



The ASPIRE Project

Task 4.1

A common approach for Sustainable Energy Action Plans.
(Deliverable 12)

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1. INTRODUCTION.

During the ASPIRE Project, communities from the six core countries that are represented in it – Czech Republic, Finland, Italy, Latvia, Sweden and the UK - will each develop Sustainable Energy Action Plans (SEAPs). Co-operation between the partners, deploying information gained through each others' knowledge and experience, will influence the Plans, which will be started, drafted and then refined throughout Work-package 4.

The common aim is to promote a more effective use and management of local energy resources. The work will be founded on (a) a deep examination of all the relevant energy-issues, and then (b) co-operation between the partners to evolve and possibly apply common methodologies and solutions. The Plans will give the targeted communities sufficient momentum to address their energy-problems and then to transform them into opportunities for social and environmental improvement.

This report constitutes Deliverable D12 of the project; it provides principles for a broad common approach for the development of the Plans. The methodology will be used by the partners to provide qualitative and quantitative information about each community from which opportunities may be developed. The partners will deploy the common approach, and analyse its effectiveness; the results from that analysis will be used to refine the common approach before the end of the Project (possibly at month 27-28), and to produce general guidelines for other communities to use when developing and adopting such Plans.

Section 2 outlines the general approach to be adopted; Section 3 starts with the definition of the communities under study, and then sets out what is needed to produce a useful description, supported by quantitative/qualitative information, of the community in terms of its population and infrastructures, the production and use of energy, and relevant geographical features, etc.

Section 4 covers the process of development of the SEAP, through which the best options for actions should be identified.

Two key topics run through the report: (a) the reduction of demand for energy, and (b) securing supplies of energy from renewable (low-carbon) sources.

2. THE APPROACH.

2.1. The scope.

An energy-plan may be written for a number of reasons, for example as part of a wider strategy for the community, or a specific tool to address climate-change. Whatever its purpose, it is important to set the approach in context of international, national, regional and local plans and policies, and to identify (a) its aim, (b) the persons or bodies who will adopt it, and (c) how it will interact with other plans and policies. These topics are covered in the next paragraphs.

The objectives for a SEAP are to (a) facilitate the meeting of targets for the reduction of Greenhouse Gas (GHG) emissions, and (b) construct priorities for action in the realm of sustainable energy.

2.2. The stakeholders.

The action to produce a SEAP may be initiated and led by a department within regional or local government, but it is important that the participation and engagement of a wider range of stakeholders is secured so that the Plan has a realistic chance of being implemented successfully. Stakeholders may include representatives of other departments within the same organisation, politicians, energy-suppliers, local businesses and householders, etc.

A few (ten to 25) representatives of key stakeholders should be invited to form a Stakeholder Steering Board (SSB). As the work progresses, it might become clear that the membership of the SSB should be changed to take most advantage from the various interests that will co-operate to produce the most significant results.

A wider range of stakeholders, including those drawn from the general public and their representative organisations, private-sector professional people and other informed people, should be invited to take part in public seminars, workshops and other events. These activities are covered in Work-package 3 of the Project.

These are the basic means by which local credibility in the proposed activities can be secured.

2.3. Integration of the approach.

Consideration may be given to the way that energy forms a part of other local objectives such as sustainable economic growth and environmental quality.

A **report*** could then be produced to describe a review of policies and plans that are relevant to the development of sustainable energy, with particular reference to the rational use of energy (energy-saving measures) and the substitution of fossil fuels with sources of renewable energy.

* A draft report for Mountain Community of Scalve has been produced and is available as reference for other Communities.

2.4. Development of options for action.

Information will be gathered about existing local plans and programmes concerning energy and sustainability (and their broader contexts – see the report quoted in 2.3), financial and commercial implications, technical viability, and relevant environmental and social data. From that matrix of basic information, and from proposals arising by local stakeholders, which give expression to further exigencies not yet addressed in existing plans/programs, discussion should produce several options for further and more detailed consideration.

In this way sectors (e.g. household, industry, commercial, agriculture, transport, etc.) and targets (e.g. residential buildings, agro-based biomass, wind resources, etc.) for action are preliminarily identified.

A more analytical evaluation of these general options should then be performed when the energy situation of the Community is examined (see Chapter 3).

