



# CONCERTO

SOCIO-ECONOMIC IMPACT  
ASSESSMENT REPORT  
EXECUTIVE SUMMARY



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is an initiative co-funded by  
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# WHAT IS CONCERTO?

The CONCERTO initiative was established in 2005 by the European Commission. During its creation, the defining concepts in mind were sustainability, replication and cost effectiveness, and the project aimed at revolutionising and modernising communities' energy systems.

With an initial network of 27 cities, the CONCERTO concept ignited, and five years later 58 cities in 23 countries across Europe are demonstrating and over 70 associated communities benefit from the growing stock of knowledge. The CONCERTO initiative highlights the role and contribution of local authorities (primarily city administrations) as coordinators of integrated actions for sustainable urban development with a focus on energy issues. The cities have a mission to research and demonstrate how energy efficiency and renewable energy use can be incorporated into cities' buildings on a large scale. CONCERTO is itself in every sense on a large scale, with CONCERTO cities comprising a population of approximately 5 Million people with about 500,000 inhabitants directly – or indirectly - affected by CONCERTO activities.

In 2010, after five years of CONCERTO, the results, findings and recommendations are available in several reports and publications:

- ✘ The CONCERTO Guide
- ✘ Planning and implementation process assessment report & Executive summary
- ✘ Report on the quality of the integration of renewable energy supply with energy efficiency & Executive summary
- ✘ Report on the assessment of the overall energy performance of the CONCERTO I communities & Executive summary

- ✘ Report on the socio-economic assessment & Executive summary
- ✘ Publication on policy recommendations & Executive summary
- ✘ 3rd CONCERTO DVD, including all above mentioned publications in electronic format

The purpose of the publications is to share the results of the CONCERTO initiative. The different publications will provide information to relevant actors aiming to implement sustainability projects in cities across Europe. By sharing this knowledge, the publications will provide an outline of what can be done and how local sustainability can become a reality. All publications can be accessed via the European Commission's DG ENERGY website at [http://ec.europa.eu/energy/renewables/concerto\\_en.htm](http://ec.europa.eu/energy/renewables/concerto_en.htm)

## The CONCERTO initiative at a glance

- ✘ 58 cities in 23 countries, close to 70 associated communities
- ✘ 1,830,000 m<sup>2</sup> of buildings built or renovated
- ✘ 530,000 tons of CO<sub>2</sub> emissions saved per year
- ✘ 5,2 million people live in the CONCERTO cities



## INTRODUCTION

What is technically and economically feasible is not necessarily ecologically or socially acceptable, and vice versa. As a result, the experience of different CONCERTO cities implementing different energy technologies and solutions needs to be placed into the appropriate socio-economic contexts and explained in the perspective of existing restrictions (e.g. technological, societal, cultural, political, economic etc). It should also be explained in terms of diverse institutional settings, organisational structures and policy processes.

Social and cultural processes may affect the acceptance of renewable energy technologies (RES) and rational use of energy (RUE). Especially in urban projects, stakeholders, residents, NGO's and local public authorities as well as end users might have different (and possibly conflicting) perceptions, priorities, opinions and interests concerning energy innovations and their use. If these differing views are not taken into account, the implementation and successful realisation of a project may meet acute resistance. Therefore, there is a need for empirically based analyses on the complex interactions between stakeholders, end users and the level of acceptance of given measures.

In order to meet the challenge of integrating social, economic and environmental aspects it is necessary to develop an integrative approach encompassing methods, processes, data streams, etc. that are able to grasp the interactions between complex systems. The

Socio-economic Assessment Report provides an analysis of the soft measures flanking the technical realisations of first generation CONCERTO projects and offers a preliminary assessment of the socio-economic impact in the various cities. The socio-economic evaluation addresses the quality, social impacts, added value and - in certain cases - risks associated with the energy services provided by the first generation CONCERTO projects in 26 communities. The assessment relies on a dedicated tool developed for this purpose for evaluating the societal and economic effect of the CONCERTO technologies and activities.

The socio-economic (SE) report builds upon analyses and preliminary findings provided in the Planning and Implementation Process Assessment Report, further complementing them<sup>1</sup>. The SE assessment relies upon findings partly available through the technical monitoring and results of CONCERTO Plus SE monitoring. There are however constraints. Due to differences between the implementation stages in the various communities, most demonstration projects have not yet been completed at the time of writing (October 2010). Moreover, only a few projects have started monitoring SE criteria and measuring indicators, and hence only preliminary analyses and findings can be provided.

### Relevance

Monitoring socio-economic effects is particularly important at the community level. It is only by understanding the impact of the implemented measures, that local planners can be prepared for changes that are likely to arise in a community as a result of the specific CON-

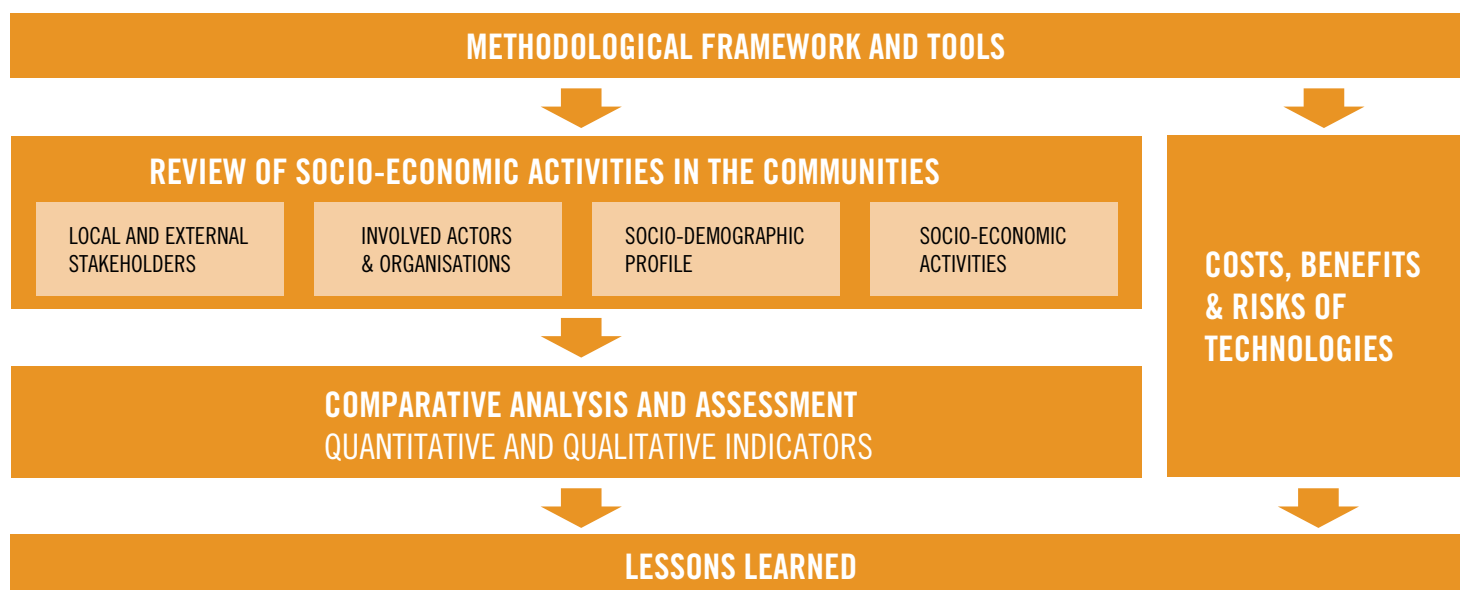
CERTO measures and activities. In fact, the expected impacts vary depending on the proposed project's type, the adopted technologies, local and regional factors, socio-economic characteristics of the community, etc. But also at the regional or at the national level, the assessment of SE impacts may end up providing decision makers with important information to weigh up the potential positive and negative effects of the activities.

### Target group

The SE Assessment Report is expected to find an interested audience among diverse groups. It addresses a wide range of stakeholders typically involved in the CONCERTO projects and on a more general level, those planning and implementing actions aimed at improving sustainability in cities. Part of the report might be relevant for municipal authorities and local decision makers; other parts might be valuable for the academic community. The report may also prove useful and for practitioners designing and implementing energy projects in the urban environment, e.g. project developers, utilities, urban planners, architects and technicians having to cope with resistance or even NIMBY attitudes of residents or stakeholders<sup>2</sup>. The report emphasises the challenges which were faced by the CONCERTO cities, highlighting the aspects of integration of sustainability criteria into planning which require further improvement in the future.

The executive summary provides policymakers and practitioners with a basic overview of the policy implications of the interventions and indicates critical factors and varied paths determining acceptance or beneficial

Figure 1: Structure of the SE Assessment Report





changes in behaviour. It also presents solutions which were applied by CONCERTO cities. Additionally, it presents the CONCERTO Plus SE framework and the set of core indicators which can be used for future projects as a tool in order to prepare a SE baseline and compare later the SE impact of given interventions.

### Structure of the SE Report

The report has been prepared in close co-operation with a number of socio-economic experts in the cities involved in the projects. It is structured into 4 sections as depicted below. Additionally, **Annex I** includes 18 SE fact sheets, **Annex II** comprises a detailed review of the available indicators for a small number of cities **Annex III** provides the documentation of two dedicated workshops and **Annex IV** gives an account of the costs and risks associated with adopted technologies.

## METHODOLOGICAL FRAMEWORK AND TOOLS

The SE assessment relies upon an integrated methodological framework, a set of criteria and tailored tools.

The main questions asked as part of the SE appraisal included:

- ✘ What are the critical SE elements/activities of the projects/communities?
- ✘ How do these elements connect to the goals and intended outcomes of the projects?
- ✘ How fundamental were SE accompanying activities in increasing acceptance and facilitating success for the CONCERTO projects?
- ✘ Which are the key factors influencing "quality of life"?
- ✘ Why did some communities have a more favourable cost-benefit ratio and a better SE impact than others?

### Challenges for the assessment

In monitoring SE activities, a major problem has been that only a limited number of the first generation CONCERTO cities have undertaken dedicated socio-economic research and carried out socio-economic flanking activities to enhance the acceptance of the CONCERTO measures, and thus to increase quality of life in the CONCERTO district. Moreover, at the time of writing, only one CONCERTO project has been finalised and all other projects are still in the implementation stage. A large number of projects extended deadlines by one or two years in order to complete their activities and therefore only a few cities have started monitoring the SE criteria and calculating the chosen indicators. For this reason, there are no final (and in some case not even preliminary) outcomes available, and the SE

assessment cannot rely on indicators measuring accomplished measures.

For the new development areas, where most measures concerning new buildings have just entered the construction stage, SE activities are only in the initial stage and monitoring activities are yet to begin. For activities in refurbishment stage, there is more abundance of SE accompanying measures and some indicators were able to be calculated, derived or estimated<sup>3</sup>. Evidence on acceptance or resistance to CONCERTO measures and their cost-effectiveness is not always clear when analysing reports or interviews. In many cases, it is difficult to isolate single parameters and qualify their impact on society, the neighbourhood, etc. The assessment is complicated in many cases by the difficulty to discern the boundary between SE activities carried out within the CONCERTO demonstration area and in the whole neighbourhood or community or between SE measures supported by CONCERTO and/or additional programmes.

SE measures have been difficult to evaluate due to lack of a proper baseline, relevant information about the socio-demographic characteristics of the cities and the near absence of initial status indicators for local socio-economics. One of the reasons for this is that socio-economic research was not a mandatory field for first generation CONCERTO applications. The main challenges met and the subsequent consequences for the assessment are summarised in Table 1 below.

