WISE-PLANS

Co-operation between communities for Energy Action Plans

Project - EIE/05/217/SI2.420182

Action: HKA1 – Sustainable Energy Communities

Deliverable D13

General guidelines on developing and adopting Sustainable Energy Action Plans (SEAPs)

Green Land

Preamble – Development of Guidelines from the Refined Common Approach.

The Common Approach (D7) aimed at providing principles for a broad common approach for the development of the Sustainable Energy Actions Plans (SEAPs). The methodology was to be used by the partners to provide qualitative and quantitative information about each community from which opportunities and priorities for actions would emerge.

The Refined Common Approach (D11) was intended to assist Communities in WISE-Plans Project to adopt the Action Plan (see **Figure 1**). The Plan should be:

- based on the analysis of energy data and other characteristics and on the identification of strengths and weaknesses of the local community;
- agreed by Local Action Boards (LABs),
- aimed at introducing actions and measures that are (likely to be) adopted and implemented in a 3-5 years horizon.

Moreover, the Refined Common Approach can constitute a solid basis for the development of Guidelines for other Communities that intend to develop a Sustainable Energy Action Plan (**Figure 2**).

Thus, through the experience gained in the WISE-Plans Project, the Refined Common Approach can be enriched and turned into operational guidelines by including:

- indications about how to face the critical phases of the project and
- suggestions / lessons learnt by Partners' Communities that can be valuable for other Communities to avoid the most common problems arising in Sustainable Energy Planning

Note: red text throughout the document highlights additional sections with respect to Deliverable 11 – Refined Common Approach.