During the process, the criteria used for decisions about the SEAPs will be recorded.

2.5. Finalisation of the strategy.

During the Project, each SSB will be active in the process of developing its SEAP and will be asked formally to endorse it at several stages. Each final Plan will consist of carefully defined and costed proposals for actions, with indications of sources of funding.

Other stakeholders will also be informed during the development of the SEAP through workshops and events.

The approval of the political representatives of the relevant community will be obtained before the implementation of the SEAP is begun.

3. DESCRIBING THE COMMUNITY.

Qualitative and quantitative description of the communities is necessary to set up each SEAP. It will include basic information about boundaries, population-density, types of settlements, economic activities, transport-systems, and in particular detail about energy.

It is very likely impossible to provide a detailed plan for every aspect of each community, and thus some sampling of representative sub-areas might be undertaken. The sub-areas may be urban, rural, an island, part of a city, a small town, a group of villages or smaller. Each selected sub-area must be clearly defined within a geographical zone around which one could draw a line representing its boundaries. Particular attention has to be paid in the choice of the sample areas, so that they are representative of a useful and distinctive part of the territory. For this reason the sub-areas should be chosen, if necessary, after a preliminary analysis of the territory. The methodology for the definition of the sub areas will be defined in a second phase, when the preliminary analysis has been carried out.

The information gained in this Project has, of course, to be communicated to the whole local community, even if the data is collected only in sample-areas. It might prove to be useful to apply statistical methods to extend to the total territory some general conclusions to be drawn from the information gathered from those limited sub-areas.

As regards energy, it is often very difficult to gather detailed data on production, distribution and consumption, as energy actors on the market are not always willing to provide data about their production and/or sales.

3.1. Methodologies for analysing the energy situation of the Community

It is then suggested that, depending on availability of data, three different methodologies are used (all of them combining quantitative and qualitative analysis in different proportions):

1. data collection and analysis: enough energy data are gathered or estimated (see 3.2 – 3.3) in order to draw a (simplified) *energy balance* (see **Figure 1**) of the Community.
2. data extrapolation: data are not directly gathered or estimated, rather it is supposed that, from the point of view of energy, the Community is similar enough to another area that has been already analysed, that is a comparable close-by area or even a greater area which encloses the Community (e.g. a region, a state, ecc.)

3. experts pooling: involved stakeholders, as recognised experts, may provide opinions or suggestions, which are based on underlying facts, data or experiences . These underlying data/facts may be provided, as regards energy, not for the entire Community but for specific cases.

The analytical assessment (through data, statistics, case studies, expert opinions) of the Energy situation of the Community will then permit to draft a preliminary List of Actions to be examined thoroughly and possibly included in the final SEAP of the Community (see Chapter 4).

In paragraphs 3.3 and 3.4 detailed inventories of data that should be collected when applying methodology 1 are presented. It is obviously possible to apply the methodology in a simplified way, estimating some data that are not easy to gather. The main objective of methodology 1 is indeed to produce a (even simplified) energy balance for the specific area under scope, which can be based on actual and also estimated data.

Methodologies 2 and 3 will be based partially on the same data detailed in paragraphs 3.3 and 3.4, which, though: a) are available for different areas and can then be inferred for the area under scope (Meth. 2) or b) are available, without being completely disclosed, in the cultural background/working experience of involved experts (Meth. 3).