**Table 1:** Main challenges for the SE assessment

Main challenge	Consequence for assessment
<ul style="list-style-type: none"> <li>✘ Differences in implementation stages between cities.</li> <li>✘ Most demonstration projects are not completed at the time of writing</li> </ul>	<ul style="list-style-type: none"> <li>✘ All cities which faced delays in the implementation will complete their demonstration activities by the end of 2010 or 2011.</li> <li>✘ Consequently, most SE-indicators, especially measuring opinion, acceptance, satisfaction of residents and stakeholders could not be measured.</li> <li>✘ For those cities only a preliminary assessment can be performed. These cities are however considered in the report and activities are analysed.</li> </ul>
<ul style="list-style-type: none"> <li>✘ A database for performing the assessment and comparisons is not available in most cases.</li> <li>✘ No (common) comparable data reporting format was used by the cities.</li> <li>✘ Even where SE-activities have been completed, some projects lack reliable and good quality SE-data.</li> <li>✘ There is no baseline measurement available for a number of important socio-demographic and SE and variables.</li> </ul>	<ul style="list-style-type: none"> <li>✘ New tools had to be developed by CONCERTO Plus (e.g. SE indicators, SE activity matrix, SE fact sheets)</li> <li>✘ The degree of detail with which the SE activities are described in projects' deliverables, annexes and documents varies greatly between projects. Some are very detailed, other only present vague and qualitative descriptions.</li> <li>✘ SE matrix and SE fact sheets have been used as a common data reporting format in order to enable comparisons.</li> <li>✘ Specific information sometimes provided in the annex of projects application has been used as baseline and complemented through information gathered from local census, personal interviews and other sources.</li> </ul>
<ul style="list-style-type: none"> <li>✘ Only a few cities have started monitoring the SE criteria and calculating the chosen indicators.</li> <li>✘ Evidence on the effectiveness of the SE activities is not clear from projects documents, deliverable and interviews.</li> <li>✘ In many cases, implementation success or failures were influenced by a combination of SE barriers and/ or drivers.</li> <li>✘ Accompanying soft measures and SE activities often cover more than the CONCERTO demonstration area.</li> </ul>	<ul style="list-style-type: none"> <li>✘ A thorough quantitative comparative assessment cannot be performed. On the basis of the few indicators available, only a preliminary, mostly qualitative assessment can be provided.</li> <li>✘ A quantitative comparative assessment is difficult to realise.</li> <li>✘ It is difficult to isolate single parameters and qualify their impact.</li> <li>✘ Data resulting from surveys include also responses from non-CONCERTO districts. It is not easy to discern the boundary between SE activities carried out within the CONCERTO demonstration area and the whole neighbourhood or community.</li> </ul>

**CONCERTO Plus SE monitoring framework**

CONCERTO Plus’s major initial endeavour was to devise a framework capable of encompassing interventions and their impact in different contexts and to find a common structure for the SE analysis in all 26 communities. This structure has considered a number of factors and their interrelationship and has tried to reflect the specific characteristics of the various projects.

Major tasks have concentrated on:

- ✘ designing a common framework to analyse and evaluate the impact of (demo-sites) accompanying CONCERTO measures which fit to different contexts and situations;
- ✘ developing a common methodology with performance indicators for monitoring the progress of local cities.

This process has resulted in the development of a “socio-economic matrix”. The latter consists of a framework for SE assessment, definitions of criteria and methods as well as lists of good practice indicators. It provides a toolkit for the impact assessment of the project activities from a bot-

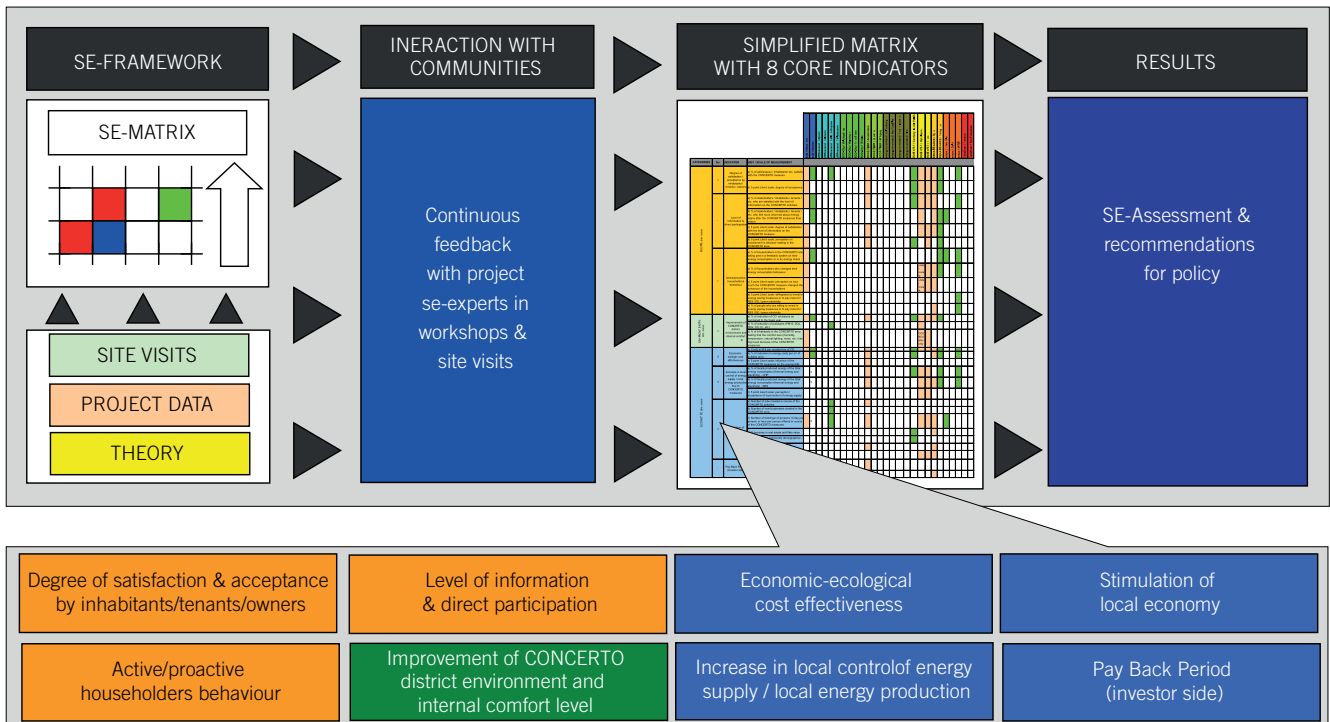


Figure 3: Socio-economic fact sheet showing the activities in Almere

Figure 2: The socio-economic evaluation framework



**CONCERTO Plus socio-economic assessment: Bottom up approach for the choice of core indicators**



The **socio-economic matrix** consists of a framework for SE-assessment, definitions of criteria and methods as well as lists of good practice indicators and provides a toolkit for the impact assessment of the projects’ sustainable strategies from the bottom up perspective



tom-up perspective. The framework has been discussed with selected CONCERTO projects in order to test its feasibility in local contexts. According to their specific context, the communities could integrate or tailor the framework in order to make it suit to the scope of their activities.

Based on the clustered information on the indicators planned or already used by the communities, CONCERTO Plus selected a set of 8 core indicators which were defined and agreed upon in an iterative way during dedicated SE workshops with CONCERTO experts. For each core indicator a unit and scale of measurement was proposed for qualitative and quantitative criteria. The resulting matrix represents the backbone for the mapping and evaluation of the SE implications of the cities' activities.

The interaction between the various elements of the SE framework and their causal relationships are illustrated in Figure 2.

Additionally, the information gathered has been supplemented by facts and figures collected through "SE fact sheets". These fact sheets provide a description of the communities' SE accompanying activities and of preliminary results/benefits. They provide:

- ✦ Socio-demographic profiles of the CONCERTO districts
- ✦ Short description of the socio economic core activities in the community
- ✦ Information about methods for data collection and data sources
- ✦ Information about surveys performed, issues addressed by them and related response
- ✦ (CONCERTO Plus) Indicators used e.g.
  - Acceptance by inhabitants/householders
  - Level of satisfaction with the CONCERTO measures
  - Change in consumption behaviour following CONCERTO activities
  - New services / positive spill over on neighbourhood and employment
- ✦ Preliminary findings
- ✦ Lessons for policy
- ✦ References to related reports

## SE ACTIVITIES IN THE CITIES

### Contextual factors

The approaches chosen by the CONCERTO communities are wide-ranging when tak-

ing into account the technologies selected, the stakeholders involved and the instruments used. These reflect the different levels of market development, maturity and acceptance of the adopted technologies by stakeholders, residents, neighbourhoods. Furthermore, they are also representative of the level of participation in grassroots activities as well as of policy styles, administrative traditions and practices enhancing citizens' participation.

In fact, the perceived implication regarding acceptance of certain measures or instruments can become a factor influencing the decision to adopt a course of policy and implement given measures. Additionally, factors which can be considered exogenous to municipal policy domains may end up spoiling plans. The real estate and financial crisis coupled with the rise in oil prices have severely affected private investors. Many of them experienced difficulties in respecting construction deadlines, especially in Spain, France and the UK. Furthermore, some countries or cities are shifting financial assistance away from renovation or new development to other schemes, with a negative impact on the sector.

### Socio-demographic factors

Following the typology used in the Planning and Implementation Report, CONCERTO demonstration activities can be grouped into three large typologies, being:

- ✦ new urban developments,
- ✦ large scale refurbishments
- ✦ overarching municipal programmes.

This classification is also considered appropriate for the SE analysis. This is largely because the respective socio-demographic structures in the CONCERTO districts vary and therefore influence the respective SE activities adopted or planned by the cities.

In new urban development projects, inhabitants of the new district arrive only after the construction works have been finished, and a sense of place and social bonding can only be developed afterwards. Refurbishment projects differ in the sense that the needs of inhabitants have to be taken into account from the beginning. Conversely, overarching municipal programmes' measures are distributed over the municipal area, involving dispersed and often diverse actors and target groups.

Many projects and cities have a certain share of social housing included in their demonstration activities, which also has an influence on socio-demographic profile (especially regarding per capita income, unemployment rates and educational level). For example in

Lyon 23% of the dwellings are dedicated to social housing schemes.

New urban areas, especially when combined with social housing, often attract young people, couples and families with small children. This was the case in Almere, Lyon, Zaragoza – Valdespartera and Ostfildern. For example the average age of a resident in Scharnhäuser Park, Ostfildern is 31.8 years old, 10 years younger than the average age of a resident in Ostfildern. At the same time, cities aim to stimulate a balanced socio-demographic profile by also including elderly people and by dedicating a certain share of dwellings to them (e.g. care homes in Almere). As social cohesion in new districts needs to grow, public areas like parks, play grounds or pedestrian areas and social and public facilities as youth and community centres have been also included in projects.

The situation in blocks of flats or neighbourhoods undergoing major refurbishment is very different. In most cities the residents of the CONCERTO area have been living there for a long time and are attached to their district and homes. Amongst them there are differences depending on whether activities concentrate on tower blocks or on houses built in the late 1950s. The buildings constructed around 1950 usually have 3-4 floors, accommodating 10-12 households, with a shared staircase. Under these conditions, neighbours are in regular contact, having built social networks with a high level of cohesion and identification. They are often elderly people (couples or single persons) with a medium or low income. As a general assumption, few children live in these flats. Examples of this type of neighbourhood can be found in Hanover, Tudela, Amsterdam, London, and Turin.

