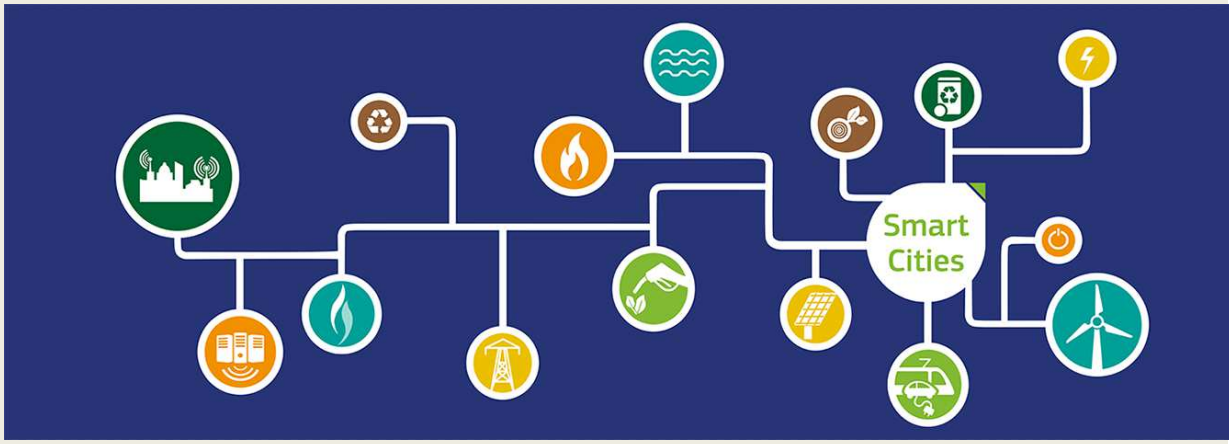
EU Smart Cities Information System

POLICY AND FINANCE MONITORING GUIDE

D23.2B



This project is a service contract to the European Union with reference ENER/C2/2017-97/SI2.765018

TABLE OF CONTENTS

CONTENTS

1. ABOUT THIS GUIDE

Smart Cities and Communities projects have implications that are wider than their local impacts or their technological demonstration. Changing the energy structures of buildings, districts and cities challenge existing business models and practices, as well as regulatory frameworks. Projects can unveil a number of factors affecting technology replication, from regulatory barriers and lack of business models, to new solutions and business models. Those can be of key importance to achieve a high level of technology replication and deployment within the EU.

Such projects are also being influenced by national, regional and local policy aspects at various levels: Perhaps because the municipality acted as the main investor or has been particularly proactive in the planning process; or perhaps a project was promoted as a showcase for demonstrating the implementations of certain energy policies or targets at local or national level. On the other hand, perhaps certain national laws posed barriers to project progress, but solutions where found to deal with these.

It is the aim of this document to deal with the capturing of policy-relevant aspects of a project, which requires monitoring under the Smart Cities Information System (SCIS). The 2018 update of this guide includes EU calls and references under the Horizon 2020 scope until 2017 – calls include all relevant EeB and SCC projects.

The developed and hereafter introduced guideline is supporting a conceptual preparation and subsequent implementation of policy recommendations based on the data gathered. For achieving this objective, an appropriate structure for gathering relevant types of information is introduced. This is a prerequisite for the political implication of the respective measures. Furthermore, by providing a common structure, meaningful comparisons of assessment results of different projects are enabled.

This guide is mainly intended for building owners, planners, occupiers, operators, monitoring experts as well as persons responsible for policy recommendations and provides assistance in the systematic acquisition of data for assessing the benefit of measures to society.

2. WHY POLICY INFORMATION GATHERING AND MONITORING?

The ultimate reason why projects obtain EU-funding is that these projects are supposed to act as practice grounds for developing strategies, techniques, skills and technologies that will live on beyond the project and that help replicate results in other similar projects. One important aspect is to identify mistakes, problems and barriers and helping future projects to avoid these or overcome them successfully, by providing already tried and tested solutions.

However, replication will not happen automatically. Policy monitoring has the aim of identifying contextual factors that contribute to successful projects. The assumption is that by understanding these an appropriate framework can be encouraged, that makes successful replication more likely.

