

# TOOL FOR SUSTAINABLE URBAN DEVELOPMENT

## INTRODUCTION

Realdania By is a subsidiary company wholly owned by Realdania, which runs a philanthropic enterprise based on return of investments. Realdanias mission is to improve quality of life and benefit the common good by improving the built environment in Denmark. Realdania By contributes to the fulfillment of Realdanias mission through acquisitions, development and sale of areas for urban development. We work in partnerships primarily with municipalities. Our first three partnership projects are FredericiaC, Køge Kyst and Ringkøbing K, all of which have a vision of becoming new, vibrant and sustainable town districts. Additionally, we develop, document and communicate knowledge and competence in the field of visionary and sustainable urban development. The Tool for Sustainable Urban Development is an example of this.



The Tool for Sustainable Urban Development was applied to underpin a competition proposal on establishment of canals in the FredericiaC urban development project. Establishing canals may be expensive, but in the project they would increase both property and amenity values and set the framework for attractive urban spaces, play

and improved access to water. And the surplus soil from the canal excavation could be put to good use for elevating the terrain as a step in the proposed climate adaptation. In this way, the proposal of canals fitted into an entirety that would contribute to sustainability in terms of economic, social, health and environmental aspects.

## PREFACE

Whether they spend a few minutes, a couple of hours or several days, politicians, managers, project developers and advisers can use the Tool for Sustainable Urban Development to gain overview and underpin sustainability efforts in urban development projects. Use of the tool is free.

Since its establishment in 2007, Realdania By has focused on the question of how to ensure optimum sustainable urban development in the widest sense of the term, that is urban development which both takes into account social, health, economic, environment and resource issues.

To help ensure our ambition, we developed the first version of a sustainability tool for the international, interdisciplinary parallel competitions in our two partnership projects Køge Kyst and FredericiaC. This first version of the tool was developed in cooperation with two other urban development companies – Carlsberg Properties and By & Havn. Since then, the tool has been tested and adjusted in several instances following evaluation sessions with competition participants.

Even though the first versions of the tool were relatively complex, they prompted the competition participants of the FredericiaC and Køge Kyst projects into interdisciplinary thinking and into relating to sustainability in the wide sense of the word. We have no doubt that it heightened the quality of the competition proposals and honed the quality of the ensuing development plans for these projects.

During the projects we have gained experience – not least from the consultants using the tool – and have now developed the tool to make it more accessible and easier to use for us and others alike. A trimmed and thoroughly prepared version 2.0 is now available, which can be used freely by everyone wanting to work systematically with sustainable urban development.

The tool can be flexibly used, either as a checklist or for a more in-depth treatment of the three sustainability dimensions, which allows, by means of a range of support tools, the total sustainability profile of a project to be prepared. Irrespective of how the tool is used, it will ensure overview from the early project development phases to the more concrete design, which may encompass an evaluation or sustainability scoring of one or more project proposals.

This booklet provides an introduction to the tool, which is available in its full version on our website. Visitors can study the tool in more detail, study several project examples of sustainable solutions and download the entire volume of tool material. The website and the material is in Danish language only, as the tool is based on Danish law and regulations, references and key figures.

Of course, this tool cannot stand alone. Central and local government authorities and other players focusing on sustainable urban development are developing many relevant initiatives and methods. The tool should be perceived as one among others and will, hopefully, find its place among the many other ideas for methodical work on sustainability in urban development projects.

We hope that future users will find that the tool can contribute to creating more sustainable cities and towns.

**Mette Lis Andersen**  
CEO, Realdania By  
November 2012

# WHAT THE TOOL CAN BE USED FOR

The Tool for Sustainable Urban Development can help urban developers in programming, developing, prioritising, adjusting or optimising urban development projects in a sustainable direction. And it can be used to describe and assess the overall sustainability profile of an urban development project.

This booklet is an appetizer for the Tool for Sustainable Urban Development, now available in version 2.0. The tool can be used free of charge and targets professional urban developers such as local authorities, area development companies and private developers as well as consultants and consultancy companies – at both management and employee levels.

The users are free to decide how they want to use the tool. Irrespective of how they choose to use it, they should plan its use on the basis of how to achieve the optimum benefit at any time in a specific urban development project. This approach should apply both if the tool is used as a simple checklist at a given point in time in a project and if it is used repeatedly in an ongoing process involving more thorough processing and evaluation. It would qualify the quality of an urban development project if all tool elements and indicators were processed and considered.

