



LUNDS UNIVERSITET

**EVALUATING THE SUSTAINABILITY VALUE MAP:  
A case study of Sagene Urban District, Oslo, Norway.**

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**A THESIS**

Submitted to  
**Lund University Centre for Sustainability Studies**

In partial fulfilments of the requirements for the degree

**Master of Science**  
Lund University International Master's Programme  
in Environmental Studies and Sustainability Science

**May 2009**

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## **Abstract**

Sustainability assessments are widely applied in urban contexts to increase the understanding of and move toward more sustainable cities. A common approach is the use of frameworks with key indicators as tools. This study evaluates the assessment tool Sustainability Value Map (SVM), developed by Chris Butters, through the case study of Sagene Urban District in Oslo, Norway. The SVM gives equal priority to the environmental, economical and social dimensions of sustainable development, and grades various parameters within each aspect. The end-result creates a holistic visualisation of the area's sustainability. An SVM was specifically designed for Sagene Urban District. 56 quantitative and qualitative indicators were selected and utilized. Data from public surveys and statistics were measured against appropriate targets and comparisons to determine each parameter's degree of sustainability. The conclusions raise concerns about the validity of the end-results, due to the lack of appropriate sustainability targets. It is suggested that the SVM's most appropriate use is as a process tool with the involvement of experts, stakeholders and members of the public. The tool is also suitable for assessments with pre-set targets rather than "ideal" sustainability goals.

**Key words:** sustainable development, urban sustainability assessment, Sustainability Value Map, indicators

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## **Acknowledgements**

I would like to thank my supervisor Patrik Wallman for his much appreciated advice during the thesis writing process. I would also like to thank Chris Butters, Maurizio Deliz and my family for all their help and support. My particular gratitude goes to Dayton Gordley for his friendship, encouragement, constructive criticism and rewarding discussions.

Title page photo: *Camilla Skjerve-Nielssen. Mosaic at Sagene Community Centre, created by the public.*

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# 1. Introduction and background

## 1.1. Sustainable cities

### Definition

Sustainable development is most commonly defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” by the World Commission on the Environment and Development’s (WCED).<sup>1</sup> The term is widely criticized for being too vague or too open for interpretation.<sup>2</sup> Nevertheless, it has also received much praise for the same reasons as this can be a positive feature. According to Robinson, “diplomats are familiar with the need to leave key terms undefined in negotiation processes and in much the same way the term sustainable development may profit from what might be called constructive ambiguity.”<sup>3</sup> Despite the ambiguous nature of the term, most agree that the concept focuses on mankind’s use of resources on the planet. It links environmental, economical and social aspects and goals. Further, it is applied from a local to global level and for present to future generations.<sup>4</sup> Specifically for urban sustainability, WCED’s definition was also used as a basis for the Urban21 Conference in Berlin 2000:

“Improving the quality of life in a city, including the ecological, cultural, political, institutional, social and economic components without leaving a burden on the future generations. A burden which is the result of a reduced natural capital and an excessive local debt. Our aim is that the flow principle that is based on an equilibrium of material and energy and also financial input/output, plays a crucial role in all future decisions upon the development of urban areas.”<sup>5</sup>

This definition rightly considers sustainable urban areas as closed systems which respect the biocapacity of Earth. Mega and Pedersen, from the European Foundation for the Improvement of Living and Working Conditions, include in the definition the significant perspective of sustainability as a process which incorporates public participation:

“Sustainability is equity and harmony extended into the future, a careful journey without an endpoint, a continuous striving for the harmonious co-evolution of environmental, economic and socio-cultural goals. A sustainable city is one which succeeds in balancing economic, environmental and socio-cultural progress through processes of active citizen participation.”<sup>6</sup>

### What is a sustainable city?

Sustainable cities not only consider the needs of the population within the geopolitical borders, but also the needs of all people on a global scale and in the future.<sup>7</sup> According to McGranahan and Satterthwaite; “The goal is not sustainable cities, but cities that contribute to sustainable development within their boundaries, in the region around them, and globally.” Further, sustainable development addresses the need for equity; between generations, in terms of access to basic services, conservation of the environment and across borders

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<sup>1</sup> World Commission on the Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987).

<sup>2</sup> J. Pope, D. Annandale and A. Morrison-Saunders. “Conceptualising sustainability assessment.” *Environmental Impact Assessment Review*, 24, (2004), 595–616.

<sup>3</sup> Quoted in: M. Holden, “Urban indicators and the integrative ideals of cities.” *Cities* 23, 3 (2006).

<sup>4</sup> J. S. Walton *et al.* “Integrated assessment of urban sustainability.” *Engineering Sustainability* 158, ES2 (June 2005), 170-183.

<sup>5</sup> J. Coplak and P Raksanyi, *Ecocity: Planning Sustainable Settlements*. (Bratislava: Slovak university of Technology, 2003), 10.

<sup>6</sup> V. Mega, and J. Pedersen, *Urban Sustainability Indicators*. (Luxembourg: Office for Official Publications of the European Communities, 1998), 2.

<sup>7</sup> G. McGranahan and D. Satterthwaite, “Urban Centers: An Assessment of Sustainability.” *Annual Review Environmental Resources* 28 (2003): 243-74.

in terms of e.g. environmental pollution and consumption of resources, between all people politically and between all species.<sup>8</sup>

McGranahan and Satterthwaite have divided WCED's sustainable development definition in two, with goals specified for each which can be applied to all built areas.

"Meeting the needs of the present" consists of:

- "*Economic needs*" – access to adequate income and economic security.
- "*Environmental needs*" – a healthy and safe living environment protected from environmental hazards.
- "*Social, cultural and health needs*" – adequate provision of services such as education and health care.
- "*Political needs*" – freedom to participate in decision-making from a local to national scale.

"...without compromising the ability of future generations to meet their own needs" consists of:

- "*Minimising use or waste of nonrenewable resources*" – includes fossil fuels, mineral resources and irreplaceable natural assets, e.g. historical districts, parks and natural landscapes.
- "*Sustainable use of finite renewable resources*" – includes e.g. fresh water use and land area.
- "*Biodegradable wastes not overtaxing capacities of renewable sinks*" – allowing for natural capacities to break down waste without causing environmental pollution.
- "*Nonbiodegradable wastes/emissions not overtaxing (finite) capacity of local and global sinks to absorb or dilute them without adverse effects*" – in particular, persistent organic pollutants, GHGs and ozone-depleting chemicals.
- "*Social / human capital*" – embedded in institutional structures.<sup>9</sup>

There are many possible conflicts between the various aspects of sustainable development with regard to the definition and the degree of equity. However, these can be avoided if all of the parts are considered as a whole. If they are, one can discover that many parts complement each other with solutions which cover several aspects at once. Although sustainability covers many broad and global aspects, it is at the local level many of the solutions can be found and implemented.<sup>10</sup>

## 1.2. Sustainability Assessment

The many interpretations of the term sustainable development have resulted in varying types of sustainability assessments.<sup>11</sup> The different beliefs regarding what should be sustained, by whom, for whom and how also have an effect on the theories of what is to be assessed and how.<sup>12</sup> This, in turn, has resulted in many different tools defined as sustainability assessments, each with varying degrees of efficiency and reliability.<sup>13</sup>

Ness *et al.* defines the purpose of a sustainability assessment based on Kates *et al.*'s core questions for sustainability research; "to provide decision-makers with an evaluation of global to local integrated nature-society systems in short and long term perspectives in order to assist them to determine which actions should or should not be taken in an attempt to make society sustainable."<sup>14</sup> In other words; sustainability assessment should increase the users' knowledge in how to move society towards sustainable goals, and the evaluators should be the people with power to create the necessary changes, i.e. the government.

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<sup>8</sup> McGranahan and Satterthwaite.

<sup>9</sup> McGranahan and Satterthwaite, 252 - 253

<sup>10</sup> McGranahan and Satterthwaite.

<sup>11</sup> Pope, Annandale and Morrison-Saunders.

<sup>12</sup> Walton *et al.*

<sup>13</sup> B. Ness, *et al.* "Categorising tools for sustainability assessment." *Ecological Economics* 60 (2007): 498-508.

<sup>14</sup> Ness *et al.*, 499

Sustainability assessments for urban areas are particularly difficult as cities are very complex systems with extremely diverse connections, relationships, values and feedbacks, perpetually changing and developing with the people who inhabit them. The ideal assessment would be through the use of a tool which simplifies this task by systematically and equally integrating the aspects of sustainability.<sup>15</sup> It should also assist the user in recognizing linkages within the urban society analyzed.<sup>16</sup>

Walton *et al.* evaluated a number of urban sustainability assessment tools to identify gaps in the current methodologies. The study also identifies the stakeholders' needs in assessment tools. In addition to the properties stated above, these include:

- Transparency and communication for the possibility to educate the public
- The ability to identify drivers of negative performance and provide suggestions for solutions
- Adaptive to any area and size of project
- Facilitation of public and stakeholder participation
- Low cost<sup>17</sup>

The study did not find any tool which meets all the criteria considered necessary for such a device. Consequently, the actual necessity for such a tool was questioned. The task of including all aspects into one framework with the intent to create a valid assessment proved to be unfeasible.<sup>18</sup> In response to this research one might have to come to terms with that the perfect tool does not exist, or rather, that one should view the tool as something which has specific uses, but which might require additional tools for other purposes.

Deakin *et al.* is also of the opinion that there is not yet an assessment tool for sustainable urban development which successfully integrates all aspects of sustainability. They, however, call for more research toward identifying such a tool. Similar to Walton *et al.*, they suggest using a variety of tools until a comprehensive tool has been developed.<sup>19</sup>

Chapter 9 of *Our Common Future* is dedicated to urban challenges. Here, WCED argues another important point with regard to the assessment of cities and the search for sustainable solutions; namely, that one cannot standardize models for urban development. Each city needs to be evaluated in regard to its own particular circumstance and geographical context.<sup>20</sup> In line with this type of thinking, McGranahan and Satterthwaite comment that one should be careful of making generalisations for cities as they are all so diverse. This regards not only cities' performances, but also the cause of their problems, and the solutions proposed.<sup>21</sup>

Assessment methods can be divided into two categories: impact assessments and objectives-led assessments. Impact assessments measure the negative consequences of a project, while objectives-led approaches define sustainability goals and assess to what extent they are reached.<sup>22</sup> In this study an objective-led tool is utilized to test its ability in assessing an existing urban area's sustainability. This tool is presented in the following section.

### **1.3. The Sustainability Value Map**

The Sustainability Value Map (SVM), developed by the architect Chris Butters from GAIA Architects, is a tool for holistic evaluation of the sustainability of buildings, urban development projects and cities. Each case has the three components of sustainability as a base with parameters in each component selected

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<sup>15</sup> Walton *et al.*

<sup>16</sup> Pope, Annandale and Morrison-Saunders.

<sup>17</sup> Walton *et al.*

<sup>18</sup> Walton *et al.*

<sup>19</sup> M. Deakin *et al.* "The assessment of sustainable urban development." *Building research & information*, 30, (2002), 95-108.

<sup>20</sup> WCED.

<sup>21</sup> McGranahan and Satterthwaite.

<sup>22</sup> Pope, Annandale and Morrison-Saunders.

according to the specific conditions of the area in focus. Thus, the SVM is suitable to use for complete quantitative and qualitative sustainability assessments of a variety of different subjects. It is also suitable for comparisons over time and between different buildings or areas.<sup>23</sup>

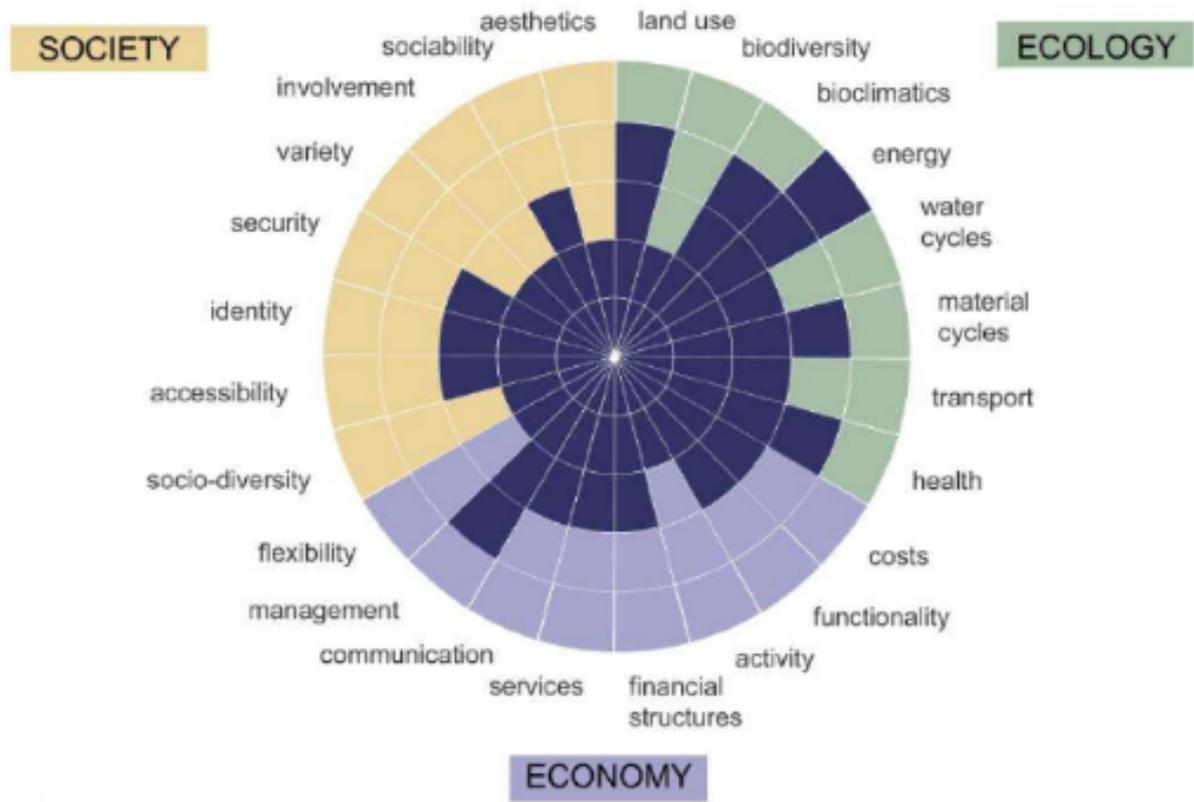


Figure 1; *Sustainability Value Map*, by Chris Butters, GAIA Architects

The figure above can be used as a guide for all SVMs. The ecology dimension assesses humankind’s effects on and relationships with the environment; including aspects concerning land use, resource use, transportation and health. The economy dimension covers the financial and institutional features; including aspects pertaining to government and services. The society dimension is concerned with the human aspects; particularly culture, community and accessibility for all. Although placed in specific categories;, all of the aspects overlap and influence each other. For example, transportation is not only important for our local and global environment, but is also important for our societies’ economies and social relations. The tool encourages simultaneous consideration of the different parameters before presenting them in a comprehensible manner.<sup>24</sup>

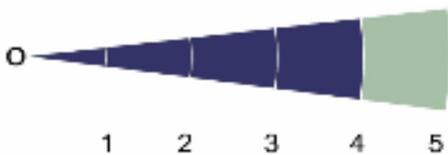


Figure 2; *The value scale of the SVM*

<sup>23</sup> C. Butters, “A Holistic Method of Evaluating Sustainability.” *Building and Urban Development in Norway*. (2004), 34-39.

