

Participative backcasting: A tool for involving stakeholders in local sustainability planning

Annika Carlsson-Kanyama^{a,*}, Karl Henrik Dreborg^a, H.C. Moll^b, Dario Padovan^c

^aEnergy and Environmental Security R&D Group, Swedish Defence Research Agency (FOI),
Division of Defence Analysis, SE-164 90 Stockholm, Sweden

^bCentre for Energy and Environmental Studies, IVEM, University of Groningen, The Netherlands

^cThe Consortium for Research and Continuing Education, Turin, Italy

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Abstract

This paper reports on the use of a backcasting approach with local stakeholders in five European cities where several Images of the Future were formulated for household consumption in sustainable cities. The aim was to find methods for inspiring local stakeholders to participate in discussions about sustainability with a long-term perspective. Previous exercises of similar kinds have mainly involved experts. A method based on workshops and back-office work was developed and is described and analysed here, together with the results obtained. The outcomes in terms of ideas, votes and dimensions are also discussed. The findings suggest that the method worked reasonably well, with the process quality receiving the highest ratings. The quality of outcomes was perceived as less reliable. Adaptations should include more efforts to recruit participants with varied backgrounds and more innovative approaches for liberating subjects' minds during the time travel stage of the process. The outcomes obtained show that there appears to be a common set of popular ideas for more sustainable everyday city life in the EU, including more local and organic food, a greener environment, better public transport and opportunities for non-motorised transport and reorientation of values. © 2007 Elsevier Ltd. All rights reserved.

1. Scope and aim

Involving local stakeholders in activities aimed at bringing their cities/towns into line with sustainable development has long been considered to be particularly important for achieving the long-term goals of sustainability adopted by many nations. In addition, it is recognised that non-sustainable patterns of consumption, particularly in the richer parts of the world, need to change [1,2]. This was the rationale for a research project partly funded by the European Commission within the 5th Research Framework Programme and devoted to *The Involvement of Stakeholders to Develop and Implement Tools for Sustainable Households in the City of Tomorrow (ToolSust)*. The main objective of ToolSust was to develop tools for environmentally sustainable consumption that could be used in everyday life.¹ Research teams from Italy, the Netherlands, Norway (coordinating team), Sweden and the United Kingdom participated in the project.

*Corresponding author. Tel.: +46 8 5550 38 92.

E-mail address: carlsson@foi.se (A. Carlsson-Kanyama).

¹The emphasis was thus on *environmental* sustainability, defined in a qualitative way as considerable reductions in resource use and harmful emissions. Social and economic aspects were partly taken into account when the stakeholders prioritised among the ideas.

Within this framework, a *participative backcasting* exercise was carried out in five cities; Padova in Italy, Fredrikstad in Norway, Groningen in the Netherlands, Stockholm (District of Södermalm) in Sweden and Guildford in the UK. Here, local stakeholders were involved in discussing sustainability issues related to everyday life. A workshop-based methodology was used in each city to develop images of sustainable life some 30 years ahead. The aim of this part of the project was to develop and test a tool, viz. participative backcasting, for involving and inspiring local stakeholders to work with sustainability issues at the local level. The tool chosen was designed to encourage broad participation, to inspire visionary thinking, and to allow concrete problem solving. In order to accommodate diverging opinions as regards the best way to realise sustainability, the methodology admitted the development of *sets* of Images of the Future.

The aims of the present paper were to (1) describe and analyse methodological experiences and (2) present and compare the ideas for more sustainable lifestyles generated by the local stakeholders in the five cities. The main task of the project was to test the methodology. However, the content of the actual images generated is also of interest, as these images represent a sample of current European stakeholder proposals for a sustainable society and everyday life. Thus they reflect the on-going debate about Agenda 21 and its implementation. The present paper focuses on qualitative aspects of the images. Within the project, calculations were also made of the energy reductions per household in the proposed images compared to current levels. The methodology used for this and the quantitative results obtained are reported by Carlsson-Kanyama et al. [3,4].

Section 2 below provides background to the methodologies used when constructing images of a future sustainable city together with local stakeholders. Section 3 gives a brief account of the actual implementation of the tool in the five European cities. In Section 4, we compare and analyse the outcomes from the workshops in terms of ideas, dimensions and visions. In Section 5, we present the evaluation of the tool as regards *process quality* and *quality of results*. Finally, in Section 6 we draw conclusions about the feasibility and effectiveness of the tool as a means of encouraging lay people and stakeholders to get involved in sustainable development issues at the local level.