The tool may help build the excellent town, but does not answer all questions. Citizen participation, project cash flow and aesthetic quality are not as such embedded in the tool. If the tool is used for benchmarking and evaluating a specific project, it is essential not to assess rigidly on score, but on how the entire project was overall planned.

Thus, the tool is not a universal tool and cannot stand alone. Even though the tool has been used, a well-founded, multidisciplinary approach to the total project will still be key.

## What does the tool cover?

The tool consists of the following sub-elements:

- › A website with interactive presentation of tool dimensions, elements and indicators as well as concrete project examples and relevant links to inspiration for the work related to the subjects of the 23 indicators embedded in the tool.
- › Guidelines for using the tool with a description of its background and contents.
- › Tables and support tools for performing the calculations designating the total sustainability of a given project.
- › All documents and support tools are downloadable in Danish from the Realdania By website: [www.RealdaniaBy.dk/Værktøj-til-bæredygtig-byudvikling](http://www.RealdaniaBy.dk/Værktøj-til-bæredygtig-byudvikling)

## 1 WHAT?

The Tool for Sustainable Urban Development focuses on the three dimensions of the wide sustainability concept, i.e. Environment and Resources, Social and Health Aspects and Economy.

The tool specifies and describes the three dimensions by means of nine elements, which should in this context be understood as significant themes or subjects covering pivotal conditions of sustainability in an urban development project.

Each element unfolds into 1-4 indicators, which constitute the level most specifically showing users what they could consider as users of the tool. The tool contains a total of 23 indicators.

For each of the 23 indicators, one key question has been prepared together with a description that serves as inspiration and shows what an exhaustive processing of the relevant indicator may cover. By answering the key questions, users are able to relate systematically to the sustainability of an urban development project.

## 2 HOW?

The tool can be flexibly used in several project types and connections. Irrespective of in which project type or connection the tool is implemented, it can be adjusted to the needs, the context and the process of the individual project, since users may choose various levels of processing:

**Simple use** – as a checklist able to provide an overview showing whether all required aspects of sustainability have been covered.

**Flexible use** – involving the selected indicators that seem relevant and add value to the user in the concrete context.

**Full use** – involving processing of all indicators throughout the various project phases based on its concrete goals and desired sustainability.

If a user selects flexible or full use of the tool, each indicator can be allotted a score on a scale from 1-5, which procedure allows the project sustainability profile to be described.

All 23 key questions can be answered qualitatively.

As an expression of society's special focus on energy, the tool also allows quantitative processing of the five indicators related to energy solutions. For that purpose, a special calculation tool has been developed.

## 3 WHEN?

The Tool for Sustainable Urban Development may help assess, adjust and make the right demands for sustainability at various stages of an urban development project. This applies, for instance, in connection with:

- › Preparation of vision, means and instruments.
- › Inspiration for establishing programme requirements for competitions, etc.
- › Self-evaluation and use as process support tool in proposal development.
- › Comparing various draft solutions to each other, including in the dialogue between competition organiser and participants in the development of solutions.
- › Consultants' development of projects from vision to plan.
- › Implementation of plans and projects.

# DIMENSIONS, ELEMENTS AND INDICATORS

The Tool for Sustainable Urban Development enables users to assess, develop and realise solutions in a widely defined sustainability concept encompassing:

› 3 Dimensions

› 9 Elements

› 23 Indicators

Environment and Resources, Social and Health Aspects and Economy constitute the three overall dimensions. Nine elements specify and describe the three dimensions in detail. In this context, an element should be understood as a significant theme or subject that covers key aspects of sustainability in an urban renewal or development project, such as transport, urban life or total economy. Each element unfolds into 1-4 indicators, which constitute the level most specifically showing users what they could consider as users of the tool.

In the development of version 2.0 of the tool, a specific goal was to minimise the number of indicators, and similarly it was important to ensure that key question processing of individual indicators must make a difference in a given urban development project. Elements and indicators falling slightly outside the urban development perspective were deliberately left out. This applies to, for instance, life-cycle considerations for building materials in future buildings.