3. DEFINING POLICY AND FINANCE FOR SCIS MONITORING

This guide covers a relatively wide range of issues that are being drawn together under the header “policy and finance monitoring”. It is therefore useful to look at the roots and definition of the word policy. The term is generally applied to the art or science of running governmental or state affairs, including behaviour within civil governments, but also applies to institutions, fields, and special interest groups such as the corporate, academic, and religious segments of society. It consists of "social relations involving authority or power" and refers to the regulation of public affairs within a political unit, and to the methods and tactics used to formulate and apply policy” [1].

[1] http://en.wikipedia.org/wiki/Politics

4. WHAT ARE WE MONITORING?

Issues to be monitored broadly fall into two categories:

1. The use of policy instruments (regulatory, financial, economic, awareness-related or otherwise of strategic relevance)
2. The need for policy intervention (technical barriers, acceptance issues, financial barriers and issues, other barriers)

Strategic and awareness related aspects relevant to SCIS monitored EU projects

These are measures that facilitate project implementation, e.g. by improving awareness and support amongst all involved, such as the defining of appropriate visions, targets, strategies as well as the forging of useful alliances.

Legislation and regulatory measures touched on by SCIS monitored projects

The following types of legislation have been identified as being relevant to the implementation of Smart Cities and Communities projects:

- Building control/ building regulations
- Spatial planning/ development control
- Energy planning/ energy supply strategies
- Transport network planning / strategies
- Privacy legislation (IT/data protection)
- Other policies and regulations influencing the project, but not directly related to energy

All of these can act as vehicles for the implementation of EU-legislation and standardisation

Financial aspects that are particularly relevant to SCIS are

- Business models
- Financial contributions by private individuals
- Financial incentives (offered by the EU, the state, the region or local authorities, which includes tax incentives, subsidised loans or other subsidies (for example EU structural funds and the upscaling of finance (investment plans) from lighthouse city to fellow city))

5. WHAT IS POLICY AND FINANCE MONITORING

As part of the data gathering for an overarching evaluation of all SCC project activities, information regarding the policy aspects explained in Section 4 will have to be gathered. The information will not only be collected from projects, but also from research by the SCIS consortium partners and from stakeholders providing information through a dedicated web system in the SCIS website.

For policy aspects affecting the single specific projects SCIS has devised a questionnaire to be filled electronically by the project developers in contrast to technical monitoring and potentially also social monitoring that should ideally be carried out throughout the project life cycle, policy monitoring on the other hand is expected to be a one-off activity.

The questionnaire for the individual project monitoring concentrates in particular on policy measures that affect the project. While it may bring some benefits to the project itself in helping to identify barriers and success factors more clearly, it is even more important outside the boundaries of the project itself: when comparing a number of projects or seeking to replicate certain achievements. This is why the responses will be added to a larger database of policy information covering examples across the EU and beyond. SCIS will contain an information gathering system for regional, national and EU policies and incentives which can be accessed on the website and which will allow contributions by all stakeholders.

In the following sections the subjects covered by the questionnaire will be explained, providing context as to why these are relevant and also providing some guidance as to what type of information could be relevant.

6. MONITORING QUESTIONNAIRE CONTENT

The questions to project developers will be adapted to the scope of their projects, as questions in the area of energy efficiency, low carbon production technology or transport can vary substantially. Different fields will be activated for project developers depending on the project scope. Annex 1 presents the policy and finance questionnaire tailored for projects involving mainly energy efficiency in buildings. As more projects are monitored, questions will expand.

For all projects, the questions will cover the following areas:

6.1 Cost benefit analysis

Project developers are asked to summarise the main issues that the cost benefit analysis have analysed and identified, such as the financial barriers and risks, but also environmental and social issues affecting the projects.

6.2 Local Economic factors

The project promoters are asked to provide simple information on the impact of the project locally, such as the number of local businesses involved and the employment generated during the project development. Project developers are asked to add any known benefits to the local economy.