2. A tool for involving local stakeholders in planning

The tool consisted of a prototype methodology that included a participative process designed to involve local stakeholders in visionary and problem-solving activities related to sustainable development. The main result was *Images of Everyday Life in the Future Sustainable City*. Initiatives and measures that can be taken at the local level in order to reach such a goal were also identified in the process. Essentially, a backcasting approach [5–8] was used, supported by a process involving workshops for structured brainstorming with stakeholders. The workshop methodology used in the ToolSust project is similar to that developed by Royal/Dutch Shell [9]. The combined approach could be called *participative backcasting* and differs from the more common approach of carrying out the main work in a research group (think-tank approach).

The approach of involving and activating local stakeholders in a visioning process is in line with a futures study tradition inspired by the Dutch historian Fred Polak. In his pioneering work *The Image of the Future* [10], he argues for the importance of visionary images of the future to strengthen engagement and inspire coordinated action among citizens. A study following the principles of Polak was performed in the early 1980s by Elise Boulding and Warren Ziegler [11]. They held a series of workshops with people mainly from the peace movement in order to develop images of a world without weapons and related action scenarios. The aim was to stimulate action among those involved in the workshops (empowerment).

2.1. Brief survey of relevant scenario methodologies

There are several scenario typologies that build on variants of the categories *probable*, *possible* and *preferable* futures [12–15]. Studies dealing with probable futures usually apply *predictive* methodologies, such as forecasting models or trend extrapolations, in trying to answer the question *What will happen?* When

profound changes are of interest, possible futures or desirable futures may be more relevant to study. The corresponding approaches could be labelled *explorative* and *normative*, respectively. In both cases scenarios are often useful, although answering different questions. Explorative scenarios show *what could happen* and normative scenarios show *how a solution to a particular problem might look* [15]. This is a pragmatic way of describing the distinction between the two approaches. Some sources argue that there are more fundamental differences of an epistemological kind between the two. Dreborg [7] maintains that backcasting utilises a teleological understanding of social systems besides causal thinking, while forecasting relies entirely on causal analysis, at least when interpreted as predictive methodology. A similar way of describing the difference between explorative and normative scenarios is by applying the concepts of *push* and *pull* driving forces [16], where push corresponds to a causal analysis and pull to a teleological analysis. However, it is not evident that explorative scenarios only rely on causal or push factors. Furthermore, during the past 10 years or so there has been a tendency to perform more complex scenario studies, e.g. by mixing the explorative and normative approaches [14,17]. A recent example is the extensive scenario work on greenhouse gas emissions [18] and mitigating policies [19] performed on behalf of the Inter Parliamentary Panel on Climate Change (IPCC).

During the 1970s, backcasting studies started to emerge. They typically addressed a perceived societal problem with the aim of finding a real solution, and are therefore of the normative variety. Examples are studies of the energy system and how it could be designed without the use of fossil fuels and/or nuclear power [20]. Recent examples of backcasting studies [21–29] are all related to sustainable transport and/or energy. Household practices have also been subjected to backcasting exercises [30,31].

Backcasting studies are typically addressed to public sector decision-makers but also to stakeholder organisations, the environmental movement, etc. and an interested general public. Often, they are not close to actual decision-making of any specific agent, but have a more inspirational aim of widening the perceptions of future options in society. Furthermore, backcasting studies have often been carried out by interdisciplinary research teams (think-tank model), in which case they cannot be characterised as *participatory*. However, there are examples of backcasting studies that use expert panels in a systematic way in order to get ideas, but also to spread them [32,33]. Furthermore, truly participatory backcasting studies, where the problem-owner or stakeholder groups take an active part in the development of scenarios, are also beginning to emerge. Robinson [17] sees participative backcasting as the second generation of backcasting studies. In the Georgia Basin Futures Project, Robinson applied a backcasting methodology based on interface-driven modelling, where stakeholders could decide on key behavioural relationships and let the model show the long-term implications for sustainability characteristics of society. The user can continue with consecutive iterations until satisfied with the outcome. Thus, sustainability goals need not be determined in advance, but are rather an emergent property. In this way, backcasting becomes an interactive learning tool for stakeholder groups.