<sup>24</sup> Butters.

The scale on the circle includes the numeric values 0 to 5, where 0 indicates very poor performance and 5 the best possible performance. The map has 8 parameters and 6 points. According to the need, the scale of the project and available time and resources, the case study SVM can be made more or less detailed than the base map presented above. Butters advises maintaining the maximum grade as the goal of the most sustainable practice possible. While this might situate the goal of “full sustainability” far off into the future, it also secures that the vision of the concept is not compromised.<sup>25</sup>

Butters also recommends that the parameters have the same weight in order to give the three pillars of sustainability equal priority. According to him, the subject of weighing is too complex to create a legitimate assessment. Furthermore, prioritizing certain aspects consequently contradicts the vision of sustainability as a holistic concept.<sup>26</sup>

In the paper introducing the tool, Butters highlights some unique qualities of the SVM compared to other assessment tools. Firstly, the SVM assesses the whole aspect of sustainability while others often focus mostly on the environmental aspects. Secondly, the SVM gives positive points to the different parameters according to their performance, i.e. the better performance the higher score and the larger the dark shaded area. Other value maps do the opposite; they give fewer points for the better performance and create a visualisation focusing on the negative rather than positive aspects of the projects.<sup>27</sup>

In correlation with Mega and Pedersen’s definition, Butters stresses the fact that sustainability is not something which is “delivered”; it always changes over time with the complex mechanisms of developed areas. This is particularly the case for cities and therefore should be assessed over a long period of time in order to understand the changes which happen gradually, and in many different layers and areas. It should however be noted that the SVM is *not* suitable to use for long-term predictions of future outcomes. Rather, it is designed to evaluate the present situation or the past compared to the present. One can still make short-term predictions by considering indicator-trends from past to present.<sup>28</sup> Additionally, the SVM can be used to evaluate e.g. buildings or development projects’ expected performance before construction to ensure a high degree of sustainability on all levels.

Thus far, the SVM has primarily been employed for the assessment of free-standing buildings and small building developments, particularly new projects. It has also been used for some development projects. However, it has never before been used for a complete assessment of a large-scale existing urban district. The following section describes the requirements of sustainability indicators, which will be applied under the framework of the SVM.

#### 1.4. Indicators

Indicators are widely applied in urban sustainability assessments and are collected and used in most cities across the world.<sup>29</sup> Broadly speaking, indicators are “parameters that give information on some phenomenon.”<sup>30</sup> This definition, by the Organisation for Economic Co-operation and Development (OECD), highlights indicators’ important properties as simple communicators of representative quantifiable information. Indicators therefore have the purpose of communicating something which should be viewed in a wider context.<sup>31</sup> With regard to the urban setting, the Danish Government’s definition highlights the

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<sup>25</sup> Butters.

<sup>26</sup> Butters.

<sup>27</sup> Butters.

<sup>28</sup> Ness *et al.*

<sup>29</sup> Global City Indicators.

<sup>30</sup> OECD quoted by H. Gudmundsson, “Making concepts matter: sustainable mobility and indicator systems in transport policy.” *UNESCO* (2003), 200.

<sup>31</sup> Gudmundsson.

relevance to urban planning and policy and thus follows Ness *et al.*'s definition for sustainability assessment. This definition describes indicators as parameters "that can show the development in some condition compared with important goals or initiatives."<sup>32</sup> From the urban perspective, it is most appropriate to use *integrated* indicator-tools, as they embrace a holistic sustainability perspective.<sup>33</sup> The SVM fits into this category.

### **Complexity**

The most recent research within the field focuses on applying a limited number of indicators, whereby one indicator represents several factors of sustainable development.<sup>34</sup> Supporting this approach, Mega and Pedersen argue that the set of indicators should be "short and significant". However, Hartmuth *et al.* criticises this indicator use where a small number of indicators are selected to represent an entire city. Less indicators are selected in order to create more efficient communication of the sustainability, but it is "almost impossible" for the authorities to make complex decisions based on a small number of indicators.<sup>35</sup> Gudmundsson raises the fair point that if a set of indicators is too extensive, it automatically also becomes more difficult to maintain and update the data, as well as more complex to summarise and present the results. Despite of the higher inherent complexity when applying an extensive indicator set, it should make it easier to identify key areas where change is needed, and which areas have an impact on one another. A set of 10-15 indicators for a whole city can probably measure the current state it is in, but cannot easily point to the specific areas where change is most needed.

### **Selection and applications**

In this context the indicators should be selected after the SVM has been designed with desired parameters and sub-parameters. Breaking the city into parts and using the appropriate indicators should make it easier to understand links as well as weak and strong areas. The indicators can be compared over time and/or to other urban areas, goals, targets or benchmarks, in order to identify improvements or detractions in relation to the goals of the subject.<sup>36 37</sup> Sustainability indicators also typically include issues of scale; from local to global and from humans to ecosystems.<sup>38</sup> According to Hartmuth *et al.*, the indicators should always be connected to local sustainability goals which are generated from more general global goals.

The indicators must be clear and understandable and the data easy to obtain and update. Most importantly, they must be representative of the matters they are measuring.<sup>39 40</sup> Qualitative and quantitative data should be used complementary in order to achieve the most comprehensive insight of the situation analyzed.<sup>41</sup> Often, qualitative objectives are used as guidelines, and although they do not consist of hard comparable data as targets do, they can be helpful in explaining the intention of the indicator.<sup>42</sup>

### **Limitations**

One should always keep in mind that indicator frameworks are merely tools and that they have limitations. There can be underlying issues not visible through this method.<sup>43</sup> For example, suitable indicators can point out where change is needed, but they cannot specify what kinds of measures are required for improvement.<sup>44</sup>

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<sup>32</sup> The Danish National Strategy for Sustainable Development quoted by Gudmundsson, 200.

<sup>33</sup> Ness *et al.*

<sup>34</sup> Coplak and Raksanyi.

<sup>35</sup> G. Hartmuth, K. Huber and D. Rink, "Operationalization and Contextualization of Sustainability at the Local Level." *Sustainable Development* 16 (2008), 261–270.

<sup>36</sup> Coplak and Raksanyi.

<sup>37</sup> Gudmundsson.

<sup>38</sup> Gudmundsson.

<sup>39</sup> Coplak and Raksanyi.

<sup>40</sup> Hartmuth, Huber and Rink.

<sup>41</sup> Coplak and Raksanyi.

<sup>42</sup> Gudmundsson.

<sup>43</sup> Coplak and Raksanyi.

<sup>44</sup> Mega and Pedersen.

There are also particular aspects of urban sustainability which cannot be measured using indicators, but, rather, require insight and knowledge of the area in focus.<sup>45</sup>

The methods and types of data gathering often differentiate from city to city, which makes comparisons between them difficult. As mentioned before, cities across the world vary to large extents and in numerous ways; in terms of geography, landscape, size, population, history, culture, climate, governance and so on. One should therefore be careful when attempting to make specific or concrete comparisons. Moreover, indicators are often not comparable over time for the same city.

### **Types of indicators**

Indicators take two forms; descriptive and diagnostic. The descriptive indicators are quantitative and rely on expert knowledge to analyse the data within a framework and propose solutions.<sup>46</sup> The data is generally perceived as facts<sup>47</sup> and often compared against specified targets and benchmarks.<sup>48</sup> The information is typically made available to the public after completion of the assessment.<sup>49</sup> Diagnostic indicators are used to understand causes, links, relationships and trends in our society<sup>50</sup> and this knowledge is utilized to propose solutions to the problems identified. The public is often included in this process. The indicators are thus operating on a more long term basis to increase the understanding of the problems and solutions. From this understanding one could claim that the diagnostic method is more appropriate in a sustainable urban development context, although one should also be careful of drawing too many links and conclusions between the indicators. The indicators should only be used as a signpost for a more thorough investigation of the affected area.<sup>51</sup>

## **1.5. Thesis purpose and scope**

The purpose of this study is to evaluate the usability and suitability of the framework tool Sustainability Value Map in the context of a defined urban area. For this intent, the sustainability of Sagene Urban District in Oslo, Norway, is assessed. A SVM is designed specifically for the area with parameters within the ecological, economical and social dimensions of sustainability. For each parameter urban indicators are selected and utilized according to their applicability and availability. The data collected from the indicators are compared to specific targets or similar urban areas in order to determine the district's sustainability in relation to numeric values on the SVM. The specific outcomes, as well as the learning outcomes from the assessment, are presented and discussed. Additionally, the process of using the SVM is examined and evaluated. Lastly, the SVM's strengths, weaknesses and limitations as an integrated assessment tool for urban areas are presented.

The following questions are addressed in the study:

- How can the SVM be utilized for the assessment of an existing urban district?
- Which sustainability aspects (parameters) should be included in the assessment of Sagene Urban District and why?
- To what extent does the SVM cater to the diverse aspects of sustainability in an assessment?
- What are Sagene's assessment's strengths, weaknesses and limitations? Did any particular problems arise during the assessment?
- What are the SVM's strengths, weaknesses and limitations? How does this compare to the literature?

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<sup>45</sup> Coplak and Raksanyi.

<sup>46</sup> Holden.

<sup>47</sup> R. Phillips, *Community indicators measuring systems*. (Ashgate Pub Ltd. 2005): 35.

<sup>48</sup> Mega and Pedersen.

<sup>49</sup> Holden.

<sup>50</sup> Phillips, 35.

<sup>51</sup> Holden.

## 2. Assessment of Sagene Urban District using the Sustainability Value Map

### 2.1. Method

The research was conducted through a case study of Sagene Urban District where the Sustainability Value Map was used as a framework for an integrated sustainability assessment. A SVM was designed specifically for the urban district. A total of 56 qualitative and quantitative indicators were selected and used for this purpose, and systematically compared against suitable benchmarks or targets. The majority of the data was collected from publicly available documents. For the assessment of some qualitative indicators not publicly available, a public survey was conducted, which is described in more detail below. In the assessment the survey is named Sagene's public survey 2009. The tool was evaluated through Walton *et al's* findings of stakeholders' needs in assessment tools.

#### Public survey

One hundred structured interviews were conducted with inhabitants in Sagene Urban District. 23 people were telephone-interviewed, but as this method was time consuming and received a low response rate the remaining were interviewed in person. The aim of the interviews was to find out the population's opinion and knowledge about certain characteristics of their district which are subjective and not easily measured by other indicators. The respondents were asked 19 closed questions about Sagene, where they graded their satisfaction on the various subjects on a scale of 1-5 or through the option of "don't know."

The change of method might have produced some inaccuracies in the results. Further, although Sagene's population consists of 21,4% immigrants,<sup>52</sup> very few (approximately 3%) participated in the survey. A number of immigrants were asked to participate, but the response rate was very low. This was unfortunate as the results do not represent all parts of the population. The findings from the survey are presented in the assessment (2.4). A translated survey can be found in the Appendix 6.1. and the results from the survey in Appendix 6.2.

### 2.2. Background to Oslo and Sagene Urban District

Oslo is the capitol of Norway and has a population of 560 000.<sup>53</sup> Oslo Commune, or the Municipality of Oslo, proclaims to be dedicated to sustainable development. They have the following vision:

"Oslo shall be a capital city in sustainable development, characterised by economic, social and cultural growth according to nature's ability to sustain that growth ecologically. We shall pass on the city to the next generation in a better environmental condition than we ourselves inherited it. Oslo shall be one of the world's most environmentally friendly and sustainable capital cities."<sup>54</sup>

The commune is part of the Aalborg-charter and supports the urban districts in their LA21 work for local sustainability and participation. They have an encompassing "Strategy for Sustainable Development for 2002-2014" and won the European Sustainable City Award in 2003 arranged by The European Sustainable Cities and Towns Campaign.<sup>55</sup>

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<sup>52</sup> The Municipality of Oslo Development and Improvement Authority. *Statistical Yearbook of Oslo 2008, 108<sup>th</sup> issue*, 55.

<sup>53</sup> The Municipality of Oslo Development and Improvement Authority, *Statistical Yearbook of Oslo 2008, 108<sup>th</sup> issue*. (Oslo: The Municipality of Oslo Development and Improvement Authority, 2008), 44.

<sup>54</sup> Oslo Kommune. Byrådsavdeling for Miljø og Samferdsel. Sustainable Development. <http://www.byrådsavdeling-for-miljo-og-samferdsel.oslo.kommune.no/miljo/english/> (accessed 15.05.09).

<sup>55</sup> Oslo Kommune. Byrådsavdeling for Miljø og Samferdsel.

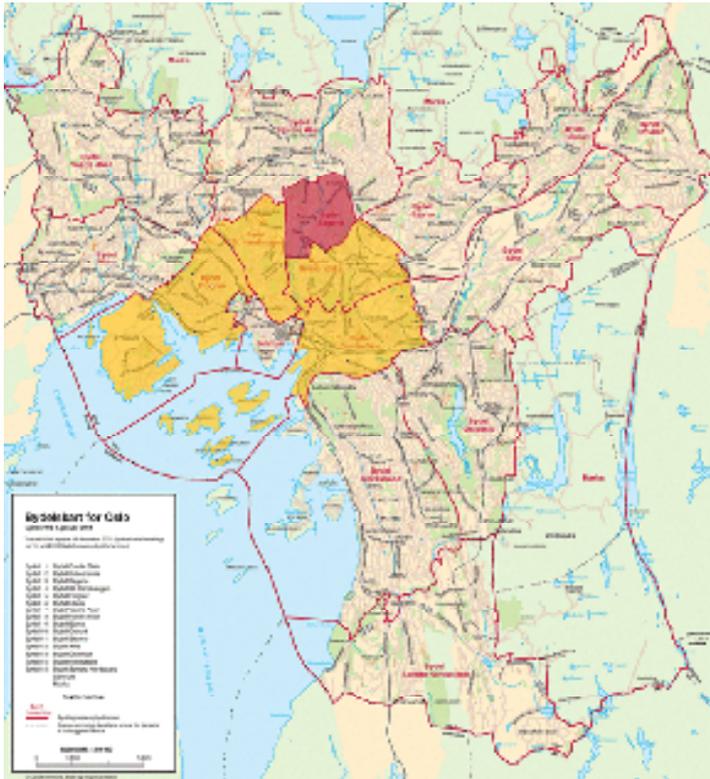


Figure 3; *Oslo Commune's Urban Districts. Sagene is presented in red, while the other inner districts are yellow.*<sup>56</sup>

Figure 4: *Sagene Urban District.*<sup>57</sup>

Sagene is one of fifteen urban districts in the Municipality of Oslo. It is also one of the five “inner city” districts. The entity is governed by fifteen elected politicians. This body is in charge of some services; including health care, social services, kindergartens and voluntary communal projects. They also have the responsibility for finance and budgets within the district, as well as environmental health protection for the inhabitants. Additionally, they are delegated other various tasks from the commune.<sup>58</sup>

Sagene Urban District is the most densely populated area in Norway, with 32 400 inhabitants on an area of approximately 1 square kilometre.<sup>59</sup> Historically, the area was an industrial district due to the river Akerselva which runs through the centre and powered many factories during the industrial revolution. Thus, the area became a typical working-class neighbourhood. Most of the housing was constructed during three different time periods; rental apartment blocks in the late 1800’s, social housing in the WWI-years and apartment blocks in the WWII-years. There has been little building development at Sagene during the last forty years, although from 2004 there has been some new development giving rise to nearly a thousand homes.<sup>60</sup> Because of its history, Sagene and the other “East-side” inner districts stood out as the areas in Oslo with the worst living conditions, the lowest life expectancy and (relatively) high unemployment. To address this negative trend, the State, Oslo Commune and Sagene Urban District constructed a policy plan called “Action Programme for Central-East Oslo” for the years 1997 to 2005. This resulted in over two hundred implemented projects, which mainly focused on improving the lives and living conditions for the inhabitants, as well as



<sup>56</sup> Oslo Kommune, <http://www.oslo.kommune.no/>

<sup>57</sup> Google Earth Image

<sup>58</sup> Oslo Kommune. Bydel Sagene. Politikk i bydelen. [http://www.bydel-sagene.oslo.kommune.no/politikk\\_i\\_bydelen/](http://www.bydel-sagene.oslo.kommune.no/politikk_i_bydelen/)

<sup>59</sup> The Municipality of Oslo Development and Improvement Authority, 44.