The share of immigrants varies from being a small minority (e.g. Hanover, Turin) to being the majority group within the community (e.g. Amsterdam, London, Zaragoza). One major objective of all these cities was to ameliorate the image of the district while at the same time avoiding negative effects of gentrification for the elderly and long-established residents. Another common feature of a number of projects is the focus on low-income residents (either young people at the beginning of their financially independent lives, older, retired people or people living in social dwellings). In these cases also issues concerning fuel poverty and ability to pay energy bills have been taken into consideration.

Activities to inform and involve the inhabitants as well as surveys on their satisfaction with the CONCERTO activities have been prominent. Some cities started their surveys by asking

for socio-demographic details in order to better understand their stakeholders (e.g. Tudela). In all cities (except Amsterdam's Leeuw van Flanderen, where parts of the original social dwellings were converted into private owned flats for middle class families) the original tenants remained in their flats. Activities in overarching municipal programmes like in Neckarsulm, Weiz-Gleisdorf and Zlín have mainly targeted owners of single family houses.

### Stakeholder involvement

The involvement and continuous interaction with different stakeholder groups is essential for increasing acceptance of the planned measures and for their successful implementation.

The SE activities target a wide range of stakeholders. In most cities, residents, tenants or owners of flats or houses and their associations are the main target group. Public and private housing associations and building developers are also addressed by a range of SE measures, or are alternatively involved in measures targeted to tenants and residents. Professionals are sometimes involved as a target group and sometimes as a participating partner. This group includes installers, energy consultants, building professionals, caretakers, sales agents and municipal employees. They are often addressed by training activities and information events.

Schools, kindergartens and universities are targeted in six cities (Almere, Viladecans, Trondheim London, Geneva and Zaragoza) through courses and lessons for pupils and students. Private companies, especially SMEs are sometimes either participating stakeholders, e.g. on smart metering or awareness raising campaigns or target groups for energy counselling.

Actors and organisations engaged in SE activities differ significantly in the CONCERTO cities. Generally only a small team is involved in the SE activities, consisting of less than five different organisations. Local authorities or the municipality are in many cases involved, often as leading partners. Alternatively, energy agencies or environmental NGOs take over a major role in planning and implementing SE actions. Universities or research institutions have the necessary scientific and methodological background and are involved in activities in cities with dedicated or focused concepts as was the case in Turin, Ostfildern, Zaragoza and Amsterdam.

### Similarities and differences in activities

Approaches for SE activities have been very diverse. There is a great variety of surveys, communication, involvement forms, training concepts, etc. Notwithstanding the unique and special nature of the local SE activities,

most similarities in these patterns depend upon whether the CONCERTO measures focus on new neighbourhood developments, large-scale neighbourhood / urban district renovation programmes or overarching municipal programmes.

In order to facilitate a comparison, CONCERTO communities have been grouped according to the following typologies:

- ✘ Cities with an ambitious and dedicated plan for socio-economic accompanying measures, some of which have developed their own indicators. The following communities have implemented their plan without major problems or delays: Ostfildern, Turin and Hanover;
- ✘ Cities with a SE plan and accompanying measures facing some delays in the implementation of this plan, especially because of difficulties encountered in new constructions: Cerdanyola, Lyon, Zaragoza, London, Amsterdam, Nantes, Almere, Milton Keynes, Viladecans;
- ✘ Cities with less emphasis on social aspects, but a stronger focus on feedback regarding consumption behaviour and some economic and tariff measures (e.g. training, energy advisory services, smart metering, tariffs structuring etc.). Communities which have implemented their activities without major problems include: Växjö, Falkenberg, Neckarsulm, Weiz-Gleisdorf, Zlín and Geneva;
- ✘ Communities with no socio-economic plan, but predominantly activities in environmental education, awareness raising and other soft measures: Delft, Grenoble, Helsingborg, Helsingør, Trondheim, Tudela, Ajaccio and Måbjerg.

### Mapping the SE Activities

The whole range of activities covered by CONCERTO cities have been mapped and subdivided into five categories:

- ✘ Information and dissemination,
- ✘ Surveys and studies,
- ✘ Stakeholder involvement,
- ✘ Activities to change energy behaviour,
- ✘ Training and counselling.

They are summarised in the SE activities matrix below. In the matrix, completed activities are marked with a cross while planned or ongoing activities are plain coloured.

The first category comprises activities that inform stakeholders, other interested people and organisations about CONCERTO related actions. While general communication materials such as websites, brochures and folders targeting a relatively wide audience were developed

and distributed in all CONCERTO cities, more specific measures were only undertaken in some of them. These involve providing specific information to residents of refurbished dwellings before and after the refurbishment, e.g. in form of information meetings, letters, guidelines and introductory trainings on how to live in the refurbished flats as well as to inhabitants of new flats, e.g. information booklets, welcoming events and introductory trainings.

Ad hoc neighbourhood info points are places where information on the demonstration site is provided to interested inhabitants, groups of people (e.g. school classes, students, expert groups) or passers by. This can be in form of an exhibit (e.g. models of new district/ building, innovative energy technologies), posters, information material or personal advice. Within CONCERTO, such information points have been established either on a temporary basis, as in Viladecans and Lyon or for a longer period of time as in Amsterdam, Zaragoza and Turin.

“Other information activities” include e.g. events and festivals (like opening ceremonies or district celebrations), TV-programmes, lotteries, prizes, etc.

The category “surveys and studies” encompasses all activities closely related to what is normally understood as SE research. Surveys (using questionnaires distributed by post, email, or even electronically e.g. via a smart metering appliance) or interviews with mainly closed, standardised questions by telephone or personally have been used to perform research regarding the opinions and attitudes of stakeholders (either generally on RES and RUE measures, energy consumption or specific demonstration measures). These surveys have been carried out only once or have been repeated to evaluate the change in perception and satisfaction after accomplishment of a specific measure (mainly the refurbishment process). Some of these surveys were exclusively addressed to inhabitants of the CONCERTO district or stakeholders directly targeted by the CONCERTO measures, other cities included more general questions in a city census or a survey addressing an area larger than the CONCERTO neighbourhood.

Other techniques used to gather opinions and feedback are face-to-face interviews (openly structured, also using open questions) and focus groups. However, these techniques require sound preparation, a good knowledge of the methodology and are costly, which is the reason why they have been scarcely used.

Topical studies cover a great variety of research, in most cases documented in one specific deliverable or report of the project. Top-





ics dealt with in the course of such studies are fuel poverty, economic analysis on refurbishment measures and RES technologies to be integrated in buildings, cost reduction potentials of certain technologies, marketability of buildings, ESCO models, tariff systems, etc.

Although **stakeholder involvement's scope** is overarching, this specific category is also used to map inhabitants or tenants' engagement in the CONCERTO area, often in

form of meetings, dialogues, etc. It denotes that this group is not only addressed to collect opinions, level of satisfaction and perceptions, but that an intense exchange process takes place and that stakeholders contribute to the development of solutions. Often housing and tenants associations are involved in such dialogues. An example is the stakeholder dialogue in El Picarral in Zaragoza where a very active tenants association was one of

the initiators of the refurbishment process or in Turin, where tenants were trained to inform other inhabitants and also conduct surveys amongst them. Some cities have also carried out other activities to involve additional stakeholder groups, for example SMEs (Grenoble), developers (Amsterdam, Lyon), owners of non-residential buildings (Geneva), energy suppliers (Delft, Växjö) and municipal employees (Helsingør).

Figure 4: SE activities matrix

		act2 / Hannover	act2 / Nantes	cRRescendo / Ajaccio	cRRescendo / Almere	cRRescendo / Milton Keynes	cRRescendo / Viladecans	ECO-City / Helsingborg	ECO-City / Helsingør	ECO-City / Trenchheim	ECO-City / Tudela	ECOSTILER / Amsterdam	ECOSTILER / London	ECOSTILER / Måbjerg	energy in minds! / Falkenberg	energy in minds! / Neckarsulm	energy in minds! / Weiz Gleisdorf	energy in minds! / Zlin	POLYCITY / Cerdanyola del Vallès	POLYCITY / Ostfildern	POLYCITY / Torino	RENAISSANCE / Lyon	RENAISSANCE / Zaragoza	sesac / Grenoble	sesac / Delft	sesac / Växjö	TetraEner / Geneva
Information	1	General information and awareness raising activities																									
	2	Information activities before refurbishment targeting residents																									
	3	Information activities after refurbishment targeting residents																									
	4	Information materials to residents of new estates (booklets, guides, welcome events, etc.)																									
	5	Introductory information and training for residents in newly built estates																									
	6	Ad hoc neighbourhood info/meeting points in the area																									
	7	Activities to increase visibility (labelling, posters, information tags, etc.)																									
	8	Other information activities																									
Surveys and studies	9	Survey before refurbishment																									
	10	Survey after refurbishment																									
	11	Survey after arrival of new residents																									
	12	Survey on general attitude to energy use, RES, RUE and energy consumption behaviour																									
	13	Face-to-face interviews																									
	14	Round tables / focus groups																									
	15	Topical studies																									
Stakeholder involvement	16	Activities to involve inhabitants/residents (meetings, fora, events, participatory activities)																									
	17	Activities to involve other stakeholders																									
Activities addressing changes in energy behavior	18	Participation in reporting-systems on energy consumption (monitoring, diaries, etc.)																									
	19	Participation in reporting-systems on RES generation (PV, solar thermal, etc.)																									
	20	Feedback on energy consumption																									
	21	Smart metering / displays																									
Training and counselling	22	Activities in schools																									
	23	Personal energy advise/coaching, energy checks																									
	24	Energy counselling for groups of owners/residents																									
	25	Training courses for professionals (installers, energy consultants, janitors, sales agents, etc.) and municipal employees																									

realised activity  
 planned/ongoing activity

**Activities to change energy behaviour** mainly include the participation of households in feedback-systems on energy consumption or RES generation (e.g. PV, solar thermal systems, biomass boilers) and smart metering. Feedback-systems are tools which households use to report about their energy consumption (e.g. diaries, internet platforms, questionnaires, collection of energy bills). These tools can be used regularly over a certain period of time (e.g. every month for the duration of one year) or only once and are for some cities a basis for technical monitoring. For a successful implementation of this method, however, householders have to be motivated to participate. This can be achieved for example by receiving feedback on consumption (high or low compared to the average, energy saving measures recommended, etc.), incentives (e.g. Almere allows the households to choose between a book on energy savings and cinema vouchers) or by granting additional subsidies (e.g. Weiz-Gleisdorf).

Smart metering implies that tenants have a monitoring appliance installed in their home, which provides them with feedback on their energy consumption and eventually also with energy saving recommendations. Smart metering devices within CONCERTO have also been used to distribute information and questionnaires and also to organise competitions (Falkenberg, Växjö).

The last category encompasses **training and counselling**. This comprises activities such as school-related projects, personal energy advice or energy checks, energy consultancy for groups of stakeholders and training for professionals. Schools and other educational facilities are involved in a wide range of cities, e.g. in London, Viladecans, Trondheim, Neckarsulm, Almere and Zaragoza. In some of these cities, e.g. in Zaragoza and Viladecans, schools and kindergartens respectively are included in the demonstration activities.