Other examples of participatory backcasting exercises involving citizens together with experts are the study by Boulding and Ziegler [11] and studies reported by Green and Vergragt [31] and Street [34].²

The backcasting approach is an example of a visionary mode of thinking and seeks desirable futures. The resulting scenarios typically entail policy measures that are assumed to facilitate development in the right direction. *Scenario planning* is another scenario tradition belonging to the explorative mode of thinking about the future. The focus is on developments external to the intended user of the scenarios—e.g. a company or a public decision-maker. Within this tradition, where Shell has a leading role, a methodology for involving stakeholders in idea generation and scenario building has been developed and successfully applied for three decades [9,35,36]. The format for this involves workshop exercises with elements of brain-storming and clustering of ideas. The aim is that due to the participative approach, the scenarios would be accepted as relevant, intriguing and plausible by those who were to use them. The set of scenarios is then used as a tool for development and assessment of strategies. By spanning and structuring an uncertainty space, the scenarios can improve strategies by making them more robust and/or adaptive in relation to changing external conditions. Thus, it is very important that more than one scenario is developed.

²Street does not use the term backcasting, but her approach shares many characteristics with backcasting, such as creating visions of future desirable states and developing means to reach these states.

Table 1

Classification of scenarios according to design process and the mode of futures thinking (based on [14, p. 26])

Type of scenario	Explorative	Normative (visionary)
Process for developing scenarios		
Think-tank model (sometimes supported by external experts)	1. Aim: inspire thinking in terms of eventualities in society at large or in academia Example: The Year 2000 [37]	2. Aim: inspire visionary thinking and debate in society. Example: The COOL project [33]
Participative model (involving stakeholders or problem-owner)	3. Aim: guide pragmatic policy-making Example: Scenario planning à la Shell/GBN [9,35,36]	4. Aim: inform visionary policy-making and inspire action Examples: The Georgia Basin Futures Project [17] and A World Without Weapons [11]

In the participative workshop methodology of Shell, there is a set of simple rules with the aim of giving equal opportunities to everyone to come forward with their ideas. Another aim of the rules is to create a good climate for innovative thinking. For example, during the idea generation phase participants are not supposed to question each other's ideas or to start a debate, because this may hamper creativity. However, asking for clarification is permitted [9, p. 141]. Oval cards are used to write down ideas suggested by the participants. The ovals are then put on a wall where everyone can see them. This technique permits a convenient clustering and re-clustering of ideas. The exercise is led by a facilitator.³

Street [34] reports on a different participative workshop methodology with its roots in the Technology Assessment tradition.⁴ It was used to increase public participation in policy-making, with special focus on sustainability issues at the local level. Here tentative scenarios were used “as a tool for creating and comparing different visions of the future, and developing a set of local environmental actions” [34, p. 149].

Table 1 gives a classification of scenarios according to the design processes applied and mode of futures thinking (explorative or normative). The ToolSust methodology belongs to box 4 (normative and participative), sharing the participative workshop technique with the Shell/GBN (Global Business Network) tradition in box 3.

2.2. The methodology chosen in ToolSust

In the ToolSust project, we chose to integrate a participative workshop methodology, inspired by the explorative Shell tradition (scenario planning), into the backcasting approach. As in scenario planning, we designed the methodology to admit several different scenarios (Images of the Future), but the reason for this was different. In scenario planning, the use of sets of scenarios is important because the aim is to cope with broad uncertainty related to external developments and to promote robust strategies. In the participative visioning work of ToolSust, the possibility of several different Images of the Future was seen as means to cope with the rather likely possibility of differing opinions and values among the group of stakeholders as regards how sustainability should be implemented. Although a common vision would be a desirable outcome, the tool could still fulfil its mission of inspiring local engagement among stakeholders even if the process resulted in several alternative Images.

A prototype method was first developed and applied in Stockholm/Södermalm by the Swedish research team. Based on a preliminary report from the Stockholm exercise and guidelines suggested by the Swedish team, the other partners then carried out similar workshop projects in their respective cities/towns. Each team brought their experiences and knowledge to the process, thereby refining and diversifying the proposed method. Every team drafted their own report [3,40–43].

³There are other similar techniques such as the Oval Mapping Technique (OMT) developed for the Strategic Options Development and Analysis (SODA) by Eden during the 1970s [38, pp. 302–320]. Another example is Metaplan, developed in Germany [39].

⁴“Essentially TA is the activity of describing, analysing and forecasting likely effects of technological change, the main purpose of which is to provide an input to technology policy making” [34, p. 145].

The prototype method tested had five distinct steps, namely:

- (1) Recruiting stakeholders for the first workshop.
- (2) Carrying out a first workshop with stakeholders during which ideas were generated, clustered and voted for.
- (3) Back-office work where images were formulated and energy reductions were calculated.
- (4) Recruiting stakeholders for the second workshop, mainly reminding those who attended the first workshop to come back.
- (5) Carrying out a second workshop with the stakeholders at which the Images were evaluated and paths to reach them were analysed. The participants were also asked to evaluate the entire exercise on this occasion.