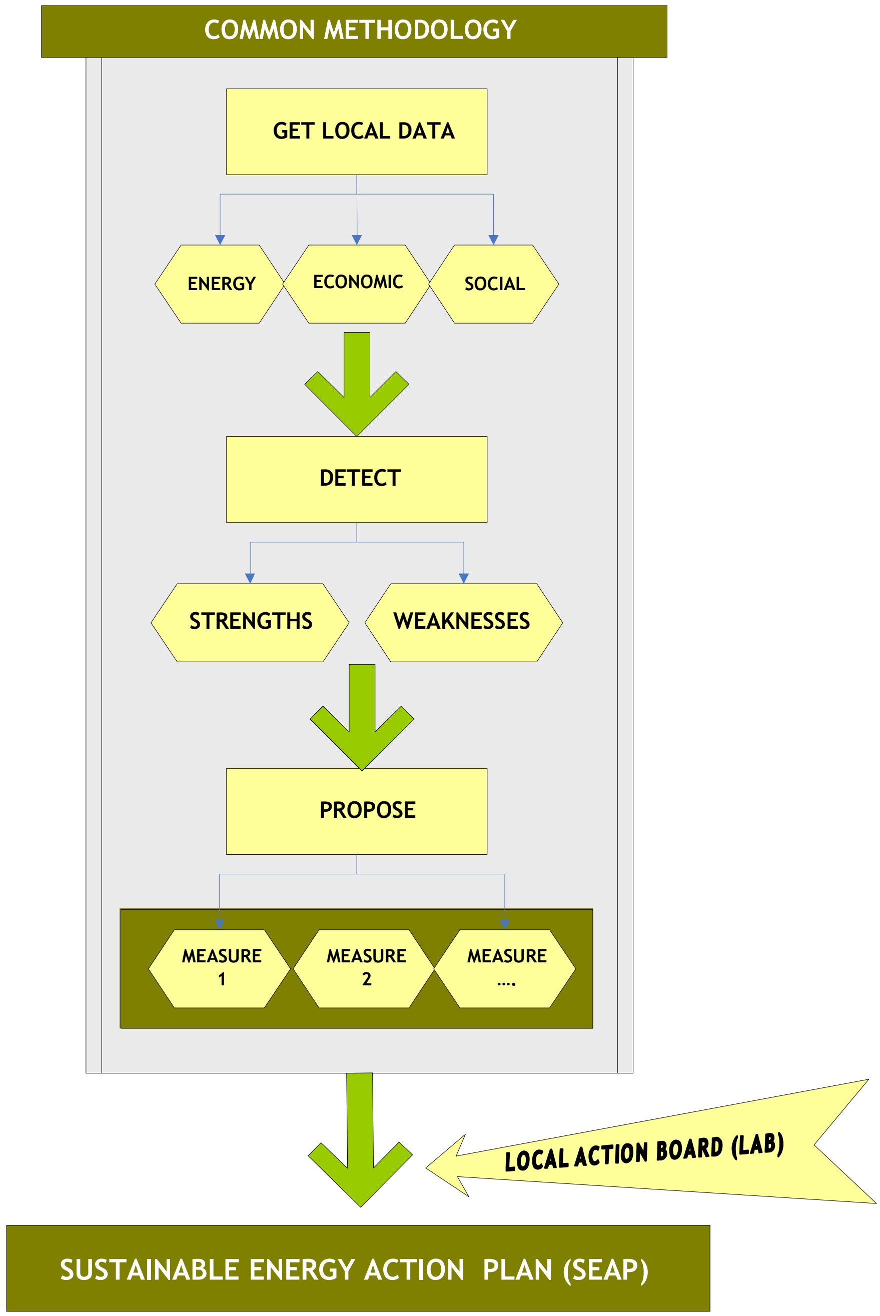


Figure 1: Common methodology for development of SEAPs

Figure 2: Development of Guidelines from the Refined Common Approach through the experience gained in the WISE-Plans Project.

GENERAL GUIDELINES ON DEVELOPING AND ADOPTING SEAPS

Contents.

Page

SUMMARY.

During the WISE-PLANS Project, communities from the four countries represented in the project - Italy, Spain, Sweden and the UK – are developing Sustainable Energy Action Plans (SEAPs).

This report provides guidelines for other Communities that want to undertake the development of Energy Plans. The methodology has been defined and tested by the Communities participating in the WISE-Plans Project.

Section 2 outlines the general approach to be adopted for development of SEAPs.

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 quantified information, of the community in terms of its population and infrastructures, the production and use of energy, and relevant geographical features, etc.

Section 4 discusses the methods by which, through sustainable energy planning, opportunities for improvement may be sought, institutional barriers overcome, and the best options for actions identified.

Section 5 refers to the adoption of planned actions by Communities, which involves identification of possible funds and of responsible bodies for the implementation.

1. THE APPROACH.

1.1. 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 (see the report on Task 2.1), 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.

1.2. 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 (10 to 25) representatives of key stakeholders should be invited to form a Local Action Board (LAB). As the work progresses, it might become clear that the membership of the LAB 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.

The range of stakeholders involved will vary according to the local situation but are likely to include:

- Politicians
- Municipal administration (representatives from economic, environmental, spatial planning departments)
- Development organisations (regeneration and economic development)
- Energy agencies/energy experts
- Social Housing Providers
- Private Developers
- Educational establishments
- Agricultural organisations
- Environmental groups
- NGOs/community groups
- Energy distribution and supply companies
- Financial institutions
- Local businesses

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

1.3. 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 raising standards in construction.

1.4. Development of options for action.

Information will be gathered about existing local plans, financial and commercial implications, technical viability, requirements in the context of development-control and laws controlling buildings, and relevant environmental and social data. From that matrix of basic information, discussion should produce several options for further and more detailed consideration.

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

1.5. Finalisation of the strategy.

During the sustainable energy planning, the LABs 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.

1.6. Critical issues and lessons learnt regarding the approach

In this section specific learning points that have been identified during the development of WISE-Plans Project are drawn out.
As regards the general approach the following critical issues have been identified:

- Community engagement is essential for a project on sustainable energy planning to be truly successful; stakeholders should be presented very early with a clear report on objectives and likely impacts of the planning initiative
- Key actors who have political, administrative and technical competence for adoption and realisation of actions need to be involved from the beginning in the Local Action Boards (LABs) and assigned a (quasi)-formal responsibility for the adoption of the Plan
- Communities should undertake an early survey on ongoing programmes at local level to ensure that the planning initiatives can be consistent and does not collide with these activities
- Discussion on the planning process have to involve, from the beginning, a wide range of stakeholders. The participation of the widest spectrum of stakeholders in the LABs can ensure that the action plan has an higher possibility to be implemented successfully.

2. ANALYSIS OF THE COMMUNITY.

The communities (using this term in its broadest sense) being studied need to be described. Qualitative and quantitative description of the communities is necessary to set up SEAPs. It will include information about boundaries, population-density, types of settlements including the designs of their buildings, economic activities, transport-systems, etc.

It may be impossible to provide a detailed plan for every aspect (e.g. for every building) of each community, and thus some sampling of representative sub-areas might have to 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 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.

2.1. 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 province, a region, a state, etc.)
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).
In order for the energy analysis to lead to consistent and sound results, the LABs need to be somehow involved in the decision on the methodology/combination of methodologies that should be applied and on the experts that can be drawn in.

