

Chapter 2

Limitations and Necessities

2.1 Backcasting

There are three basically different categories of future studies, each answering different types of questions. These are the Predictive (What will happen?), the Explorative (What could happen?) and the Normative (How can a certain goal be attained?).¹

It is the last category that informs this book, the type of futures study that has specific goals to strive for. In some cases these goals can be fulfilled simply by making the right decision or if the existing development pattern continues on the road taken. In such situations it is perhaps suitable to use “preserving normative scenarios”. They are preserving in the sense that they do not challenge the existing development trends and are empty of larger surprises. In other cases the picture may be considerably darker and only small indications exist suggesting that the goal will be reached at all. In such situations, it might be necessary to utilize “transforming normative scenarios”. They are transforming in the sense that they look for or demand larger changes in order to attain the chosen goals.²

Transforming scenarios are also relevant when facing community problems of such type or size that it is difficult to see how they can be solved as they are so strongly tied by current conditions. When the purpose is to provide supportive information for developing more long-term, stable solutions to the problems, then new approaches are called for. These can in turn give birth to new ideas for solutions that surpass the frameworks set by today’s conditions and trends. This book can be seen as a transforming normative scenario study with a focus on visualizing the shape of solutions for the stated problems and a subordination of the measures needed to reach solutions.

The question of sustainable development is of such character as to make it essential to develop thinking towards more long-term, stable solutions. Research in this area is based on the insight that if the economic growth on the current model

¹Börjeson, L. et al. “Scenario types and techniques”, 2006.

²Ibid.

continues, there is a risk that the eco-system will be undermined and other resources depleted. Managing a global, social and economic development is no small task in itself. Then add to that the simultaneous necessity for preserving the production capacity of the eco-system while leaving the resources basically untouched for future generations and the task becomes much larger. Many of the current environmental measures only ameliorate the problems, creating some sort of sustaining defense, especially since they are isolated and usually lack relationship to the size of the change needed to attain a sustainable development.

One way to handle long-term questions such as sustainable development is to use the backcasting approach. As a transforming normative scenario, the backcasting approach asks that images of the future be developed that point to the attainment of a specific goal. Thus these images are already expressly normative in the problem formulation. Images of the future have a very prominent place in such studies. They illustrate how central parts of the field being studied can appear in some, rather remote future. The method is defined by an effort to liberate the design of the images of the future from today's mental straitjacket and dominating trends. At the same time they try to view significant parts of the ambient world as impressionable. When analyzing the possibilities for attaining a goal placed beyond trend-driven developments it is important not to fix external factors too tightly. Otherwise there is a danger that the developmental possibilities will not be revealed and observed.³

The backcasting approach has been used since the 1970s for several larger future energy studies, both in Sweden and in other countries, though it was not named until the 1980s.⁴ During the 1990s it was mainly used to study sustainable development of various segments of society, such as the transport sector or urban areas.⁵

The most critical step in the backcasting approach is describing one or preferably more images of the future, each one illustrating ways to solve a larger societal problem. Naturally these will not present a complete picture of the future, but comprises a focused presentation of certain significant traits in the community of the future that are seen as especially relevant to the societal problem being studied.

There are several variants of backcasting. The one used here can be named target-oriented backcasting. It consists of four steps.⁶

³Höjer, M. What is the point of IT? 2000a and Dreborg, K. H. Scenarios and structural uncertainty, 2004.

⁴Johansson, T. B. et al. "Sweden beyond oil: the efficient use of energy", 1983; Kaijser, A. et al. Changing direction: energy policy and new technology, 1991; Lönnroth, M. et al. Solar versus nuclear, 1980; Robinson, J. B. "Energy backcasting", 1982 and Steen, P. et al. Energi – till vad och hur mycket (Energy – for what and how much?), 1981.