3. Implementing the tool in five European cities

3.1. Recruiting stakeholders and conducting the first workshop

Recruiting participants for the workshops did not aim at a representative sample of the population. Instead, the idea was to involve people who felt committed to the local society and who considered environmental and futures issues to be important. Furthermore, by local stakeholders is meant residents as well as grass-root movements, various professional groups, NGOs, etc. For the recruitment, the project teams mainly used informal methods, such as personal contact, local advertisements, having a booth at a local shopping mall, personal invitations by letter and telephone. In the contacts with potential participants, the focus question was *How will everyday life in your city be carried out in a much more environmentally friendly way 30 years from now?* We emphasised that expert knowledge in environmental issues was not needed but rather a commitment to the city and an interest in environmental questions. The number of participants recruited for the first workshop varied between 12 and 20.

The first workshop aimed at producing thematic clusters of ideas on how a sustainable city might work around 2040. In four of the cities, the work proceeded in four steps: (1) Introduction of aim and workshop methodology; (2) idea generation; (3) clustering; and (4) prioritisation by voting on the most and the least desired ideas. The method was first tried out in Stockholm and then copied in three other cities, Padua, Groningen and Fredrikstad, albeit with some minor alterations to fit local circumstances. In Guildford, a somewhat different procedure was used.

The Stockholm model was to use a whole day for the first workshop. Firstly, the participants were given an explanation of backcasting and then they were asked to travel ahead in time and to imagine that they had arrived in Stockholm during the year 2040, where life was much less resource-demanding and more sustainable than now. They were asked to think about what they could see in terms of everyday life. How did people travel, what did they eat, how did they shop, etc? The teams used some images to spur imagination and everybody was given some time for personal reflections and to jot down impressions from that time travel.

After this phase, a methodology inspired by Shell and GBN was used. This meant that the facilitator asked all participants in turn to mention one of their ideas. One to two team members, who took down the ideas on labels and put them on the wall, supported the facilitator. The group performed the clustering of ideas, and here discussion appeared. After the clustering, there was time to ponder over the results and to add a few complementary ideas. For the voting each participant received six green dots (for highly valued ideas or clusters) and three red ones (for unpopular ideas or clusters). The process resulted in a rich harvest of ideas, further discussed in Section 4.

3.2. Back-office work

The respective teams did the work of creating scenarios based on the clusters of ideas back-office. In all cities the deductive methodology was applied [9]. In short, this means that one tries to find two key dimensions in the material (clusters of ideas) that can be combined to form a grid of four quadrants, each representing one scenario (skeleton). Sometimes one may take the two clusters that received most votes and try to find a polarity in each, which are then expressed as dimensions. This is not always easy, as testified by several teams.

However, all project teams managed to make a ‘scenario cross’ that they found interesting and also reasonably true to the material generated at the workshops. One example from Groningen of how the back-office work proceeded is given below.

In Groningen, two persons spent almost a day discussing the ideas, to identify dimensions and arrange the ideas in scenarios in accordance with these dimensions. During that day, interaction also took place with members of the Swedish team to check the preliminary findings with regard to the dimensions and the corresponding scenarios. The polarity green versus compact was derived quickly from the ideas produced during the first workshop. Several polarities were additionally considered, but all were only able to address a subset of the ideas. Finally a complex polarity, Village versus Metropolis, was able to discriminate between the majority of the ideas. This polarity is partly based on the view of a future city: on one hand a quiet, simple, introvert, small-scale city functioning as a regional centre and on the other a busy, challenging, expanding and substantially outgrown city functioning as a European centre of culture, commerce and education. After the identification of the two main dimensions, four scenarios were defined and the ideas were easily allocated to these scenarios.

After identifying the scenario cross, the respective teams created 3–4 visions to fit it. For each city there were thus several visions about a future and sustainable city portraying the many different ways in which resource use can be lowered. All five teams in ToolSust appeared to have enjoyed writing the stories and none reported troubles when completing this phase.

Calculations of energy reductions in the different images were also carried out with the help of previous estimates made by the energy analysis programme (EAP) and additional assumptions, see further reports by Carlsson-Kanyama et al. [4,44].

3.3. Recruiting stakeholders and conducting the second workshop

Several teams thought that the relative success of the first workshop would make the participants come to the next event with little effort. However, the e-mail invitations that the teams relied heavily upon were not sufficient to achieve this and the number of attendees dropped compared to the first workshop.