Energy advice and energy checks have been carried out in many CONCERTO communities. They were especially implemented in the ones with overarching municipal activities such as Neckarsulm, Falkenberg, Weiz-Gleisdorf and Zlín, but also in Hanover, Tudela and Amsterdam. These advisory services have been different in content and quality, ranging from half-hour standardised checks and recommendations to specific counselling with calculation of energy saving potentials and information on funding opportunities (Hanover). Other forms of counselling have included workshops or seminars addressing a certain group of residents (e.g. private house builders) or SMEs which pro-

vided specific information about possible energy savings in buildings.

Training for professionals (e.g. installers, energy consultants, sales agents, planners, architects, construction workers) have been organised and carried out in most cities. These are hardly comparable since they have different focuses, durations and content. In some countries training programmes have been developed jointly across CONCERTO projects and cities or have been shared amongst cities (e.g. in France).

## COMPARATIVE ANALYSIS AND ASSESSMENT

### 3.1. SE monitoring criteria

Only a few cities, amongst which all those participating in the POLYCITY project, have developed and partly already measured their own SE indicators. A number of cities and projects have adopted the CONCERTO Plus SE matrix or elements of it as basis for the implementation of their own SE concepts. Table 2 below summarises the agreed 8 common criteria for which indicators are being collected and calculated.

For a limited number of cities it was possible to obtain, calculate or estimate some indicators. As shown by Figure 5 below, the criterion "active/proactive householders' behaviour" provides the most frequently adopted social indicators. However, due to the fact that the different communities do not use the same items of these indicators, and that only a few measurements are available, it is hard to compare values of the common indicators. Whenever possible and methodologically significant, values have been compared in tables and figures.

### Coping with the social dimension: Analysis of the indicators in the communities

As shown in Figure 6, CONCERTO projects approached the CONCERTO common criteria and indicators in various ways. Social criteria were especially considered in refurbishment projects that could focus their research on a comparison between the original situation and the situation after the completion of the CONCERTO activities. Cities that focus on the refurbishment of residential buildings addressed the following areas in their comparative (ex-

ante and ex-post) surveys: Involvement, information and training of residents, feedback on the increase of comfort levels and change of behaviour. Projects that concentrate on new urban developments lack a baseline for tenants' satisfaction or change in behaviour. They can only analyse the behaviour of the tenants after they move in or, in certain cases, compare it with previous living conditions. On the other hand, information and training, acceptance of the deployed technologies, economic development of the district in terms of business activity, jobs and public facilities are of key interest for all projects and have been extensively recorded also in cities focusing on new development.

Cities with overarching local programmes as well as cities with no dedicated socio-economic concept focused their interests mostly on information, dissemination and training, economic conditions and markets for a specific technology.

### Attitudes of residents: Satisfaction and acceptance

Attitudes of community residents towards development and towards CONCERTO specific actions as well as their perceptions of community and personal wellbeing are important means of determining the social effects of the CONCERTO activities. Such attitudes and perceptions reflect the quality of life that residents would like to enjoy, whether it implies keeping the neighbourhood as it is (resistance to change/ fear of change) in order to maintain the image of a small community (sense of place); expanding the boundaries of the neighbourhood or providing increased housing capacity to new residents and businesses.

Perceptions and opinions on community's social well-being have been recorded in surveys and also by directly motivating residents, stakeholder or both to clearly voice their opinion regarding the anticipated changes. In some cities (e.g. Hanover, Turin, London) these surveys have been or will be repeated after the accomplishment of the measures to compare behaviour and attitudes and detect an inherent bias towards given sources of energies, forms of consumption (centralised versus decentralised heating), kinds of buildings, etc. In these cases indicators were collected.

Extensive renovation projects for existing urban neighbourhoods are especially challenging due to socio-economic implications and resistance to change. The challenge is to implement comprehensive renovation activities that ensure significant primary energy savings, but at the same time guarantee increased social cohesion and a sense of place and identification



**Table 2:** SE assessment criteria

SOCIAL DIMENSION
<p>✘ <b>1. Degree of satisfaction / acceptance by inhabitants / tenants / owners:</b> This aggregated indicator covers the question as to how satisfied different actors (inhabitants, tenants, owners, stakeholders, citizens of the community, etc.) are with CONCERTO measures. This may include the refurbishment of their home or office, the application of a solar heating system, the implementation of district heating, training programmes, energy checks, outreach, etc. It also includes the degree of satisfaction with the CONCERTO district or area as a place to live, work and to operate.</p>
<p>✘ <b>2. Level of information &amp; direct participation:</b> This indicator addresses the extent to which inhabitants were informed before, during and after the CONCERTO measures (information material, campaigns, events, meetings, interviews, etc.). This aggregated indicator consists of various items and records i) the level of satisfaction with CONCERTO measure related information and ii) to what extent people were involved in the CONCERTO relevant decision-making processes (e.g. in the planning, implementation, etc.).</p>
<p>✘ <b>3. Active / proactive householders' behaviour:</b> This indicator provides information on the behaviour of the householders. It addresses householders taking part in any sort of feedback-system on their energy consumption (e.g. diaries, questionnaires on energy consumption, internet surveys, collecting energy bills, control instruments, etc). Additionally, it also assesses whether householders have changed their energy consumption behaviour (either as a result of the CONCERTO measures or for other reasons). The aggregated indicator also refers to the willingness of people to invest in energy efficiency measures (e.g. insulation, energy efficient equipment (e.g. energy-saving household appliances, light bulbs, further refurbishment measures, etc.) or spend more on renewable energy and green electricity.</p>
ENVIRONMENTAL DIMENSION
<p>✘ <b>4. Improvement of CONCERTO district environment and internal comfort level:</b> This aggregated indicator includes i) the reduction of CO<sub>2</sub>-emissions and ii) reduction of environmental pollution (e.g. PM10, NOx, SOx, CO, O3) in the CONCERTO area, with consequent improvement of the air quality in the district. Additionally it also covers changes in internal comfort levels (humidity, temperature, natural lighting, acoustic quality, etc.) as a consequence of the CONCERTO actions.</p>
ECONOMIC DIMENSION
<p>✘ <b>5. Economic-ecologic cost effectiveness:</b> This indicator refers to the cost-effectiveness of measures related to CO<sub>2</sub> savings ( per avoided ton of CO<sub>2</sub>). This criterion brings together the environmental and economic dimensions: the costs of a measure are connected with its main objective. It also covers the reduction of energy costs per m<sup>2</sup> of building area within the CONCERTO projects and the influence that CONCERTO measures have on the tenants' energy bills. The indicator shows whether the measures to boost the share of renewable energy, to refurbish older buildings and build energy efficient new ones as well as the measures to increase the awareness had any effect on the energy bills of users.</p>
<p>✘ <b>6. Increase in local control of energy supply / local energy production due to CONCERTO measures:</b> This aggregated indicator consists of various items and shows how much energy (electricity and thermal energy) is produced locally in the CONCERTO area or in the community either through CHP plants or RES (capacity of the plants in the considered area). Local production and supply of energy is an important factor for a secure and independent energy supply and for enhancing decentralised paths. The source for this indicator is mostly technical monitoring data. The indicator also includes the acceptance of the local production of energy by stakeholders and inhabitants.</p>
<p>✘ <b>7. Stimulation of local economy:</b> This aggregated indicator, consisting of various items, covers the creation of new jobs and businesses within the CONCERTO area and different training offered to professionals and homeowners. It also includes changes in community demographics and the growth of the neighbourhood and / or a change in the values of flats and real estate in the district. This indicator also assesses a project's success in making a district more liveable and appealing to citizens and records people and stakeholders' perception of stimulation of local economy and improvement of the image of the CONCERTO district.</p>
<p>✘ <b>8. Payback Period (investor side):</b> The Payback Period refers to the period of time it requires to recover the costs of an investment.</p>

for residents in the concerned districts. Thus taking into account tenants' needs and attitudes in advance can encourage the desire for change. The analysis shows that comprehensive renovation activities could be successfully implemented at the neighbourhood scale when the specific needs of the residents and stakeholders have been taken into consideration and when the concepts have respected social and cultural diversity, social cohesion and attachment to the existing neighbourhood structures (e.g. Hanover, Turin, Amsterdam). These comprehensive renovation activities have been organised in a way to ensure that the social mix and diversity, social cohesion and sense of place in the concerned neighbourhoods is maintained or even improved. This is done while trying at the same time to avoid the potential negative effects of gentrification. In these cases targeted information and resident feedback was also a major concern.

**Level of information and direct participation: Involving, informing, educating**

The scope of campaigns and information activities varies and success depends on a number of direct and indirect factors. Following critical success factors for activities aimed at **informing, involving** and **increasing the visibility** of a project can be extracted from the analysis of the communities:

- ✘ Careful planning and targeted preparatory phase, including major stakeholders
- ✘ Clear objectives, simplicity
- ✘ Focus on involvement, training and education
- ✘ Focus on stimulation and empowerment
- ✘ Stimulation of people's desire to live and work in CONCERTO buildings/districts
- ✘ Good visibility among the target group
- ✘ Possibilities for feedback from the target groups
- ✘ Follow-up/ repetition (second phase) of the activities (campaigns, surveys, etc.)

**Involving**

CONCERTO experiences indicate that taking a bottom-up approach is the most effective way of persuading inhabitants to get involved and gives them a sense of identification with the project. In this respect, the key is to encourage participation right from the start, by taking a user-centric approach, and by evaluating the success by gathering feedback through inhabitants (i.e. bills, diaries, questionnaires, internet tools, interviews) and focus groups with stakeholders, etc.

The analysis shows that comprehensive renovation activities could be successfully implemented on the neighbourhood level when par-