<sup>60</sup> Oslo Kommune. Bydel Sagene. <http://www.bydel-sagene.oslo.kommune.no/>

revitalizing the parks and green-areas.<sup>61</sup> Although the inner-East districts are still behind the rest of Oslo in some aspects, the Action Programme has improved the areas a considerable amount. This has had an impact on the houseprices and the socio-economic background of the inhabitants, as many students and young professionals have moved to the district during the last decade. In 2001, Sagene Urban District created their first Local Agenda 21 plan and, in 2002, they became one out of twenty so-called “pilot communes” in the LA21 work. Since then they have been committed to being a frontrunner in sustainable development. This will be discussed further in the assessment of the urban district.

### 2.3. Sagene Urban District’s Sustainability Value Map

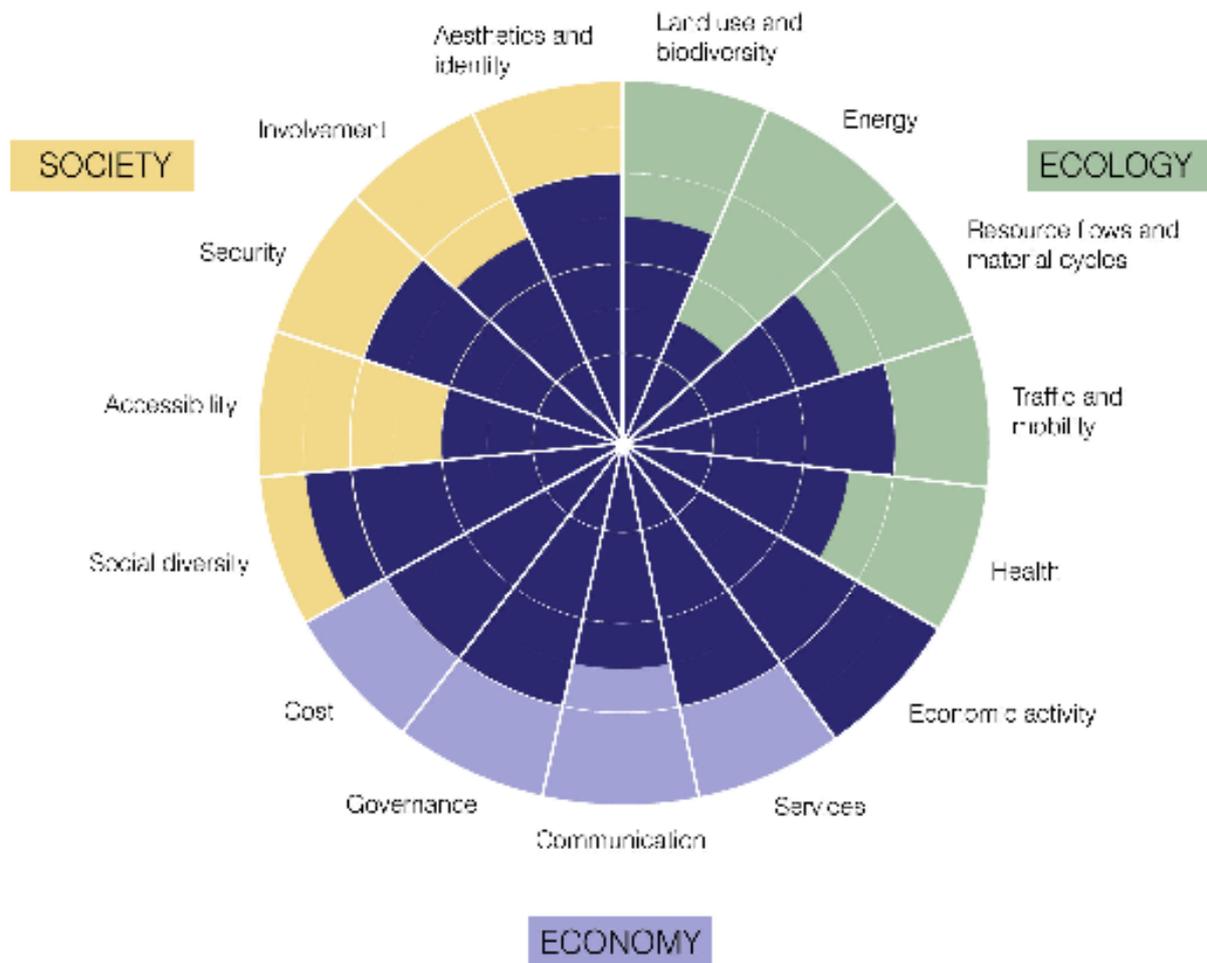
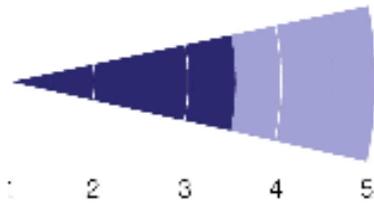


Figure 5: Sagene Urban District’s Sustainability Value Map

<sup>61</sup> Oslo Kommune, <http://www.oslo.kommune.no/>

Figure 6: *Sagene's SVM's value scale*



Sagene's SVM consist of 15 parameters; five for each sustainability dimension. They were selected as the most relevant for Sagene Urban District. In this case it was important to think about the location and political conditions of the area; i.e. it is an existing political urban district in the centre of Oslo. It is both its own political entity and part of Oslo Municipality. Thus, the size of the population and the context

was important, in relation to the types of services which should be provided.

Rather than having eight parameters for each dimension, some were combined, e.g. *Land use and biodiversity* and *Aesthetics and identity*. Other aspects included in the base map were not appropriate for Sagene's value map. For example *Bioclimatics*, regarding the orientation and location of buildings<sup>62</sup> is more relative to new development projects. *Financial structures*, concerning equity, security of tenure and credit systems<sup>63</sup>, might be very important issues in some developing countries, while one can claim that this is relatively stable in Norway.

The scaling is a little different than the base SVM as Sagene's map has the values 1-5 rather than 0-5. Each parameter is given a value from 1-5, including half-values, which in reality gives the scale nine values. The parameters' value is based on the average of the sub-parameter values. When placed in the map, this value is rounded to the nearest half-value.

## 2.4. Assessment of Sagene Urban District

This section contains the assessment of Sagene Urban District where the SVM is used as a tool. Each parameter in the SVM (e.g. land use and biodiversity, governance, security) consists of a selected number of sub-parameters, whereby each is defined by one or more indicators. The data from the indicators is compared with case-specific targets, and used to assign a value to the sub-parameter. When either a target could not be identified, a comparison is made to a similar urban context. In turn, these values are then averaged together for each parameter. Lastly, the values are presented in the SVM. The text below presents a brief background of each parameter, followed by the sub-parameters' findings and the reasoning behind the assigned values. The tables systematically present the sub-parameters and their objectives, indicators, findings, comparative targets and obtained values. Please note that the references for the tables are listed in the bibliography (5.2), not as footnotes.

### 2.4.1. Ecology

The ecology parameters cover the relationships between humans and nature from a local to a global scale. Local issues concern the ratio between human settlements and nature, which are important for both people's quality of life and the natural environment. Immediate causes of health problems for the inhabitants are also a local issue. Energy, waste handling and transportation are subjects which are all important at a local level, but which also have global consequences due to consumption of natural resources and the emission of greenhouse gasses (GHG).

#### Land use and biodiversity

Compact cities with mixed use buildings are considered the most optimal design for sustainable urban development.<sup>64</sup> At the same time it is important that the cities have a balance of humans, buildings and nature. A balanced density provides the optimal spaces for humans and wildlife, as well as conserving as much land as possible.<sup>65</sup> A high building density also provides better conditions for infrastructure, public

<sup>62</sup> Butters.

<sup>63</sup> Butters.

<sup>64</sup> G. Haughton, "Developing sustainable urban development models." *Cities*, 14, 4, (1997) 189-195.

<sup>65</sup> Coplak and Raksanyi.

transport, walking, cycling, safety and general life in the public areas. In terms of resource saving this is ideal as less transportation means less energy consumption, and apartment blocks typically use less energy than single family houses.<sup>66 67</sup> Population density and amount of green areas should therefore always be considered concurrently and in relation to local circumstances.

Including green areas into urban areas has numerous advantages, which also overlap into the economic and social dimensions. Green spaces improve air quality, aesthetics and the physical and psychological health of the public. They reduce noise, heat and stormwater flooding. The most optimal green areas are those which consist of natural and local vegetation, as they require less maintenance and provide habitat for wildlife.<sup>68</sup> Modern Northern cities typically consume large amounts of food while producing very little and are therefore dependent on land elsewhere for this purpose. However, cities in the South and historical records of cities in the North show that it is still possible to grow substantial amounts of food in a city. In addition to being important for food security and individuals' economic wellbeing, it also reduces energy use for transport, can provide employment and improve people's physical and mental health. Community gardens and allotments also enhance the social bonds amongst citizens.<sup>69</sup>

ECOLOGY					
Land use and biodiversity					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Density of buildings and people	Land use should be made efficient by having a high density of buildings and people, with sufficient amounts of public spaces, parks and green areas.	People per hectare	Sagene has 104,4 people per ha. <sup>1 2</sup>	Sagene is compared to Oslo's inner city districts' average of 66,4 people per ha. <sup>3</sup>	5
Amount of green areas	Land use should be made efficient by having a high density of buildings and people, with sufficient amounts of public spaces, parks and green areas.	Percentage of green areas of total area	Sagene has 20% green areas. <sup>4</sup>	Sagene is compared to Oslo's inner city districts' average of 14,8% green areas. <sup>5</sup>	5
Quality of parks	The quality of the parks should be high to function as pleasant recreational areas as well as serving other purposes such as improving the air quality and reducing noise, heat and stormwater runoff in the city. <sup>6</sup>	Sagene's public survey 2009: public's opinion on the quality of the parks	Sagene's public survey 2009: grade 4 (median) [average: 3,75]	Target: grade 5.	4
Available habitat for birds, insects, amphibians and small mammals	The natural environment in the city should be protected by the provision and maintenance of spaces for other species to thrive.	Important biotopes, area and number	Sagene has 6 important areas for biodiversity on 860 ha of land. <sup>7</sup> 6200 hectares are	Sagene is compared to Oslo's inner city districts' average of 41,2 important areas	

<sup>66</sup> Houghton.

<sup>67</sup> Coplak and Raksanyi.

<sup>68</sup> Coplak and Raksanyi.

<sup>69</sup> L. Holland, "Diversity and connections in community gardens: a contribution to local sustainability." *Local Environment*, 9, 3, (2004), 285 - 305

(biotopes)			classified as green area at Sagene, of which 14% are important for biological diversity. <sup>8</sup>	for biodiversity on an average land area of 6348 ha. <sup>9</sup>	2
Productivity of land, use and availability of allotments and community gardens	Dependency on land elsewhere should be reduced by increasing the amount of food produced within the city.	1) Available allotments / community gardens 2) Sagene's public survey 2009: public's opinion on availability of allotments / community gardens	1) Oslo: 0,25 sq m allotment per inhabitant. <sup>10 11</sup> 2) Sagene's public survey 2009: grade 2 [2,49]	1) Oslo is compared to Berlin: 9 sq m allotment per inhabitant. <sup>12 13</sup> 2) Target: grade 5.	2
<b>Total value</b>					<b>3,6</b>

Table 1: *Land use and biodiversity*

#### *Density of buildings and people*

Compared to Oslo's inner city districts' average, Sagene has a very high density of people. The sub-parameter must be considered together with the "amount of green areas" below.

#### *Amount of green areas*

Compared to the inner city average, Sagene has a greater amount of green areas. When assessed together with the population density, it is clear that the balance between green spaces and people is optimal.

#### *Quality of parks*

Ideally, the quality of the parks should have been measured by an expert in landscape planning and ecology. As this was not attainable, the public was asked in Sagene's public survey 2009 to grade the quality of the park. The public is "satisfied" with the quality of the parks.

#### *Available habitat for birds, insects, amphibians and small mammals (biotopes)*

The indicator for available biotopes should ideally have been the population size of one or more bird species over a number of years. This data was not available and instead a documentation of important biotopes in the districts of Oslo is used. The comparison indicates that Sagene does not have many important biotopes.

#### *Productivity of land, use and availability of allotments and community gardens*

Productivity of land is measured in availability of allotments for the inhabitants. As the data for Sagene was not available, the data for Oslo is used. Oslo is compared to Berlin as the German city is known to have a very high allocation of productive green areas for its citizens. Compared to Berlin and the grade from Sagene's public survey 2009, the district performs very poorly in this category.

#### *Value assigned: Land use and biodiversity*

All sub-parameters considered, Sagene receives a value of 3,6 in this parameter. The high values assigned to density, green areas and quality of parks, are countered by the low values of available biotopes and productivity of land.

### **Energy**

The energy parameter concerns how much energy individuals consume and how the energy is produced. The source of energy determines how much greenhouse gasses (GHGs) and other pollutants are released into the

environment. In Norway, 99% of the electricity<sup>70</sup> is produced by hydropower and in Oslo much of the energy is produced by the incineration of waste. Therefore, it is the transportation sector which has the highest share of GHG emissions, contributing over fifty percent of the total amount.<sup>71</sup>

It is crucial to examine cities in relation to our environment in a global context<sup>72</sup> and particularly in relation to energy consumption and GHG emissions. A city may have excellent performance regarding local and regional environmental aspects, but large impacts on regions elsewhere and on the planet as a whole.<sup>73</sup> Below, energy consumption and GHG emissions are evaluated both in a local and a global context.