The following pages provide an overview of the three dimensions, nine elements and all 23 indicators of the tool. For each of all 23 indicators, a key question has been prepared, and their answers facilitates a systematic description and assessment of the sustainability of an urban development project. Find a more detailed description in Danish of each of the 23 indicators and the use of their key questions on the Realdania By website: [www.RealdaniaBy.dk/Værktøj-til-bæredygtig-byudvikling](http://www.RealdaniaBy.dk/Værktøj-til-bæredygtig-byudvikling)

**Værktøj til bæredygtig byudvikling**

Uanset om man bruger få minutter, et par timer eller flere dage, kan værktøjet til bæredygtig byudvikling hjælpe politikere, ledere, projektudviklere og rådgivere med at skabe overblik og styrke den samlede bæredygtighedsprofil i et givent byudviklingsprojekt. Værktøjet kan anvendes frit.

**Hvad kan det?**  
Værktøjet operationaliserer og konkretiserer et byudviklingsprojekts bæredygtighed både ift. miljø og ressourcer, social og sundhed og økonomi.

**Hvad rummer det?**  
Værktøjet består af en række vejledninger og støtteværktøjer, som gør det muligt at forholde sig til og behandle udvalgte indikatorer for bæredygtig byudvikling.

**Hvordan anvendes det?**  
Værktøjet kan anvendes fleksibelt til evaluering, selvevaluering og benchmarking i forskellige faser af et byudviklingsprojekt.

**Download materiale**  
Download det samlede materiale, som værktøjet består af.

Få overblik over de dimensioner, elementer og indikatorer, som man kan forholde sig til, når man ønsker at gennemføre bæredygtig byudvikling...