⁵På väg mot ett miljöanpassat transportsystem (Towards an environmentally adapted transport system), 1996; Transport and environment, 1999; Steen, P. et al. Färder i framtiden (Journeys in the future), 1997; Åkerman, J. et al. Destination framtiden (Destination future), 2000; Metz et al. "Climate options for the long term", 2003; Åkerman, J. and Höjer, M. How much transport can the climate stand?, 2006.

⁶Similar versions of backcasting have been described in Dreborg (2004) and Höjer, M. and Mattsson, L. G. "Determinism and backcasting in futures studies", 2000.

The *first step* is to establish criteria and goals. In this study we choose criteria for sustainable resource use, as we mean that these are basic components in the sustainability concept and own a more absolute character than those criteria that can be formulated regarding social and economic development. This means that we accept as given such biophysical parameters as a finite world, complex ecologic interdependencies and the laws of thermodynamics. Rather we investigate how non-biophysical parameters such as technology, preferences, distribution systems and ways of living can be adapted to the frameworks established by complex biophysical systems that our societies are based on. What are accepted in our analyses are the physical, quantitatively defined, resource-based entities, as opposed to what we vary in our search for a sustainable city, namely the qualitative aspects of human activity such as housing related structures, institutional set-ups and household living patterns.⁷ The criteria for sustainable resource use are easier to quantify than social and economic sustainability criteria. This means that clear requirements can be placed on a system, something that facilitates the search for creative solutions. What we are looking for are solutions that satisfy the resource criteria and also vital aspects of the social and economic dimensions of sustainability. As we develop the images of the future, we have taken the importance of these dimensions into consideration by varying the social and economic conditions between the images. In addition, the social and economic dimensions play an important role in the evaluation of our work. The goal is to develop images of the future that are as attractive as possible from a social and economic point of view, but under the condition that each of them must fulfill demands on ecological sustainability.

The *second step* is to investigate if the goals and criteria formulated are far from today's situation or rather simply those values that forecasts of the future development provide. Should the goal and the trend development agree, the discussion is not about some large, hard-to-handle societal problem and therefore the analysis work can be discontinued.

Should this not be the case, the *third step* begins, namely developing images of the future. This work is based on analysis of the most important factors or powers behind the development today, meaning those factors that have created the societal problem, as well as those factors that could promote future solutions. This then forms the basis for choosing themes for images of the future. The choice of characteristic qualities for these images is a critical moment in this work. The qualities we have seen as critical are directly linked to the resource use of urban residents and determined by a combination of the possibilities provided and choices made within or at the limits of available possibilities. This done, the images of the future can be described as solutions that either attain the established goals or satisfy the formulated criteria. This work takes into consideration the consequences of other aspects than those included in the criteria or goals. It is at least as important to judge the attractiveness of the images from social and economic perspectives.

⁷See Daly, H. Beyond growth, 1996, for an in-depth argument for this perspective.

The results of this work are then presented for discussion by all parties concerned. Thus the relevance of the images can be tried and supportive comments received for use in the next step of the work with the images of the future.

In the *fourth step* the implementation paths to reach the images of the future are analyzed. By studying today through the images of the future, it is possible to determine the change needs and thus what choices can be important to make in the near future in order for a given image to be implemented. Identifying the trend breaks or reversals that are necessary and how to stimulate this is essential. The task is not to develop a plan for the future societal development. Rather the purpose here is to make it probable that a radically different society is possible.⁸

The images of the future are important for showing the possibilities in situations that easily can seem hopeless. It is premonitions that important goals will not be attained that justifies backcasting studies. In other scenario studies the effort is often to develop scenarios that are very different from each other. It is sometimes said that the aim is to span the credible range of possibilities, an expression that suggests a desire to cover all possible developmental bases. Backcasting, on the other hand, seeks to show how solutions to very difficult problems might look. Just this focus on difficult problems means that the differences between the various images of the future are seldom seen to be as large as the difference between the existing situation and the group of images. The reason is that the hard problems being focused on tend to place requirement on change in a certain direction, a change that then affects all images of the future.