ECOLOGY					
Energy					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Energy consumption	Energy consumption should be minimised to reduce resource use and the release of pollutants. <sup>14</sup>	Energy use per person per year (Percentage of renewable energy sources)	Oslo's inhabitants use 27 500 kWh per person per year (59% renewables) <sup>15</sup>	Oslo is compared to other Nordic cities, person per year (% of renewables in brackets, incl. transport): Reykjavik: 38 000 kWh (60%) Stockholm: 28 000 kWh (36%) Malmö: 27 000 kWh (30%) Gothenburg: 43 000 kWh (19%) Helsingfors: 29 000 kWh (8%) <sup>16</sup>	3
Greenhouse gas emissions	The amount of greenhouse gasses released to the atmosphere should be minimised to reduce the contribution to global climate change. <sup>17</sup>	1) Greenhouse gas emissions per person per year 2) Increase (I) or decrease (D) of total CO2 emissions since 1990 levels	1) Oslo's inhabitants released (2003) 2,3 tons of CO2 per person per year. <sup>18</sup> 2) From 1991-2007 emissions increased by 8,6%. <sup>19</sup>	1) Oslo is compared to other Nordic cities, per person per year (2003) (increase or decrease in brackets): Reykjavik: 2,0 t / CO2 (I) Stockholm: 3,2 t / CO2 (D) Malmö: 4,6 t / CO2 (D) Gothenburg: 5,1 t / CO2 (D) Copenhagen: 5,7 t / CO2 (I) Helsingfors: 9,9 t / CO2 (I) <sup>20</sup>	3
Ecological footprint	All citizens on Earth should use resources and produce waste within Earth's biocapacity.	1) Ecological footprint of Oslo per person 2) Ecological and carbon footprint of Norway per person (these two indicators are not comparable)	1) Oslo's ecological footprint is 80 000 sq m of land / person. <sup>21</sup> 2) Norway has a total footprint of 6,9 global ha / person, and a carbon footprint of 1,55 global ha / person. <sup>22</sup>	1) Ecological footprint of Oslo is compared to the target of Earth's available land of 21 800 sq m. <sup>23</sup> 2) Ecological and carbon footprint of Norway is compared to the target of the Earth's biocapacity of 2,1 global ha per person. <sup>24</sup>	1,5
<b>Total value</b>					<b>2,5</b>

Table 2: Energy

<sup>70</sup> Statistics Norway. *Energy*. 2009. <http://www.ssb.no/energi/> (accessed 15.05.09).

<sup>71</sup> Statistics Norway. *Kildefordelte utslipp til luft av klimagasser, etter kommune. 2007. Prosent*. <http://www.ssb.no/emner/01/04/10/klimagasser/tab-2009-02-17-02.html> (accessed 15.05.09).

<sup>72</sup> Haughton.

<sup>73</sup> McGranahan and Satterthwaite.

### *Energy consumption*

As it was not possible to find energy data specifically for Sagene the average data for Oslo is used for all of the sub-parameters. For energy consumption and GHG emissions the comparison makes use of the data from a Nordic city cooperation on urban indicators, where Oslo is compared to six other Nordic cities. The comparisons reveal that Oslo is performing relatively well; it has amongst the smallest amount of energy consumed per capita and the second highest share of renewable energy. Despite these comparisons, it is obvious from the ecological footprint sub-parameter that Oslo (and the other Nordic cities) needs to reduce its energy consumption when viewed in conjunction with the GHG emissions indicator.

### *Greenhouse gas emissions*

From the same Nordic city comparisons Oslo has amongst the lowest GHG emissions. However, the levels have increased steadily since 1990. In contrast, other cities, e.g. Stockholm, have managed to decrease their GHG emissions over the same period of time.

### *Ecological footprint*

Ecological footprinting is used here as a tool to indicate Oslo's and Norway's energy use compared to the available resources within the geopolitical boundaries and the planet. Although one should be aware of the inherent assumptions and inaccuracies of the tool,<sup>74</sup> it is here used to illustrate that in a global context Oslo emits a significant amount of greenhouse gases. Both Oslo's and Norway's footprint is presented because the city is dependent on the activities elsewhere in the country. Compared to Earth's biocapacity the city has an ecological footprint far too large.

### *Value assigned: Energy*

The parameter's value is 2,5. Although Oslo compared to other Nordic cities consumes less energy and emits a smaller amount of GHG's, comparisons between cities are not as valid. When considered in the context of the Earth's biocapacity this overrides the comparisons and hence lowers the total value.

## **Resource flows and material cycles**

Because waste decomposition produces the GHG methane, it is important for our climate to reduce the total volume of material that is sent to landfill. Making use of waste can be a valuable source of energy and decrease the pressure on non-renewable energy resources. Still, producing waste consumes natural resources and handling waste is expensive, requires energy and releases GHGs and other pollutants.<sup>75</sup> It is therefore important to reduce the total amount of waste generated. Hence, two indicators are used in the analysis; the amount of waste produced per person, and the amount of waste which is utilized for other purposes.

ECOLOGY					
Resource flows and material cycles					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Amount of waste	The total amount of waste produced should be reduced in order to limit environmental degradation. <sup>25</sup>	Household waste per person per year	Oslo: 405 kg per person per year. <sup>26</sup>	Oslo is compared to: Norway: 414 kg/pers/yr. <sup>27</sup> Copenhagen: 474 kg/pers/yr. <sup>28 29</sup> Stockholm: 391 kg/pers/yr. <sup>30</sup>	3,5

<sup>74</sup> C. Aall and I.E. Norland, "Det økologiske fotavtrykk for Oslo kommune – resultater og forslag til anvendelse av økologisk fotavtrykk som styringsindikator." *ProSus*, 1, (2002).

<sup>75</sup> G. Boyle, B. Everette and J. Ramage, *Energy Systems and Sustainability. Power for a sustainable future*. (Oxford: Oxford University Press, 2003).

Recycled waste	There should be an efficient recycling system to minimise the amount of waste sent to landfills. <sup>31</sup>	Percentage of waste recycled	Oslo's waste recycled (incl. energy recovery in brackets): 40% (79%) <sup>32</sup>	Oslo is compared to (incl. energy recovery in brackets): Norway: 50% (71%) <sup>33</sup> Copenhagen: 23% (97%) <sup>34</sup> Stockholm: 23% (99%) <sup>35</sup>	4
Wastewater treatment	All wastewater should be effectively treated to minimise water pollution.	1) Percentage of sewage treatment coverage 2) Small-scale closed loop systems or regional wastewater treatment	Wastewater treatment in Oslo: 1) 100% of sewage waste goes through chemical-biological treatment. 2) Wastewater is treated regionally and released into the Oslo fjord. <sup>36</sup>	Oslo is compared to Norway's average: 1) 80% of sewage waste goes through chemical-biological treatment. <sup>37</sup>	4
Local water quality	The quality of the local water sources should be high as defined by the Oslo Commune.	Water quality of Akerselva.	Akerselva varies between grades 2 and 4. The rivermouth varies between grades 3 and 4. <sup>38</sup>	Target: highest grade; 1 (very good) Lowest grade; 5 (very bad)	3
<b>Total value</b>					<b>3,6</b>

Table 3: *Resource flows and material cycles*

#### *Amount of waste*

For waste and recycled waste only data for Oslo Commune was obtainable. This data is compared to Stockholm, Copenhagen and the national average. Oslo's inhabitants produce less waste than the national average and Copenhagen, but a little more than Stockholm. The sub-parameter must however be considered in correlation with the amount of waste recovered, as discussed in the section below.

#### *Recycled waste*

Oslo has higher recycling rates than the other Scandinavian cities, while Stockholm and Copenhagen have more energy recovery from waste. Compared to the Norwegian average it is apparent that Oslo can recycle more. Furthermore, as Stockholm exemplifies, it is possible to obtain 99% energy recovery. Although not directly comparable, if one considers how much waste is produced in relation to how much is recycled (not including energy recovery) Oslo produces more waste than the national average. However, it produces over thirty percent less waste than the other Scandinavian capitals.

#### *Wastewater treatment*

The wastewater treatment sub-parameter is divided into two indicators. The first concerns the percentage of sewage treatment coverage in the Oslo region. The second considers whether wastewater is treated regionally or through small-scale closed loop systems, such as through greywater recycling or biogas production. In the Oslo region all of the household wastewater is treated regionally in large treatment plants and released into the Oslo Fjord.

#### *Local water quality*

Sagene Urban District has the river Akerselva running through it, which is important for the natural environment, the general wellbeing of the people and the historical and cultural identity of the area. However, the river has around one hundred surface water pipes leading to it in case of flooding, and forty

emergency sewage water pipes in case of system failures. The river is also prone to accidental occurrences industrial waste releases.<sup>76</sup> Thus, the water quality varies a considerable amount.

*Value assigned: Resource flows and material cycles*

The parameter receives a value of 3,6. Recycled waste and wastewater treatment are assigned high values, which are countered by the local water quality and amount of waste produced.

**Traffic and mobility**

Although the traffic and mobility parameter is under the ecology section the subject also considers economic and social aspects of sustainability. Economically, it is important to have high mobility, e.g. easy access to workplaces. Socially, it is important to reduce the amount of traffic in the streets in order to provide a safe and humane environment for people. Ecologically, it is essential to reduce energy-use and the amount of pollutants released into the environment. Therefore, public transport, walking and cycling should be prioritized and public services should be decentralised in order to be available for all citizens.<sup>77</sup>

ECOLOGY					
Traffic and mobility					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Public transport, walking and cycling facilities	A good and efficient public transport system should be provided to reduce the amount of trips by private cars and to ensure a high freedom of mobility for the inhabitants.	1) Percentage of trips compared to total km/yr by transport mode 2) Sagene's public survey 2009 : public's satisfaction with (a) public transport, (b) cycling roads and (c) pavements.	1) Inner Oslo, % of trips: a) Public transport: 24% b) Cycling & walking: 49% c) Car: 26% <sup>39</sup>  2) Sagene's public survey 2009: a) Publ. transport: 5 [4,69] b) Cycling roads: 3 [2,59] c) Pavements: 4 [3,97]	1) Oslo is compared to Freiburg, Germany: a) Publ. transport.: 18% b) Cycling & walking: 52% c) Car: 29% <sup>40</sup>  2) Target: grade 5.	4
Safety in traffic for all users	The number of people affected by road accidents should be minimised. <sup>41</sup> People should feel safe in the traffic, particularly pedestrians and cyclist who are more vulnerable to serious injuries.	1) Number of accident per 1000 inhabitant. 2) Sagene's public survey 2009 : the feeling of safety for (a) motorists, (b) cyclists and (c) pedestrians.	1) Sagene Urban District has the lowest number of accidents in all of Oslo with a value of 0,92. <sup>42</sup> 2) Sagene's public survey 2009: a) Motorists: grade 4[3,74] b) Cyclist: grade 3 [2,64] c) Pedestrian: grade 4 [3,79]	1) Sagene is compared to Oslo's average accident value of 1,66. <sup>43</sup> 2) Target: grade 5.	4
<b>Total value</b>					<b>4</b>

Table 4: *Traffic and mobility*

<sup>76</sup> Oslo Kommune. Vann- og Avløpsetaten. *Fakta om Akerselva*. 25.07.2005

[http://www.vann-og-avlopsetaten.oslo.kommune.no/vassdrag\\_og\\_fjord/vassdragene\\_i\\_oslo/akerselva/article49482-16063.html](http://www.vann-og-avlopsetaten.oslo.kommune.no/vassdrag_og_fjord/vassdragene_i_oslo/akerselva/article49482-16063.html) (accessed 15.05.09).

<sup>77</sup> Coplak and Raksanyi.

*Public transport, walking and cycling facilities*

The sub-parameter covers the public’s mobility habits and their satisfaction of the services provided by the commune. Updated and comparable transport data from other Scandinavian cities were not obtainable. Therefore, data from Freiburg in Germany is used, a city well-known for their sustainability implementations in the transportation sector as well as in many other areas. The comparison reveals Oslo with equally significant, if not more, services than Freiburg. Sagene’s public survey 2009 evaluates the provision of public transport, cycling roads and sidewalks at Sagene. The results show that the public is “very satisfied” and “satisfied” with the public transport system and the provision of sidewalks. The district is, however, lacking an adequate provision of cycling roads.

*Safety in traffic for all users*

The second aspect covers people’s safety in traffic at Sagene, valued both through the consultation of statistical data and Sagene’s public survey 2009. Compared to other districts in Oslo, the results show that Sagene’s population both feel and are quite safe. The limiting factor can be linked to the above section; Sagene is lacking cycling roads and cyclists feel less safe in the traffic.

Value assigned: Traffic and mobility

The combined value is 4, due to the satisfactory public transport system and comparatively safe traffic situation. It is countered by the lack of cycling roads and general safety for cyclist.

**Health**

The health parameter concerns the amount of pollutants in the air which have negative effects on people and the environment. In addition, the general health of the population is considered, measured by the number of people who suffered from acute heart infarct. The pollutants measured are nitrogen oxides (NOx) and suspended particulates (SP), commonly released from the combustion of fossil fuels in car engines. NOx is a source of acid rain, which has detrimental effects on ecosystems. Both NOx and particularly SP can cause respiratory illnesses and other serious conditions for humans.<sup>78</sup> A third aspect important for human health in an urban context is noise pollution, which is largely influenced by traffic. Noise pollution is a widespread problem in cities. It can cause stress and annoyance, which can lead to disruption of work and rest for the affected people.<sup>79</sup>

ECOLOGY					
Health					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Noise pollution	Noise pollution in the city should be minimised to prevent negative health effects for the inhabitants.	Number of people affected by noise over 55 dBA.	In Sagene, 27.4 % of the population is affected by outdoor noise above 55 dBA. 6.9% are affected by noise indoors. <sup>44</sup>	Sagene compared to Oslo inner city districts' average of 45,1% affected. Those affected by noise indoors is 22%. <sup>45</sup>	3
Air-pollution; Nitrogen Oxide (NOx)	Air pollution in the city should be minimised to prevent negative health effects for the inhabitants.	NOx emission levels Number of days per year in which national limits are exceeded for 1) Kirkeveien	1) Amount of NOx by Kirkeveien was 233 microgram/m <sup>3</sup> in 2008, and exceeded national limits once during that year. 2) The amount by Ringroad 4 was 142, with no data for	Target: 0 days	

<sup>78</sup> D. L. Greene, International Encyclopedia of the Social & Behavioral Sciences. *Sustainable transportation*. (Elsevier Science Ltd, 2001).

<sup>79</sup> Greene.

		2) Ringroad 4	exceeding limits. <sup>46</sup>		4
Air-pollution; Suspended Particulates (SP)	Air pollution in the city should be minimised to prevent negative health effects for the inhabitants.	SP emission levels Number of days per year in which national limits are exceeded for 1) Kirkeveien 2) Ringroad 4	1) Kirkeveien's amount of SP is 65 microgram/m <sup>3</sup> , but the value fluctuates considerably from year to year, e.g. 95 in 2007 and 146 in 2003. Kirkeveien exceeded national limits 3 days in 2008, 15 days in 2007 and 43 days in 2003. 2) Ringroad 4 had 80 microgram per cubic metre in 2008 and exceeded the limit 6 days. <sup>47</sup>	Target: 0 days	3
Medical health	The possibilities for a good health should be ensured for all inhabitants in all areas of the city.	Number of people between 50-79 years of age who suffered from acute heart infarct per 10 000 inhabitants.	In Sagene, 105 per 10 000 inhabitants between the age of 50-79 years of age were treated for acute heart infarct. <sup>48</sup>	Sagene is compared to Oslo inner city districts' average of 114 people per 10 000 inhabitant. The outer city districts' average is 88 people per 10 000 inhabitant. <sup>49</sup>	3,5
<b>Total value</b>					<b>3,4</b>

Table 5: Health

#### *Noise pollution*

Sagene is compared to Oslo's inner city districts' average, where a large part of the population is affected by noise pollution. Sagene's population is not as badly affected, but it is still regarded as a problem.

#### *Air-pollution; nitrogen oxide (NOx)*

Air pollution (NOx and SP) is measured in number of days exceeding national limits in two large roads nearby Sagene, Kirkeveien and Ringroad 4. The results show that the level of NOx is quite low, with only one day exceeding national limits.