6.3 Policy and administrative questions

Projects are strongly affected by the local regulatory environment and local planning. The developers are asked to provide information on the impacts on the project and how barriers have been overcome. Below are some examples of the issues that project developers might encounter:

6.3.1 Spatial planning

Local governance and spatial planning have a key role in creating urban environments that support less energy intensive lifestyles and the transition towards low-carbon communities. Spatial planning departments can influence the energy performance of construction projects, by stating conditions that must be fulfilled in order to be allowed to build. There are various ways how planning departments can state such conditions for new projects. There are also wider strategies and actions that a planning department might use in order to ensure better energy performance. This could also involve strategies for reconciling sustainability/renewable energy with heritage and/or nature conservation concerns (listed buildings, heritage conservation areas, and nature reserves), strategic alliances with surrounding municipalities in place (e.g. close cooperation could help to balance heat demand for larger heating networks…) etc.

At a macro level, spatial planning influences the transition to efficient energy production and where construction activities take place and whether these locations encourage or discourage the use of renewable or low carbon energy generation.

Question to cover the following areas have been prepared:

- List of the regulatory requirements affecting the project;
- Obligation to submit an energy strategy (in line with their National Energy Efficiency Action Plans, predicting probable energy demand and suggesting solutions on how to meet this demand) together with the planning documents for new or renovation projects;
- Specific energy performance requirements (e.g. building permission can only be obtained for buildings exceeding building regulation standards by 20% or for buildings meeting PassivHaus

standard; minimum/maximum indoor temperatures; requirements for minimum ventilation rates; boiler and/or air-conditioning plant efficiency etc.);
- Planning obligations to generate on-site renewable energy for a new building or buildings undergoing renovation (e.g. a requirement of 10% of total predicted demand of a new building; Renewable Portfolio Standards that require the increased production of energy from renewable energy sources; obligations that encourage generation of electricity from eligible renewable sources; obligations that encourage electric and/or thermal energy storage of renewable energy on site or nearby);
- Obligations to connect to a district heating network or on-site power production units to the grid
- Obligations to locate new developments near heat-sources for district heating (regulated through local strategic development plans);
- Requirements regarding building orientation (e.g. to either push for optimum solar access or to optimise density, orientation to roads etc., which may prevent optimum solar access; optimisation of floor plan, building profile and glazing areas that maximise passive heating and cooling etc.);
- Use of sustainability assessment systems (e.g. LEED, BREEAM, DGNB, SBC, VERDE etc.) as a way for the planning department to specify sustainability targets and to encourage designers and planners to improve energy performance;
- Energy performance improvement for listed buildings or within a conservation area (where historic buildings are designated, then building consent and planning permission have to be obtained).

These measures are directed at those applying for planning permission. In addition, planning departments will have internal strategies that guide their decision making. In order to ensure that decisions are being made in favour of the most sustainable option a range of tools and techniques such as the ones below are being used by municipalities:

- Maps that show potentials for renewable energy sources and technologies (supply);
- Energy models or maps for local energy demand (demand density);
- Geographic Information System (GIS) is being used for the mapping of the above potentials;
- Decision-making based on an analysis of local energy potentials and demands, i.e. decisions are generally “evidence based".

The examples given here are not exhaustive, nor are all municipalities able to make use of the measures and techniques stated. They may be bound by adverse rules at national or sub-national level.

The aim of policy monitoring is to draw out similarities, differences, and good examples from the planning context in which the SCIS Projects found themselves in.

6.3.2 Building Regulations

Building regulations are minimum standards for design, construction and alterations that ensure that any new or rehabilitated building meets certain technical requirements. Traditionally these have concentrated on soundness of structure, and health and safety related aspects. One of the challenges of looking at construction issues across national borders is that building regulations are different from one country to the next, not just in content, but also in the way they are being made. However, from a high-level perspective, Pedro, J.B. et al. (2010)[2] found that there are nevertheless broadly speaking similarities:

[2] Pedro J.B., Meijer F. and Visscher H. *(2010), “Technical Building Regulations in EU countries”, TU Delft.

- at least the framework for building regulations is set at national level, though the actual regulations may be defined at subnational level (e.g. in Germany each federal state has its own building regulations);
- the topics covered are generally the same in all EU-countries.

Table 6-1: from Pedro, J.B. et al. (2010) "Who sets the technical building regulations?"