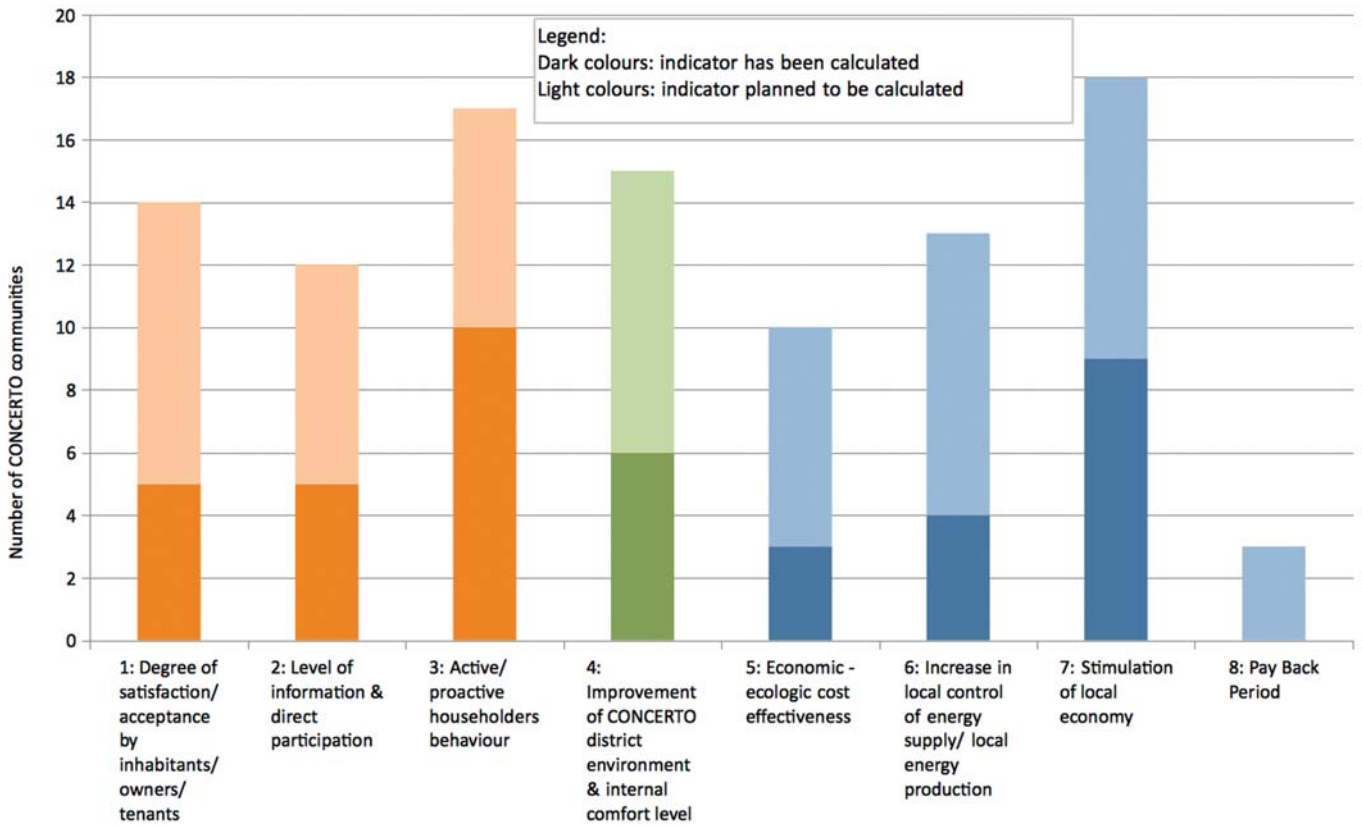


Figure 5: Indicators planned or used by the CONCERTO cities

Figure 6: Social dimension: overview of the available and planned indicators

				act2 / Hannover	act2 / Nantes	cRRescendo / Ajaccio	cRRescendo / Almere	cRRescendo / Milton Keynes	cRRescendo / Viadecans	ECO-City / Helsingborg	ECO-City / Helsingør	ECO-City / Trondheim	ECO-City / Tudela	ECOSTILER / Amsterdam	ECOSTILER / London	ECOSTILER / Malmö	energy in minds! / Falkenberg	energy in minds! / Neckarsulm	energy in minds! / Weiz Gleisdorf	energy in minds! / Zlin	POLY-CITY / Cerdanyola del Vallès	POLY-CITY / Ostfildern	POLY-CITY / Torino	RENAISSANCE / Lyon	RENAISSANCE / Zaragoza	sesac / Grenoble	sesac / Delft	sesac / Växjö	TetraEner / Geneva		
CATEGORIES	No.	INDICATOR	UNIT / SCALE OF MEASUREMENT																												
SOCIAL dimension	1	Degree of satisfaction / acceptance by inhabitants / tenants / owners	a) % of addressees / inhabitants/ etc. satisfied with the CONCERTO measure	✗																											
			b) 5 point Likert scale: degree of acceptance	✗																											
	2	Level of information & direct participation	a) % of stakeholders / inhabitants / tenants / etc. who are satisfied with the level of information on the CONCERTO activities	✗																											
			b) % of stakeholders / inhabitants / tenants / etc. who feel more informed about energy topics after the CONCERTO measures than before	✗																											
			c) 5 point Likert scale: degree of satisfaction with the level of information on the CONCERTO measure																												
			d) 5 point Likert scale: perception on involvement in decision-making in the CONCERTO area																												
	3	Active/proactive householders behaviour	a) % of householders in the CONCERTO area taking part in a feedback system on their energy consumption or in an energy check	✗																											
			b) % of householders who changed their energy consumption behaviour	✗																											
			c) 5 point Likert scale: perception on how much the CONCERTO measure changed the behaviour of the householders																												
			d) 5 point Likert scale: willingness to invest in energy saving measures or to pay more for RES / EE / green electricity																												
			e) % of people who are willing to invest in energy saving measures or to pay more for RES / EE / green electricity																												

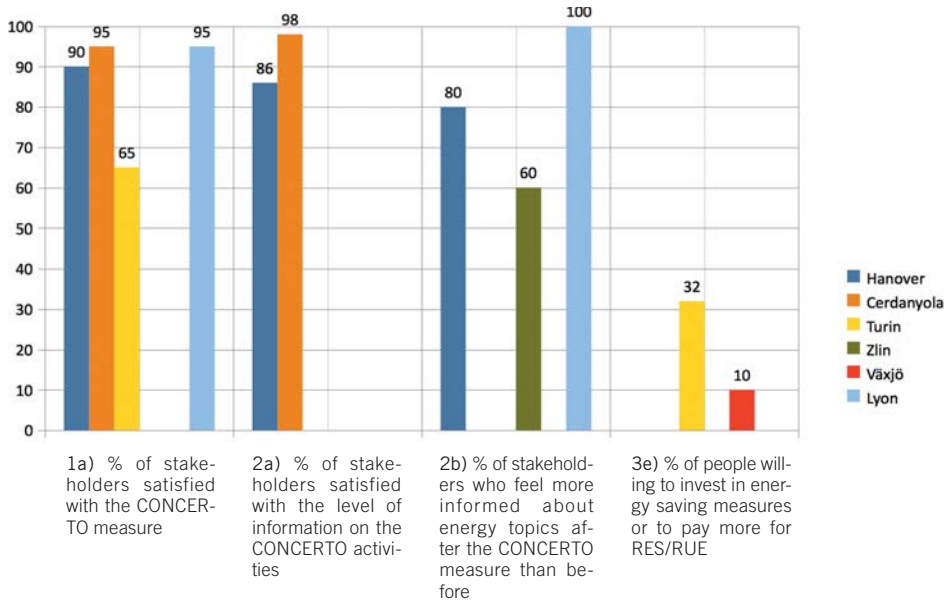


Figure 7: Comparison of selected social indicators

ticipative approaches involving residents in the renovation process were initiated at an early project phase (e.g. Hanover, Zaragoza, Turin) and supplemented by targeted information. In Turin, for example, this approach has been applied in the different implementation phases of the project (the design, implementation, training and monitoring stages) to involve stakeholders at each stage. In particular, a representative sample of inhabitants were involved to provide communication support aimed at ensuring the most effective use of the new systems, and also at a reduction in energy consumption and costs. Thus some residents have been trained to help conduct questionnaires, interview neighbours and carry out surveys. Inhabitants trained to interview tenants acting as multipliers were invaluable at speeding up the construction process, taking the pressure off site supervisors and to increasing the social acceptance of the adopted measures. This was also experienced in Hanover. In these cities the level of acceptance and satisfaction recorded by indicators is satisfactory (see Figures 7 and 9).

In countries with a strong tradition of tenants' rights, and where residents associations have a certain bargaining power, residents identify more strongly with the rehabilitation process. In such cases, a good balance between appropriate management of public real estates and sustainability of the costs for low-income households has been achieved. The Ecostiler project in Amsterdam carried out information campaigns targeting residents as well as a structured stakeholder dialogue. In the stakeholder dialogue, about 30 participants from citizen groups, local district councils and housing asso-

ciations discussed intensively preferred energy and CO<sub>2</sub> reduction options for future housing renovation in their district. The stakeholder group extensively discussed options for combining rents and energy bills so that refurbishment activities do not excessively increase the costs of living for tenants.

In Zaragoza, focus groups were organised and formed by a limited number of residents with a primary interest in energy saving and ecology. The purpose of training this kind of resident is to create leaders who promote good practice in their homes. At the same time these residents became a point of reference for the project in the respective blocks. Through them, a relationship could be established enabling to gather feedback.

But also in the case of new development early participation has been of crucial importance. The planning process of the Cerdanyola Directional Centre was accompanied by an important participation process. An Information Office was created from the very beginning of the project to show the development of the Directional Centre and to facilitate the information and citizen participation.

### Informing

In the large majority of cities, a number of general and specific information activities have been carried out. The picture of the various outreach activities and related campaigns is varied and ranges from information boards at the construction sites to activities in schools. Traditional communication channels dominate: booklets and brochures were distributed in the majority of cases. Personal advice and training were provided in about half of all cases.

Although not an effective way of fostering behavioural change, such measures have nevertheless proved to be satisfactory in convincing residents that they are being thought of by the project team. Information ultimately leads to a better understanding amongst those who may be initially biased against the project. Additionally, such activities also empower residents, engaging them in discussions about the need for efficient energy use, and new and existing ways to achieve it. For example in Ostfildern, results of a survey (expressed on a four point-scale) show that inhabitants in the CONCERTO districts are very satisfied with their living conditions (3.21), they widely accept renewable energy (3.67) and endorse a stronger use in future (3.62). Moreover they appreciate the biomass CHP-unit in Scharnhäuser Park (3.46). The survey also shows that costs have a crucial impact. While inhabitants generally support renewable energies, they would be far less willing to bear higher costs (2.0). With regard to the state of information it can be stated residents have a limited knowledge regarding energy, but they have a high interest in learning more.

### Increasing visibility

CONCERTO projects have found effective ways to reach a wide audience, thereby promoting the image of RES and sustainable buildings and enhancing the desire to live and work in such areas. Projects regularly featured in local media, raising positive awareness about sustainable installations. Renewable energy sites such as wind and solar plants gain significant media attention, as was the case for the solar island in Almere, Netherlands. The opening of the fourth largest solar collector system in Europe, consisting of 520 solar collectors with a surface area of 7,000 m<sup>2</sup> serving 2,700 households, has enjoyed great media coverage.

Another means of attaining higher visibility is by establishing info points or centres. In Zaragoza, for example, the CUS (Sustainable Urbanism Centre in Valdespartera) opened in June 2010 and will be used for training and events, hosting an exhibition on energy efficient building systems.

Visualising the real-time energy use of buildings directly on the neighbourhood map is a suitable way of understanding the energy demand of a neighbourhood by indicating groups of buildings with the highest energy demand and those with a high energy performance. This method has been implemented in Ostfildern (Scharnhäuser Park), where energy use data is transferred automatically from heat meters to a database that is coupled with a Geographical Information System (GIS). The results are visible on the project's website.

**Householders' Behavioural Change**

CONCERTO communities reported a number of activities aiming to affect energy consumption behaviour, investment behaviour or attitudes towards new forms of energy in general. A large number of them addressed users of the new or refurbished buildings.

Householders, as potential users are often unaware of practices and technologies available, often sticking to old energy inefficient habits. In both refurbishment and new construction activities, it is therefore important to inform and train residents to change their behaviour either through dedicated counselling activities or through participation in feedback activities on their energy consumption. Actions can also be taken through individual energy advising and energy checks. In Cerdanyola, for example, there were several meetings with new residents and feedback was gathered through questionnaires. Also training for residents' associations is particularly important for renovation projects because it has been shown that it increases understanding and willingness to change consumption routines.

In London's neighbourhood Roupell Park, results of the face to face surveys show that residents have a good level of awareness of existing environmental issues and may be open to changing their behaviour in order to reduce their environmental impact.

**Energy checks and participation in feedback systems**

Some CONCERTO cities use metering equipment in buildings (temperature and humidity sensors, heat flow and electricity meters, data loggers and dedicated servers) which collect during a certain time period information concerning energy usage and also encompass comfort parameters.