#### *Air-pollution; suspended particulates (SP)*

The level of SP pollution exceeds the acceptable levels frequently, although the level is lower in 2008 than the previous years. It should also be noted that when these statistics were released the government was in the process of updating and adjusting their limits for SP. The number of exceeding days might therefore be different when the new limits are published.<sup>80</sup>

#### *Medical health*

The indicator "number of people who suffered from acute heart infarct" is used by Oslo Commune to represent the general health of the public. There can be many causes for heart failure, and is not used here in relation to environmental pollution. The statistics for the general health of people show very large variations from district to district. Comparably Sagene's performance can be considered to be tolerable as there are more heart attacks in other parts of inner Oslo, but much less in the outer districts.

#### Value assigned: Health

All considered Sagene Urban District's issues concerning general health and pollutant levels limit the parameter's final value to 3.4.

<sup>80</sup> The Municipality of Oslo Development and Improvement Authority, 32.

## 2.4.2. Economy

Economic sustainability is a highly debated topic, often concerning the conflicts between the ideologies of economic growth and environmental protection. Environmentalists are usually of the opinion that prioritizing economic growth undermines the goal of reducing our ecological impacts. Further, it deters higher public participation in decision-making and removes the ambition of equity between us and future generations.<sup>81</sup> This assessment of Sagene's economy does not cover economic growth and trade as such. Rather, it measures the human aspect of the economy in terms of employment rate and diversity of occupations. Additionally, the economy dimension includes aspects of e.g. governance, communication and abundance and quality of public and private services. Similar to the ecology dimension, these issues overlap into social aspects as well.

### Economic activity

To have a low unemployment rate is undeniably crucial, both economically and socially for a given area. Thus, it is beneficial to have an intersectoral workforce in order for the society to be less vulnerable in times of crisis.<sup>82</sup>

ECONOMY					
Economic activity					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Employment	There should be a high rate of employment in the population.	Unemployment rate of inhabitants between 16 and 66	Sagene's unemployment level is 2,1%. <sup>50</sup>	Sagene is compared to Oslo inner city districts' average of 2,2%. Average for Oslo is 2,0%. <sup>51</sup>	5
Diversity of employment	There should be employment for the inhabitants in a variety of sectors to reduce vulnerability in times of crisis. <sup>52</sup>	Types of employment in the largest sectors (in %)	Sagene's employment sectors: - priv. & publ.services:29,3% - finance & business: 22,0% - shops & restaurants:20,5% - oil & mineral extraction and related industry: 13,7% - energy & water supplies and constr. work: 12,3% - transport & telecommunication: 3,0% <sup>53</sup>	Sagene is compared to Oslo: - priv. & publ. serv's: 36,1% - finance & bus.: 24,7% - shops & rest's: 19,2% - oil & mineral extraction and related industry: 6,2% - energy & water supplies and constr. work: 6,0% - transport & telecommunication: 7,0% <sup>54</sup>	5
Varied economic base	There should be a varied scale of incomes amongst the inhabitants.	1) Average salaries 2) Scale of salaries	1) Average income in Sagene: 200 298 NOK <sup>55</sup> 2) Sagene's income scale (in NOK): 0 – 99 900: 18.8% 100 000 – 199 900: 20.6% 200 000 – 299 900: 17.2% 300 000 – 399 900: 21.0%	1) Average income in inner Oslo: 223 872 NOK <sup>57</sup> 2) Sagene is compared to Oslo's inner city district's income scale (in NOK): 0 - 99 900: 20,9% 100 000 – 199 900: 18,7% 200 000 – 299 900: 17,1% 300 000 – 399 900: 18,6%	

<sup>81</sup> A. While, A.E.G. Jonas, and D. Gibbs, "The Environment and the Entrepreneurial City: Searching for the "Urban Sustainability Fix" in Manchester and Leeds." *International Journal of Urban and Regional Research*, 28, 3, (2004), 549-69.

<sup>82</sup> Coplak and Raksanyi.

			400 000 – 499 900: 11.0%	400 000 – 499 900: 10,1%	
			500 000 +: 9.2%	500 000 +: 11,3%	
			Unknown: 2.0% <sup>56</sup>	Unknown: 3,2% <sup>58</sup>	5
<b>Total value</b>					<b>5</b>

Table 6: *Economic activity*

#### *Employment*

Sagene's unemployment rate is similar to both inner Oslo and Oslo's average. The unemployment rate of all the compared areas is very low.

#### *Diversity of employment*

Sagene has a high diversity of employment sectors, which correspond with the overall employment sectors in Oslo.

#### *Varied economic base*

The average yearly income for Sagene is slightly less than the average for inner Oslo, but a comparatively low average income does not imply that the economy is unsustainable. The aspect of average incomes will be assessed further in relation to property values under the cost parameter. The salaries vary significantly between the different districts, and Sagene seems to have a greater diversity of incomes than most other areas in Oslo.

#### Value assigned: Economic activity

Sagene obtains a value of 5 as it has not only a significantly low unemployment rate, but also a high diversity of work and a varied economic base.

#### **Services**

Having the appropriate services locally is important across the whole spectrum of sustainability. It is, naturally, more convenient for the public and reduces the need for transportation. It also generates local jobs, more liveliness and interactions between people in neighbourhoods. Going to school or working locally increases people's feeling of identity and sense of belonging to their district.

<b>ECONOMY</b>					
<b>Services</b>					
<b>Sub-parameter</b>	<b>Objective</b>	<b>Indicator(s)</b>	<b>Finding(s)</b>	<b>Comparison(s) / target(s)</b>	<b>Value [ 1-5 ]</b>
Schools and kindergartens	Schools and kindergartens should be provided locally for all children in order to further support decentralisation of services and foster community relations.	School and kindergarten coverage percentages	Sagene's - Local kindergarten coverage: 71.9 % <sup>59</sup> - Local school coverage year 1-7: 95.7 %. - Local school coverage year 7-10: 102.6 %. <sup>60</sup>	Target: 100% local school and kindergarten coverage.	4
Public services	Public services should be provided at a high standard locally in order to further support decentralisation and foster community	Oslo Commune Public Survey 2004 and 2007; Satisfaction with public services in your district.	Sagene average 2004: Grade 3,2 <sup>61</sup>	Target: grade 5. Sagene is compared to Oslo average 2004 and [2007]: Grade 3,2 <sup>62</sup> [3,7] <sup>63</sup>	3,5

	relations.				
Commerce; private shops	There should be a sufficient amount of high quality local shops in order to further support decentralisation of services and foster community relations.	Sagene's public survey 2009 : population's opinion on the availability of adequate shopping facilities	Sagene's public survey 2009 : grade 4 [3,49]	Target: grade 5.	4
Culture and activities	Culture and activities should be locally available for all ages in order to further support decentralisation of services and foster community relations.	Sagene's public survey 2009: population's opinion on the availability of culture and activities for (a) adults (b), youth (c) children and (d) sports.	Sagene's public survey 2009 : a) Adults: grade 3 [3,22] b) Youth: grade 3 [3,07] c) Children: grade 4 [3,63] d) Sports: grade 4 [3,72] Average all: 3,41.	Target: grade 5.	3,5
<b>Total value</b>					<b>3,8</b>

Table 7: *Services*

#### *Schools and kindergartens*

The statistics show that local school coverage is very high, while local kindergarten coverage is somewhat lacking.

#### *Public services*

Oslo Commune's public survey 2004 assesses people's satisfaction with the public services at Sagene. According to the survey, the public is "tolerably satisfied" with the availability of public services. Oslo Commune's public survey 2007 was only available for Oslo as a whole commune. The comparison suggests that the services have improved from 2004 to 2007, but one cannot know for certain whether or to what extent this relates to Sagene specifically.

#### *Commerce; private shops*

The indicator for commerce is derived from Sagene's public survey 2009. Public's satisfaction with local shops was measured and reveals that people are "satisfied" with the availability of private shops.

#### *Culture and activities*

Culture is very much a social aspect as it is an expression of human interactions in the society.<sup>83</sup> Still, culture and activities are part of a place's provision of services, whether they are public or private. History, another aspect of culture which is an important factor in the identity of a place, is covered under the society dimension. People's satisfaction with culture and activities was measured in Sagene's public survey 2009. The results show that the respondents are "tolerably satisfied" with the provision for adults and youth. Regarding the availability of culture and activities for children and for sport related activities, people are "satisfied".

#### Value assigned: Services

The combined value for all the services considered is 3,8. Local school coverage and the availability of shops receive high values, which are lowered by kindergarten coverage, general public services as well as culture and activities.

<sup>83</sup> Coplak and Raksanyi.

## Communication

For a democratic society it is vital to have good communication between the governing body and the public. The government should be efficient and transparent and the public should have access to and be informed of the matters concerning their community. It is essential for the participation and involvement of the citizens that communication with the local government goes both ways.<sup>84</sup> Furthermore, the public should have easily accessible opportunities to follow the affairs of the global society.

ECONOMY					
Communication					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
High information density	There should be easily accessible opportunities for the public to follow local, national and international affairs.	Broadband Internet coverage	Oslo's average 70,7% <sup>64</sup>	Oslo is compared to Norway's average: 67,1% <sup>65</sup>	4
Efficiency and transparency of the political system	There should be efficient two-way communication between the public and the local government. <sup>66</sup>	Oslo Commune Public Survey 2004 and 2007: Public's satisfaction with the information from Oslo Commune.	Sagene 2004 Grade: 3,1 <sup>67</sup>	Target: grade 5. Oslo 2004 and [2007]: Grade: 3,3 <sup>68</sup> [3,5] <sup>69</sup>	3
<b>Total value</b>					<b>3,5</b>

Table 8: *Communication*

### *High information density*

As data was not available for Sagene, the sub-parameter is measured by the broadband Internet coverage in Oslo and compared to the national average. The results show that Oslo's inhabitants have high broadband internet coverage. Still, the coverage has the potential to be higher, and from the evaluation of the trends in the recent years it probably will increase.<sup>85</sup>

### *Efficiency and transparency in the political system*

For this sub-parameter it is harder to identify a suitable indicator. Oslo Commune's Public Survey from 2004 is used to measure Sagene's satisfaction with the information received from the municipality. The grade is also compared to the average value for Oslo in 2004 and 2007. Sagene's satisfaction level is defined as "tolerable", which is lower than the city average. The grade for Oslo improved from 2004 to 2007, although the increase was minimal.

### Value assigned: Communication

The total obtained value is 3,5, due to the public's only tolerable satisfaction with the information provided by the commune and a relatively moderate broadband coverage.

<sup>84</sup> Coplak and Raksanyi.

<sup>85</sup> Statistics Norway. *Privatmarknaden. Breibandsabonnement fordelt etter overføringskapasitet og fylke inkludert Svalbard. 3. kvartal 2008. 12.12.2008.*

<http://www.ssb.no/inet/arkiv/tab-2007-02-01-01.html> (accessed 15.05.09).

## Governance

Having a well functioning and democratic government is evidently crucial for a society's performance. The governance parameter is measured by the district's commitment to sustainable development and their democratic involvement with the public.

ECONOMY					
Governance					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Commitment to sustainable development	The government should work towards environmental, economic and social sustainability.	1) Local Agenda 21 2) "Miljøfyrtårn" (environmentally certified) organisations	1) Sagene Urban District is committed to LA21 and sustainable development. They have an encompassing plan for 2008-2012. <sup>70</sup> 2) Sagene has certified 7 out of approximately 30 district-owned organisations. It has a goal to certify all by the end of 2009. <sup>71</sup>	1) Target: The district should be committed to LA21 and meet the specified goals within the allotted timeframe. 2) Target: All district-owned organisations should be environmentally certified.	4,5
User involvement	Public participation and involvement should be an integrated part of decision-making and governance in the district.	Percentage of participants in local elections	Sagene's voting coverage: 55,7% <sup>72</sup>	Sagene is compared to Oslo's inner city districts' average: 53% Oslo's average: 57,4% <sup>73</sup>	3
<b>Total value</b>					<b>3,75</b>

Table 9: Governance

### *Commitment to sustainable development*

Sagene Urban District's extent of and achievements with LA21 implementation is assessed. This is not a numeric indicator, therefore the amount of environmentally certified organisations are used as a complimentary numerical measurement. The assigned value is high as the district has been very devoted to LA21 since 2001, and has implemented many successful projects.<sup>86</sup> Although only one quarter of the district-run organisations have been environmentally certified, the district has a goal to certify all within 2009.<sup>87</sup>

### *User involvement*

The sub-parameter is measured by the participation rate amongst Sagene's public in the 2007 local elections. The results show that Sagene's rate is above the inner city districts' average, but slightly below Oslo's average. Ideally, participation should be higher as a relatively low participation in local elections indicates that there is not much involvement in local political issues as a whole. Participation in the municipal election is higher, at 62%. Still, the voting rates are quite low compared to Gothenburg and Stockholm with 76% and 79%, respectively.<sup>88</sup>

<sup>86</sup> Oslo Kommune. Bydel Sagene. *Vedlegg til Plan for bærekraftig bydelsutvikling 2008-2012.*

<sup>87</sup> Oslo Kommune. Bydel Sagene. *Plan for bærekraftig bydelsutvikling 2008-2012.*

<sup>88</sup> The Municipality of Oslo Development and Improvement Authority, 362.

*Value assigned: Governance*

The total assigned value is 3,75. The reasoning behind this value is mainly influenced by the local government's dedication to sustainability, as the user involvement is rather low.

**Cost**

The parameter considers the cost of properties and maintenance in relation to the public's income. On a long-term basis, it is important that the property values do not rise more than the current population's income, as this would result in a shift in the socio-economic structure of the area.

ECONOMY					
Cost					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Monetary value of buildings and flats	Properties should be affordable relative to the present population's income.	Price per square metre compared to people's income.	Sagene's average yearly income: 200 298 NOK <sup>74</sup> Sagene's properties' average price/sq m: 38 000 NOK <sup>75</sup> [5,3 sq m per yearly average income]	Sagene is compared to: Oslo's average yearly income: 241 363 NOK <sup>76</sup> Oslo's properties' average price/sq m: 35 600 NOK <sup>77</sup> [6,8 sq m per yearly average income]	3
Cost of maintenance and services	The cost of maintenance and services should be affordable in relation to the population's income.	Municipal taxes on dwellings (for provision of water, sewage, maintenance, cleaning)	Oslo's municipal taxes on dwellings: 5955 NOK <sup>78</sup>	Oslo compared to national average of 8272 NOK (Highest 12 269 NOK, lowest 4 749 NOK) <sup>79</sup>	5
<b>Total value</b>					<b>4</b>

Table 10: *Cost*

*Monetary value of buildings and flats*

The inhabitants of Sagene have a smaller average income compared to the rest of Oslo. The apartments are, at the same, time more expensive. As the district was previously a working-class area and has been revitalised during the last 10 years, its popularity and houseprices have increased more than people's incomes. From 2003 until 2007 Sagene's houseprices increased by 40%, the highest increase amongst the urban districts.<sup>89</sup> Through this it is understood that people's incomes compared to houseprices are lower than Oslo's average.

*Cost of maintenance and services*

Each dwelling in Norway is required to pay a tax towards maintenance and services, such as for sewage, water and street cleaning. According to the system and the need, this tax varies from place to place. The indicator here is used to assess how well the system for maintenance is in Oslo. Compared to the average income, the cost of maintenance in Oslo is lower than the national average. This is particularly beneficial for Sagene's population which has an income 40% lower than the city average.