2.2. General information.

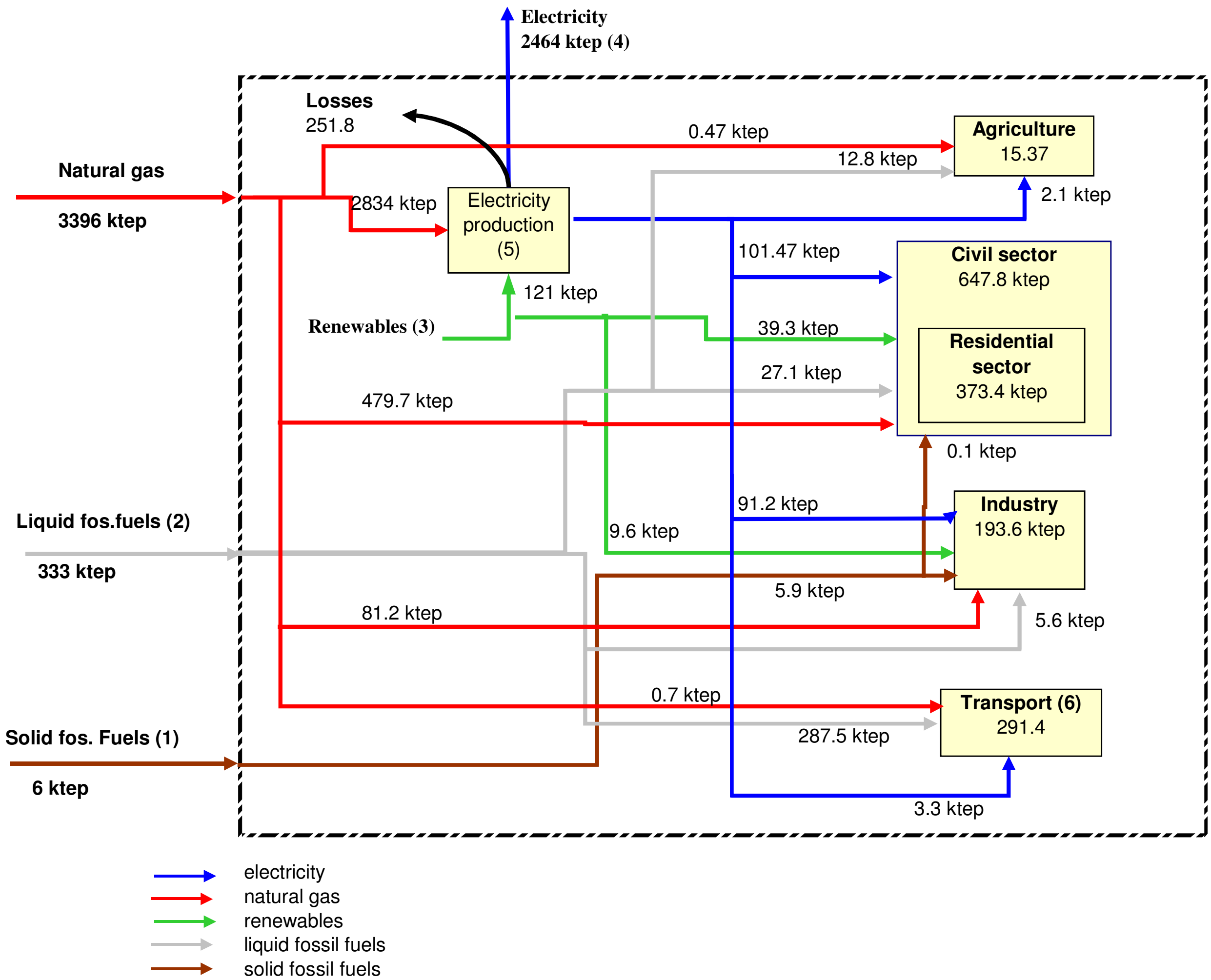
Data on the whole community should be collected under the following headings:

(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.

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 Communities (e.g. Ticino and in Swansea in WISE-Plans Project), natural gas has 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.*



Notes:
1) Coal.
2) Diesel, oil, gasoline, LPG.
3) Biomass, solar, hydro.
4) Electricity is quantified in terms of primary energy except when referred to final uses. The amount "exported", then, includes also the losses of energy associated to the electricity that is consumed outside the boundaries of the Park
This is a normal practice in the elaboration of energy balances, but it does not take into account that all the losses of energy have their effects (emissions in atmosphere, over-heating of cooling-water, in this case the water of the river) in close proximity to the sites of electricity production, that is within the Park.
5) Concerning the output and efficiency of thermoelectric plants, expected values have been used, i.e. values referred to plants as they will be after interventions underway (e.g. Turbigo after the conversion to combined-cycle).
6) The available data for liquid fuels (diesel and gasoline) used for transport are derived from the global values for the three provinces. Then, they do not represent necessarily fuels used within the Park (more likely fuels distributed within the Park). In fact, the majority of traffic regarding Park's municipalities is to and from Milan, which is out of the Park. Besides, the available data probably exclude the consumption of Malpensa airport (around 100-120ktep).