Miljø & ressourcer  
4 elementer

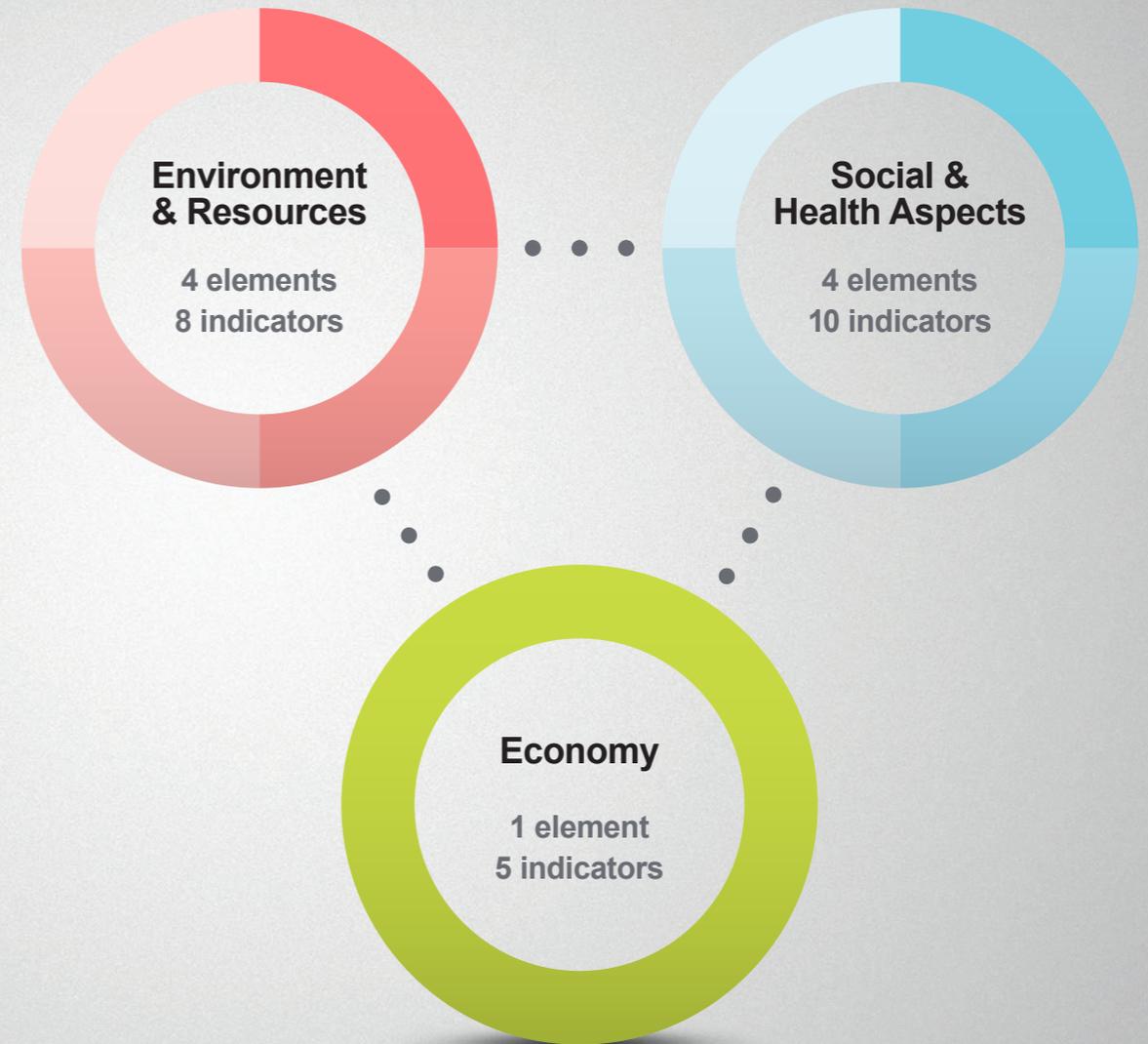
Social & sundhed  
4 elementer

Økonomi  
1 element

**Gå på opdagelse**

▲ On the Realdania By website, visitors can explore an interactive presentation of tool dimensions, elements and indicators as well as concrete project examples and relevant links to inspiration for the work related to the subjects of the 23 indicators. The website is in Danish language only, as the tool is based on Danish law and regulations, references and key figures.

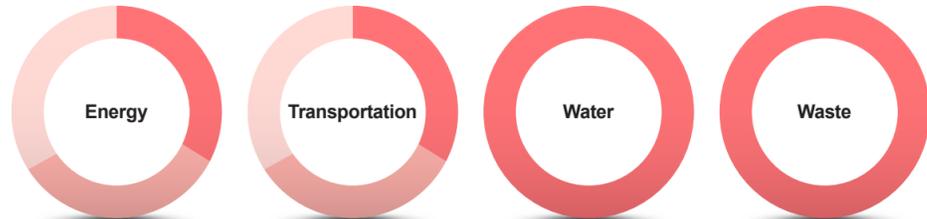
**GAIN AN OVERVIEW OF THE THREE  
DIMENSIONS, NINE ELEMENTS AND  
23 INDICATORS OF SUSTAINABLE  
URBAN DEVELOPMENT**



DIMENSION



ELEMENTS



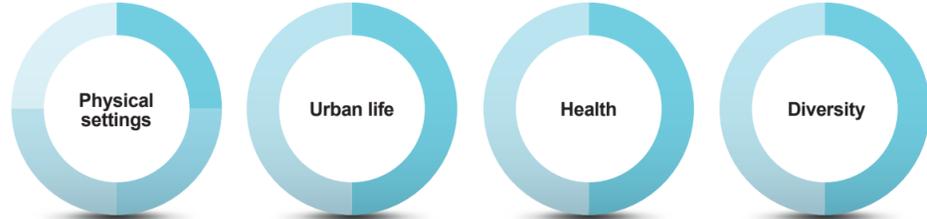
INDICATORS

Energy	Transportation	Water	Waste
1 Energy consumption for building operation	4 Facilities for pedestrians and cyclists	7 Rainwater management	8 Waste management
2 CO <sub>2</sub> emission from electricity consumption	5 Incentive to use public transport		
3 CO <sub>2</sub> emission from heat consumption	6 Traffic solution		

DIMENSION



ELEMENTS



INDICATORS

Physical framework	Urban life	Health	Diversity
9 Local climate conditions	13 Variation of urban functions	15 Unorganised physical activity	17 Variation in resident segments
10 Adaptation to climate change	14 Urban spaces and meeting points	16 Health-promoting measures and activities (other than sports)	18 Activities and space for everyone
11 Safety			
12 Green and blue elements in urbanscape			

DIMENSION



ELEMENT



INDICATORS

Overall economy				
19 Pollution and foundation engineering at site development	20 Infrastructure at site development and operation	21 Capital and operating costs of future buildings	22 Socioeconomic implications of electricity supply solution	23 Socioeconomic implications of heat supply solution

# KEY QUESTIONS

23 INDICATORS

## Environment and Resources

### Energy

- 1 To what extent will energy consumption for building operation be reduced compared to expected standard requirements for the project period?
- 2 To what extent will CO<sub>2</sub> emissions from the district electricity consumption be reduced compared to the reference where the entire consumption is covered by grid supply?
- 3 To what extent will CO<sub>2</sub> emissions from the district's heat consumption be reduced compared to the reference where the generally relevant supply type is used?