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Central authorities	■	■	■	■	■	■	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Regional authorit.	■	■								■				■									■		■		■
Local authorities		■						■						■	■	■	■				■							
No information											■	■																

Building regulations are also the most important measures to define energy requirements for buildings. Since coming into force of the first version of the EPBD, all building regulations now have to contain requirements for energy performance of new buildings and major refurbishments. Comparing these requirements across countries is highly desirable for a number of stakeholders, for example landlords and investors with international property portfolios, the EU and individual member states, who want to compare how well they are doing in comparison to their neighbours. As energy performance values depend on number of variables, such as climate conditions, local calculation procedures, metrics used, system boundaries, primary energy factors etc., comparisons are extremely complex and can at this stage only be done by artificially eliminating some of the variables. It is hoped that further progress in CEN standardisation will eventually improve this situation, but for now such comparisons have to remain predominantly a matter for scientific research, less so for policy monitoring. However, there are certain energy related aspects that are being addressed by building regulations in some countries, but not others. In order to identify improvement potentials information regarding these should be captured in order to compare international practice. These aspects are: summer over-heating, the requirement for more renewable energy generation as well as increasing electricity consumption in buildings, trigger points for energy efficiency improvements for existing buildings. Furthermore, there are several other factors which should be taken into consideration during and at the end of the project to address the effectiveness and impact of the project: implementation of regulations, property valuation techniques, decision-making tools for renovation strategies, quality standards, and inspection and monitoring strategies. These are further addressed in the technical monitoring guide.

Recent developments indicate that there is increased attention to the importance of skilled workforce. On a national level, it qualification and training schemes of building professions and blue colour works should be monitored (for example through BUILD UP Skills initiative, Erasmus +, Roll-out certification and accreditation schemes)

6.3.3 Trigger points for energy efficiency improvements to existing building stock

While energy efficiency for new buildings and major refurbishments are a core theme of building regulations and have to be covered by all Member States it is a critical area for existing building stock. The question here is whether obligations exist in building regulations (or other associated regulations) to improve energy efficiency of existing buildings outside of major refurbishment projects. Trigger points could be for example:

Physical

- If a roof is being replaced or substantial works are taking place on the roof, roof insulation has to be brought up to a certain standard.
- If parts of the heating system need to be replaced (e.g. following a safety inspection), the pipework has to be insulated as well or an efficient boiler needs to be installed.
- If substantial work is being undertaken on the façade, the relevant wall needs to be insulated
- If a window is being replaced, it has to be replaced with an energy efficient one

Financial/legislative

- The credibility of the expected energy savings by standardisation of the refurbishment planning
- If a flat is being lent out, it needs to satisfy certain minimum energy efficiency criteria

6.4 Other Legislation – Non-Energy Related.

Legislation that is not energy-related in itself may have an impact on the energy strategy of a construction project. This could be general environmental legislation or more specifically legislation related to water protection, air quality, noise pollution etc. that may have influenced the planning of a SCIS project. Such legislation could be in favour of a more sustainable energy solution or adversely affect it. Information on these should therefore also be covered.

An example could be a biomass combined heat and power plant would have resulted in unacceptable road movements from supply lorries, causing noise and air pollution. Therefore, PV was used to reduce CO_2 emissions.

6.5 Questions for integrated projects covering districts and cities

The questionnaire for the new generation of projects at district and city level integrating more low carbon power generation and transport projects is included in this guide as an appendix.

6.6 Financial Aspects

An important goal for smart city policies and programs is to help reduce the barriers that projects face when being implemented. Financing is a crucial factor that affects the design and implementation of projects and the deployment of technologies. Understanding what different financing strategies and business models were successfully used, and what were the most relevant barriers encountered in SCIS-related projects is decisive to creating effective policy intervention and measures.

6.6.1 Financing models

Disseminating information on successful business models will help improve the odds of success for future RES/ EE projects. It is therefore of interest to understand which business model was used in a given SCIS project. A list with examples of financing models can be found in Annex 2.

6.7 Financial Incentives – Tax Reliefs

Examples exist for tax relief at various levels for buildings with particularly good energy performance. These could be set at local, regional or national level. There may also be other financial incentives for energy efficient buildings that have not been covered in annex 2. There could be lower rates for taxes to be paid locally, e.g. business tax or building-related taxes. Often taxes have to be paid to the state or to a municipality when buying a property and there could be a lower tax rate for certain exemplary buildings. There could be other tax exemptions that private people or businesses can get, if investing in energy efficiency or renewables or doing refurbishments e.g. income tax reductions. If the project benefitted from tax relief, project developers should specify.

