-learning platform and tools could start several preliminary questions needed to be solved. This included e.g. the definition of target (and user) groups, the identification of possible obstacles and restraints, the distribution of tasks and authorisations and so on. The most obvious are described below.

3.3.1 CHALLENGES FOR SETTING UP AND RUNNING AN E-LEARNING PLATFORM

For any educational website, there are a number of generic challenges to be faced. In the North Sea – SEP case these included:

- Overcoming the increased competition from related yet distinct institutions globally, ensuring that the site affirms the project's reputation and demonstrates its credibility.
- Staying dynamic through presenting current information about relevant topics and events whilst keeping the learner community involved through social media and high quality interactive e-learning.
- Offering more online services including information libraries, rich media, discussion and collaboration tools, and online applications.
- Presenting diverse information for different audiences including prospective individual and community-based learners, educators, academia and industry.
- Offering more evaluation resources including content cataloguing, stakeholder presentations, online learner tours, and interviews with current learners and stakeholders.

3.3.2 USING TECHNOLOGY TO ENSURE QUALITY

From the start of the project, Dundee College has used technology internally, driven by the large scale of the project and the geographical diversity of the international project team, project board, stakeholders and focus group testers. Using tools such as Microsoft SharePoint server, Skype, Mind Manager and online form based data gathering has allowed the project to overcome the communication challenge of project production and ensured that the project has maintained its business case fit. In addition the use of such technology has allowed the project to be opened up to a wider range of stakeholders at stages earlier than dissemination, which has helped to speed up development time and enhance the quality of the learning objects by encouraging and enabling the participation of college management, lecturers, industry, fund holders and students. It should also be noted that the technology has provided a synergetic effect in parts of the project and opened up the inclusion of additional features for future use. For example, using digital technology to undertake focus group testing and rollout and delivery testing, allowed users to not only access the learning but also to provide real-time feedback and automated reporting through the inclusion of questionnaires. The adoption of not only minimum requirements but also industry best practice has reaped a variety of rewards for the project through more efficient development, simplified rollout and the ability to provide a truly flexible offering to the project partners.

An illustration of this is the use of XML for triggering content delivery and interaction within a 3D environment, which also allows the user to tailor their experience to take advantage of higher screen resolutions and more powerful hardware if available. This has allowed a simple editor to be used in localising all text and audio content from English into other languages. The net result has not only been a reduction in the cost of localisation but also the additional benefit of the learning objects being used as a language teaching tool for users.

3.3.3 TARGET GROUPS

There was a wide range of target groups from school children through to professional actors in the energy sector. The content and delivery methods reflect this wide range of group and more importantly their level of knowledge. The main vehicle in knowledge provision was the learning gateway supported by workshops. The learning gateway extended to a greater audience than could ever have been reached through traditional means, the nature of the pedagogic design made training events particularly and allowed learners to strengthen their knowledge by reinforcement, crucially at a time and place of their choice. A diverse group of stakeholders will always have differences in their prior learning and levels of existing knowledge, therefore users are able to select the most appropriate learning content for them. Learners will be able to monitor their own progress by completing selfassessment questions at the end or appropriate point of each learning outcome. Each section of content also has a multiple choice /multiple response knowledge test in order to let the learners assess their learning and enable stakeholders to report on the learning undertaken and achieved.

In order to provide a breadth and depth to the learning content that is appropriate for the diverse target audiences (of house owners, craftsmen, architects, engineers and energy consultants, school pupils etc.) the learner can input which category they are in. Once the user has selected their learning requirements the information presented is seamlessly tailored to their needs, be it general or specific. The corresponding material will produce enhanced interactivity in individuals' learning experiences in order to encourage them to develop their own skills for learning and to become autonomous users of learning resources.

Supported by new developments in pedagogy, the learning gateway has focused on transforming the nature of the learning process for both students and tutors. The e-learning packages and systems that have been developed in the context of this project are not just for distance or remote learning, but will form part of a conscious choice of the best and most appropriate ways of promoting effective learning including their incorporation into face to face delivery.