### Transportation

- 4 To what extent have solutions been established to encourage people to walk or bike in the district?
- 5 To what extent has the district been prepared to ease use of public transport?
- 6 What traffic solution has been established, and which traffic distribution is prioritised?

### Water

- 7 How is rainwater managed, and what means are used to prevent rainwater from being conducted to sewers?

### Waste

- 8 How is waste managed, and what means are used to reduce waste volumes and optimise waste sorting?

## Social and Health Aspects

### Physical framework

- 9 To what extent have local microclimatic conditions been considered?
- 10 To what extent have future changes in local climate conditions caused by climate change been taken into consideration and accommodated?
- 11 To what extent has safety and accessibility been considered in relation to, for instance, older people, children, disabled people, people with prams going into, leaving or moving about in the districts?

- 12 To what extent are green areas and blue elements integral aspects of the urban scape, and how is the widest possible biodiversity ensured in the town?

### Urban life

- 13 To what extent are variation in and distribution of urban functions embedded?
- 14 To what extent have urban spaces, meeting points, functions in ground floors, etc., been created that encourage stays in areas, spontaneous activity while also creating communities, local urban life and coherence with surrounding areas?

### Health

- 15 To what extent is it possible to enjoy unorganised leisure-time and sports activities inside the district or in interaction with the district's surroundings?

- 16 To what extent is it possible to perform health-promoting measures and activities (other than sports) aimed at promoting public health in the district?

### Diversity

- 17 To what extent does the district contain structures that allow suitable variation in the housing supply of the town hosting the urban development area?

- 18 To what extent does the town and the urban environment offer activities, room and inclusion for everybody?

## Economy

### Overall economy

- 19 How are contaminated soil, polluted groundwater and foundation engineering handled, and what essential measures are used to minimise the costs of pollution and extra foundation engineering as an aspect of site development?
- 20 What key solutions related to planning, establishment and operation of infrastructure contribute to an excellent overall economy?
- 21 What key solutions optimise establishment and operating costs of future buildings?
- 22 To what extent is the electricity supply solution a reasonable use of society's scarce resources?
- 23 To what extent is the heat supply solution a reasonable use of society's scarce resources?

# EXAMPLES OF TOOL USE

In Realdania By's Køge Kyst and FredericiaC partnership projects, use of the tool contributed to assessing and qualifying the sustainability of the project development plans.

The aim of the Tool for Sustainable Urban Development is to inspire professional urban developers to adopt wide and interdisciplinary sustainability approaches. Thus, the answers to the 23 tool key questions should optimally interlace sustainability dimensions, elements and indicators.

In the Køge Kyst and FredericiaC projects, this sustainability approach promoted holistic development plans, which actually optimise several aspects at once. Below follow concrete examples of sustainable solutions picked from the two project development plans.

In the FredericiaC development plan, a striking green natural area meanders through the new districts and enables town residents to cultivate crops, exercise, meet, play, etc. The "green band" is embedded in a strategy aimed at testing whether local food production can become a driver of urban development. Use of the tool helped ensure that the green band furthers social and health sustainability by ensuring enhanced urban life and social cohesion along with the environmental and resource sustainability by enabling, for instance, heightened self-sufficiency. The green band can also contribute to creating a more attractive urban district.



▲ As an aspect of a major climate proofing measure taking into account potential flooding, permanent water-level increases, storm surges etc., the Køge Kyst development plan envisioned the Strandengspromenade, a promenade elevated over the existing terrain. The promenade is an active landscape modelling element of a major area that will accommodate recreational activities like water sports, walking and running routes and nature experiences. In that way, the Strandengspromenade is an excellent example of a solution that relates to several tool dimensions and indicators.