6.8 Barriers

SCIS projects set out to be visionary project, ahead of common building practice, where often new technical solutions are piloted. Naturally, whenever a new, non-standard approach is trialled, barriers of various kinds will be encountered. Barriers are always politically relevant. Barriers can occur due to technological, legal, administrative, economic or social issues. Information on these has to be gathered together with the solutions found to overcome them. This can help a smoother run for similar future projects, by either avoiding these issues or having solutions at hand. As well as listing such barriers and providing specific details, it is of particular interest how these were being dealt with.

- Have they been overcome? How?
- Has a work-around been found? How?

6.9 Success Factors Enablers

For the endeavour to ensure replication of SCIS-like projects, it is of particular importance to understand what made a project successful. For example, it may be felt that success hinged on one particular person. In this case, it would be important to understand the role of this person. This could be a formal role as per her or his job description or her or his role within the constellation of other stakeholders – e.g. her or his ability to mediate between opposing interests or her or his enthusiasm for the job.

On the other hand, success factors may have been tied to particular activities or the way the project was structured.

Success factors may be linked to strategies for overcoming barriers. Further examples could include ‘proactive involvement of a community group’ or ‘ability of mayor to bring businesses on board’.

6.10 Replication

As emphasised at various points in this guide, the ultimate aim is to stimulate further SCIS-like projects, by having provided an example that low-carbon neighbourhoods can work and allowing various stakeholders to learn relevant skills. Certain standards, technologies or other aspects that were tested in SCIS may have been required by the planning authority for another neighbourhood scale project. In order to facilitate such replication, the requirement to develop deployment plans is becoming more frequent.

Sometimes SCIS-projects have indeed influenced other nearby projects already. The names and key characteristics should be captured, e.g.:

- Number of dwellings/ units
- Technologies used
- Timescale of the project
- Type of investment

- Overall impact of the project (e.g. energy savings, renewable energy production, increased living standards, effect on the market)
- Best practices and lessons learned

6.11 SOCIAL ASPECTS – Stakeholder participation

Reducing energy use, improving efficiency and use of renewable and low-carbon technologies are important aspects of meeting carbon reduction goals. Most of the work in this area follows a physical, technical and economic model of the built environment, but it also has a social part. How people are encouraged to save and use energy requires an entire societal shift. Though relevant attention has been given to changing individual behaviour, social contexts and institutional expectations and involvement have to be emphasised as well. This process is a participatory effort, and a central role is played by the participation of various stakeholders.

Typology of stakeholders

The complexity of the SCIS monitored projects is most apparent in the number and variety of stakeholders involved. For the SCIS database to succeed, it will need to have a sound understanding of the stakeholders engaged in the monitored projects. In this way, sharing of knowledge and best practices with other project developers is enabled and the support for the development of a permanent structure for collecting and assessing costs in the context of social monitoring is ensured.

The project developers are asked to identify the typology of stakeholders involved in the projects. The categorisation will include local authorities (planning officials, council members, utilities officials, energy agencies and environmental authorities, architects etc.), private stakeholders (building contractors, real estate developers, landlords and tenant etc.) and other categories that have the ability of influencing other groups (mass media, scientists, general public etc.).

Stakeholder participation

As a social aspect, citizen engagement becomes an increasingly relevant factor in SCIS-type projects. Methods of monitoring are discussed in more depth in the social monitoring guide, but it is important to be aware of this development.