3.3.4 THE CONTENT

Crucially, all content added and still being added, has tagging facilities to improve search engine discovery and to allow targeted searching by particular learner groups for their needs and the context of those needs. In addition to this tagging, the site features social networking tools with the ability to use social bookmarking, Twitter, learner generated discussion forums and smart phone QR Codes for marketing and dissemination would normally be beyond the reach of such a project. Content such as visualisation and mapping, can simply be embedded within the site to enable easy content access and encourage discussion and transnational exchange of information.

In order to provide an immersive environment for the learner animations were modelled to give a sense of realism and act as a showcase for the innovative work taking place there. For example, in selecting a new insulation component in determining a u-value of a composite structure the learner is then presented with appropriate data showing the change in pertinent measurable. This method demonstrates the multiple levels that the material can work on.

In addition, when the learner is zoomed in, he/she is able to access a bank of relevant rich media content such as photos, videos, animations and documents that can be viewed online or downloaded to their computer or mobile device. Clickable objects within the building

environment display a rich media pop-up window providing information on environmental considerations including ideal solutions, financial pay-back periods and carbon reduction estimates where relevant. This information can be administered by appropriate stakeholder staff. This enables authorised members of the group to select an item from the database and edit its text content and add appropriate rich media such as video, animation, and images and quiz questions.

In line with W3C guidelines and accessibility best practice, all rich media has alternative text descriptions and fonts are web-safe, use high contrast colours schemes and are scalable.

3.3.5 CONTENT MANAGEMENT

For targeted content accuracy and for moderation purposes, it was anticipated that partners would not want to provide participation by learners in all areas. Therefore, the solution caters for a granular approach to content management; for example, items such as forums being open to all, blogs being authored by subject experts and commented on by learners and document upload only being open to subject experts. Such a solution means that online and offline activities can be tied together with a calendar function for workshops and seminars. It is possible for such events to be filmed and placed on the site as part of a searchable multimedia repository. This not only acts as a catalogue of the project, but enables those who could not attend such events to still benefit from them and aid in project dissemination. The educational website is proving to be economically efficient, easy to maintain, informative, dynamic and appealing to learners through:

- Easy and intuitive content management through a text editor allowing the simple editing of content without any HTML knowledge.
- Improved site visibility through optimisation placement in search engine results by web addresses, page titles and descriptions that are search engine-friendly, therefore improving the project's position in the search results and attracting learners more effectively.
- Importing from existing data sources including learner information, organisational documents, and legacy websites
- Empowering project stakeholders to update content without requiring the help of the IT department. The solution can also enable a content workflow, ensuring that content will be properly reviewed and approved before going live.
- Maintaining multiple online resources for the different learner members.

An administration module has been designed for secure access by the partners. This module enables them to upload new content and refresh current content using a series of templates, ensuring the sustainability of the learning materials over time and also ensuring that the presentation of content has a project-branded continuity. The administration module can amend functionality and content to each constituent part of the site. This can be securely accessed by appropriate administrative staff from within their browsers. Where appropriate, other content and functionality can be administered with commonly used software (such as Microsoft Office, Adobe Photoshop etc.) so that alterations and updates can be made as and when required. The administration module is an intuitive application, however, online training and remote support is offered via phone, email and Skype.

3.3.6 TECHNICAL DETAILS

The development has been undertaken to enable the solution to run within a browser window. While this has been designed to be resolution independent (for resolutions of 800 x 600 or higher), the targeted resolution for design purposes is set at 1024 x 768 as 97 % of users employ this or higher setting on their computer. The solution has been developed to run on both Microsoft Windows (XP or higher) and Apple Macintosh (OSX 10.2 or higher) platforms.

In order to serve the majority of potential users the most common browsers are supported for use with the model (see Table 4). The Web Content Accessibility Guidelines (WCAG) recommended by the World Wide Web Consortium (W3C) 1.0/2.0 browser guidelines for accessibility were followed and tested with automated toolsets and with human quality assurance practices during the development phase. As part of a strategic approach to development Dundee College employs industry standard toolsets. To this end the only plugin required is Adobe Flash. This was recommended due to its being free to download and use, easy to install, its high market penetration and the fact that it is still a long-life system.