2.2 Shared Traits and Differing Dimensions in the Images of the Future

As the discussion above has shown, the images of the future hold a central position in the backcasting work. Each presents a different way to satisfy the goals. Thus one important question is what is varied and what remains constant between the various alternatives.

We are not working here with assumptions for political or economic systemic changes. The differences we assume in these areas are not of such dignity that they affect the result in any significant ways. Our overall assumption is that the current world order will continue, though with certain tangible shifts in the economic activities and thus a resulting adjustment between the various continents. We see this development mainly as a continuation of current trends that have resulted in a concomitant adjustment over the most recent 4 decades, even though all parts of the

⁸The approach is discussed in Dreborg, K. H. "Essence of backcasting", 1996; Höjer, M. Telecommunicators in the multinuclear city, 2000b; Robinson, J. B. "Futures under glass", 1990; Quist, J. and Vergragt, P. Past and future of backcasting: The shift to stakeholder participation and a proposal for a methodological framework, 2006.

world have not been involved, most specifically Africa south of the Sahara. It is naturally possible and perhaps even probable in some ways that the economic and social turbulence during the last half century will have immense effect on human environmental actions and thus on the possibilities for realizing various types of images of the future. However, these are not major questions in this study.

All six images of the future share one facet, namely that they are localized in the Greater Stockholm area.⁹ We have placed the images in the Stockholm geography and demography in order to gain a stronger coherence than would have been the case if they had been designed for non-specific cities, places and populations. Such coherence can obviously be driven too far making it difficult to draw any general conclusions. However, we do not feel that this danger is especially large. The images ought to be understandable and the report be studied with understanding by both those who have and those who lack knowledge of today's Stockholm.

The images of the future are prepared for year 2050, and are compared with statistics for Stockholm year 2000. The choice of temporal perspective represents a balance between two considerations, namely providing space for large changes on the one hand and the possibility for imagining and sensing the contours of the future society based on today's on the other. In most studies, 50 years is a long temporal perspective. It is even unusual for future oriented societal studies to look farther ahead than that. However, we believe that this longer time perspective is essential for studying lethargic complexes such as urban structures, as well as the action patterns and time use of households. A shorter perspective would not provide the freedom of thought that is a necessary condition for discussing larger changes.

Looking back some 50 years we can see that the mass use of cars had not yet begun in Europe. The conditions for the enormous spread of housing in and around our cities were not yet in sight. Suburban spread still depended on public, frequently track-bound transport means that kept the exploitation low. Half a century is the period in which a long, economic wave based on the car and the closely related single-family home could mature and reach saturation. It is also the temporal frame in which a new, restructured economic wave can grow and be accepted. It is possible that the changes between 1950 and 2000 seem exceptionally great, but in a book on Stockholm's environmental history it is shown that the differences were great between 1850 and 1900 and between 1900 and 1950 as well.¹⁰ But 50 years is not a magic period. Much of what we are discussing can just as well happen in 40 or 75 years. A more rapid change would reduce the environmental damages and ensure that repairs need not be as comprehensive. The reverse is true if the transformation takes more time. But for our analysis there is no numeric magic in the number 2050.

The population growth or urbanization pace is one material characteristic and an important factor that must be integrated into the analyses of the sustainable city.

⁹Greater Stockholm comprises Stockholm County except for Norrtälje, Nynäshamn, Södertälje and Nykvarn municipalities.

¹⁰Pettersson, R. (ed). *Bekvämlighetsrevolutionen* (The convenience revolution), 2008.

A population growth carries with it challenges for satisfying the needs of the new residents when it comes to housing, facilities, transport and other infrastructure items. But it also brings opportunities both for utilizing the latest, environmentally most advance technologies, as well as supplementing and supporting existing settlement structures and traffic systems so as to attain a more efficient whole. However, the future population growth has not been varied between the different images of the future since we want to test the conditions for the various spatio-temporal solutions under constant conditions. In establishing future growth in the Greater Stockholm region we have utilized the forecasts the Stockholm County Council's Office of regional planning and urban transportation prepared within the framework of the regional development plan 2010.