Figure 3: Example of a simplified energy balance, Community of Parco del Ticino – Italy (data expressed in ktoe of primary energy per year); year 2005

2.3. Information to be collected on energy currently delivered.

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) Numbers of heating plants rated above 30 kW, 300 kW, etc., 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 CO_2) 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			

2.4. Information to be collected on the use of energy.

2.4.1 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) Variations over the past ten years, and along a typical year, of consumption, divided into three sub-classes - heat, electricity and vehicle-fuels;
(c) Variation throughout the territory in the density of demand for heat and electricity; and
(d) Losses of energy in distribution of energy.

2.4.2 Buildings.

Existing buildings, retrofits of buildings, and new buildings should be considered separately.

Sub-areas for sampling should 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-performance, according to the most recent European (CEN) standards (so called "*Calculation Procedures*")*, or another method, to be agreed**. 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.

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. **the system for demonstrating building-energy performance shown on the Concerto Community Data Sheet seems to be similar to the assessments that CCS would make on specific buildings. 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_SAVE_projects.pdf *).*

Collect the following classes of data on existing buildings, but also state the current and expected values based on changes in specifications (in Wales, refer to the current Building Regulations):

(a) State energy demands (kWh/m^2/yr) in terms of the total floor-area used and subject to heating/cooling, taking account of system-losses;
(b) Describe energy-carriers, and systems for heating, cooling, and ventilation (if separate from heating/cooling); lighting; hot water; and other uses; and

(c) Point out 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 should be also underlined.

It is important in this phase to separate carefully the classification of buildings, into the following sub-categories, related to their different energy demand:

(a) Houses;
(b) Offices;
(c) Shops;
(d) Schools, leisure-centres, etc.;
(e) Hospitals, residences for elderly people in care, etc.; and
(f) Industrial sites.

2.4.3 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).

2.4.4 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, which can conveniently be called a "*Study Objective Zone" (SOZ*), it might be difficult to establish the various patterns of the different constituent municipalities within the SOZ.

The following text offers general ideas upon which a methodology could be based. This methodology is based on complex mathematical methods, the details of which are beyond the scope of this report.

(a) Input data.

Input data is needed to evaluate fuel-demand. The following main categories are distinguished:

(a) **socio-economic data** represent information concerning the SOZ such as numbers of houses, jobs, cars, etc. The data should be made collected at least annually. Information and tools contained on the Web can provide powerful assistance because they contains the statistical base-data; and
(b) **fuel-consumption data** should also be collected at least annually (in the same years as for the socio-economical data); information on every type of fuel should be gathered.

(b) Selection of main data.

When input data is known, mathematical expressions (least squares, etc.) can be applied to the fuel-consumption data and to the most appropriate socio-economic data, that is to say, the data that closely relates to the consumption of fuel in the transport sector. These socio-economic data will be known as "*Final Data*" (FD). Then models are generated for the SOZ.

Note: Andalusia Energy Agency (Spain) has developed a software to perform these calculations.

(c) Obtaining models at local level.

Local level models are generated based on the FD and using selected mathematical algorithms (least squares, etc.). The sum of local-level fuel consumptions must match the total consumption within the SOZ. It should be understood that there may not be only one solution for this step, so consideration should be given to the generation of different models to obtain more than one solution.

(d) Estimation of demand for fuel (output data).

Once a model that relates to fuel-consumption and FD has been defined, consideration of the evolution of the FD in future years allows the estimation of fuel-demand at the local level. Evolution of the local-level data should be considered by the use of adequate statistical functions.