7. ANNEX I: POLICY AND FINANCE QUESTIONNAIRE DESIGNED FOR SCC AND EEB PROJECTS

QUESTIONS TO EU project participants			Additional information
	Yes	**No**	
Has a cost benefit analysis been undertaken?			Main issues identified:
Did the cost benefit analysis include *social impacts*?			Main issues identified:
Did the cost benefit analysis include *environmental impacts*?			Main issues identified:
Local economic factors	**Yes**	**No**	
Were local businesses involved?			Please specify shortly
Number of local full-time employed in person years over the project time?	Number		
Benefits identified for the local economy - if known	Please specify		
POLICY AND ADMINISTRATIVE QUESTIONS			
Please explain if this has been the case in your project:	**Yes**	**No**	**if yes:**
Has your project been affected by any regulatory instruments?			Please provide short explanation
Was there an obligation to submit an energy strategy with the planning documents			Please provide short explanation
Where there any energy performance requirements imposed by regulation?			Please provide short explanation
Was there a planning obligation or restriction on on-site renewable energy generation for a new building or development.			Please provide short explanation
Was there an obligation to connect to district heating or have on-site power production technologies connected to the grid?			Please provide short explanation
Was there an obligation to locate new developments near heat- sources for			Please provide short explanation

district heating			
Were there any obligations on building orientation			Please provide short explanation
Is there a need to submit sustainability assessment for systems being used (e.g. LEED, BREEAM, DGNB...)			Please provide short explanation
If the project is in listed buildings, can energy performance improvements be made to listed buildings? What requirements are attached in such cases.			Please provide short explanation
Was it necessary to use maps showing potentials for renewable energy sources / technologies?			Please provide short explanation
Was it necessary to provide energy models or maps for local energy demand (demand density)			Please provide short explanation
Was mapping done using Geographic Information System (GIS)?			Please provide short explanation
Was the administrative capacity and decision-making process of the administrative bodies good to handle such projects?			Please provide short explanation
Are the building regulations adapted for high energy efficiency standards and on-site energy generation and storage?			Please provide short explanation
Were there any external technical constraints (e.g. local energy infrastructure)?			Please provide short explanation
If there has been refurbishment of buildings, where there any building or other regulations imposing certain standards?			Please provide short explanation
Were building regulations implemented in an effective manner for such projects?			Please provide short explanation
Were the property valuation techniques sufficient to handle these projects?			Please provide short explanation
Were the decision-making tools for renovation strategies able to deal with these projects			Please provide short explanation

Did the relevant quality standards cover all aspects of the project?			Please provide short explanation
Were inspection and monitoring strategies sufficient to cover the project?			Please provide short explanation
Other policy and administrative factors			
please identify			Please provide short explanation
please identify			Please provide short explanation
please identify			Please provide short explanation
please identify			Please provide short explanation
please identify			Please provide short explanation
please identify			Please provide short explanation
FINANCING SOURCES			
What kind of financial model has the project used?	**Yes**	**No**	**if yes:**
Power supply company owned by municipality ("Stadtwerke")			Please provide short explanation
Public Private Partnership (PPP)			Please provide short explanation
Energy Service Company (ESCO)			Please provide short explanation
Energy Supply Contracting (ESC)			Please provide short explanation
Energy Performance Contracting (EPC)			Please provide short explanation
Integrated Energy Contracting (IEC)			Please provide short explanation
Leasing			Please provide short explanation
Urban development contracts			Please provide short explanation
Other			**if yes**
please identify			Please provide short explanation
Funding from private individuals?			**if yes**
Crowdfunding			Please provide short explanation and the % covered
Business Improvement District (BID)			Please provide short explanation
Housing Improvement District			Please provide short explanation
Property Assessed Clean Energy (PACE) financing			Please provide short explanation
On-bill financing			Please provide short explanation
fares / tariffs / tickets			Please provide short explanation
Other			**if yes**
please identify			Please provide short explanation
Benefits from tax relief or other financial incentive?			**if yes**

Tax relief			Please provide short explanation
Other			**if yes**
please identify			Please provide short explanation
BARRIERS	**Please specify including how have those been overcome**		
Objections by stakeholders			
Legal Barriers			
Administrative Barriers			
Technical Barriers			
Economic Barriers			
Social Barriers			
SUCCESS FACTORS/ENABLERS	**Please specify**		
Technical Success factors identified			
Social success factors identified			
Institutional success factors			
Economic success factors			
Other success factors			
Replication	**Yes**	**No**	**Please specify**
Are you aware of the project being replicated?			
Identified needs to replicate the project?			
Has a deployment plan with all the relevant criteria been developed?			
SOCIAL			
Stakeholders involved			
	Yes	**No**	Please provide some information on number and how
Utilities (state owned or private)			
Energy service companies			
Municipality (general)			
planning or environmental authorities			
Architects			
Energy/environmental consultants and engineers			
Energy agencies			
Real Estate Developers			