The assumption regarding how many persons will live in Greater Stockholm in about 50 years is a central factor in formulating the urban housing information we face when shaping the images of a sustainable future city. Studies of urbanization sequences are unanimous in showing that urban growth varies over time and population growth fluctuates in both short and long-term perspectives. Thus it has proven difficult to forecast except in the rather near future and under stable development phases. Nor is our ambition here to predict the most likely development. Rather we seek to present a frame in which the images of the future are not unlikely and which at the same time holds challenges for the urban adventure in the nearest half-century. We have used the alternatives in the Regional development plan as points of departure.¹¹ In Base the average population growth is assumed to be 22% between 2005 and 2050, while in High it is assumed to be 48%, corresponding to a growth between 450 and 950 thousand inhabitants from year 2005. In this book we use a population increase for Greater Stockholm of 700,000, or 44% for the period 2000–2050.

The uncertainty is not as large when it comes to predicting the future median age, but over so long a period as to 2050 it too will increase. Even here we accept the assumptions in the Regional Plan. A varied growth rate means variations in age group distribution. If today's age-specific moving patterns hold, a greater immigration would mean a larger share of children and a concomitant shrinking in the share of older persons.

The future development of employment is another important parameter in urbanization and the shape of the future city, specifically through the construction and localization of work sites. The Regional development plan 2010 assumes that the employment rate will increase in the High alternative and decrease in the Low alternative. We use an alternative in between those, a slightly lower employment rate but with an increased population the number of work places still increases by 300,000 jobs.

While backcasting enables and encourages images of the future generation independent of current trends, it is not totally possible in practice. Each future study

¹¹ Office of Regional Planning and Urban Transportation, 2008, 2009.

is more or less consciously and explicitly a reflection of its time as to which factors may vary and which should be kept constant. Though the numbers of variations in images of the future are in principle infinite, it is hardly practically possible to vary more than a very limited number of factors in one study and still retain lucidity.

The factors we have chosen to vary can be linked to a spatial and a temporal dimension. Having chosen a household perspective, we focus on everyday actions and by emphasizing the importance of temporal and spatial structures, we indicate that the actions are dependent on an urban context.

The environmental load of urbanites is determined by a combination of the possibilities available and the choices made. The action frame is limited by such factors as the physical structures. The transport system and housing qualities play a vital role in deciding which alternatives city residents can choose from, including such factors as local trips and living space. These two account for a large share of the environmental impact of the households. For this reason, the spatial dimension of the urban structure, with the transport system and housing distribution as the most important components, has been chosen as one of the two dimensions forming the basis of the images of the future.

Three different urban structures appear in the images of the future. One, a polycentric structure, has a limited number of large cores growing outside the inner city and in competition with it. In another urban structure, based on the current Stockholm structure with subway and commuting trains, there is a reinforcing development of smaller centers and hubs. The third structure accepts the tendency to sprawl and is thus based on the development of low-rise, villa and single-family houses. We have named these three Urban Cores, Suburban Centers and Low-rise Settlements.

Other factors with decisive influence on the total environmental load are the scope and character of the household consumption. This use is in turn affected by both the economic conditions and the household time use. With strong growth greater consumption and greater investments are possible and thus in principle a larger environmental load. But the increased room provided by investments can also create possibilities for more efficient consumption in the sense that the consumed goods and services have lower energy content per monetary unit. Growth is linked to the size of the collective work effort – it is higher if the average annual work time is longer.¹² Shorter work hours also result in lower income, but at the same time more time for unpaid work. Thus the work time affects consumption both by affecting income and also by influencing activity patterns. We have chosen to let the temporal dimension vary in our images of the future. The variations are described as differences in tempo and contain variations in the work time scope, as well as the consumption room and activity patterns linked thereto.