In Växjö, the municipal utility informs end users about their energy consumption (both for electricity and district heating) through a user interface called "EnergjKollen". This interface is available online and can be accessed by every end-user. The municipal utility has also set up a successful energy saving campaign based on competition between households. By bringing into play competition between end users, the municipal utility in Växjö found an appealing way of increasing tenant interest in sustainability.

In Falkenberg, by installing dedicated display devices in buildings, the municipal housing company tried to push tenants to check their energy consumption. The so called smart box is a computer and information terminal which is connected to a central server with a system for individual metering of water, domestic hot water

and household electricity. The smart-box provides residents with real-time information on their heating, electricity and hot water consumption. It calculates CO<sub>2</sub> emissions (in kg) caused by the energy used in the dwellings and provides information also on other issues that might be interesting for residents (weather forecast, time schedule of public transport, etc.).

In Falkenberg, as result of a survey with 47 respondents (43.5% return) tenants living in the multi-storey low energy houses Hertings Gärd showed willingness to use the smart box (3.3 points in a 5 point scale) and declared that their water and energy consumption has decreased (3.3 points in a 5 point scale) and is lower than in their previous residence (3.4 points in a 5 point scale).

In Zaragoza, an advanced system combining fibre optics, GSM communication systems and database software is connected to real-time information displays in a public building. In Lyon energy consumption of certain dwellings and the public spaces of the buildings (garages, staircases, etc.) will be monitored with sensors and data loggers.

**Energy checks/specific energy advisory services**

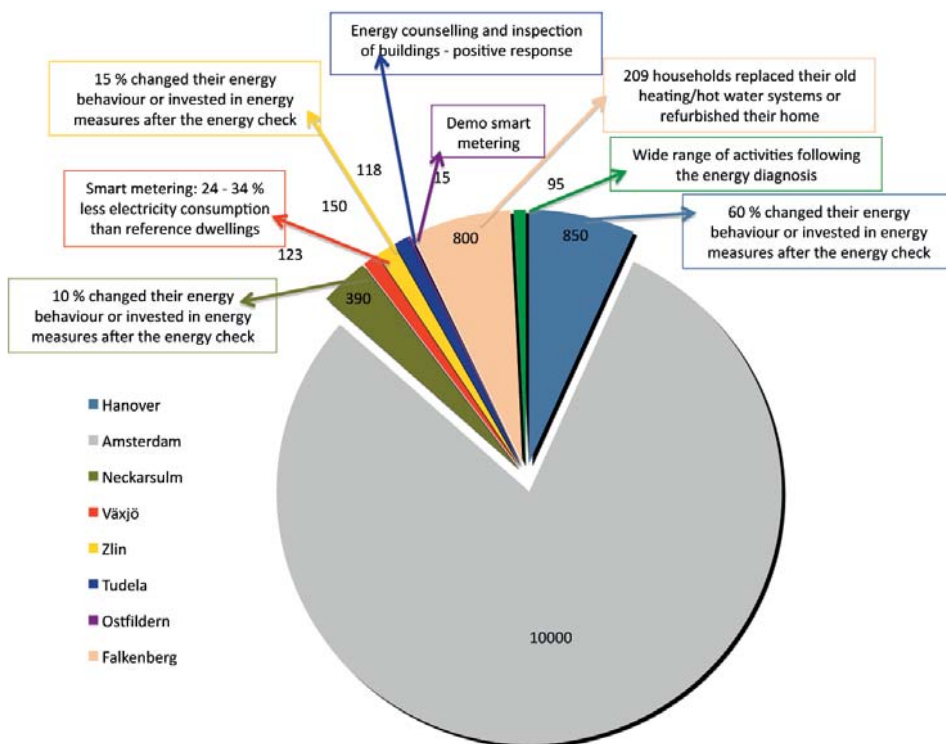
Environmental perception and energy saving behaviour vary according to the householders' composition, demographic structure (age, level of education and occupation) as well as life style. Experience shows that customised advisory

services may help householders to adopt more energy conscious behaviour. Flanking information activities and energy checks have helped improving practical knowledge about RES and energy savings.

Customised energy consultancy schemes (Hanover) and energy checks (Zlin, Neckarsulm, Amsterdam, Tudela, etc.) developed for individual home owners and residents in general have helped enhance comprehensive building renovation activities. These activities have been even more successful when combined with financial incentives. In Hanover, for example, home owners that applied the CONCERTO standards by retrofitting received a voucher of 2,500 Euros.

In order to meet the energy efficiency targets of the programme, the city of Zlín involved energy checks of all private, office and industry buildings in the demonstration area and provided financial incentives, a public campaign, education, training, activities of local energy agencies and networking for local actions. As a result, energy awareness in the community has significantly increased (60% feel more informed). Also in Neckarsulm, around 390 Energy Checks have been carried out. About 10% of the participants of the energy check retrofitted parts of their house as a result of the counselling. Private persons looked for energy advice especially for alternative heating systems, energy saving measures in buildings and energy certificates for residential buildings.

Figure 8: Participation in energy checks and feedback systems





### Willingness and capacity to pay more for sustainability

The socio-economic status of consumers and their ability to pay can either hamper or enhance their possibilities to invest in energy efficiency projects. In such situations, a combination of different instruments is necessary. Careful consideration is required particularly in neighbourhoods with large variations in income levels. For example, in cities such as Nantes, fuel poverty was highlighted as a major issue whereas in the Nordic countries, with considerably different housing structures and welfare systems, fuel poverty was not a major concern.

In Nantes a study was undertaken analysing the influence of housing quality, domestic equipment and energy practices on fuel poverty. The experience of Nantes in this field is exemplary since their focus on unpaid energy bills and a better management of the energy consumption constituted a social issue (combating poverty and inequalities), an urban issue (maintaining a healthy habitat for the populations in the city centres), an environmental issue (decreasing pollution and saving resources) and an economic issue (reducing expenses and increasing the attractiveness of the city).

### 3.2. Coping with the environmental and economic dimensions

Up to date, figures on CO<sub>2</sub> emissions and economic and environmental cost effectiveness

of CONCERTO measures are only available for a very small number of communities, and in some of these cases only for selected demonstration objects. The matrix on p. 14 illustrates the planned and only partially available environmental-economic indicators. In order to sketch a comparative analysis of the results of the communities, preliminary data derived from the technical monitoring have been used.

#### Environmental criteria

In the SE assessment methodology, it was suggested to evaluate the share of reduction in CO<sub>2</sub> emissions compared to the basis year. However, only for a small minority of cities values are available, and some only partially. For example Zlín could achieve a 29.5 % reduction of CO<sub>2</sub> emissions as compared to the basis year, Neckarsulm 24% fossil energy savings (2005-2010). Ostfildern recorded a 26% reduction (kg/capita) in the year 2007 compared to a supply system with natural gas fired condensing boiler for individual buildings.

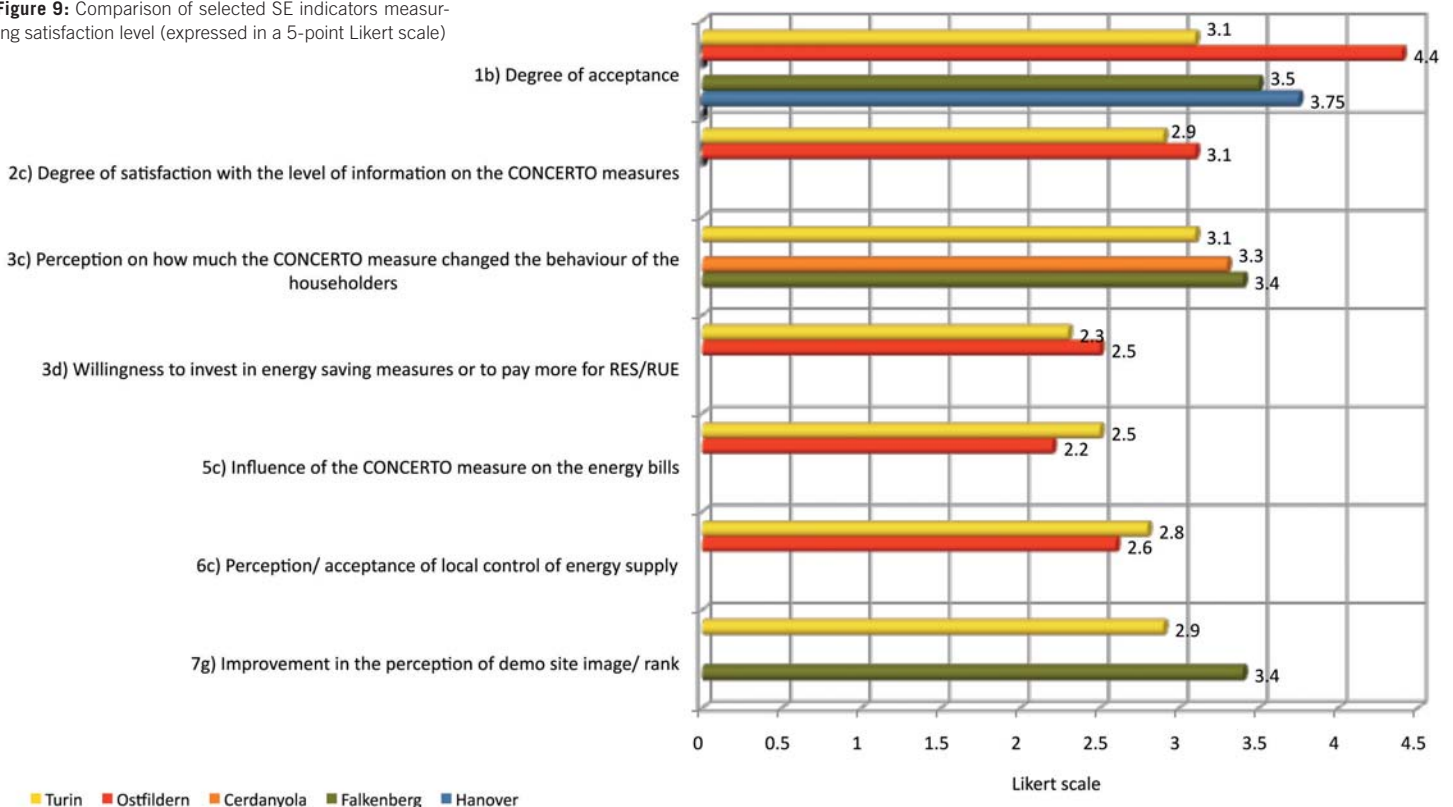
For comparative purposes, consistent data derived from CONCERTO Plus technical monitoring has been used. This is also the case in cities where some data were provided. Figure 12 puts side by side the total CO<sub>2</sub> emissions avoided in the cities, split into avoided CO<sub>2</sub> in energy generation (either through RES or increased energy efficiency in the production process, like CHP plants) and energy de-

mand in buildings (both for electricity use and heating/cooling).

The figure shows that there are five cities with high levels of avoided CO<sub>2</sub> emissions (Amsterdam, Cerdanyola, Falkenberg, Helsingborg and Helsingør). This result is almost entirely due to installation of RES and CHP plants (production side) and to a lesser extent thanks to energy efficiency gains on the demand side (reduced energy demand in buildings for electricity, heating, cooling). On the contrary, cities like Zaragoza, Almere, Turin and Lyon (amongst others) have focused more on energy efficiency measures in (new and refurbished) buildings and less on large scale RES production.