<sup>89</sup> The Municipality of Oslo Development and Improvement Authority, 133.

Value assigned: Cost

The combined value is 4. The property values compared to incomes receives a medium grade, which is heightened by the value received by the relatively low maintenance cost.

### 2.4.3. Society

A sustainable society is an active society with a strong identity, where people feel safe and included. It is a place where people are bound together, not only because of their common geographical and political borders, but also because of the area’s culture and history.<sup>90</sup> This assessment covers these community-related aspects of society, but also tries to connect the issues to the global society.

#### Social diversity

Social diversity is beneficial for a society. It means having a population with a wide spectrum of ages, incomes, employments and cultures. Diversity encourages a higher understanding between different types of people and creates a livelier society. Housing for a variety of people prevents segregation and improves social equity.<sup>91</sup>

SOCIETY					
Social diversity					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Socio-economic mix	There should be a wide spectrum of ages, incomes, employments and cultures in a society, to prevent segregation and improve social equity.	Income scale (already covered in 2.1. economic activity)	Sagene’s income scale: 0 – 99 900: 18.8% 100 000 – 199 900: 20.6% 200 000 – 299 900: 17.2% 300 000 – 399 900: 21.0% 400 000 – 499 900: 11.0% 500 000 +: 9.2% Unknown: 2.0% <sup>80</sup>	Sagene is compared to Oslo inner city districts’ income scale: 0 - 99 900: 20,9% 100 000–199 900: 18,7% 200 000–299 900: 17,1% 300 000–399 900: 18,6% 400 000–499 900: 10,1% 500 000 +: 11,3% Unknown: 3,2% <sup>81</sup>	5
Mixed ages	There should be a wide spectrum of ages, incomes, employments and cultures in a society, to prevent segregation and improve social equity.	Age structures	Sagene’s age structures: age 0-12: 10,8 % age 13-19: 3,0 % age 20-39: 53,8 % age 40-66: 24,9 % age 67+ : 7,5 % <sup>82</sup>	Sagene is compared to Oslo’s average: age 0-12: 15,1 % age 13-19: 6,7 % age 20-39: 36,1 % age 40-66: 31,3 % age 67+ : 10,7 % <sup>83</sup>	4
<b>Total value</b>					<b>4,5</b>

Table 11: *Social diversity*

#### *Socio-economic mix*

The indicator for this sub-parameter, income scale, is already assessed in the economy section, under the sub-parameter “varied economic base”. In this section the same indicator is used to demonstrate the variability of socio-economic groups and diversity, rather than the economic concerns of employment. The

<sup>90</sup> Coplak and Raksanyi.

<sup>91</sup> Coplak and Raksanyi.

indicator is compared to the average for Oslo inner city districts, and shows that there is a broad variety of people's incomes in Sagene.<sup>92</sup>

#### *Mixed ages*

The age structures for Sagene compared to the average in Oslo shows that the district has less children, youth and over 40's and more young adults between 20-39. This is the same for all five inner city districts, where more than half of the population is in this age group.<sup>93</sup> It is usually more attractive for families with school children to move outside the inner districts to less dense areas.

#### Value assigned: Social diversity

The parameter obtains a total value of 4,5, because it has a very broad socio-economic mix. It would be optimal to obtain evenness amongst the age groups and thus this category lowers the parameter to a small extent.

#### **Accessibility**

Accessibility regards the inclusion of all types of people in the society through the provision of equal access to public goods and opportunities. Special consideration should be placed on the most vulnerable members of the community, such as children, youth, elderly, disabled and immigrants.<sup>94</sup>

SOCIETY					
Accessibility					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Inclusivity of all groups of people; children, elderly, handicapped	All people in a society should have equal access to public goods and opportunities. <sup>84</sup>	Oslo Commune Public Survey 2004 and [2007]	Sagene's average grade for 2004: Satisfaction of living environment for: - Children: 3,1 - Youth: 2,9 - Growing old in the district: 3,0 - Coverage (in relation to need) of special housing for elderly and disabled: 2,8 <sup>85</sup>	Target: grade 5. Sagene is compared to the average grade for Oslo 2004 and [2007]: Satisfaction of living environment for - Children: 3,9 [4,0] - Youth: 3,6 [3,6] - Growing old in the district: 3,4 [3,5] - Coverage in relation to need of special housing for elderly and disabled: 2,7 <sup>86</sup> [2,8] <sup>87</sup>	3
Integration of immigrants	All people in a society should have equal access to public goods and opportunities. <sup>88</sup>	Oslo Commune Public Survey 2007; people with non-Western background compared to Norwegian people	Average grade for people with non-Western background for all of Oslo:  Public satisfied with: -Work opportunities: 57% - Education opportunities: 53% - Cultural activities:	Non-Western people's averages are compared to Norwegian people for all of Oslo:  Public satisfied with: -Work opportunities: 78% -Education opportunities: 67% -Cultural activities: 64% <sup>90</sup>	3

<sup>92</sup> The Municipality of Oslo Development and Improvement Authority, 296.

<sup>93</sup> The Municipality of Oslo Development and Improvement Authority, 47.

<sup>94</sup> Coplak and Raksanyi.

			37% <sup>89</sup>		
<b>Total value</b>					<b>3</b>

Table 12: *Accessibility*

*Inclusivity for all groups of people; children, elderly, handicapped*

The sub-parameter assesses the living environment for children, youth and elderly, as well as the available special housing for disabled and elderly people. The indicator is the 2004 Public Survey by Oslo Commune for Sagene and Oslo. The 2007 survey for Oslo is used to recognize the trend, although it is difficult to know if an increase or decrease in satisfaction levels for the whole city can be related to Sagene specifically. The results demonstrate that children, youth and elderly people in Sagene are less satisfied with their living environment compared to the average for the city. The availability of special housing is similar to the rest of Oslo, and the average grade from the survey is “tolerable”.

*Integration of immigrants*

The second aspect of accessibility is the integration of immigrants. Sagene has 17% non-Western immigrants compared with the average of Oslo’s inner city of 18%.<sup>95</sup> Oslo Commune’s Public Survey 2007 illustrates that Norwegian-born people are much more satisfied with opportunities for work, education and culture than immigrants from non-Western countries.<sup>96</sup> Here it was not possible to assess the outcome specifically for Sagene, but a similar trend to the rest of Oslo is assumed.

Value assigned: Accessibility

The total assigned value for the accessibility parameter is 3 due to the minority groups’ low satisfaction levels with their living environment and opportunities.

**Security**

*Security* is concerned with one social aspect; the security of the people from crime-related incidents. It is, however, not only concerned with how many people are victims of crime; it is also a question whether the people feel safe in their local environment.

<b>SOCIETY</b>					
<b>Security</b>					
<b>Sub-parameter</b>	<b>Objective</b>	<b>Indicator(s)</b>	<b>Finding(s)</b>	<b>Comparison(s) / target(s)</b>	<b>Value [ 1-5 ]</b>
Crime	The public should be and feel safe from crime-related incidents.	1) Acts of crime per 1000 people 2) Sagene’s public survey 2009 : population’s feeling of safety	1) Sagene has 144,7 crimes per 1000 people. <sup>91</sup> 2) Sagene’s public survey 2009 : Grade 4 [3,85]	1) Sagene is compared to Oslo’s inner city districts’ average of 218 crimes per 1000 people. There are, however, large variations; district with highest crime is 342 per 1000 people. The inner district with the lowest crime is Sagene. <sup>92</sup> 2) Target: grade 5.	4
<b>Total value</b>					<b>4</b>

Table 13: *Security*

<sup>95</sup> The Municipality of Oslo Development and Improvement Authority, 55.

<sup>96</sup> Oslo Kommune. *Publikumsundersøkelsen 2007*.

## Crime

Both statistics and Sagene's public survey 2009 are used to assess this aspect. The results show that Sagene has the lowest crime rate of the inner city districts. This is also lower than the city average.<sup>97</sup> The respondents in the survey expressed satisfaction with their feeling of safety in their district.

### Value assigned: Security

Sagene receives a grade 4 in the parameter, as both statistics and the public express satisfactory levels of security.

## Involvement

Involvement is here defined by people's interactions and contributions to their community on a social level by e.g. participating in volunteer work, public meetings, sport clubs and other activities. Such involvement demonstrates the level of social capital in a society, which is a term describing the networks and shared values of people. Strong communities not only increase the relationships between people but also their connections to the area. A strong community can also play an important part in creating a more sustainable society through participation and shared responsibilities.<sup>98</sup>

SOCIETY					
Involvement					
Sub-parameter	Objective	Indicator(s)	Finding(s)	Comparison(s) / target(s)	Value [ 1-5 ]
Opportunities for participation in community work	There should be sufficient possibilities for the public to be involved in the community to increase communal relations.	1) Available opportunities 2) Sagene's public survey 2009: (a) public's opinion on opportunities and (b) public's knowledge of available opportunities	1) There is a sufficient amount of volunteer opportunities in Sagene. 2) Sagene's public survey 2009 : a) Opinion: grade 4 [3,72] b) Knowledge: 43% of respondents	1) Target: High availability of opportunities to participate in volunteer work for the public. 2) Target: High knowledge of these opportunities.	3,5
Involvement in non-profit organisations	There should be a high level of public involvement in the community to increase communal relations.	Oslo Commune Public Survey 2007; "how often do you volunteer in non-profit organisations?"	Oslo's average: - Daily: 1% - A few times a week: 6% - A few times a month: 9% - A few times a year: 11% - Less than above: 21% - Never: 47% <sup>93</sup>	As high as possible	3
Global involvement	People and communities should contribute to global equity by being responsible	Dedication to Fair Trade labelling	As part of their LA21 plan for 2008-2012, Sagene has a goal to increase its share of ethical and environmentally responsible products and it give training to the district's employees on ethical	Target: to support Fair Trade and be a Fair Trade commune. There are 14 Fair Trade Communes in Norway, and 40 communes which are	

<sup>97</sup> Statistics Norway. *Anmeldte lovbrudd, etter utvalgte lovbruddsgrupper, gjerningsfylke og -kommune. Gjennomsnitt for 2004 og 2005. Absolutte tall og per 1 000 innbyggere.*

<http://www.ssb.no/emner/03/hjulet/hjulet2006/tabell-07.html> (accessed 15.05.09).

<sup>98</sup> Worldwatch Institute. *State of the World 2008. Innovations for a Sustainable Economy*, 152-154.

	for the products they consume.		consumption. Within the time period it will apply to become a Fair Trade urban district. <sup>94</sup>	working on becoming one. <sup>95</sup>	4
<b>Total value</b>					<b>3,5</b>

Table 14: *Involvement*

*Opportunities for participation in community work*

The first part of this sub-parameter is based on an evaluation of available volunteering organisations in the district, i.e. not a quantitative indicator. It concludes that there is a sufficient amount of volunteering opportunities in the district. The second aspect reviews whether the public is aware of the opportunities and the public survey reveals that many are not. The reasons for this can be that people are not interested in being involved and/or because these organisations have not reached out to the public sufficiently.

*Involvement in non-profit organisations*

Oslo Commune's Public Survey from 2007 illustrates Oslo's populations' involvement in volunteer work. It indicates that the involvement is quite low. A similar pattern is assumed for Sagene.

*Global involvement*

The first two sub-parameters focus on involvement at the local scale. The third sub-parameter is concerned with citizens' responsibility to work towards fairness and equality on a global scale. As a consumer, this can be done by choosing products with a known origin and conditions of production, e.g. by selecting products labelled Fair Trade. Communes, towns, cities, and urban districts can also obtain the Fair Trade certification, which requires that the commune actively promotes the label.<sup>99</sup> Thus, this indicator evaluates Sagene Urban District's use of Fair Trade products within the local government, as well as their plans to become a Fair Trade urban district. A goal in Sagene's LA21 plan for 2008-2012 is to increase its share of ethical and environmentally responsible products and educate the district's employees on ethical consumption. Within the time period, Sagene will apply to become a Fair Trade urban district.<sup>100</sup>

*Value assigned: Involvement*

The overall value is 3,5. Sagene Urban District could benefit from a higher participation, both socially and economically. Concerning global involvement and responsibility, the government is working towards improving ethical consumption of goods. For this they receive a high mark on the SVM, although it will not receive top marks until the district has become a Fair Trade urban district and volunteerism has increased.

**Aesthetics and identity**

Visual aesthetics are important for the public's wellbeing, but also for their feeling of pride and connection to a place, and thus their own identity. Additionally, it is important for an area to be attractive for people and businesses. Unattractive areas or buildings are classified by some as visual pollution, as they can reduce the quality of life for residents.<sup>101</sup> Visual pollution can also have effects overlapping into the economic dimension, e.g. though lowering property values.

<b>SOCIETY</b>					
<b>Aesthetics and identity</b>					
<b>Sub-parameter</b>	<b>Objective</b>	<b>Indicator(s)</b>	<b>Finding(s)</b>	<b>Comparison(s) / target(s)</b>	<b>Value [ 1-5 ]</b>

<sup>99</sup> Fairtrade Max Havelaar Norge.

<sup>100</sup> Oslo Kommune. Bydel Sagene. *Plan for bærekraftig bydelsutvikling 2008-2012*.

<sup>101</sup> Coplak and Raksanyi.

Visual aesthetics of urban objects, e.g. buildings, streets, squares etc.	The public should be satisfied with the aesthetics of their urban environment.	1) Sagene's public survey 2009 : population's opinion on visual aesthetics 2) Oslo Commune Public Survey 2007: percentage of Sagene's public who to a large extent think they live in a pleasant area	1) Sagene's public survey 2009 : grade 3 [3,08] 2) Oslo Commune Public Survey, Sagene: 49% <sup>96</sup>	1) Target: grade 5. 2) Target: 100%	3
Sense of belonging to the neighbourhood	The public should have a strong sense of belonging to their urban district and be proud to let it be a part of their identity.	Sagene's public survey 2009 : population's feeling of belonging to the neighbourhood	Sagene's public survey 2009 : grade 4 [3,83]	Target: grade 5.	4
Historical and cultural identity of Sagene	The community should preserve monuments, buildings and stories of cultural and historical value to maintain and increase the identity of the area.	Historical buildings, monuments and literature.	As an old industrial worker's area of Oslo from the 1600's, Sagene has a strong historical identity with many remaining buildings and monuments. It also has much fictional and historical literature about this, as well as history clubs. <sup>97 98</sup>	Target: A strong historical identity.	5
<b>Total value</b>					<b>4</b>

Table 15: *Aesthetics and identity*

*Visual aesthetics of urban objects, e.g. buildings, streets, squares etc.*

The sub-parameter is measured using two different surveys. Sagene's public survey 2009 assesses the public's opinion on the visual aesthetics in Sagene Urban District, such as buildings, streets and squares. This obtained the grade of "tolerable satisfaction". The complimentary survey was Oslo Commune's Public Survey from 2007, where Sagene's inhabitants were asked to what extent they think they live in a pleasant area. Here, 49% think they do to a "large extent".<sup>102</sup> Oslo Commune's survey received a more positive answer than Sagene's public survey 2009, but this is due to the nature of the questions posed. "Pleasantness" is a broader term and can also include other aspects than aesthetics, such as the amount of greenery and traffic.

*Sense of belonging to the neighbourhood*

The second sub-parameter uses the public Sagene's public survey 2009 to assess people's feeling of belonging to their neighbourhood. According to the survey the respondents are "satisfied".