The second workshop had a more conventional format than the first, with *presentations of images, discussion and critique* followed by (group) *discussions on policy measures* promoting a development that led to the Images of the Future. The set-up was slightly different in the five cities with more or less emphasis on policy measures. In Stockholm, the second workshop took place during one evening. The teams presented the four different images, a description of which had been sent to the participants beforehand. There were discussions about the realism and consistency of the visions and then participants were asked to choose the vision they preferred and discuss policy measures with other participants. In Groningen, the second workshop started with presentations concerning the scenarios and with discussion of the scenarios. After that, three groups were formed to elaborate each scenario to a policy programme.

4. Outcomes

The outcomes from the 10 workshops in five different cities and the respective back-office work were a number of ideas, clusters and votes, as well as dimensions, images and energy reduction calculations. We present and discuss these outcomes with the focus on identifying how popular or unpopular certain ideas related to sustainable everyday life may be in a European context.

4.1. Ideas and votes

A record of the total number of ideas and clusters from the five workshops is shown in Table 2.

Many ideas generated could, if implemented, directly influence energy and other resource use. These ideas concerned topics such as diet and food purchases, transport and mobility, the built environment and waste handling. Suggestions in these areas are easily translated into changed environmental impacts in terms of, e.g. reduced need for transportation if more food is produced locally, reduced use of petrol if more people cycle instead of using a car and less need of material extraction if more material is recycled. However, many

Table 2
Number of ideas and clusters in the five workshops

	Number of clusters	Number of ideas	Number of ideas/participant
Padova	8	97	8
Guildford	14	132	8.8
Groningen	9	87	5.4
Fredriksstad	12	106	5.3
Stockholm/Södermalm	13	105	7

ideas that were put forward during the workshops were more subtle when it came to their potential for reducing resource use and pollution. However, they are equally important as they portray aspects of sustainability considered very important by stakeholders, namely democracy, ethics and education, in other words they represent the social dimension of the sustainability discussion.

Ideas about *food and diet* appeared in all the cities as possible solutions for a more sustainable city life. There were many similarities between the proposals and some of them appeared in several cities. Those that appeared very often included more local foods, sometimes including proposals for city farming and more organic foods and seasonal foods. More contact with the producer was another common proposal. Proposals about food were mostly given green dots, indicating a high acceptability for this type of measure. The most popular proposals in all the cities were those related to more natural/organic and local food. Proposals for vegetarian food were less well supported, but not voted against. The overall impression is that local and organic/natural foods are attractive options, while vegetarian and seasonal food are acceptable options. Previous surveys within ToolSust has shown that households highly value information about the origin of food and that an important reason for buying organic food is that it is perceived as healthy and good for the environment [45].

Ideas about *transport, mobility and traffic* were many in all cities. ‘Better and cheaper public transport’ was a common proposal and that included suggestions regarding shuttle buses, trains that stop at local stations, public transport for free, cable cars, rapid transport systems, clean and silent public transport and dense and frequent public transport to give some examples. The ‘Economic instruments’ issues included taxes on aviation and fuel, road tolls and congestion charging. For ‘Encouraging non-motorised transport’ a number of suggestions were put forward, such as bicycle parking places outside shops, a pool of bicycle carriages, a network of cycle tracks between communities and free walking and cycling lanes without reducing obstacles. ‘Ecological long distance travel’ included proposals for holiday trips by balloon and magnetic levitation high-speed trains, as well as more use of railways. During the voting, it became clear that proposals about better and low-cost public transport and better opportunities for non-motorised transport were popular, while restrictions in car use and travel patterns were more controversial and they were not always suggested.

The most commonly proposed ideas about *housing and the built environment* were related to a greener city, a city with more accessible public space, and a city where energy is collected in or on buildings with the help of solar cells or solar panels. Other proposals common to several cities were a more compact city with higher buildings and denser structure, a cleaner city, a city with more energy-efficient buildings, a city with lower temperature indoors and a city with more co-houses. The voting revealed that several of these proposals seem popular, such as a greener city and a city with buildings designed and equipped for energy collection. In two cities, Stockholm and Groningen, proposals about a more compact city were controversial and there the structure is already quite compact. This shows that the existing city structure is an important determinant for what can be considered a sustainable solution. The ideas that provoked the participants substantially included those about restrictions in construction, lower indoor temperature and more co-houses. The first two ideas limit freedom in choosing housing and indoor climate and can be understood in the context of opposition to restrictions on consumer demand. The opposition to the proposal about co-houses is more difficult to understand. Perhaps it challenges the ideal of the nuclear family.