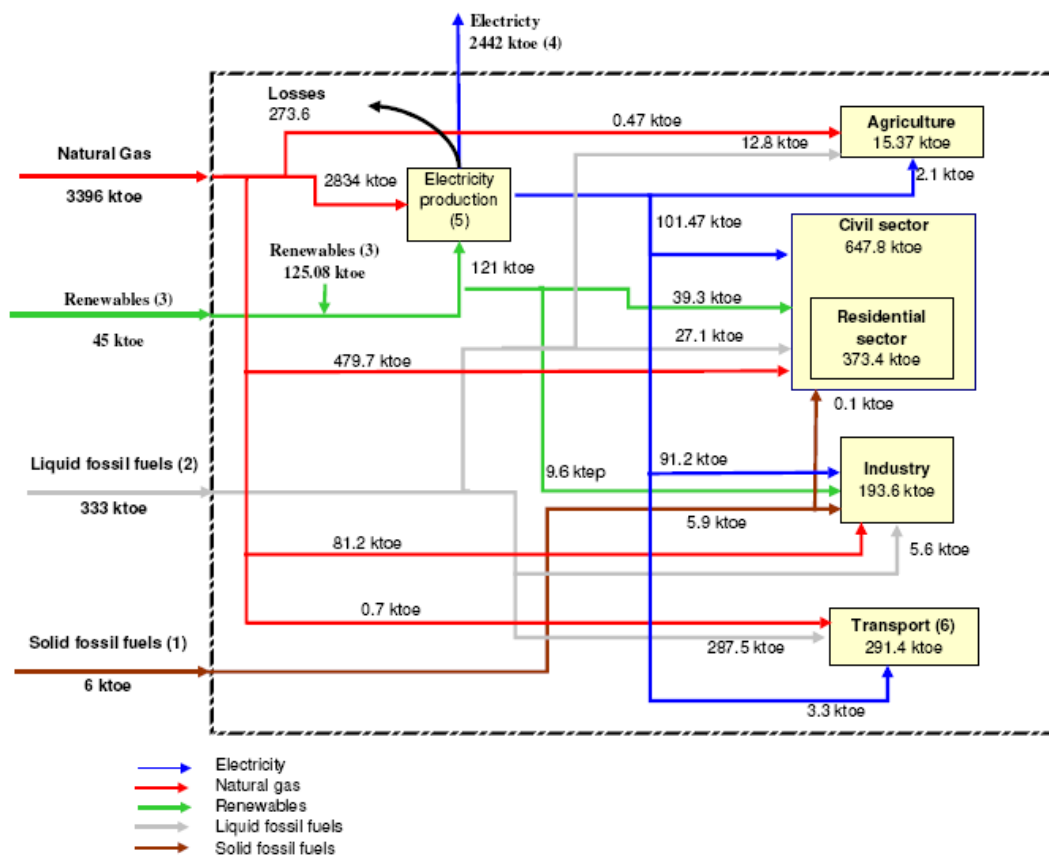


Figure 1: Example of Energy Balance

3.2. General information.

Data on the whole community should be collected under the following headings:

- (a) Areas (ha) of land allocated to various end-uses, e.g. heavy-industrial sites, light-industrial sites, commercial sites, shops, public buildings of several kinds, housing of several kinds, agricultural areas, commercial forests, land worked for minerals, natural areas; etc.;
- (b) Total population of the identified community;
- (c) Information on the local climate;
- (d) Industrial activities by sectors: number of firms; some measure of outputs, etc.; and
- (e) Agricultural/rural activities: number of farms; some measures of crops, etc.

Geographical elements of the area, such as topography, types of vegetation, proximity to the sea and climate, etc., will illuminate opportunities for the useful exploitation of RES.

3.3. Information to be collected on energy currently delivered (*Methodology 1*)

Data should be collected under the following headings:

- (a) Number of plants (thermoelectric, hydro, geothermal etc.) for generation by fuel-type; installed MW; generated electricity (GWh);
- (b) when available, number of heating plants rated above 300 kW, separated by fuel-type;
- (c) Extent (length and percentage coverage of potential customers) of electricity network (transmission and distribution);
- (d) Extent (length and percentage coverage of potential customers) of natural-gas network;
- (e) Local energy-prices paid by consumers for gas, oil, electricity, vehicle-fuels (separating the element of tax/duty);
- (f) Estimation of local specific cost for energy production from renewables;
- (g) *Per-capita* emissions (e.g. of CO₂) deriving from the generation of energy;
- (h) Import-export of energy sources, or electricity through the community boundaries; and
- (i) Other relevant environmental impacts that can be quantified.

It would be also helpful to have a table showing the current status of RES in each community, perhaps of the type shown in **Table 1**.

Table 1: A table to report on the current status of RES in each community.

Source	Capacity of production installed -kW/MW installed	Delivery of useful heat to customers - MWh/year	Delivery of electricity to customers -MWh/year
Biomass-fuelled heating (including heat recovered from biomass-fired power stations)			
Heat from solar collectors			
Heat from ground-source heat-pumps			
Other green heat			
Electricity from hydro-power			
Electricity from wind-power			
Electricity from biomass, including biodegradable wastes			
Photovoltaic electricity			
Other green electricity			
Totals			

A description of the infrastructure for the supply of energy*, and a comparison of costs of fuel, might provide a useful basis for consideration of the balance between centralised (i.e. external to the community) and local energy-supplies.