*Historical and cultural identity of Sagene*

The historical and cultural identity of Sagene is based on an evaluation rather than a numeric indicator. This is because it was difficult to acquire a suitable indicator for the aspect of identity. From this assessment Sagene Urban District has a strong historical identity.

<sup>102</sup> Oslo Kommune. Publikumsundersøkelsen 2007.

### Value assigned: Aesthetics and identity

The combined value is 4. The sense of belonging to the neighbourhood and the historical identity of the area are high, while the only “tolerable” visual aesthetics decreases the value to a small extent.

## **2.5. Discussion of the results and proposed solutions**

Sagene Urban District shows a relatively high overall sustainability compared to the targets and comparisons in the assessment. However, there are still several aspects which should be addressed for improvement. Below is a discussion of the weaker points from the findings of the indicators. Here is also an attempt to see connections between these issues with some suggestions and examples for how they might be improved.

In the Ecology dimension Sagene needs to focus on:

- Providing more space for community gardens and allotments, as well as more habitats for wildlife.
- Drastically reducing greenhouse gasses, particularly in the transport sector.
- Treating wastewater and particularly stormwater locally to reduce pollution in Akerselva and the Oslofjord.
- Reducing the amounts of household waste produced.
- Providing more cycling roads for better and safer alternatives to motorized transport.
- Reducing noise and SP pollution.

From these points one can see several connections. Firstly, although the data for shares of transportation indicates that inner Oslo has an excellent public transportation system which is greatly utilized by the public, there is still too much motorized traffic. This consumes large amounts of nonrenewable energy and emits GHGs and other pollutants. Thus, this is an area which should be in focus for future improvements. Secondly, there can be stronger connections between green areas, stormwater absorption and air and water pollution.

A solution to these problem areas is to have a greater amount of natural vegetation in the green areas rather than lawns space. This could also be in the form of areas for fruit and vegetable production. Further, many paved areas, flat roofs and external walls of buildings could provide ample space for vegetation. Also, small wetlands and ponds could be created. These measures would provide several benefits. More stormwater would be absorbed, which would cause less water pollution in the river and the fjord. They would provide natural habitats for resident species. The vegetation would also absorb CO<sub>2</sub> and other pollutants and the soft surfaces would reduce noise. Vegetable gardens could compost food-waste which will improve soil quality. One can also stretch the benefits to include people’s physical and mental health. Not only because of the decreased pollution, but also because gardening is well known as natural and preventative therapy for people.

Other solutions can provide further connections between the problem areas. An excellent example is in the city of Fredrikstad in Norway where the busses run on biogas (methane) produced by the inhabitants’ food and sewage waste. In addition to reducing the amount of sewage waste, it substitutes for the emissions of GHGs from fossil fuels and reduces the sound level of the busses. The biogas can also be sold to private cars.<sup>103 104</sup>

In Copenhagen there has been an extensive scheme to increase the share of cycling trips by the provision of safe cycling roads. In addition to reducing pollutants from motorized transportation, cycling provides

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<sup>103</sup> Frevar KS. Distriktets miljøbedrift.

<http://www.frevar.no/Venstremeny/Forretningsomr%C3%A5der/Energiparken/tabid/104/Default.aspx> (accessed 15.05.09).

<sup>104</sup> Stiftelsen Idebanken. *Bybusser går på kloakk*. 08.08.07.

<http://idebanken.no/Godeeksempel/bibliotek/ProsjektID.asp?ProsjektID=437> (accessed 15.05.09).

exercise which improves people's physical and mental health. Currently, one third of people in Copenhagen cycle to work or school and the municipality has a goal to increase this to include half of the population by 2015. They also intend to reduce the amount of cyclists seriously injured in traffic by 50%, and make sure that at least 80% of the population feels safe when they cycle.<sup>105</sup> This is accomplished through the provision of an extensive network of wide cycling roads, which often are in a different colour than the roads for the motorized vehicles. They have provided many so called "green routes" with separate cycling lanes particularly for longer commutes, as well as combinations with public transportation. They have focused on improving the safety of crossroads, where most accidents occur, and maintenance and cleaning of the cycling lanes. Furthermore, they have run many campaigns to encourage the population to cycle.<sup>106</sup> However, one must take into account that Copenhagen has a milder climate and a flatter landscape than Oslo, both beneficial conditions for cycling. One can, therefore, not expect to have the same amount of cyclists as in Copenhagen, but it is clear that we can learn from their successful projects and increase the cycling in Oslo to a large extent.

In the Economy dimension Sagene needs to focus on:

- Providing better availability of public services.
- Providing more culture and activities for youth and adults.
- Providing better and/or more information from Oslo Commune.
- Increasing public participation.
- Securing affordable housing for the present inhabitants.

Here the connections are not as apparent as in the Ecology section. As the survey concerning public services did not allow for the specification of the types of services, an additional survey should be conducted to understand which areas the public is dissatisfied with. There is a possible connection between public participation and adequate information from the authorities. If more information was provided on projects in the local area, there might be a higher interest in being involved. This is recognised by the local government, who in their current LA21 plan has a particular focus on improving and encouraging stakeholder involvement.<sup>107</sup> Affordable housing is a problem which is harder to address as private homes follow the market forces. A discussion of solutions to this aspect is outside of my expertise.

In the Society dimension Sagene needs to focus on:

- Increasing the inclusivity of children, youth, elderly and immigrants.
- Providing additional special housing for disabled and elderly.
- Increasing people's awareness of volunteer opportunities.
- Increasing the public involvement in the community.
- Improving the visual aesthetics of the buildings, streets and public squares.

Here public involvement particularly stands out as having strong links to public participation in the *Economy* section. It shows that even on a less political level the public is not actively involved in their local community. It also shows that the public are not aware of many of the opportunities to be involved in, just like the information provided from the commune might influence the participation in political issues. I would recommend these aspects to be studied further to investigate how they are connected and to find the underlying driving forces. The inclusiveness is also an aspect which could be viewed in correlation with involvement and participation.

Different authorities are responsible for different problem areas. Some are the responsibility of the Urban District, while most fall under the Oslo Commune's jurisdiction. Others overlap between the two, and some

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<sup>105</sup> Københavns Kommune. *København – cyklernes by*. <http://www.kk.dk/Borger/ByOgTrafik/cyklernesby.aspx> (accessed 15.05.09).

<sup>106</sup> Københavns Kommune. *Cykelpolitik 2002-2012*. Københavns Kommune, Bygge- og Teknikforvaltningen, Vej & Park. (2002).

<sup>107</sup> Oslo Kommune. Bydel Sagene. *Plan for bærekraftig bydelsutvikling 2008-2012*.

demand the attention from independent organisations or private actors. Through their LA21 plan the urban district proves that they are serious about improving the areas they are responsible for. They actively promote sustainable practices and lifestyles within their own organisation and amongst the citizens. Oslo Commune's projects are larger and it is difficult from this assessment to understand fully the direction they are heading. They have a positive vision and have implemented and are planning many successful projects. However, there are also some highly disputed projects, particularly within the transportation sector and the increase of GHGs. One can here question whether the commune recognises that the city needs to consume resources and emit wastes within Earth's biocapacity, and also whether they realize the urgency in this. As described earlier the commune's vision proclaims:

“Oslo shall be a capital city in sustainable development, characterised by economic, social and cultural growth according to nature's ability to sustain that growth ecologically.”

Strictly speaking, it is here not defined that Oslo shall be within Earth's biocapacity, as “nature” is an ambiguous term.

### **3. Evaluation of the sustainability assessment**

#### **3.1. Evaluation of the results**

The largest challenges in the assessment of Sagene Urban District by using the Sustainability Value Map and urban indicators were:

- to find the data for the selected indicators,
- to justify using other indicators when the data for the ideal ones were not available,
- to find targets or comparisons to measure Sagene's data with and
- to justify using other comparisons if the ideal ones were not available.

These four issues were problematic during the assessment process. In the following sections the experiences from the assessment and the use of the SVM are discussed. The outcome's validity is critically evaluated.

#### **The sub-parameters**

The sub-parameters are the building-blocks of the parameters presented in the SVM. Therefore, the selection of sub-parameters inevitably determines the parameter's value. Each parameter has different broadly defined topics, which cover different aspects of sustainability. Some require many sub-parameters to cover the topic, e.g. “land use and biodiversity”, while others only need one, e.g. “security”. However, the more sub-parameters, the less each one is worth when they are averaged. Still, it would be very hard to justify using a set number of sub-parameters as one would then have to either omit significant aspects or create insignificant aspects.

Some sub-parameters that should have been included were not possible to measure, e.g. the urban environment's ability to manage stormwater. Because this sub-parameter is excluded the remaining sub-parameters are automatically worth more as a portion of the whole value.

A further predicament is that some sub-parameters, e.g. “density of buildings and people” and “amount of green areas” are interdependent factors and need to be examined concurrently. However, as they are dependent on each other for understanding the level of sustainability, one can argue that they should be given a combined value rather than a separate one. Still, in this assessment they were given a value each which was then combined.

### **The indicators**

As mentioned, it was laborious to find the data for all of the selected indicators and often the required indicator had to be substituted with the next suitable one. If more time and resources were available one could have used the most ideal indicators by creating the necessary data-collection procedures for these.

In some cases, e.g. the “accessibility”, “involvement” and “historical and cultural identity” parameters, general information was used instead of or in addition to qualitative or quantitative indicators. This was because an indicator alone could not represent the situation adequately, or because an appropriate indicator did not exist. Creating a personal assessment from a variety of qualitative sources has positive and negative aspects. The positive aspect is that this creates a more holistic picture of the situation; one can discover trends, relationships and connections in a different way than with statistical indicators. The negative aspect is that it is much more time consuming to collect and assess such documents. The danger is also that one might overlook certain relevant aspects, and the assessment is more dependent on the researcher’s perspective. Still, if one can use a combination of statistical data and other documents, this might be the most thorough assessment.

### **The collected data**

In the assessment the average for Oslo often had to be used rather than data for the urban district. It would have been more beneficial to have the entire data specifically for Sagene. For this case study, however, one can claim that it is not a crucial aspect. If the assessment had been carried out for the sake implementing solutions, site-specific data would have been sought out and utilized.

### **The comparisons, targets and assigned values**

In accordance to Butters’ recommendations for using the tool, I would have liked to compare Sagene’s data with the “ideal”, i.e. the most sustainable examples or targets possible for each sub-parameter. During my research I found that the “ideal” targets for an urban area are often not known, disputed or not possible to find from existing data. As it in most cases was not possible to find valid targets or appropriate comparisons for the highest value, the task of specifying the targets for all five values became even more problematic. Each value was therefore estimated in relation to the highest justified value, although “full” sustainability (value 5) probably could have an abstract goal much higher.

The lack of targets is the most significant shortcoming of the assessment, as it complicates (and undermines) the value system. Firstly, how can it be justifiable to give a certain grade with no comparison of the ideal? Secondly, if one lacks the ideal target and instead uses a comparison with another city, how can that city be justified as the ideal sustainability target? These matters are most apparent in the “energy” parameter with the first two sub-parameters “energy consumption” and “GHG emissions”. The data is compared to six other Nordic cities and the results show that Oslo has amongst the lowest energy consumption and GHG emissions. Because there are no specific targets of how much energy should be consumed or how much GHG is acceptable to emit, comparisons with similar cities can only give a relative indication of how well Oslo is performing. Thus, as these are the only comparisons made Oslo is expected to obtain a very high value on the value map. However, numerous scientific articles can verify that developed cities need to emit much less GHGs in order to approach a sustainable level. An effort is made to balance this error by using the footprint tool as an indicator in the third sub-parameter. This connects the topic to why GHGs need to be reduced in the first place; namely to prevent major changes to our global climate. The first two sub-parameters are therefore viewed in this perspective and are not assigned a high value. Then, a further query complicates this parameter; is the third sub-parameter, with its global perspective, worth more than the other two indicators? If it influences the grading of the others, it is already granted a higher weight.

Similar issues arise for the “economic activity” parameter which receives the highest grade on the SVM. Here, the disputable issue revisits the question of what the indicators are compared with. In the assessment they are compared with the average for Oslo, as the topic is dependent on the local system and circumstances. It would be less suitable to compare the district to e.g. other Nordic cities. As Sagene performs well economically in the chosen sub-parameters and indicators compared to Oslo’s average, it receives a high mark. If other indicators were used to represent the sub-parameters, and other comparisons

were made, the grade might have been quite different. For example, what would be the result if economic growth was measured? This reveals the significance of the selection of indicators and comparisons.

Mentioned above is the debatable topic of weighing the different sub-parameters. This becomes an issue in several incidences in this assessment. One example is in the “cost” parameter, defined by two sub-parameters; “cost of housing” and “cost of maintenance”, whereby both are related to the inhabitants’ average income. The housing cost compares a one-off payment of a few million NOK to the average income, while the maintenance cost concerns a few thousand NOK annually. Because the housing cost is too high it receives a low grade, while the maintenance cost is low and receives a high grade. Averaged together this makes the overall grade presented on the SVM quite good. However, is not the cost of a home more important than the maintenance cost? It is obviously more important to have a place to live in the first place than the issue of having to pay a few thousand more or less for maintenance. Then the question is *how much more* should the house indicator be worth than the maintenance indicator. Alternatively, if there is no weighing, one could argue that the maintenance indicator should be removed altogether, as it paints an inaccurate picture of the situation in the value map.

One could, in several cases, claim that weighing would be the most appropriate option as it would justify the values, particularly when it is problematic finding the appropriate targets. On the other hand, one could argue that giving each sub-parameter a separate weight would further complicate the task; both with measuring and assigning the value, and substantiating the weighing system.

As sustainability is a goal with no end, our expectations of the concept, and with this the ideal targets, will always move with the development of knowledge and technology over time. Therefore, we can only set targets within the limitations of the present society. The braver decision-makers are at implementing new projects, the easier it will be for other areas to use their site as a precedent and learn from their experiences. The crucial aspect of this is communication; that all of the data is made publicly available to ensure easy access and comprehension for decision-makers, planners and citizens elsewhere. If we are to increase our knowledge about living within Earth’s biocapacity, we need to share the knowledge at all scales.

### **3.2. Evaluation of the assessment process**

Chris Butters emphasises that the *process* of assessing sustainability is just as important, if not more, than the results on the SVM itself.<sup>108</sup> From this perspective, I evaluate the manner in which this assessment was conducted, i.e. as an individual separate from the authorities and without any personal connections to the area in focus.

The Regional Vancouver Urban Observatory (RVu) carried out a project where the process of selecting the key indicators was a goal in and of itself by combining expert and citizen opinions and recommendations. The participation led to increased realisations of values and opinions about what sustainable development is.<sup>109</sup> In concurrence with other authors discussed in this paper, Holden also favours the view of sustainability as a strive for knowledge, with a never-ending goal to continue learning. RVu, therefore, follows a diagnostic methodology and includes citizen involvement to learn from their life-experiences in the community. This is combined with the experts’ knowledge. Holden argues that “while experts’ work is likely to have a bias toward international standards, citizens’ work is likely to have a richer context-dependency.”<sup>110</sup> According to this study, the outcome might be similar in terms of policies for sustainability, but the process connects the stakeholders in a more beneficial way.