As a reflection of the high awareness of the environmental implications of waste reduction and the high engagement in sorting in all the European cities [45], proposals for *waste handling* appeared in all cities, albeit

in different numbers. The most frequent ideas about waste were those for more and easier recycling, less packaging and especially less plastic packaging, more second-hand goods and re-use and repair, as well as energy recovery from waste. These ideas are related to a two-fold strategy for reducing environmental impacts from waste; reduction at source and efficient handling of whatever wastes that are still produced. Most votes for waste ideas were green, with few negative ones.

Some highlights from the ideas related to *social sustainability* were the numerous calls for a changed lifestyle and ethics regarding consumption that implied less emphasis on material goods and more on human relationships. In Fredrikstad there were proposals that shopping should not be a social meeting point and a very popular idea in the same city was that there should be a ‘revolution of values and ethics’. In Padova, a supported idea was that one should ‘listen to human voices’ to a greater extent. All these ideas have similarities in that they indicate a wish for a society with less emphasis on material possessions and individualistic values and more emphasis on some not so well-identified new values that differ from those of today. In this context it is interesting to note that the only proposal for more religious values, suggested in Fredrikstad as ‘the ten commandments’, was controversial and voted against heavily. The need for a new orientation of values seems to be deeply felt but how to voice it remains a vague but important or controversial theme from the workshops.

While many of the ideas related to lifestyle and ethics mentioned above were uncontroversial, more controversial ideas appeared in the area of demography, family planning and household types. In Fredrikstad, more religious values were suggested as mentioned above and that, together with ideas put forward about ‘stable nuclear families’ and ‘reduction in divorces’ created a stir during the idea generation. In Guildford, a proposal of ‘euthanasia’ got seven red dots and a proposal about ‘compulsory sterilisation after a certain number of children’ got a record of 10 red dots. So demography issues in a future sustainable EU city should be handled carefully with no restrictions on individual freedom and acceptance of various family types.

Under the topic of democracy, there were numerous suggestions in all cities and they all boiled down to an increased role for local democracy and a more bottom-up and participative approach in decision-making. Examples were: space and time for meetings, revitalised local politics, local democracy fully developed, bottom-up approach, multi-language politics, local and participatory democracy, social mediation, direct democracy, power to local communities, close dialogue between politicians and citizens. Local democracy seemed indeed to be considered a very important issue in the sustainable future city.

4.2. Dimensions and images

The dimensions that emerged from the five teams working back-office between workshops are listed in Tables 3 and 4.

Four underlying regimes (*use of space, values in everyday life, organisation of society, efficient and cleaner technology*) are represented in the dimensions and they were related to how space is used, the dominating values in everyday life, how society is organised and the role of technology.

The *use of space* regime was strong enough to be the basis for its own dimension in two cities, Groningen and Stockholm/Södermalm. These were the two most compact cities and here use of space was partly a controversial issue. In Stockholm, one end of the spatially defined dimension (the Green option) included a

Table 3
Dimensions identified by the five research teams

	Padova	Guildford	Groningen	Fredrikstad	Stockholm
Dimension 1	Multi-culturalism versus Localism	Global versus Local	Green versus Compact	Urban versus Local	Green versus Manhattan
Dimension 2	Individualism versus Collectivism	Top-Down versus Bottom-Up	Village versus Metropolis	Modern versus Traditional	Organisation from below versus from above

Table 4

Overall evaluations by the stakeholders of the two workshops when responding to how true certain statements are. 1 = Do not agree at all and 5 = agree fully^a

Question	Mean score			
	Guildford	Groningen	Fredrikstad	Stockholm
The meetings opened up new perspectives for how one could live in the future	4.0	3.3	4.0	3.3
The meetings opened up new perspectives for how one can think about the future	4.0	3.8	3.9	3.8
The meetings contributed to new and valuable contacts within the city	3.7	3.8	3.6	3
The meetings contributed to more knowledge on environmental issues	3.8	2.8	3.5	3.3
The meetings contributed to me living in a more environmentally friendly way from now on	3.7 ^b	1.8	3.3	2.5
The meetings contributed to me becoming more engaged in environmental issues	3.7 ^c	2.2	3.4	3.3
The meetings contributed to me becoming more engaged in issues related to the future	–	2.8	3.9	3.2

^aIn Padova the questionnaire to the stakeholders was not used.

^bIn Guildford this question was put as: participating in the workshops has encouraged me to live more environmentally friendly.