We use two tempi in the images of the future, namely Fast and Slow. There is no apparent difference in the average annual work time between Fast and today, but

¹²Refer to Långtidsutredningen (The Swedish longitudinal survey) 1999/2000, 2000.

there has been a substantial economic growth. In Slow, the economic possibilities are as large as today, but the average annual work time is shorter.

2.3 Household Perspective

The resources utilized by a community and the environmental load caused by this utilization can either be noted at production or calculated during consumption. Logic shows that it is the same magnitudes. In order for the results to actually be the same, we must keep in mind the following:

1. that certain goods and services are consumed as inputs during production of other goods and services;
2. that a considerable share of the production of goods and services is consumed collectively; and
3. that production for investment on the consumer side appears as a gradual wear during the utilization of infrastructure and other investment goods.

Choosing thus, as we have done, to view urban sustainability from a household perspective does not mean that we feel that the households and their actions are the source of the resource use and environmental load caused by the collective production and consumption. The choices made by the households are important, but a number of institutional conditions outside the control of the households also hold decisive roles for the total environmental load, namely how corporate production, distribution and marketing is designed, as well as how external living conditions of the households are formed, such as traffic systems and housing structures.

There are several reasons for choosing the households as observation interface for the flow of natural resources to the cities. Not only are they the central unit for consumption, reproduction and free time, but they are also an organization where much production takes place. Many different activities are found in the households. All goods and service produced will sooner or later be used by the households, either directly and specifically, such as detergents, energy for lighting and child care, or indirectly and generally, such as the political system for bringing various interests together, the administrative system for handling common concerns (police, fire-fighters and the military), and the infrastructure (systems for transportation of people, goods, electricity, water and sewage). As we see it, the households are the end users of everything, meaning that they produce all final service. This final service is created using various resources. The individual's work is combined with greater or lesser use of machines and other equipment, as well as bartered, bought or publicly supplied goods and services.¹³

Previous historical experiences from the end of the nineteenth and the early twentieth century show that household decisions and actions have played a vital

¹³Gershuny, J. Social innovation and the division of labour, 1983.

role in social change with far-reaching consequences for societal development. The initiatives and efforts by the households have contributed to enabling some of the truly meaningful changes in the industrialized communities, including less illness and mortality, better nutritional standards, higher education levels and greater comfort at home. Their demand for goods and services that only in part were available in the marketplace ensured that these would to a great extent be produced within the households and some of the market demand was aimed at supplementary goods.¹⁴ This role for the households is important in analyzing the sustainability of urban life, not least when pathways to a sustainable city are on the table.

With the household as the observation interface, the frequently ignored informal sector becomes visible and activity shifts between it and the formal sector can be handled, as can technological and social innovations. The decisions made in the households grow in importance as the share of the total consumption necessary for maintaining life shrinks. Thus the household use of possible choices gains in importance. Yet further reasons that a household-based perspective on urban sustainability is preferable to a producer centered one include the facts that the households have closer, more local links to the companies, are more strongly tied to the city, and that images of the future formulated with households and their functionality as a point of departure are easier to concretize and understand. Choosing households as focal point for analyzing resource flows and sustainable urban development stands in agreement with the thought that it is the lives that are to be lived in the city that should be and can be made sustainable, not the city itself.

Thus we can describe the nature resource utilization of urban households in a consequent manner if we take the final service they produce and that is produced for them by public consumption in the form of political, administrative and security services. This final consumption in the households satisfies a number of fundamental desires or needs. Since the households play an active role in satisfying these, it is possible to describe these as household services. The actions of the households and the effects of these on natural resource use will be mapped and discussed based on a separation of these functions into six categories, namely Personal, Residence, Food, Care, Common and Support. An operationalized description of how this has been interpreted in temporal and energy terms can be found in Appendices A and B.¹⁵ These have been chosen since they are important to natural resource use by size and/or growth rate. They are also meaningful in the way people live in the city. They correspond to fundamental household needs, but also takes into consideration the fact that welfare is a function of other factors than just those that satisfy physical

¹⁴De Vries, J. "The industrial revolution and the industrious revolution", 1994.