Similar beliefs to Holden were developed during the assessment. By selecting and using indicators without interacting with the stakeholders in the community, I was forced to ignore the small but important aspects of society. For example, a quantitative indicator can not express the communal benefits and increased

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<sup>108</sup> Butters.

<sup>109</sup> Holden.

<sup>110</sup> Holden, 177.

individual values gained from the local school children's regular visits to the elderly-homes. A numeric indicator can not inform about the local NGO who works for improving the immigrant children's sense of ownership to the local parks. Neither can it report on the benefits of the community centres' regular meetings to educate the public on sustainable lifestyles. These are examples of aspects which makes a community unique, and which might create stronger sustainability than a policy document. A quantitative indicator can only reveal so much information; to move on to the next step and identify what the grassroot organizations are working with one needs to compliment the numerical data with the public's knowledge. When the scale of the assessment is as large as an urban district with over thirty thousand inhabitants, the idiosyncrasies of a society tend to disappear. It is crucial to be able to identify these aspects in an assessment, as one should use the society's present strengths to find and create future solutions. The assessment's first draft of parameters and indicators included much "softer" aspects of sustainability, such as car sharing schemes, flea markets, vegetation on and around buildings, water saving technologies, fair space use of private cars and artistic and experimental expression of the public. However, all of these and several other features had to be removed because of the lack of valid evaluation through indicators. This resulted in an overwhelming number of parameters composed mostly of "hard", measurable indicators, which do not reveal the human and inspiring characteristics of Sagene.

Furthermore, during the study's closed ended interviews many people wanted to share more information and expanded on the simple numeral answers provided. One lady expressed with annoyance how late the municipality always is with cleaning up the gravel on the streets after winter, making it more dangerous for her to cycle. A smiling man told the story of the rich old gentleman who runs an old-fashioned convenience store, not because he needs the income but because he likes talking to people. With concern in her voice another lady informed me that her apartment had been broken into recently and therefore she did not feel as safe anymore. And another man, who enjoys organising the elderly dance every Saturday at the community centre, was concerned about the need for more funding for these events. These little stories are individuals' concerns and opinions, but together they can say something important about the urban environment as a whole. They are all within the realm of the urban sustainability assessment, i.e. quality of urban objects, transportation, services, security, safety, identity and culture. If people in the community were involved in choosing the indicators the SVM outcome might have looked the same or completely different. But most importantly; the learning outcomes and experiences for both decision-makers and the public would have been much different and more beneficial. People's values would have been visible and taken into consideration. Moreover, the public's sense of ownership to their neighbourhood would increase, through their expressions of opinions and ideas for solutions. Thus, it should be a goal to combine the knowledge and facts received from the hard indicators with the soft immeasurable insights and values of the public.<sup>111</sup>

There is, unfortunately, limited space here to examine the specific findings from the assessment other than the brief discussion in chapter 2.5. Although the specifically assigned values might be disputable, there is no doubt that the process of using the SVM as a framework developed my ability to distinguish connections between the ecological, economical and social components of sustainability. Through the selection and interpretation of the different sub-parameters and indicators, my knowledge about the building blocks in an urban society increased a considerable amount. If experts, policy makers and stakeholders from different parts of society cooperated on a sustainability assessment for an urban district, the learning outcomes would be immeasurable on all accounts. I therefore highlight the significance of the Sustainability Value Map as a process tool, and argue that this method, if carried out within the recommendations above, is more valuable than the values assigned.

### **3.3. Evaluation of the Sustainability Value Map**

#### **Suitability for integrated sustainability assessment of urban areas**

The SVM provides a framework for an integrated sustainability assessment, as it forces the user to give equal priority to the three dimensions of sustainability. Furthermore, it provides guidance to which parameters

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<sup>111</sup> Holden.

within the environmental, economical and social realms should be included. This guidance, presented in Butters' base map and more detailed in his presentation paper, includes all aspects of urban sustainability as presented by McGranahan and Satterthwaite in the introduction (p 6). Moreover, it integrates the systemic view as well as considering sustainability as a process towards increased knowledge of our societies and our impacts on the natural environment.

The SVM does not, however, have a set of indicators to choose from or a set of goals or targets to reach. Hence, it is up to the user to design and define these aspects according to the project in question. If done by one individual, it can make the assessment extremely subjective. Like any tool, the SVM can be used in a less appropriate manner, and if the research is not carried out properly it can present a warped picture of the project's actual sustainability. The crucial aspect here is to decide upon a sustainability definition to guide the process and the goals of the assessment. According to Gudmundsson, the authorities' use of definitions to a large degree determines the selection of indicators.

The discussion in chapter 3.1 suggests that assigning values to a larger urban area through the application of an extensive indicator set becomes a very complex task. This is recognised by Walton *et al.* who discuss the intricacy of balancing an adequate degree of detail while creating a valid and just assessment. As mentioned above, the SVM is best utilized as a process tool rather than as a means to assign numerical values pertaining levels of sustainability. In this context one can suggest that the SVM works against the use of descriptive indicators and through its "looseness" favours a diagnostic approach. Pope *et al.* suggest that rather than selecting numerical goals, it would be more beneficial to create a set of principles and criteria to work toward. Such principles would be much like Sagene's assessment's objectives. The measurement according to the authors would, however, concern whether or not these objectives are met, rather than to what extent they are reached. This is an interesting perspective, and while I recognise the value of changing the methodology to use principles only, I also favour utilising a scale to identify the degree of strengths and weaknesses inherent in an urban district.

### **Communicative properties**

One of the most fundamental qualities of the value map is that it presents the findings in a comprehensible manner. It does not show statistics, trends or solutions, but it gives a quick and easily understood image of the current situation. This is important because the user can then do a very thorough (or simple) assessment, and present the findings as detailed as he/she finds appropriate or necessary for the audience. Further, this strength makes the discussion concerning the use of a small or large set of indicators less relevant from a communicative perspective. With the SVM, the authorities can use a comprehensive set of indicators which provides them the appropriate information while, at the same time, they can communicate the findings in a simpler form.

However, one aspect of the presentation format should be discussed further. As the SVM is a circle, the values are not allotted equal spatial priority, i.e. the highest value acquires more space than the lowest value in the middle of the circle. Although it is not as visually attractive, the values would be more equally balanced if they were presented in rows. To understand this presentational difference, an SVM was created with the parameters arranged vertically and with each value as a square. From viewing the two value maps below, the circular visual could be perceived as less sustainable than the rectangular, although their values are identical. Still, a circular image presents a visualisation of more holistic sustainability. To keep the circular form, one could consider making each value point equal by decreasing the distance between the rings of the circle, with each increased value.

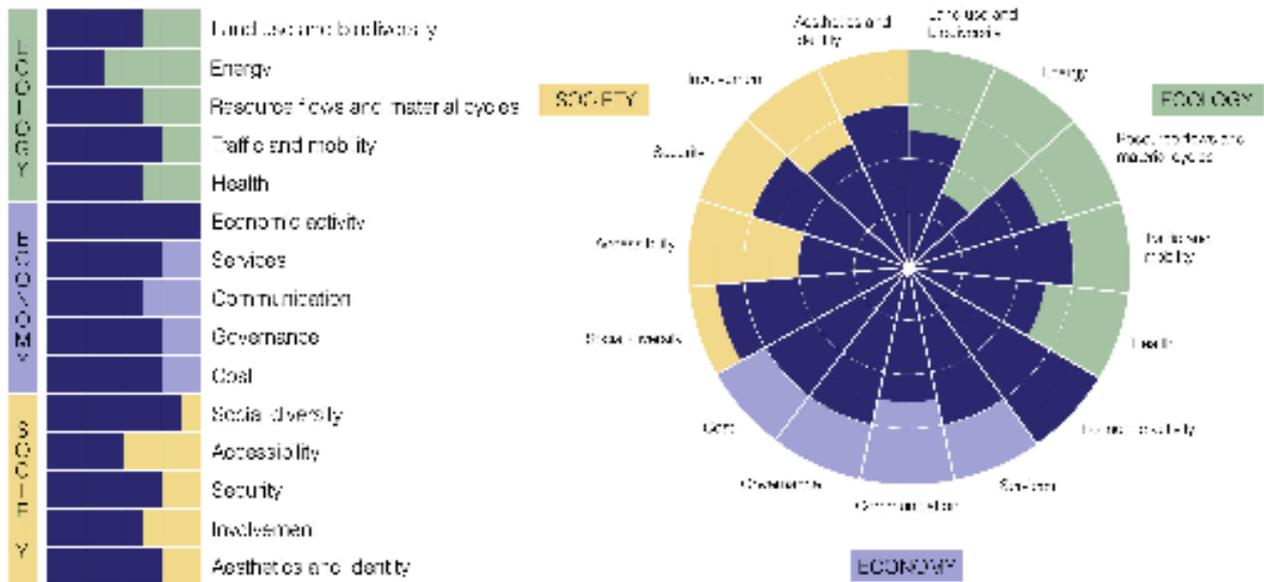


Figure 7: A rectangular and a circular SVM

**Ability to identify drivers of negative performance and provide suggestions for solutions**

A third aspect Walton *et al.* mention in their study (p 7) is the aspect of a tool’s ability to identify the drivers of negative performance and provide suggestions for solutions to those identified. The SVM does not provide these answers on its own, and it is doubtful that any sustainability assessment tool does. However, through the users’ process of application; of selecting, reading and discussing the different indicators, of seeing connections between them and understanding the project’s weak and strong areas, they should be able to recognize the driving forces of negative performance. They should then be able to use the gained knowledge to identify the type of solutions required for improvement. It is important to understand that for a person not involved in this process, who only views the SVM after completion, it is quite impossible to identify the problem areas or recognise the drivers behind the issues of negative performance. Such is the limitation of the tool, which should always be kept in mind.

**Adaptability and flexibility**

The SVM should be catered to each specific project, place or city according to their backgrounds, needs and contexts. This is a very advantageous property of the tool, as it is then applicable for a diversity of sustainability assessments. It is not even necessary to use indicators with the framework. As an alternative, one could assess softer aspects of the parameters compared with the individual objectives. This would be much less specific and perhaps more challenging to grade accurately, but it could give insights into other values that an indicator-based approach could not. One can also combine the use of indicators with other evaluation methods, and present them in the SVM. This enhances the point that the SVM has a great deal of flexibility in its applications.

The requirement of the tool is to be designed specifically to each area in question. However, this also carries with it a limitation. This makes the SVM unsuitable for comparisons between different projects, unless these are specifically arranged and coordinated from the concept stages.

**Facilitation of public and stakeholder involvement**

The SVM does not facilitate public and stakeholder involvement *per se*. It is completely up to the user whether this plays a part in the assessment, although, as argued, it would be more beneficial for an increased knowledge of the society’s needs. This is however not a negative aspect; rather it amplifies the flexibility of the SVM.

## **Cost**

The tool itself is free to use, but the way it is used can be more or less labour-intensive. From the time spent on the assessment I can suggest that the cost depends on several aspects. Firstly, it depends on the size of the project and the extent to which it is expected to be assessed, i.e. the number of indicators or the method of evaluation. Secondly, the cost is dependent upon the existing systems of data-collection, i.e. if the data for the indicators are already publicly available for use. If new data-collection procedures have to be arranged, the cost in terms of time spent on the assessment will be greater. The assessment process will also largely influence the cost, i.e. to what degree there is public, stakeholder and expert involvement or just one individual responsible.

## **4. Conclusion**

The purpose of this study was to evaluate the usability and suitability of the framework tool Sustainability Value Map in the context of a defined urban area; Sagene Urban District in Oslo. From the sustainability assessment's evaluation, it is apparent that numerically assessing an urban district while using an extensive indicator set is a very complex task. The values are dependent on a high number of variables which makes the validity of the presented end-result questionable. This is particularly due to the lack of "ideal" sustainability targets to compare the urban district toward.

The use of indicators in an SVM would be most useful in a situation where the sustainability is measured toward pre-decided targets, e.g. goals set by the government. The tool would then illustrate the authorities' degree of success in reaching these targets. The SVM is, as already demonstrated by Butters, also useful in the planning process of new buildings or new urban areas. Again, the project would be measured against pre-set targets rather than "ideal" sustainability targets.

Sustainability is not easily measured. Still, the emphasis in an assessment does not need to be strictly concerned with the final obtained values to have meaning. The most useful application of an SVM would be if the process was considered to be the goal rather than the values themselves. To be most rewarding, this process should depend on the involvement of stakeholders and the general public. The reason for this is twofold; for the involved to increase their understanding of the area's sustainability and to utilize the different actors' knowledge, perspectives and values. The SVM's strength lies in guiding the user to define sustainability according to the specific conditions of the area in focus and to evenly prioritize the three dimensions of sustainability.

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## Appendix

### 6.1. Interview questions (English version)

How satisfied are you with the following in Sagene Urban District:		1	2	3	4	5	Don't know
		Very dissatisfied	Dissatisfied	Tolerable	Satisfied	Very satisfied	
1.	The availability of activities and culture for adults						
2.	The availability of activities and culture for youth						
3.	The availability of activities and culture for children						
4.	The availability of sports and physical activities						
5.	The opportunities to participate in volunteer work						
6.	The selection of commercial shops						
7.	The availability of public services (e.g. schools, kindergartens, health centres)						
8.	The availability of religious gathering places						
9.	The aesthetics of the buildings, streets and public squares						
10.	The quality of the parks and green areas						
11.	The availability of green areas for fruit and vegetable cultivation (allotments)						
12.	Your safety in relation to crime						
13.	Your feeling of belonging to the neighbourhood						
14.	The availability of public transport						
15.	The availability of cycling lanes						
16.	The availability of sidewalks						
17.	Your safety in traffic as a (answer below)						
a)	Motorist						
b)	Cyclist						
c)	Pedestrian						
18.	How long have you lived in Sagene Urban District?						
19.	How old are you?						
20.	Which gender are you?	male			female		

## Appendix

### 6.2. Interview results

No	Question	Median	Average	Response rate	Don't know	Total points
1.	The availability of activities and culture for adults	3	3,22	78	22	251
2.	The availability of activities and culture for youth	3	3,07	28	72	86
3.	The availability of activities and culture for children	4	3,63	38	62	138
4.	The availability of sports and physical activities	4	3,72	68	32	253
5.	The opportunities to participate in volunteer work	4	3,72	43	57	160
6.	The selection of commercial shops	4	3,49	100	0	349
7.	The availability of public services (e.g. schools, kindergartens, health centres)	4	3,61	83	17	300
8.	The availability of religious gathering places	3,5	3,67	36	64	132
9.	The aesthetics of the buildings, streets and public squares	3	3,08	99	1	305
10.	The quality of the parks and green areas	4	3,75	99	1	371
11.	The availability of green areas for fruit and vegetable cultivation (allotments)	2	2,49	55	45	137
12.	Your safety in relation to crime	4	3,85	99	1	381
13.	Your feeling of belonging to the neighbourhood	4	3,83	99	1	379
14.	The availability of public transport	5	4,69	100	0	469
15.	The availability of cycling lanes	3	2,59	88	12	228
16.	The availability of sidewalks	4	3,97	99	1	393
17.a	Your safety in traffic as a motorist	4	3,74	62	38	232
17.b	Your safety in traffic as a cyclist	3	2,64	81	19	214
17.c	Your safety in traffic as a motorist	4	3,79	100	0	379
18.	How long have you lived in Sagene Urban District?		8,55	100	0	855
19.	How old are you?		38,15	100	0	3815
20.	Which gender are you?	m=44 f=56		100	0	