BROWSER	PROJECT MANAGEMENT	DESIGN	DEVELOPMENT
· Internet Explorer 6 or higher · Firefox · Google Chrome · Opera · Safari	· Microsoft Office · Microsoft SharePoint · Intervals Timesheets	· Adobe Photoshop · Adobe Flash · Adobe Illustrator · Adobe Director · Adobe Acrobat · Adobe After Effects · Adobe Premiere · Adobe Audition · NewTek Lightwave · Autodesk 3ds Max	· Adobe Flash · Microsoft Visual Studio · Net Framework · Microsoft ASP .Net · Microsoft SQL Server

Table 4: Supported browsers and standard development and implementation tools used

3.4 The e-learning Knowledge Base

The original intention of the knowledge database was to allow project partners to share energy plans, national standards, case studies, best practices and other relevant material. Various options were put to the project partners and the relative merits of the available approaches to the creation of a suitable transnational database were decided. Project partners had to be clear on and agree on what the access arrangements to the transnational database was going to be, who the target user group will be and what features were required. In the end it was decided that there were sound arguments to make access available to specific groups and most information eventually being made available to the general public as well of course to the Project Partners. It had also to be decided on which groups should have read only access and which should have contributor status. However the flexible design of the knowledge base allows for all eventualities and for the future extension of the resource base. Importantly, it allows smooth interaction between the e-learning Academy and the e-learning Gateway.

3.5 e-Learning Academy

The e-Learning Academy contains an analysis of different techniques considering connections of structural parts, thermal bridges and aspects of craftsmanship. The activity focuses on the refurbishment of existing buildings and also handles other techniques for the work with the energy efficiency of buildings, even tightness of buildings.

The academy contains seven different modules dealing with specific topics around sustainable energy planning and management. Each module is closing with a set of assessment questions. The contents of the modules have been defined as follows:

Module 1

Module 1 gives an »Introduction to Mechanical Heat Recovery Ventilation«. It especially deals with

1. The purpose of ventilation in buildings
2. Operating principles of Mechanical Heat Recovery Ventilation Systems

3. Advantages of Mechanical Heat Recovery Ventilation Systems

Module 2

The second module deals with »Mechanical Heat Recovery Ventilation«, giving more detailed information on solving ventilation heat loss calculations.

Module 3

Module 3 is giving insight into the »Components of Mechanical Heat Recovery Ventilation Systems«, including

1. Layout of component parts of a Mechanical Heat Recovery Ventilation System
2. Function of component parts of a Mechanical Heat Recovery Ventilation System
3. Assessment questions

Module 4

In module 4 »Heat Exchangers Used in Mechanical Heat Recovery Systems« are in the focus, dealing with

1. Concurrent heat exchangers
2. Cross flow heat exchangers
3. Counter-flow heat exchangers
4. Channel heat exchangers
5. Surface area and heat transfer

Module 5

For module 5 the topic »Design and Installation Factors for Mechanical Heat Recovery Systems« has been chosen, including the subtopics:

1. Location of ventilation devices and components
2. Ducting installation
3. Air transfer
4. Control systems

Module 6

The sixth module deals with »Integration of Additional Heating in Mechanical Heat Recovery Ventilation Systems«, divided into 6 subtopics:

1. Purpose of additional heating
2. Electric Heating Element
3. Solar Hot Water Installation
4. Ground Source Heat Pump
5. Air Source Heat Pump
6. Free standing appliance

Module 7

The last module provides know-how in the field of »System Commissioning«, dealing with:

1. Installation checklist
2. Air flow measuring devices
3. Annual maintenance plans

Content is partly provided through animated web presenting. The following table shortly outlines the background for animated information display for module 1:

CONTENT SECTION	REFERENCE SOURCE	KEY LEARNING OUTCOMES	KEY STORYBOARD STEPS
Introduction to Mechanical Heat Recovery Ventilation	Mechanical Ventilation with Heat Recovery-Types of Ventilation Solutions-Compliant Ventilation Systems-Continuous Mechanical Supply and Extract Ventilation with Heat Recovery-How it Works	To show the basic operating principles of mechanical heat recovery ventilation.	· To show warm moist air is extracted via a ducting system from wet rooms and into a heat exchanger · To show cool incoming replacement air from outside is ducted to the heat exchanger · To show warm moist air is retained in the heat exchanger and transfers heat energy to the incoming replacement cool air. · To show that this preheated incoming supply air is distributed into habitable rooms · To show cool stale air is extracted and is ducted to outside the building