¹⁵Gershuny (1983), pp. 1f, 67ff divides the household service functions into ten categories: "Food, shelter, domestic services, entertainment, transport, medicine, education, and, more distantly, government services, 'law and order' and defense". These ten are taken from the European System of National Accounts. In the categories we have developed we have removed the transport segment, as this function most frequently serves as a means for satisfying other functions, allocating it instead to the other functions based on the purpose of the trip. The other Gershuny categories have in some cases been combined in order to facilitate the analysis. The Support category has been added.

needs, such as access to transport and mobility, as well as to the comforts of life and opportunities for recreation. This taxonomy is sufficiently flexible to embrace even such things as symbols of belonging or apartness, factors with great importance to individual identity and base in social fellowship.

1. *Personal* identifies a vital, varied category that includes such functions as night sleep, clothing, hygiene, recreation, entertainment, leisure trips and summer houses. It also includes a number of durable and semi-durable goods (TVs, computers, hi-fi systems, recordings, videos and DVDs, books and clothing), consumer goods (tobacco, alcoholic drinks, soap, make-up), and services (public cultural services and personal services). The consumption linked to free time has been growing for a long time, an increase that in all likelihood will continue into the future. Some of the activities are such as to affect the actions of households in the other categories. The goods and services may generate the need for space and travel. This category includes much of what serves as lifestyle indicators.
2. *Residence* plays a central role as an activity arena and gathering point for the household members. The resource consumption includes the residence and parts of its equipment. Residential services and heating/lighting are important components. Other parts are the furnishings (furniture, rugs and textiles) and household services, such as cleaning, maintenance and repairs. Housing expenses have been a heavy post in household budgets for a long time, but their share is beginning to show a long-term reduction. The size and function for the households are factors with high effect on household resource use.
3. *Food* is a category that can be satisfied in different ways, among them through preparation of items purchased using household equipment, through restaurants visits or through the use of a collective dining hall. The resource use comprises not only the actual consumer goods, but also the equipment needed for storage, purchase and preparation of foodstuff, as well as parts of the restaurant and café visits. In the longer term the share of household expenses attributable to food and drink has shrunk drastically. However, it is clear that food and drink have a fundamental role in the everyday life of the households and in societal organization with considerable consequences for the utilization of natural resources.
4. *Care* comprises mainly health care, schooling and various other care services. It deals with an important part of everyday household function, a segment that will most likely increase in importance. A growing share of household expenses and of the national budget will probably be assigned to education, health and other care services. In recent years there have been large-scale discussions of how these services should be organized, not least the role of the informal sector in this context. The temporal and spatial organization of these services can include possibilities for resource effectivization. In this there are large differences between various service types, including the possibilities for using new technology. Certain services can hardly be made more efficient in a conventional sense without losing quality, but in others there are excellent opportunities for keeping resource use at a low level, for example through new ways of using information technology.
5. *Common* includes public utilities such as the political system, defense, police, courts, central and local governmental authorities, as well as county and

municipal administrations. This category also includes participation in political parties, householder associations and neighborhood co-operation. The activities are mainly financed publicly and usually difficult to link directly to the households, even if they contain a service segment that calls for direct contact with the general public. Since this consumption is mainly collective, only a small part can be apportioned to individuals and households. However, these public services are essential as they satisfy a fundamental need for security and safety.

6. *Support* refers to the central function filled by the household members who in one way or another sell their labor in exchange for the means to consume goods and services. A relatively large share of household time is used for this purpose as time for salaried work, time for travel to and from the job, and time for changing jobs. However, in our household oriented perspective the resource used in working will not be booked on the household that contributes to the production through work, but on those households that eventually consume what is produced. Still, the household's own input for doing the work will take a special position. It can be a question of buying work clothes and tools, though such expenses are normally marginal. Instead, almost all resource use allocated to Support comes from commuting. This category is special in that it has a unique role in the design of the urban structure and for the households' time use. Work travel dominates during rush hour traffic and is thus a determining factor for traffic system dimensioning.