*Note: * in some ASPIRE Countries, natural gas may have a very substantial position in the heating market, so it is clear that the gas-supplier(s) will have an important role to play in providing information about the pattern of usage of heating-fuels in those markets. Different circumstances will obviously apply in other communities.*

3.4. Information to be collected on the use of energy (Methodology 1)

3.3.1 Total consumption.

Essential data on energy-consumption will be collected, concentrating on the following variables:

- (a) Total and specific consumption (average *per capita per annum*) of energy (kWh/year) by the community at present, separating electricity, heat and vehicle-fuel and the source of primary energy;
- (b) when available, variations over the past three years, and along a typical year, of consumption, divided into three sub-classes - heat, electricity and vehicle-fuels;
- (c) when available, variation throughout the territory in the density of demand for heat and electricity; and
- (d) Losses of energy in distribution of energy.

3.3.2 Buildings.

Sub-areas for sampling could be selected, where a full monitoring is not possible, and then the buildings should be classified in terms of their total floor-areas, and their energy consumption. An evaluation of the energy performance of building could be accomplished according to the most recent European (CEN) standards (so called "*Calculation Procedures*")*, or other methods**. Methodologies that have been already applied in other EU-financed projects addressing energy-consumption*** in buildings could also be taken as references whereas they prove usefully applicable to communities.

Data to collect on (a sample of) existing buildings could be:

- (a) energy demand (kWh/m²/yr) in terms of the total floor-area used and subject to heating/cooling, taking account of system-losses;
- (b) description of energy-carriers, and systems for heating, cooling, and ventilation (if separate from heating/cooling); lighting; hot water; and other uses; and
- (c) variation on energy demand through the year, or inside the monitored area (rural vs. town-centre). Differences in the specific energy demand for building built in different years could be also underlined. Existing buildings, retrofits of buildings, and new buildings could be considered separately to assess their varying consumptions. Sub-categories of buildings could also be addressed to evaluate their different energy demand (houses; offices; shops; schools, leisure-centres, etc.; hospitals, residences for elderly people in care, etc.; and industrial sites.

Notes:

*1. * the relevant information is available at:*

http://www.buildingsplatform.eu/cms/fileadmin/documents/information_papers/P02_EPBD_CEN_Standards.pdf (The set of CEN standards developed to support the implementation of the EPBD in the EU Member States)

2. ***for instance, the system for demonstrating building-energy performance shown on the Concerto Community Data Sheet could be applied. The relevant web-site is:*

http://europa.eu.int/comm/dgs/energy_transport/rtd/concerto2/doc/2005_concerto_guide_annex_3_en.xls

3. **** European projects supporting the implementation of the Building Directive (http://www.buildingsplatform.eu/cms/fileadmin/documents/information_papers/P01_EPBD_SAV_E_projects.pdf).*

3.3.3 Agriculture (other than buildings).

A broad assessment of levels of specific consumption of primary energy per unit of output should be made.

Collect data on energy-costs (identify taxation separately).

3.3.4 Transport (other than buildings).

The evaluation of demand for fuel in the transport sector on a common basis is a difficult process because of the wide range of different circumstances, and the large number of factors that could intervene. This process is also complicated because, whereas in many cases, fuel-consumption is known for a larger region it might be difficult to establish the various patterns of the different constituent areas within the greater zone.

3.3.5 Industrial activities not already covered.

A broad assessment of levels of specific consumption of primary energy per unit of output could be made for each sector. This count should consider only the energy dedicated to the production cycle, excluding the installations necessary for heating the buildings, classified as civil plants.

It would be very useful to collect data on energy-costs per output unit (identify taxation separately).

Any variations over previous years (in, say, costs or consumptions) should be pointed out, as well as variations within the years, wherever possible.