Table 5: Animations Examples: Animations LOG Module 1

3.6 The e-Learning Gateway

Stakeholders have a high demand for e-learning. However, using technology to raise »energy awareness« and »know how« requires an easy as possible approach, as this is crucial to the successful uptake and use of the learning gateway. It was identified early on that using the available technology to leverage the required dissemination and support process for the project was not only appropriate but also vital to its success. Through using consistent branding and the website to gather data and deliver information, the technology should become a champion for the project as it reached out to all stakeholders.

Through the e-learning Gateway learners are offered choices concerning their learning that they had not experienced in the past. This way learners are in control of their own learning, resulting in feeling more responsible for their own learning. This all leads to a greater sense of ownership resulting in improved motivation. This is echoed in the thoughts of tutors who facilitate that learning. Gone are the days when learners are educated en masse with tutors using didactic approaches to lead learners towards learning outcomes.

Choices are not all about the learning medium, they are also about the learning process itself. Technology based delivery means that learning can take place at a time and a place, which is convenient to them. Learners can prepare for assessment, catch up on a missed class, or simply reinforce what they learned that day at home, at work, in a library or resource centre or even on their mobile phone. It is evident from the workshops that were delivered there is a need for face to face but equally workshops require to be more dynamic and interactive, hence the design of the learning gateway. Learners are not often offered choices as to the pace of learning; this is especially true of traditional workshop delivery. If they struggle to keep up in a traditional workshop/classroom situation, evidence tells that learning through the learning gateway means that they can set their own pace and be comfortable in the knowledge that they are not being left behind or are 'holding up' their peers. Similarly, learners have felt that the support they are offered for learning in this way is more effective. It can either come instantly through on line feedback from quiz type activities, or tutor responses to individual problems via e mail, phone or in person. This may be because tutors are able to tailor support better to meet individual needs of learners by using the technology available and using the time they have freed up from face-to-face learning.

Within the frame of North Sea – SEP two e-learning tools have been developed by Dundee College: The Energy Trail and the Energy Isle

3.6.1 THE ENERGY TRAIL

The Energy Trail developed by Dundee College has the purpose to engage the full attention of senior primary school pupils through active and interactive learning while they are discovering how to save energy and lower carbon emissions at school and at home. The competitive nature of the game provides a positive aspect to playing the game which is designed to hold the interest of the pupils while providing them with a »fun« experience.

Teachers will want to combine the use of this game with classroom lessons and activities on climate change, the finite life of fossil fuels, the global need to reduce carbon emissions, save energy and develop and use sustainable and renewable energy sources. Playing the Energy Trail will encourage young people to be:

- Successful learners
- Confident individuals
- Effective contributors
- Responsible citizens

These aspirations are a central part of the new Scottish Curriculum for Excellence for primary and secondary schools but they are also aspirations that all European countries hope their school pupils will achieve.

Figure 5: e-Learning Gateway: Badge for successfully running through the online system

To play the Energy Trail one will need to use all detective skills to complete the missions given. It can be played as often as wanted, and the more often the game is played, the more badges can be collected. To be able to play it is only necessary to create an account, accept a mission and record the information concerning this mission that can be found at home, at school and in the community, and to see how other players all over Europe are doing by checking out the map that shows all the players.