Building contractors/ building trades			
Facility managers			
Housing providers/ landlords			
private homeowners			
Tenants			
Press and media			
Scientists/academics			
General Public			
Research institutes			
Regulators			
Significant surveys	Number	**Description and results**	

8. ANNEX II: POTENTIAL FINANCING MODELS

There are a wide variety of financing models can be used to finance project. This guide provides a list with examples of such model (combination between different financing models is also possible):

- PPP – Public Private Partnership: involves a contract between a public-sector authority and a private party, in which the private party provides a public service or project and assumes substantial financial, technical and operational risk in the project. In general, renewable energy investments have a substantial upfront cost, which challenges project budgets. A public private partnership can help by shifting up front cost and risk to a private organisation. The partnership could be organised as an ESCO.
- ESCO or ESCo - an energy services company: a commercial business providing a broad range of comprehensive energy solutions including designs and implementation of energy savings projects, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.
- ESC - Energy Supply Contracting: An Energy Service Company (ESCO) supplies useful energy, such as electricity, hot water or steam to a building owner (as opposed to final energy such as pellets or natural gas in a standard utility contract). The ESC model is particularly well suited for generating electricity and heat from RES.
- EPC - Energy Performance Contracting: An ESCO guarantees energy cost savings in comparison to a historical (or calculated) energy cost baseline. For its services and the savings guarantee the ESCO receives performance based remuneration.
- IEC - Integrated Energy Contracting: The IEC model is a hybrid of ESC and EPC aiming to combine supply of useful energy, preferably from renewable sources with energy conservation measures in the entire building. The model is currently being piloted in Austria and Germany.
- Leasing enables a building owner to use a renewable energy installation without having to buy it. The installation is owned or invested in by another party, usually a financial institution such as a bank. Leasing can be a central component of the business model of an ESCO or of a company that introduces a new technology to the market.
- Urban Development Contracts enable the agreement of the developers and the urban authorities on a design plan which achieves not only the private interests of the developer, but also the public interests of the public authorities. These contracts generally include financial support by the public sector to help the developer to cater for the public goods.
- Crowdfunding is a method for raising funding from a large number of people to cover the costs of projects. This method can be used in cases where the projects has benefits for the public at large.
- BID - A Business Improvement District: a defined area within which businesses pay an additional tax or fee in order to fund improvements within the district's boundaries. The improvements could also include energy-related improvements.
- A housing improvement district works similarly to a business improvement district, but tackles housing improvements. The concept has been tested in Hamburg.
- PACE - Property Assessed Clean Energy financing: A mechanism set up by a municipal government by which property owners finance RES and EE measures via an additional tax on their property. The property owners repay the ‘assessment’ over a period of 15 to 20 years through an increase in their property tax bills. When the property changes ownership, the remaining debt is transferred with the property to the new owner.

- On-bill financing: Utilities provide financing (i.e. a loan) for RET and EE measures. The building owners (or building users) repay the loans via a surcharge on their utility bills.

9. ANNEX III: POTENTIAL BARRIERS

Annex III contains a list of potential barriers which occur throughout different phases of projects.

Objections

- objection of grid operators
- opposition of gas supply companies

Legal barriers

- lack of relevant by-laws/ordinances at the local level
- long and difficult authorisation procedures
- listed building status/ conservation area status
- Renewable energy technologies insufficiently taken into account in spatial planning
- planning rules against biomass incineration plants due to emissions and transport movement

Administrative barriers

- high number of authorities involved
- lack of proper administrative capacity
- lack of coordination and between different authorities
- lack of integration of services
- master plans are not based on studies that analyse the opportunities of using local energy sources and installations

Technical barriers

- lack of experience in developing a specific technology
- lack of training in the sector especially for installers
- lack of foresight in town planning (uncertainty about lead times)

Economic barriers

- High construction costs
- reduced profitability
- invisibility of full costs of electricity from non- renewable energy sources
- lack of tax incentives
- lack of subsidies

Social barriers:

- lack of awareness among target groups (constructors, architects, home owners, real estate companies)
- lack of awareness among the general public
- low acceptance of new projects
- resistance towards behaviour changes