4. DEVELOPMENT OF SEAPs

4.1. Strengths/weaknesses in the community and priorities for consideration in the SEAP

In the first phases of the Project, the Communities are supposed to carry out (a) a general analysis of the territory of the area under scope (especially as regards sectors that have been identified as the most significant); (b) an investigation of energy-consumption and other energy facts.

These assessment would then lead to a pretty accurate identification of strengths, weaknesses and opportunities as regards RUE saving and use of RES in the Community. Accordingly,

priorities for Action can be properly detected and a preliminary List of Actions can be delivered in the form of a Draft SEAP.

4.2. Review of the draft SEAP

The identified Actions to be included in the plan will undergo a more reasoned reviewing to address, in each community:

- the main characteristics of the actions to be included in the Plan, that is the description of the types of actions envisaged, considering:
 - a) the targeted area of improvement
 - o renewable energy promotion (or the specific renewable sources to be sustained – e.g. biomass/biofuels, hydro, wind, geothermal, etc.)
 - o energy saving (or the specific sectors to be addressed – e.g. industry, civil buildings, transport, agriculture, etc.)
 - b) the nature of the initiatives which will be planned
 - o extensive actions (e.g. common regulations for all the municipalities in a community, etc.);
 - o single initiatives to be developed, mainly for dissemination purposes (e.g. pilot initiatives in the field of renewable energies/energy saving);
 - o other actions;
- the criteria adopted to select (and justify the choice of) actions to be included in the Plan
 - o cost-benefit analysis → the aim is to identify the specific cost of the intervention (Euros/avoided tonne of oil equivalent)
 - o consistency and complementarity with ongoing local programmes,
 - o existence of proven technologies on which the actions will be based,
 - o commitment of local actors to carry out the planned initiatives,
 - o others
- further information required to evaluate feasibility of actions and to decide for an ultimate inclusion of them in the Plan
 - o amendments to the regulatory (national/regional/local) framework needed to introduce the actions in the existing planning procedures,
 - o funds needed to carry out the actions and existing financing mechanisms that could be considered,
 - o possible initiators,
 - o others

4.3. Investigation of financing systems

Aspects to be evaluated include:

- Range of financing options (public/private programmes)
- Support to local actors (energy service companies-ESCOs; manufactures; installers; etc.), also by means of specific measures (e.g. loans, rotational funds, etc.)
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4.4. Local implementation policies

A description of expected growth in and development of the community will provide information on expected changes to energy-demand and emissions and may help to identify opportunities for RUE and RES. For example, changes in land-use might be relevant to the

future perspective for RES. Similarly, likely changes in patterns of energy-demand must be taken into account when calculating targets for the reduction of emissions of GHG.

The methodology used in the previous section to assess current use of energy may be applied and integrated to produce a forecast of energy-needs based on forecasts of growth in population, new building-developments etc.

Expected changes in the regulations and planning will be underlined, to be considered in the definition of the SEAP.

Creating “power for action” will require knowledge of the main drivers for the several markets, including data on the supply-chains of the relevant resources (including sources of capital and debt), taxation, grants, access to the market for newcomers, cultural obstacles (especially lack of knowledge and/or trained craftsmen), etc. The aim is to determine the real potential for increasing the substitution of energy derived from fossil fuels with RES within the next five/ten years.

The scope of this Project does not include a full financial analysis, but partners may decide to include an analysis of the financial implications of different scenarios for meeting targets for reducing emissions.

In working through these topics, evidence of barriers to progress will emerge. Apart from considerations of the limits on the levels of costs that society is ready to pay to address climate-change and other perils that arise from over-dependency on fossil fuels (and indeed nuclear power), there are important regulatory issues, such as the willingness of society to accept the visual impact of new infrastructure (e.g. wind-turbines, combustion plant, etc.).

After taking all these points into account, the SEAPs should each list all of the options that seem most favourable in the particular circumstances of the community studied.

The SEAPs should set out clearly what needs to be done; the relevant timescales; the party(ies) responsible for leading the actions beyond the end of the Project; and arrangements for monitoring against performance-indicators.

5. CONCLUSION.

This draft report outlines a common approach that the partners should use during the process of writing SEAPs.

In month 27, a review of the common approach adopted will be made as part of Work-package 4. Feedback from the partners on its effectiveness in practice will then influence the final outcome of Task 4.1 in which guidelines will be produced and offered for general use by others in the future.