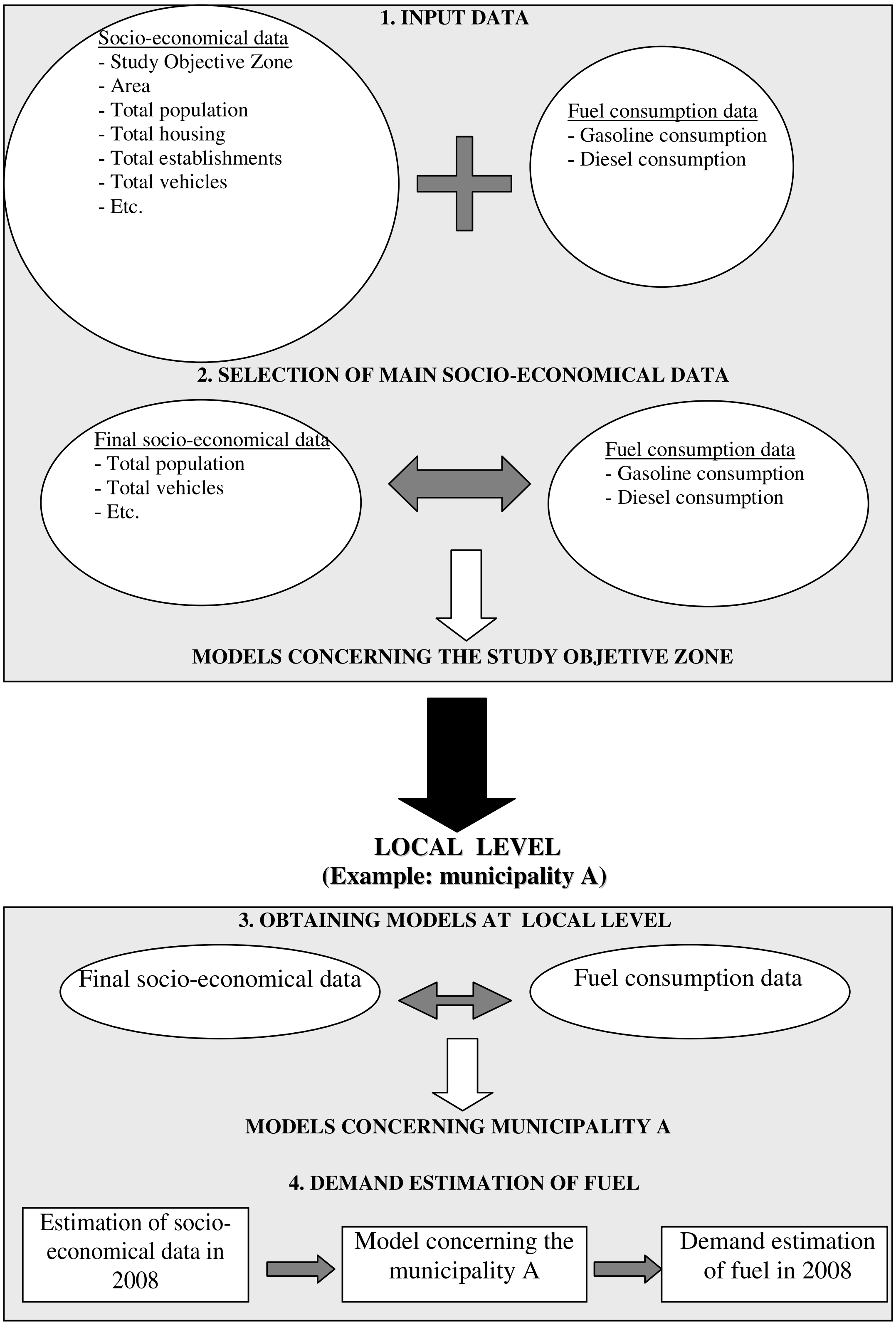


Figure 4: A summary of an example of the process of estimating the demand for fuel at Regional level for a SOZ consisting of four Municipalities: A, B, C and D.

2.4.5 *Industrial activities not already covered.*

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

2.5. Expected changes in the community without the intervention of the plans

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.

2.6. Critical issues and lessons learnt regarding the analysis of the Community

A Sustainable Energy Community (SEC) is a community that will commit itself to a process of continuous improvement and defining of targets in order to:

- use less energy;
- increase local renewable energy generation;
- enhance security of energy supply.
- maximise benefits (profits, jobs, environmental quality) deriving from local businesses related to sustainable energy
- increase energy-awareness of citizens.

In order to achieve these aspirations there are certain pre-conditions:

- a clear (geographic, demographic and socio-economic) definition of the community;
- a baseline assessment of critical variables as regards energy (existing level of energy use; existing level of renewable energy use and available resources; existing energy targets; existing planning policies; projected developments over a defined timeframe; level of energy income in the local community, etc.)

This assessment can be very demanding because of the difficult collection of data from a spectrum of bodies: electricity suppliers, fossil-fuels suppliers, regional/provincial/local energy agencies, provinces/municipalities, etc. Privacy concerns are often raised from these bodies when data on energy production and consumption are asked.

Nonetheless a clear and quite accurate energy profile of the community is a very important pre-condition to correctly define actions that can be beneficial for the Community.

When actual data cannot be collected it is then important to refer to other reliable sources of information (e.g. regional/national data survey on energy or report/studies of recognised bodies) on which the planning initiative, and especially the definition of priorities, can be based.

3. IDENTIFICATION OF TARGETS/ACTIONS AND DEVELOPMENT OF THE SEAP.

The purpose of this step is to define:

(a) the *status quo in* each segment of the study;
(b) the potential for improvements;
(c) targets for improvements; and
(d) the actions necessary to achieve those targets.

Based on (a) an analysis of policies and plans that exist at the European, national and local levels, and on (b) the evaluations referred to in previous section, the intention is to develop projections for potential beneficial changes in the next five to ten years, the costs of implementing such changes, and relevant barriers to implementation.