^cIn Guildford the question was put as: participating in the workshops has encouraged me to become more engaged in environmental issues.

halt to the expansion of the built-up areas. Instead, spaces were converted from being parking lots and roofs into plantations, gardens and shrubberies, increasing possibilities for locally grown food. At this end of this spatial dimension there was no demolition of existing housing stock, so people would still be living in the same housing, predominantly in flats. At the other end of the Södermalm spatial dimension was the Manhattan option, with a denser city with higher buildings where terraces and roofs are covered with solar cells and solar panels and with numerous dwellings on boats. As a consequence, the city becomes less segregated with less exposure to greenery and agriculture.

Values in everyday life was a strong regime and present in all the cities. In Padova, it constituted one of the main factors for creation of both dimensions used for this city, called Individualism versus Collectivism and Multiculturalism versus Localism. At the Individualistic end, life was lived in single-family households with little or no contact with other people, while at the other end contacts between neighbours and colleagues were frequent and use of common space for meetings and gatherings was an everyday feature. The dimension Individualism versus Collectivism considers the dilemma that exists between private and collective interest. In the dimension called Multicultural versus Localism, values tended towards universalism at one end as opposed to those tending towards seclusion at the other. As a result, global solidarity was part of everyday life at the Multicultural end, while racism dominated at the Localistic end.

The regime about *organisation of society* influenced, among other things, one dimension from Guildford and Stockholm. Here, the dimension Top-Down versus Bottom-up included changes towards sustainability initiated by the government, business and other large-scale organisations on one hand (Top-Down end) while the Bottom-Up end implied that the principal responsibility for sustainability has been taken at the level of individuals and households. In the Top-Down end, legislative and economic forces had been instrumental for this change while in the Bottom-up end, education has fostered a value change.

More efficient and cleaner technology is an aspect in many of the proposed dimensions but there are differences in how important it is and which technologies are in use. The latter issue is partly a reflection of dominant values and how society is organised. In Fredrikstad, the focus in the Modern versus Traditional dimension was partly on which kinds of technologies are used, with the more futuristic ones at the Modern end. Examples of such solutions are solar cells, systems for adjusting food intake to a regularly updated health profile, video conferences, car-pooling, and internet newspapers by computer and electrical buses. Technologies in the Traditional end were merely an upgraded version of today's solutions exemplified by cars run on hydrogen cells and district heating.

Four images for each city were constructed and they were named after their positions in the scenario cross which could be constructed once the dimensions had been identified. Several teams used pictures to portray the characteristics of the visions that required names, such as *Modern and Urban* (Fredrikstad), *Together on Green Söder* (Stockholm) and *Organised Communities* (Guildford). The energy reductions calculated for each one resulted in a decreased used per household of 19–57% compared to now [3].

5. Evaluation

5.1. Evaluation by the stakeholders

The evaluation covered aspects of process and products. The *first workshop* was evaluated regarding the degree to which the participants felt that they were able to express their views and were listened to during the whole process. Scores were high in all cities, more than 4 on a scale from 1 to 5, where 1 indicated disagreement with the statement and 5 total agreement. The same workshop was also evaluated for the degree to which the process was inspiring and informative. Here the scores were more varied but never lower than 3.3 on a scale from 1 to 5. The Guildford workshop model was also appreciated for its process and content, the lowest score on any questions was 3.9. The general pattern is thus that people felt they were listened to a very high degree but the scores for inspiration and informative value were somewhat lower, though acceptable. It is worth noting that in Groningen, the participating politicians were quite positive about the rule that no argument was allowed during the idea generation. This was liberating, they thought, and promoted the creative process.

The *second workshop* also got high scores for the degree to which participants felt they were listened to, from 4.4 to 4.7 on a scale from 1 to 5. The extent to which the presentation and discussion of the images was regarded as inspiring got scores from 4.0 to 4.3 and the participants also thought that the time allocated to it was suitable. The discussion on how to achieve the images, i.e. the policy measures, was seen as more moderately inspiring, with a scores ranging from 3.6 to 4.4.

At the end of the second workshop, the stakeholders made an *overall evaluation* of the two workshops by responding to seven prepared statements about the meetings. Some of these had to do with the intended results and some had to do with other unintended but plausible results. As shown in Table 4, the most positive result was for the question about the extent to which the meetings opened up new perspectives for how one can think about the future. In this question both the processes and the products were evaluated and were graded from 3.8 to 4.0. One of the main intended results was to open such perspectives to the stakeholders and the evaluation showed that the method worked rather satisfactorily. Another of the main objectives was to stimulate new thoughts about how one could live in the future and here the most positive results were obtained in Fredrikstad and Guildford, with 4.0 on average, while the stakeholders in Stockholm and Groningen graded it 3.3 on average. On this point, the method needs to be improved.