◀ The Køge Kyst development plan contains green open spaces ("Almindingerne") in the urban spaces between future housing blocks at Søndre Havn. Rainwater will be conducted through the Almindingerne encountering reservoirs and purification units on the way, which system will relieve the urban sewer system. With its varied planting and visible rainwater, the Almindingerne constitute the green and blue main district structure and will be fitted out with excellent framework to underpin community formation between residents and possibilities for experiencing nature in town. With a few exceptions, the area will only have pedestrian and bicycle traffic. In one stroke, the Almindingerne handle several aspects, encompassing socioeconomic, social, health and environmental sustainability. It became evident when the tool was used to assess the competition proposal on Almindingerne, just as it contributed to honing the proposal in the process from competition to final development plan.

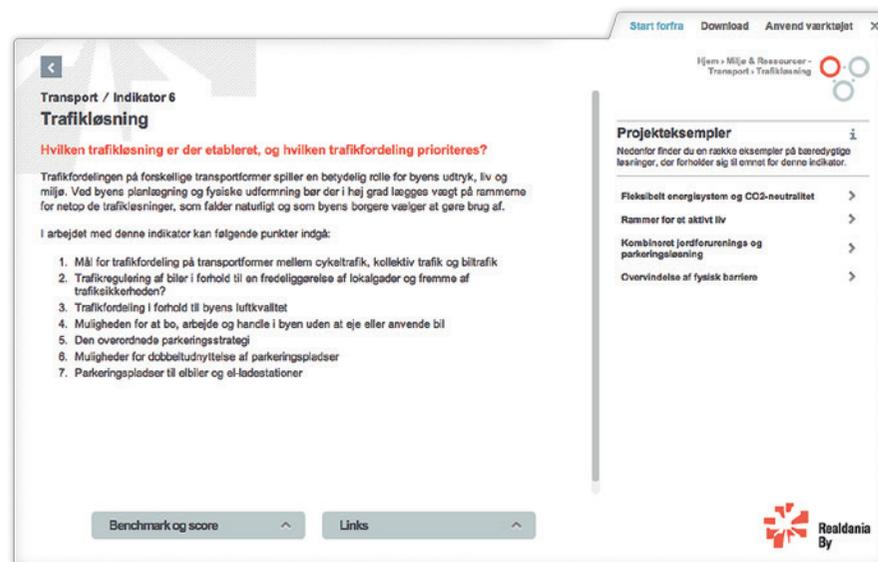
# THE STORY OF THE TOOL

Simplification and usability were key words in developing the Tool for Sustainable Urban Development, which Realdania By in this booklet presents in version 2.0. The route of the tool through competition phases and preparation of various development plans, evaluations and revisions concluded in making tool use easier and more user-friendly.

“We had the clear focus that the tool must be usable and add value to several user types in various interrelations, irrespective of whether the tool is generic in its character. That is why we practised how to communicate the tool and its flexible use in the best way. The process also increased the quality of the content, because we really needed to prioritise and focus on the precise content of the relatively few indicators with which the new version of the tool operates,” explains

Claus Ravn, chief consultant at Realdania By, who was responsible for version 2.0 of the tool.

According to Claus Ravn, the tool can help embed an ambitious focus from the project start and ensure that the great ideas and visions of sustainability often characterising urban development and urban renewal project may actually be realised.



◀ On the Realdania By website, visitors can explore the 23 indicators (in Danish). The illustration shows indicator 6: Traffic solution. On the right, visitors can click project examples showcasing traffic solutions. At the bottom, they can find links for more inspiration and find out how to select benchmarking.

## Version 1.0

— a complex tool

From the outset, the level of ambition was high when in 2007 Realdania By joined Carlsberg Properties and By & Havn in developing version 1.0 of the tool, the aim being to assess, adjust and pose the optimum requirements for sustainability in urban development projects.

The high level of ambition quickly became synonymous with many indicators. Thus, version 1.0 contained as much as 58 indicators to be answered by the participating, interdisciplinary teams involved in the parallel competition of Køge Kyst, a partnership project between Køge Local Authority and Realdania By.