The first topic for analysis will be the potential for reductions in the use of energy, which will address several specific aspects of the energy-saving in different sectors. The aim is to identify the exact type and specific cost of each effective intervention (e.g. euros/avoided tonne of oil equivalent) for (a) buildings of several types, (b) agriculture, (c) transport, and (d) other industries.

The second topic for analysis will be the potential for the replacement of fossil fuels with renewable energy of the appropriate kinds (heat, electricity, transport-fuels, etc.). This will require knowledge of the main drivers for the several markets, including data on the supply-chains of the relevant resources, 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.

3.1. Inclusion of Actions in the 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

- extensive actions (e.g. common regulations for all the municipalities in a community, etc.);
- single initiatives to be developed, mainly for dissemination purposes (e.g. pilot initiatives in the field of renewable energies/energy saving);
- other actions;

- the criteria adopted to select (and justify the choice of) actions to be included in the Plan
  - cost-benefit analysis → the aim is to identify the specific cost of the intervention (e.g. euros/avoided tonne of oil equivalent)
  - consistency and complementarity with ongoing local programmes,
  - existence of proven technologies on which the actions will be based,
  - commitment of local actors to carry out the planned initiatives,
  - others
- further information required to evaluate feasibility of actions and to decide for an ultimate inclusion of them in the Plan
  - amendments to the regulatory (national/regional/local) framework needed to introduce the actions in the existing planning procedures,
  - funds needed to carry out the actions and existing financing mechanisms that could be considered,
  - possible initiators,
  - others

3.1.1 Indicator for cost-effectiveness analysis of carbon abatement options

Analysis of cost effectiveness of carbon abatement options offers an estimate of the cost per tonne of carbon saved over the lifetime of a measure (action in the SEAP), providing a useful metric when comparing interventions.

The CO_2 abatement cost of a certain option refers to the additional cost of this option (compared to the reference) divided by the amount of CO_2 saved (compared to the reference option). To determine the cost of the options, net present value[1] calculations are carried out. Though, costs in this case are expressed as a positive values. So a negative €/ton figure indicates that the measure is cost effective.

Table 2 shows some examples of GHG abatement cost estimates for different technical options. The figures in the column 'mean' show the value of the abatement cost of the option when it is implemented instead of the reference option, e.g. wind power on-shore instead of a coal-fired power plant, average across the EU-25 in 2010. The mean figure therefore does not apply to a specific baseline and does not reflect differences in site-specific conditions. In practice for each option, a cost curve would apply, that would show how the costs increase as a function of the cumulative capacity (of e.g. wind power) implemented.

[1] The net present value (NPV) of an investment (project) is the difference between the sum of the discounted cash flows which are expected from the investment and the amount which is initially invested. It is a traditional valuation method used in the discounted cash flow measurement methodology, whereby the following steps are undertaken:

a) calculation of expected cash flows (often per year) that result out of the investment
b) subtract/discount for the cost of capital (an interest rate to adjust for time and risk)
the intermediate result is called *present value*
c) subtract the initial investments
the final result is called NPV

Table 2: Overview of cost estimates for some abatement options. Source: "Social cost-benefit analysis of climate change mitigation options in a European context", ECN-Energy Research Center of the Netherland, December 2006, http://www.ecn.nl/docs/library/report/2006/e06059.pdf

Optino	Reference	Economic cost		
		2.5% €/tCO2	Mean €/tCO2	97.5% €/tCO2
CHP	CCGT	-117	-30	35
Insulation	Oil/no insulation	-83	-22	106
Insulation	Gas/no insulation	-83	-22	106
Nuclear	PCC	-11	-1	9
CHP	PCC	-3	12	27
Heating efficiency	Standard gas boiler	-200	23	50
Wind on-shore	PCC	11	30	49
IGCC (coal-based)	PCC	-5	31	66
CCS industry	No CCS	10	35	60
Wind on-shore	CCGT	-10	46	95
PCC + CCS	PCC	23	50	76
Biomass co-firing PCC	PCC	40	52	65
PCC + CCS	CCGT	16	105	184
Biomass co-firing PCC	CCGT	64	115	159

Note: 2.5%-Mean-97.5% figures are calculated based on assumptions varied according to their uncertainty distributions, with the discount rate between 5 and 10% (mean 8%).
CCGT: Combined cycle gas turbine;
CHP: Combined heat and power (co-generation);
PCC: Pulverised coal combustion (power plant);
IGCC: Integrated gasification combined cycle (power plant);
CCS: CO2 capture and storage.

The figures presented in **Table 2** are based on various assumptions (on discount rate, specific investment costs, operation & maintenance costs, capacity factor, conversion efficiency, fuels costs, lifetime , etc.). Nevertheless they are useful to understand the kind of results that the analysis is going to determine.
Communities may adopt such a methodology, when sufficient data are available, to evaluate and rank different potential actions (options) in terms of their cost-effectiveness.
This is only one of the possible indicators that can be used. Other indicators, e.g. those defined and applied at international/national level (source document should be cited), could be used.