Additionally, this indicator also covers changes in internal comfort levels (humidity, temperature, natural lighting, acoustic quality, etc.) as a consequence of the CONCERTO measures. However, these aspects have been quantified by a negligible number of cities. In Hanover, even though this indicator was not directly monitored, results of surveys reveal that the greater comfort resulting from constant room temperatures lessened the need to raise the temperature by opening the radiator valves. Tenants aired the rooms by opening windows for short periods than previously (in 2010 82% compared to 70% before the retrofitting) and turned off the heating more frequently than before modernisation (84% compared to 64%). In Turin, the percentage of residents feeling that

Figure 9: Comparison of selected SE indicators measuring satisfaction level (expressed in a 5-point Likert scale)









of 0.07 €/kWh to 0.10 €/kWh. Even if the consumption is lower and the increases are due to a rise in energy tariffs, the results of the survey show that the majority of residents perceive the current heating system as more expensive than the previous one. This increased cost has affected the acceptance of the measures in the district.

The influence on energy bills estimated for Hanover shows lower energy consumption in 4,700 modernised dwellings out of a total 1,177 buildings in the proKlima-promotion area. This means on average a 19 Euro savings on energy costs per month. The influence of the CONCERTO measures on the energy bills in Ostfildern is derived from estimates based on a heating cost comparison and average demand reduction (56 kWh/m<sup>2</sup> instead of 90 kWh/m<sup>2</sup> as defined by the German EnEV regulation) compared to possible reductions by passive houses (15 kWh/m<sup>2</sup>). The value of the index is 2.2 in a 5-point scale (best = 5, worst = 1)

### Increase in local control of energy as key economic factor

Local production of energy is not only an important factor for the security of energy supply and for enhancing decentralised paths, but also to improve the local economy. CONCERTO Plus aggregated indicator consisting of Indicator 6a) and 6b) shows how much energy (electricity and thermal energy) is produced locally in the CONCERTO area or in the community ei-

ther by polygeneration plants or RES. The indicator also includes the acceptance of the local energy production by stakeholders and inhabitants. These indicators could only be quantified by a very limited number of cities. Therefore, with regards to the comparative analysis, proxies have been used and derived from CONCERTO Plus technical monitoring.

Installed gas CHP capacity can be taken as a good proxy for local control of energy supply. Additionally, the ratio between total renewable energy generation (electrical and thermal) within CONCERTO compared with the energy consumption in CONCERTO buildings gives information about local energy share. Figure 13 shows the installed gas CHP capacity for heat and electricity in the CONCERTO cities. Gas CHP systems have been or are in the process of being installed (or extended) in Amsterdam, Cerdanyola, Grenoble, London, Milton Keynes, Turin and Växjö. Installed capacities range from over 12 MW<sub>th</sub> and 10 MW<sub>el</sub> in Cerdanyola to 317 kW<sub>th</sub> and 247 kW<sub>el</sub> in Växjö. In Turin for example, the electricity actually produced by the tri-generation system installed within the framework of the POLYCITY project and by the PV installations is larger than the electricity demand of the CONCERTO district buildings.

Biomass or biogas CHP plants have also been installed by CONCERTO cities, but are not included in this figure as they are illustrated in Figure 14.

The ratio between the total RES generation (electrical and thermal) within CONCERTO ar-

eas and the energy consumption in the CONCERTO buildings has been calculated and expressed in percentages. Figure 14 shows the results of this calculation. A percentage under 100% shows that less renewable energy is produced within CONCERTO area than is used in the CONCERTO buildings; a percentage above 100% indicates that there is more renewable energy produced within CONCERTO areas than is used in CONCERTO buildings. Accordingly, very high percentages (> 1000%) indicate that a considerable energy surplus is produced. This can be due to various reasons, e.g. large RES installations, very few buildings involved in CONCERTO, very low energy consumption of buildings, etc.).

### Stimulation of local economy

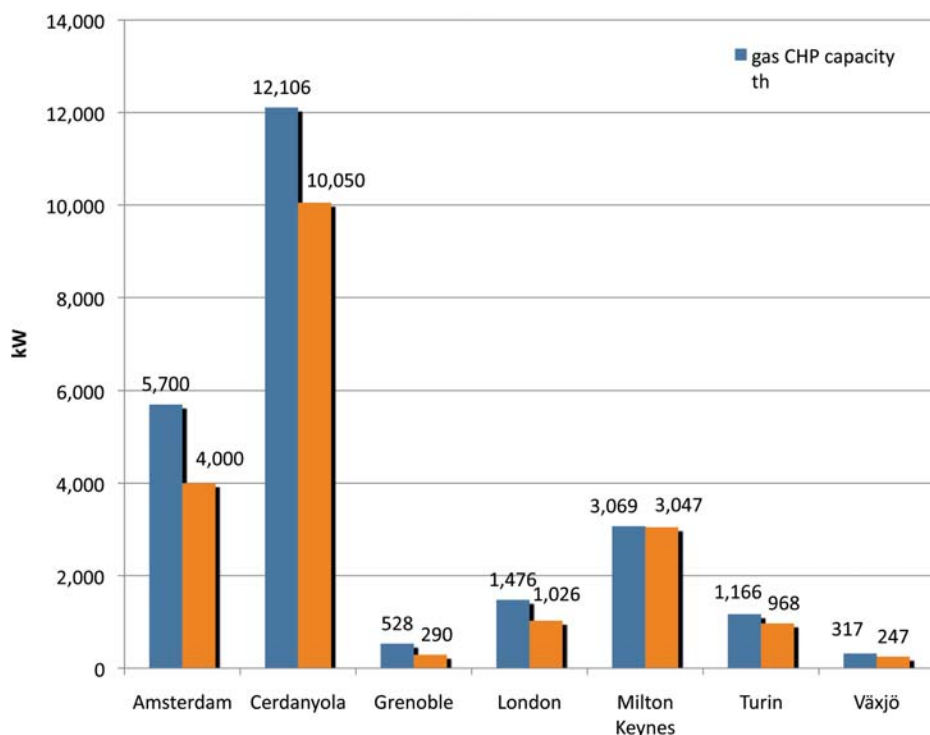
Indicator (7) consists of various sub-indicators and includes the creation of new jobs and businesses within the CONCERTO area and different trainings offered to various target groups. This indicator also assesses whether or not a district has been made more liveable and appealing to citizens (and indirectly increased property value) and records people and stakeholders' perception of stimulation of local economy and demo site image.

Two cities provided measurement for new jobs, i.e. Ostfildern with 2,087 jobs with regard to employees liable to social security and Cerdanyola measuring a current number of 150 new employees and estimating a potential for 10,000 new jobs.

Training and qualification is an important factor to stimulate local economy and is addressed by Indicator 7c). Targeted training activities were significant for the implementation of advanced energy-efficient retrofitting standards and improving skills. Local training courses raised the skill sets of participants and were important to ensure the quality of work in the demonstration sites. Training and motivation of professionals (installers, energy consultants, caretakers, sales agents, etc.) have been carried out in a large majority of projects. The target group of building users also includes caretakers and building managers. A large quantity of data could be retrieved, but figures are hardly comparable. Training offered has been expressed in hours, days, number of training sessions without indication of hours, number of participants, etc.

Concerning Indicator 7g) measuring improvement of image or rank of the CONCERTO area, a questionnaire performed in Turin had two types of questions regarding perception of the district with a high number of items regarding perceptions about the neighbourhood and

Figure 12: Installed gas CHP capacity in the cities. Source: CONCERTO Plus technical monitoring indicators



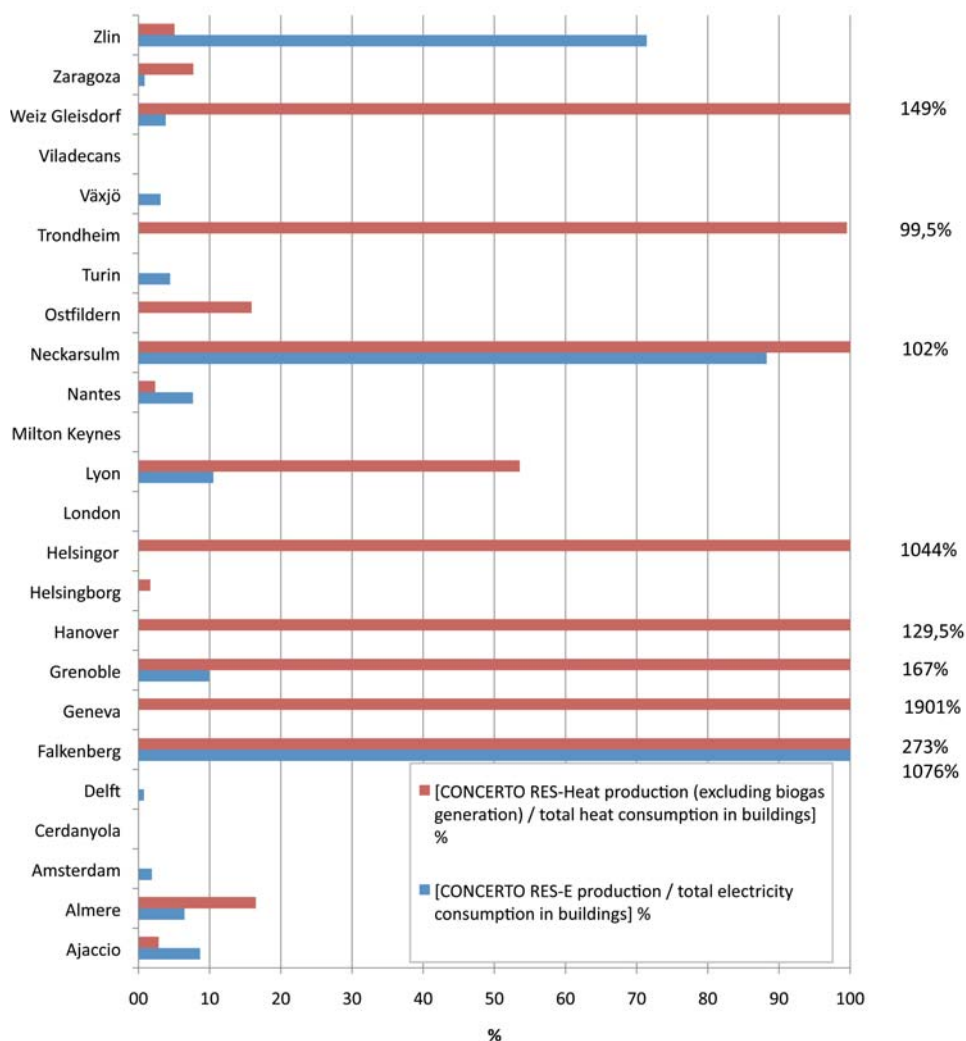


Figure 13: Ratio between total RES generation (electrical and thermal) within CONCERTO compared with the energy consumption in CONCERTO buildings. Source: CONCERTO Plus technical monitoring

the quality of services offered in a scale of 7 values (from “much inadequate” to “much adequate”). The resulting mean value for the indicator corresponding to 4.1 in a 7 point Likert scale denotes an increased attractiveness and better rank of the CONCERTO district.

## LESSONS LEARNT AND REMAINING CHALLENGES

The analysis of the activities carried out and the appraisal of the few available indicators reveals that accompanying socio-economic activities and soft measures have had positive effects on the implementation of the demonstration activities. The following lessons for policy can be drawn:

### Designing socio-economic activities and measuring success

In order to meet the challenge of integrating social, economic and environmental aspects it is necessary to develop an integrative approach (encompassing methods, processes, data streams, etc.) which is able to grasp the interactions between complex systems.