Concerning the unintended or secondary results, the extent to which the meetings contributed to new and valuable contacts within the city was lower in Stockholm than in all the other cities, perhaps reflecting the differences in city size. Concerning the extent to which the meetings contributed to better knowledge about environmental issues and living in a more environmentally friendly way, the results differed. In Guildford these two questions were phrased in a slightly different manner than in the other cities, so it is difficult to compare results fully.

Comments made in connection with the overall evaluation were related to the amount of inspiration the stakeholders got during the workshops but also to whether they considered themselves as already living in quite an environmentally friendly way and not being able to do much more to their opinion.

5.2. Comparing the ToolSust method with other approaches

Two examples of other studies that formulate images of the future with a participative approach are the COOL and the SusHouse projects. The COOL project studied sectors (such as industry, transportation) using

sector directed backcasting approaches with mainly sector-bound stakeholders. Several discussions about the potential implementation of measures were organised [29]. The SusHouse project analysed the long-term feasibility of sustainable household practices on some household activity domains (e.g. food, clothing and washing). Potential sustainable scenarios were derived for some important household activities with the help of a mixture of backcasting and forecasting techniques. Workshops were used with specialists and general experts in order to combine expertise and creativity in the development and the assessment of the scenarios [46]. In contrast with ToolSust, COOL and SusHouse did not involve local stakeholders and citizens in the workshops, nor did these projects carry out systematic evaluations of the workshops. Furthermore, in COOL and SusHouse the scenarios were mainly described with facts and not with texts about everyday life in each vision as in ToolSust.

The Value II project of the CEC, reported in Street [34], is a project with many similarities with ToolSust when it comes to approach and aim. It engaged local stakeholders including citizens in workshop activities, it aimed at developing a participative tool for involving citizens in sustainability planning at the local level, and it carried out a systematic evaluation of the workshop methodology applied. However, there are also a few differences. In the Value II project, the participants in the workshops represented four categories, viz. policy-makers, residents, the private sector and technology experts. In ToolSust, technology experts were mostly lacking, and policy-makers were not involved in all cities. Another difference is that in the Value II project, four scenarios describing possible arrangements for future urban living were used as input to the visionary workshops, in order to stimulate thinking. As to results, the ToolSust evaluation showed that the workshops worked very well as a process tool, while the results in terms of stimulating new ideas were rated somewhat lower, although adequate. In the Value II project, the workshop tool was ‘more or less viable’ [34, page 154], while the workshop rated highly in terms of being interesting, educational and motivating. In both projects the link to actual decision-making was felt to be weak among some participants, even though local policy-makers took part in the Value II workshops. The weak link between decision-making and citizen participation has been recognised in Sweden, where public opinion usually enters into the planning process at such a late stage as to have a minor influence on actual outcomes. This has prompted some Swedish authorities to explore new methods for involving citizens already at the very early stages of planning, an example being dialogue.

6. Concluding remarks

The workshop-based methodology used for participatory backcasting with local stakeholders worked reasonably well, but should be improved in certain aspects. The *process quality* of the workshops (‘listened to’, etc.) seemed to have been quite high, possibly with the exception of Padova. The *quality of results* (ideas, clusters, images, ways of reaching the images) was more uneven. Norway and the UK rated highest.

Some refinement of the participative process is needed to further improve the method. Most importantly, efforts should be devoted to recruiting participants with varied backgrounds, expertise and value orientations, a more innovative approach should be used for liberating the mind during the time travel and more use should be made of images, etc. when presenting the Images of the Future. It is also important to improve the path analysis and when the method is used for real, there should be a plan for continuing the work and linking it to the local planning processes.

There is a common set of popular ideas for more sustainable everyday city life in the EU. Examples included more local and organic food, a greener environment, better public transport and opportunities for non-motorised transport and a reorientation of values. It is important to recognise these ideas at every decision-making level in the European Union.

The potential energy reductions related to household consumption were substantial (up to 50% of the present level) in the images of the future sustainable cities. However, there is evidence that even if all popular ideas for sustainable city life were implemented and even if much more efficient technology than today were used, the energy reductions per capita would not be sufficient when long-term goals such as a 66% reduction are considered. The challenge to find solutions to this dilemma is enormous. It includes reconsidering the use of urban space and technology, values in everyday life and how society is organised.

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