3.2. Template for describing actions included in the SEAP

A Template for describing actions included in the SEAP and presenting them to the wide spectrum of interested parties is given hereafter.

<table>
<tr><td>Wise Plans energy</td><td colspan="2">Type of Action (E= Extensive planning action I= Single initiative)</td><td colspan="2">INSERT ACTION NAME</td></tr>
<tr><td colspan="3" rowspan="4">INSERT PICTURE (before the action)</td><td colspan="2">TARGET</td></tr>
<tr><td colspan="2">Insert the target to be achieved</td></tr>
<tr><td colspan="2">IMPROVEMENT AREA</td></tr>
<tr><td colspan="2">Insert the area</td></tr>
<tr><td colspan="5">DESCRIPTION AND PROCEDURES</td></tr>
<tr><td colspan="5">Insert action description and the development process</td></tr>
<tr><td colspan="5">RESPONSIBILITIES</td></tr>
<tr><td colspan="4">EXECUTION</td><td>MONITORING</td></tr>
<tr><td colspan="4">Insert body/person in charge for the action (company, municipality, etc.)</td><td>Insert reference person/body from the LAB, who is monitoring the execution</td></tr>
<tr><td colspan="2">DEADLINES</td><td colspan="3">COST/FINANCIAL</td></tr>
<tr><td colspan="2">Insert time schedule</td><td colspan="3">Insert estimated cost of the action and how is going to be financed. When possible include a cost-effectiveness indicator (e.g. € per avoided ton of CO_2). For extensive actions a range of cost estimates can be introduced.</td></tr>
</table>

<table>
<tr><td>Wise Plans energy</td><td>Type of Action
(E= Extensive planning action
I= Single initiative)</td><td>INSERT ACTION NAME</td></tr>
<tr><td colspan="3">NEEDED RESOURCES/PREREQUISITES</td></tr>
<tr><td colspan="2">INSERT PICTURE 2 (expected after the action)</td><td>Resources/complementary conditions needed for the action to be completed</td></tr>
<tr><td colspan="3">RESULTS</td></tr>
<tr><td colspan="3">Direct and indirect results obtained (CO2 reduction, etc), lessons learned, opportunities to replicate in other communities, detected barriers, etc.</td></tr>
<tr><td colspan="3">INDICATORS</td></tr>
<tr><td colspan="3">Indicators to measure the success/ evolution of the action</td></tr>
</table>

An example of an actual described action is included here as reference.

<table>
<tr><td>Wise Plans energy</td><td>I</td><td colspan="2">SOLAR COOLING INSTALLATIONS</td></tr>
<tr><td colspan="2" rowspan="4">
</td><td colspan="2">TARGET</td></tr>
<tr><td colspan="2">To carry out solar cooling installations in Doñana</td></tr>
<tr><td colspan="2">IMPROVEMENT AREA</td></tr>
<tr><td colspan="2">RENEWABLE ENERGY</td></tr>
<tr><td colspan="4">DESCRIPTION AND PROCEDURES</td></tr>
<tr><td colspan="4">This action measure consists in carrying out 2 solar cooling installations in Doñana community. The total power of the installation is 9 kW and the squares metres is 20 by each installation.

The situation of the installations is in a tourist office in Matalascañas (in the province of Huelva) and in a camping site in Aznalcazar (in the province of Seville), where environmental and energy education campaigns are often carried out.

This action measure has a dual objetive;
1) Carrying out solar cooling installations
2) Promotion of the rational energy use</td></tr>
<tr><td colspan="4">RESPONSIBILITIES</td></tr>
<tr><td colspan="3">EXECUTION</td><td>MONITORING</td></tr>
<tr><td colspan="3">> Rotartica (Gas Natural SDG and FAGOR electrodomésticos, Coop)</td><td>> Andalusian Energy Agency
> Foundation Doñana 21</td></tr>
<tr><td colspan="3">DEADLINES</td><td>COST/FINANCIAL</td></tr>
<tr><td colspan="3">> Duration: 6 months
> Inicial date: 01/06/2007
> Final date: 18/12/2007</td><td>> COST: 100.000 €
> FINANCING:
100%: AAE (I.D.A.E agreement)</td></tr>
</table>

	I	**SOLAR COOLING INSTALLATIONS**

NEEDED RESOURCES / PREREQUISITES

> Looking for adequate location
> Technical visits to the location
> Selection of 2 installations
> Development the project
> Creation of informative panels
> Inauguration and promotion of the installation
> Monitoring and check of the installation

RESULTS

STATUS:
> Installation being implemented
SAVINGS:
> Energy saving: 3,12 toe of primary energy per year
> Environmental saving: 8 ton of CO2/year
EXTRAPOLATE:
> Possibility of extrapolating to others communities
DIFFICULTIES:
> Selection of an adequate location to carry out the installation
> Agreement by the owner of the builiding
> Administrative proceedings for developing of the installation

INDICATORS

> Tonnes of CO_2 saving
> Primary energy saving
> Number of visits to the installation

3.3. 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.)