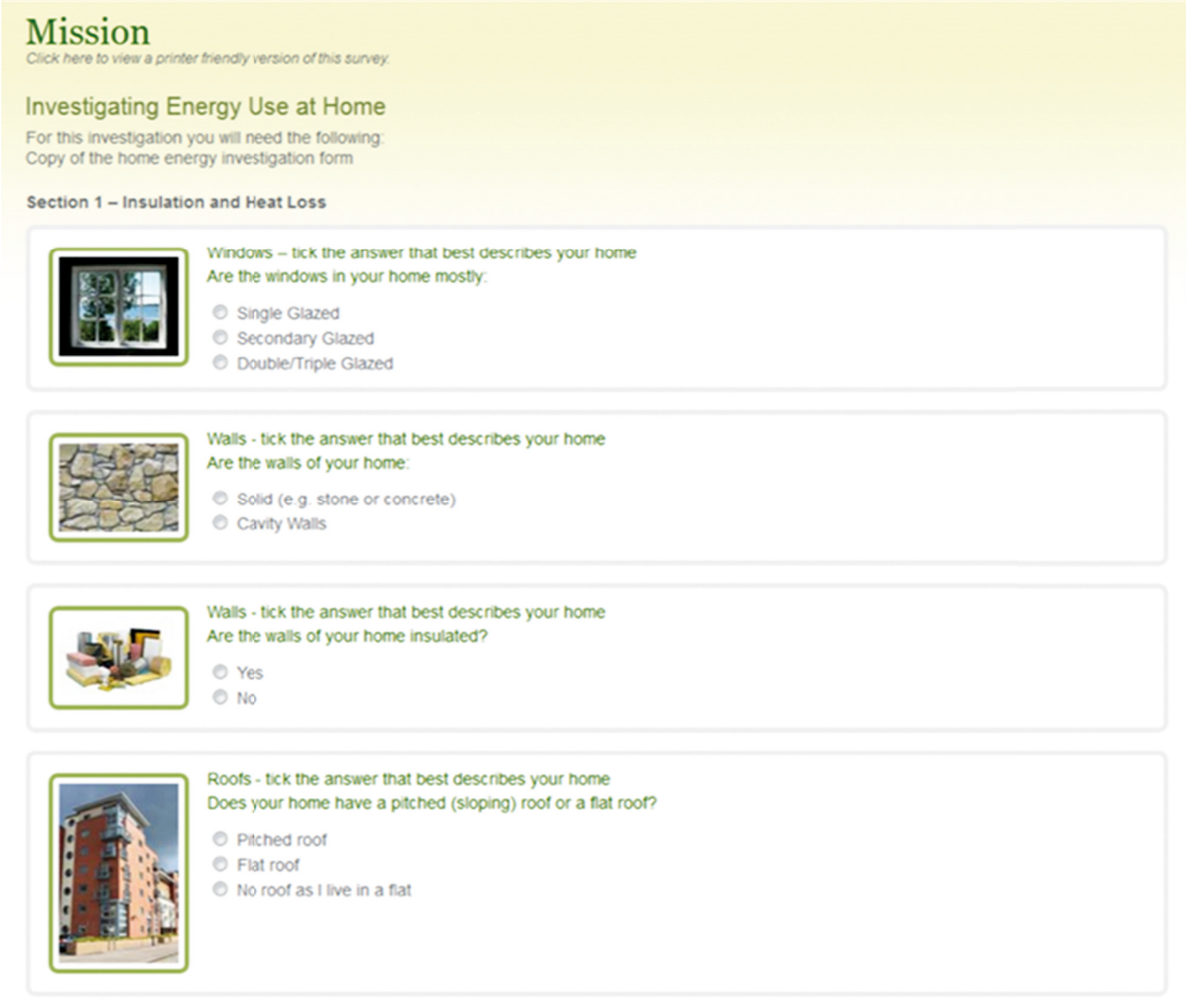


Figure 6: e-Learning Gateway: Mission to be accomplished

3.6.2 THE ENERGY ISLE

The Energy Isle is a simple but effective online tool, playfully providing a considerable amount of interesting information on energy consumption, generation as well as saving and efficiency opportunities. Information is available for ten different issues (biomass, home energy, electrical appliance, eco footprint, lighting, wave power, hydroelectric, solar photovoltaic, tidal power and wind power. For each topic a spot on the island's map is reserved. Information is available as texts, as graphics or as surveys that can be completed by the learner. This way many different aspects can be dealt with, knowledge can be obtained and curiosity is triggered.