Since the point of departure is the needs and desires of the households, the category structure does not differentiate between private and public consumption. From a household perspective these two types of consumption are simply different ways of satisfying a need and in that way equivalent. Still it is obvious that the different ways to satisfy needs can have various consequences for the use of natural resources. Travel is not treated as a separate needs category since it is seen as a means for reaching a goal.

The point of departure for household activities is not only determined by an effort to describe the use of natural resources by the households in a thorough manner. It also provides excellent possibilities for discovering environmentally positive spirals that can generate desirable changes in other respects as well through changes either in some part of household activities for satisfying fundamental everyday needs or in technological or structural conditions or in both. Such spirals can initiate the development of social innovations, that is that the needs and desires sought by the households can be satisfied in new ways.¹⁶ For example, changes in the inner structure of the residence and in the urban setting (communications and transport possibilities and functional integration) can make it possible to house additional activities in the home or its immediate proximity. The result can be reduced travel and a more efficient local use. Consistently applied this approach can

¹⁶Gershuny, J. och Miles, I. The new service economy, 1983, pp. 89ff.

also lead to simplified identification of any obstacles to change. Thus consideration can be taken to the degree of realism in conceivable changes.

2.4 Creating Images of the Future

A number of different phenomena have been described in the second part of this book and are intended to serve as documentation or building blocks for the construction of images of the future. Procedures and approaches may vary, in much as a result of dealing with dissimilar phenomena, such as urban structure, household activity patterns and technology, but where the differences are a consequence of the fact that the documentation has been developed by authors with varied subject competence. This diversity has been essential for including all the aspects that must be considered when urban sustainability and the possibilities for shaping urban life along the lines of the developmental requirements that are to be analyzed. However, there is a common element in the arrangement and focus of these chapters. Each one deals with the current situation, important trends and conceivable future alternatives. This provides the presentation with a measure of unity and grants the questions in three areas, namely urban structure, household handling patterns and technology, a similar treatment.

The main authors have received the task of co-ordinating the concurrent work. This has been done by examining the current situation, trends and future alternatives, seeking to determine if the images can handle the criteria established, as well as with consideration concerning the attractiveness and realism of the images from a social and economic perspective.

The images of the future have been developed in several steps and with a varying number of participants for each. In the first step we primarily focused on idea generation aimed at creating as broad a foundation as possible for shaping the future pictures. There occurred a certain agglomeration of ideas, meaning that the ideas were grouped in order to gain a convergence. Only persons who had worked or were working in the project or in some related project in one of the research groups were included in this step. The result of this introductory step was then worked over in three groups, one focused on technology, one on the design of urban structures and one on household action patterns (spatio-temporal dimensions in the images of the future). This done, a representative core group developed the ideas into a first, somewhat complete, draft version of the six images of the future. This draft was then the subject of a workshop that included project participants in order to identify problems in the images and find solutions to them. After a reworking, the images and paths to attain them were discussed in a workshop arranged by the Swedish research council Formas, with some 50 participants from the research programs *The City as a Life Environment* and the *The Sustainable City*. While this resulted in some adjustments to the images, the main results were ideas for deeper analysis discussions of the paths towards the images of the future.

The images of the future were also tested through qualitative interviews with a number of Stockholm residents. The starting point here was that urban residents have differing attitudes towards what would be the best way to solve the problems of environmental load. The method in this sequence was to confront the interview persons with certain central parts of the images exhibiting changed or unchanged everyday practices and asking them to discuss them. The traits offered were partly opportunities for better economy or more free time, partly new construction in a few, large centers or an urban sprawl in a larger number of smaller centers. In addition the persons were asked what their position was regarding measures for reducing energy use. Among the results of these interviews could be counted knowledge about the conditions households see as blocking them from altering everyday routines and what evaluation criteria they use when making their minds up about alternate images of the future.

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