3.4. 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 the planning initiative 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 planning project; and arrangements for monitoring against performance-indicators.

3.5. Critical issues and lessons learnt regarding the development of the SEAP

A sustainable energy action plan (SEAP) is a planning document that contains a list of actions defined and agreed by a Community to favour renewable energy sources and promote application of energy saving and efficiency measures.
Development of such a document is only possible as a result of the strong commitment from the relevant local authorities, including local politicians as well as energy end-users, technical experts, private companies and the like.
In order for the planning process to be effective, common criteria to define objectives, targets and actions, and to select actions to be included in the Plan, have to be outlined.
Moreover, a well-structured process for discussion and review of targets/actions should be agreed and communicated to stakeholders joining the LABs, so that the final Plan will be more easily achieve the consensus of the local community.
The leaders of the planning process should make LABs and stakeholders understand that the central phase of the development of the SEAP is the analysis of the Community to recognise strengths and weaknesses related to energy and to identify opportunities for improvements on the way towards sustainability.

As regards contents of the Plan, in principle, all sectors responsible for energy consumption (civil/residential, industry, agriculture, transport) should be analysed and targeted. Likewise, all potential renewable sources (biomass, wind, solar, geothermal, wave, tidal and hydro) should be considered for promotion or explicitly excluded when minimal pre-conditions are missing. Coordination of different parts/argument is very important because the final Sustainable Energy Action Plan (SEAP) has to be consistent.

Then, as financial and organisational resources are limited, a process for the selection of actions to be included in the Plan should be carried out, based on certain agreed criteria and on formal responsibility for ultimate decisions assigned to LABs. Criteria that permit a clear comparison of actions (e.g. cost-effectiveness evaluation) should be preferred.

Nonetheless, a pragmatic approach should be envisaged when some actions already programmed by local stakeholders are encountered. These actions should be included in the planning framework and given adequate publicity to promote replication by other actors.
Moreover, as exemplar projects are very important for creating awareness on sustainable energy in local communities, some demonstrative actions should be always included in the Plan.

Finally, actions should be thoroughly described in the Plan document by means of an attention-getting template so that all stakeholders and citizens can understand their impact on the Community. It is thus important that the planning process and the final document (SEAP) receives enough media coverage.

4. ADOPTION OF THE SEAP

The sustainable energy action plan (SEAP) must be "adopted" by local authorities/actors for the actions to be realised. Adoption means; a) a more operational outline of actions (also by splitting them in sub-actions/tasks), b) the assignation of these actions/sub-actions to some responsible entities and c) the definition of deadlines for realisation of action/sub-actions.
The following scheme (table) can be very useful to discuss within LABs and comprehend what the adoption really means for the Community.

Action	Sub-actions/ Tasks	Responsible entity	Deadline	Notes
…	…	…	…	…
…	…	…	…	…
…	…	…	…	…

The adoption phase can be considered completed when responsible entities have agreed on the actions (and sub-actions/tasks) and on the deadlines for accomplishment.

4.1. Critical issues and lessons learnt regarding the adoption phase

The adoption phase is intended to define clearly what the actions consist of, who are the responsible actors for their realisation and by when they need to be accomplished..
During the adoption phase it is very important to draw the attention to the measures in the energy field that are already scheduled by national/regional/local laws/regulations. The actions included in the SEAP (except those actions that are more aimed at raising awareness of stakeholders) should aim at higher targets ("plupositive" actions) than those set by current regulations as regards promotion of renewable energies and application of energy efficiency measures. Thus, it is important that the additional requirements set by the SEAP through the various actions are discussed within the LABs and the impact is clearly figured.
Difficulties may arise when these "plupositive" actions entail additional costs that responsible bodies (especially local public authorities, which face budget constraints) must bear for their application. In these cases possible funding schemes must be devised.
During the adoption phase it is important that enough information is provided about specific targets and indicators related to the actions. Moreover it is necessary to comprehend implications and cross-impacts of the actions for achieving the highest effectiveness.

5. CONCLUSION.

This draft report outlines a methodology to carry out sustainable energy planning at local level and develop and adopt a corresponding action plan (SEAP).

Moreover, through the experience gained in the WISE-Plans Project, the methodology has been enriched by including:

- indications about how to face the critical phases of the project and
- suggestions / lessons learnt by Partners' Communities that can be valuable for other Communities to avoid the most common problems arising in Sustainable Energy Planning