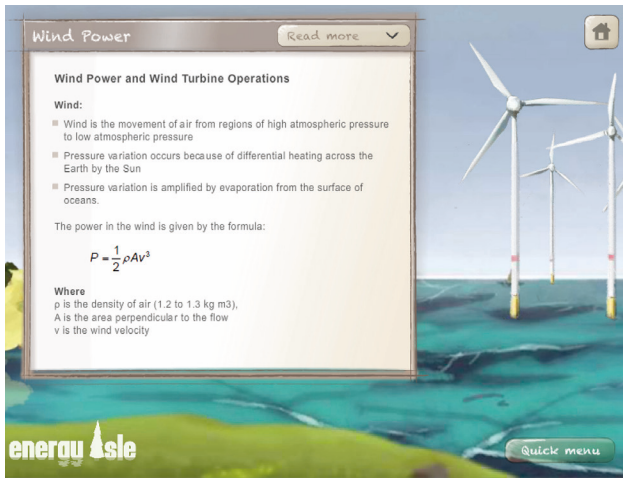


Figure 7: Screenshots of the Energy Isle-Programme (Both tools are retrievable under http://www.junction-18.com/NSSEP/Home.aspx)

4 LIST OF FIGURES AND TABLES

Figure 1:
The Ladder of Participation (Sherry Arnstein (Arnstein, 1969)) 6

Figure 2:
Ladder of Participation 7

Figure 3:
Dissemination integrated in other proces 8

Figure 4:
Dissemination Roadmap 13

Figure 5:
e-Learning Gateway: Badge for successfully running through the online system 21

Figure 6:
e-Learning Gateway: Mission to be accomplished 21

Figure 7:
Screenshots of the Energy Isle-Programme 22

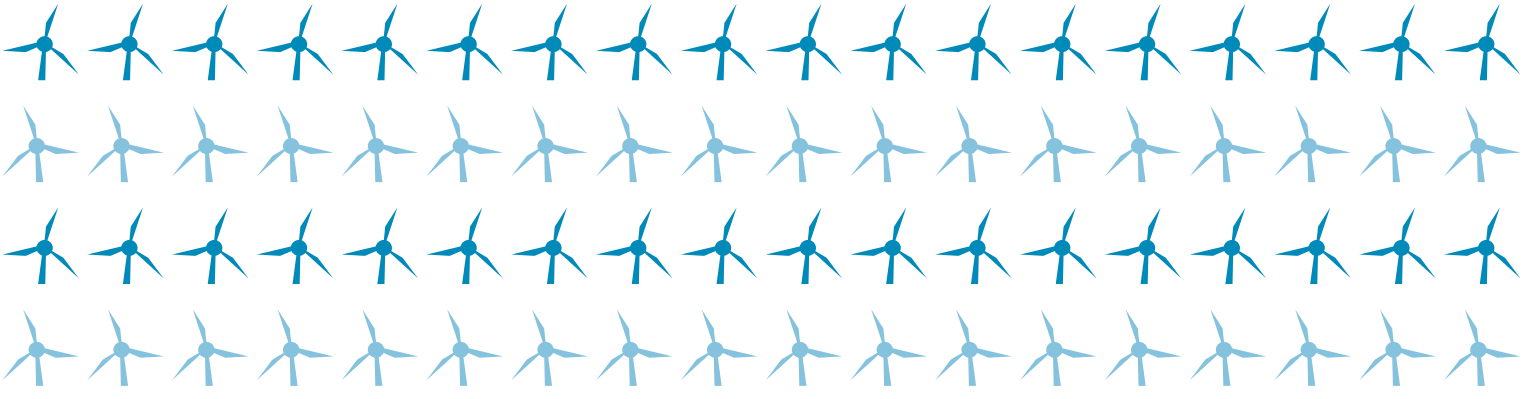
Table 1: Various instruments to be used in different dissemination strategies 10

Table 2: General topics for a communication plan 11

Table 3: Project phases, tasks and corresponding PR and communication activities (examples) 12

Table 4: Supported browsers and standard development and implementation tools used 18

Table 5: Animations Examples: Animations LOG Module 1 19



SUSTAINABLE ENERGY PLANNING NORTH SEA

The Interreg IVB North Sea Region Programme
Investing in the future by working together for a sustainable and competitive region

EUROPEAN UNION
European Regional Development Fund

JADEHOCHSCHULE
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