The assessment of the various CONCERTO experiences reveals that successful integration of sustainability criteria requires flanking socio-economic activities and dedicated SE concepts. Cities could meet challenges more easily when:

- ✘ From the beginning, concepts have been clearly defined, comprehensive and tailored to the specific characteristics of the project.
- ✘ Implementation of measures affecting residents have been communicated and when residents have been informed and involved in the activities from the outset and throughout all phases of the project,
- ✘ Information campaigns and surveys were commenced even before the demonstration activities began (especially for renovation projects)

Cities that developed such strategies and had dedicated SE plans could better cope with difficulties related to:

- ✘ implementing comprehensive renovation activities that ensure significant primary energy savings while simultaneously guaranteeing an increased social cohesion, sense of place and identification of the inhabitants in the concerned districts;
- ✘ finding the right balance between energy improvement and quality of life amelioration. Local acceptance of renovations under occupied conditions could be increased for example by involving tenants (information campaigns prior to projects, metering activities by tenants, training tenants as advisors and potential multipliers);
- ✘ finding means to contact and motivate the various user groups;
- ✘ identifying acceptance issues problems at an early stage and reacting to these problems by either adapting the project activities or taking these aspects into account for future activities;
- ✘ designing support programmes and providing additional financial incentives

For future programmes it is important to make socio-economic criteria mandatory, and to create a standardised SE data base to support projects during their implementation phase.

### Addressing the social dimension Stakeholder commitment

Getting stakeholders involved is the first step towards making a commitment, and making a commitment makes people more likely to act. Understanding the target groups, inhabitants and home owners was one key to successful refurbishment activities. The central message is to involve the ones affected by the measures so as to ensure acceptability of the project and social response. It is crucial that participation of the project affected people is provided at each stage from planning through to implementation and is paramount to keep them informed about the development.

Behavioural change can only take place if there is an effective ‘engagement’ of stakeholders and residents, which means more than simply raising awareness and understanding. It is also necessary to cover the “domains” of concern, emotion and comportment. To achieve this, communication initiatives need to overcome a number of barriers at an individual and social level. It is vital to remove barriers created by feeling disempowered, disillusioned or distrustful of information and also to erode any long-established “bad” con-



sumption patterns. The CONCERTO cases have shown a high number of accompanying activities which aim to increase both cognitive and emotional involvement. Empowering schemes addressing residents, who can liaise and network with other tenants or establishing district agencies are very effective means and should be used more widely.

Refurbishment of flats and works on the building site put considerable burdens on all tenants, especially with regards to dirt and noise pollution. Special attention should be devoted to liaising with tenants, running through the entire process from planning to end use. Local advisers should counsel tenants and act in the CONCERTO district with a mediating function. They can be invaluable when it comes to speeding up the construction process, taking the pressure off site supervisors and increasing the social acceptance of measures.

### **Refurbishment in low-income areas**

Often, refurbishment activities have been carried out in "difficult" areas. Due to the improved standard of the dwellings and buildings and of the infrastructures, the neighbourhood could become or is on the way to obtaining a better image. As a consequence, some districts are starting to attract young families with higher income, thus improving the social mix. In countries with a tradition of strong tenants' rights, and where residents associations have a certain bargaining power, there is a higher participation of residents in the rehabilitation process. Successful concerted gradual rehabilitation processes rely strongly on:

- ✘ Participation as a key method;
- ✘ Residents identifying keenly with the refurbishment activities;
- ✘ A balance between correct management of public real estates and sustainability of the costs for low-income households.

### **Creating awareness and providing information**

The effects of providing awareness raising and information activities can be manifold. These can lead to outcomes ranging from better acceptance of construction works and general public interest about the results, to an improved perception of the district and concrete improvement in quality of life. Due to information and increased acceptance, adjustments to the needs of the target groups and involvement of inhabitants and stakeholders, the implementation also of very complex measures could advance. A general lesson learnt is that the acceptance by the residents and their readiness to change their

behavioural patterns are important factors if retrofitting is to meet its energy efficiency targets in a sustainable way.

Surveys amongst the stakeholders allowed addressing problems concerning dissatisfaction and preventing other major difficulties. Due to accompanying socio-economic research, it has been possible in some of the CONCERTO cities to identify problems at an early stage and react on these problems either by adapting the project activities or by taking these aspects into account for further phases. For example, a survey carried out in a community showed that generally inhabitants were satisfied with the biomass polygeneration plant in their district. However, people living very close to the plant were highly concerned and showed lower levels of acceptance. This important finding will influence participation and information processes in the future. Elsewhere, a survey on tenants' satisfaction with their living situation and level of pride for their district showed shortcomings in one of the two areas. Lessons learnt can be applied to improve subsequent activities and make a positive impact on this situation.

Success in surveying tenants' attitudes depends on the method chosen. Methods that included personal contact either through direct interviews or a personally delivery of a questionnaire achieved a higher return rate than methods where a questionnaire was sent by email or by post.

### **Triggering householders' energy behaviour**

Householders' energy behaviour is influenced by factors such as available income, cultural and societal backgrounds (attitudes, beliefs, standards), housing conditions and country-specific regulations. Experience suggests that better information and campaigns to incite behavioural change are essential, but have not been demonstrated as effective enough to change households' energy consumption. Indeed, perceived problems related to energy costs in households do not always provoke behavioural change and encourage energy saving measures. Nevertheless, educational measures have been playing an important role and especially for households with low incomes that spend a high fraction of their budget on energy. In contrast, evidence shows that providing households with better feedback on their energy consuming behaviour can make them more aware of their every day behaviour and how this is related to energy consumption.

There have been surveys in a number of cities targeting changing attitudes towards new

developments, towards renewable technologies, energy efficiency, etc. However, there is no strong correlation between changing attitude and changing behaviour. Feedback and follow-ups are crucial. Feedback either through ITC (displays) or diaries or personal advisory services gives people signals about the impacts of their behavioural changes. Follow up contacts are important in motivating people to continue to behave in an energy efficient manner.

On the spot counselling and the establishment of reference points and a guiding service for the citizens in the district in form of development/territorial agencies can be a factor that ensures smoother project implementation. Residents tend to trust neighbours more than external advisors. The engagement of residents trained as multipliers in local agencies have demonstrated to be a valuable vehicle to inform and convince tenants.

There has been not enough evidence to draw conclusion on whether or not different feedback systems affect different behavioural changes and reduce consumption. Although studies show that specific feedback has been important in inciting change, there are also cases proving that feedback alone was not enough to affect energy consumption. Much hinges on the frequency of the feedback (weekly, monthly or daily). Smart meters and real-time displays could encourage users to change their behaviour, especially if coupled with time dependent tariffs which offer consumers a clear financial incentive to change. Whilst it may be true that incentives may foster short-term change, it is unlikely that they bring about long-term change. People may respond to incentives by changing their conduct. However, it is questionable whether or not they will revert to their original consumption routines when incentives no longer apply.

To summarise, the analysis of all **3 social criteria** provides evidence that in a number of CONCERTO cities' residents and stakeholders:

- ✘ identify with their district (CONCERTO area) and are proud to live or work there;
- ✘ appreciate the changes brought about by the CONCERTO initiative;
- ✘ are satisfied with the better image of the district / block of flat;
- ✘ welcome the higher comfort levels;
- ✘ are positive about the perceived effects and planned measures because of expected overall economic benefits;
- ✘ value the CONCERTO measures because they enable improvements in the image of the district and help enhance the sense of place and quality of life.

### Coping with the environmental and economic dimensions

Even if the chosen indicators belong to the technical domain, the analysis shows that coupling technical data with flanking social activities is essential for success.

There are cities where high levels of CO<sub>2</sub> emission could be avoided. This is almost entirely due to the installation of renewable energy and polygeneration plants and to a lesser extent to energy efficiency gains on demand side (reduced energy demand in buildings for electricity, heating, cooling). Success on energy efficiency measures in new and refurbished buildings is related to consumption patterns. These require longer time to appear than CONCERTO's evaluation timeline allows for, requiring a change in consumption habits.

It is too early on and there is too little evidence to claim that innovations brought about by CONCERTO technical measures have stimulated the local economy and impacted on the socio-environmental system. The economic impact of CONCERTO measures will take much longer time to appear than social impacts. Measurable data will probably be available by 2011 and therefore it was not possible to draw conclusions on cost effectiveness, new services, increased short-term and long-term employment, increase in property value, etc.

In a number of communities, the influence of CONCERTO measures on energy bills resulted in lower energy consumption. However, due to increased energy costs and tariffs, residents somehow perceived the new heating system as more expensive than the previous one. This prejudice reiterates the need for targeted information and counselling. New heating forms will be more widely accepted if they are presented in a user-friendly way. They must be explained clearly to the tenants, especially the elderly.

Refurbishment activities in blocks of flats, especially retrofitting the building envelope and simultaneously converting individual heating systems to a centralised district heating system sometime poses difficulties in comparing energy bills before and after the conversion. In some cases, there have been misunderstandings concerning the resulting higher standing charge and instalments. As a result, retrofitting measures have faced opposition from residents. Conversely, social activities aimed at generating a sense of empathy and timely information concerning changes in rent and additional costs to be covered by the tenant via targeted information material helped to increase understanding and acceptance.

From a rational choice viewpoint, it can be assumed that people weigh up choices, such as whether to install solar thermal technology or build according to low energy criteria and then act according to their economic advantage. Information campaigns in this case help little to affect decisions. Life cycle cost assessments are only carried out if the investor in the building is also the user. Cost-efficiency rationale, however, does not always play a role. In some cases solar energy has been integrated as a symbolic action to demonstrate sustainability awareness. Proactive engagement by stakeholders has meant that they have provided additional financial resources.

In some cities, economic aspects were analysed in case studies comprising the conditions for investment in the area. The analysis of investment potentials led to the assumption that non-energy-specific potentials outweigh energy-specific potentials. A lesson for policy is that marketing strategies are still based on fundamental site-related factors, such as transport, public infrastructure, market potential, etc. rather than energy-specific factors.

Eco buildings, as well as reducing environmental impact, also create better indoor air quality as well as better thermal insulation, sound proofing, and overall aesthetics than conventional buildings. These aspects, together with the saving potential due to reduced operating costs help promoting acceptance. Little data on cost per square meters could be gathered. Nonetheless it can be inferred that without targeted incentives (fiscal, financial, etc.) the higher investment costs of the buildings remain a significant barrier, hindering future investment.

In summary, an analysis of the **environmental criteria** and of the **3 economic criteria** provides evidence that in a number of CONCERTO cities' stakeholders:

- ✘ appreciate improvements in the quality of life and the reduction in their environmental footprints through CONCERTO measures;
- ✘ perceive a certain stimulation of the local economy through new services, the possibility for new jobs, increased skills through local training measures, increase in the local control of energy;
- ✘ appreciate CONCERTO measures as means to improve or enhance the image and standing of the district and hence increase the property value and local appeal. These factors may help attracting new investment.

### Footnotes

1. See, Di Nucci M.R, Pol, O. et al (2009), *Planning and Implementation Report*, downloadable European Commission's DG ENERGY website at [http://ec.europa.eu/energy/renewables/concerto\\_en.htm](http://ec.europa.eu/energy/renewables/concerto_en.htm)
2. NIMBY is an acronym for "not in my back yard" denoting opposition by residents
3. Some estimates rely upon the CONCERTO Plus technical monitoring, which however only provides preliminary calculations updated in October 2010