“It was certainly not easy for the teams to use the tool because of the many indicators, which were not all equally operational. But the tool still helped them consider all dimensions and ensure, for example, that the proposals were financially viable,” explains project director of Køge Kyst, Jes Møller, and continues:

“The Køge Kyst development plan we presented in 2011 would not have been the same without the tool. In developing the plan, we prepared the competition proposals on the basis of the tool, just as the tool came to direct the preparation of a sustainability strategy in all three dimensions. For example, the tool meant that the development plan had a stronger prioritising of facilities for pedestrians and cyclists.”

## Version 1.1

— fewer indicators and improved process

Following its first use and subsequent evaluation involving contributions from Copenhagen Business School, competition participants, project secretariats, etc, version 1.1 was developed. The resulting version reduced the number of indicators from 58 to 51 and also allowed inclusion of experience on how the tool use could fit into a development process. Version 1.1 was used in the parallel competition and development plan activities for FredericiaC and the competition on developing Thomas B. Thriges Gade in Odense.

“We used the tool actively in the process both as a checklist and as a prompt in relation to particularly prioritised elements in the competition process for FredericiaC and in the subsequent development plan activities. In itself, the physical plan for FredericiaC incorporates a significant sustainability contribution due to building density, closeness to public transport services, building orientation in relation to sun and wind and an attractive framework that can stimulate exercise and healthy lifestyles,” explains Jens Christensen, project director of FredericiaC.

## Version 2.0

— simplification, user-friendliness and support tools

Less than half the number of indicators, a completely new version of the economy dimension and the “Safety” indicator are some of the changes and additions now included in version 2.0 after a comprehensive evaluation and review.

“The benefits of using the first versions were great, but they could have been easier to use. We have now simplified the tool and believe that we have also increased its professional level. We have, for instance, developed a special calculation tool, which can be used in processing the energy element to calculate both the CO<sub>2</sub> emission and the socioeconomic impact of a given energy solution. In its current form, the tool will hopefully reach a wide group of professional urban developers who can benefit from and use it and, eventually, apply it to optimise and realise projects with high sustainability requirements in all three dimensions,” explains Claus Ravn, and continues:

“To the extent needed, we are prepared to update the entire or parts of the tool. For this reason, we would appreciate feedback on the use of the tool.”

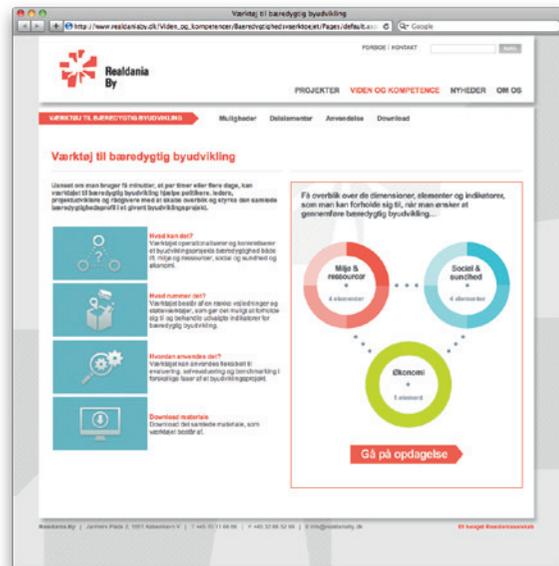
# HOW TO GO ON

If reading this booklet has made you want to use the Tool for Sustainable Urban Development in your project, go to our website (in Danish)

[www.RealdaniaBy.dk/Værktøj-til-bæredygtig-byudvikling](http://www.RealdaniaBy.dk/Værktøj-til-bæredygtig-byudvikling)

## On the site, you can:

- 1 Read about what the tool can be used for, what it contains and why it came into being.
- 2 Explore dimensions, elements and indicators for sustainable urban development and see concrete project examples for each indicator.
- 3 Read about the contexts in which the tool can be used and who can use it.
- 4 Read how the tool can be used: Full use (all dimensions, elements and indicators processed), flexible use (most relevant indicators processed) or simple use (tools used as checklist).
- 5 Download:
  - Guidelines with, for instance, description of 23 sustainability indicators containing:
    - › A key question whose answer specifies and describes the project in relation to each indicator.
    - › A clarification of how a project can be described and assessed in relation to the indicator in question.
    - › Benchmarks for scoring.
  - A form to be used for answering the 23 key questions.
  - A spreadsheet for preparing a sustainability profile.
  - A calculation tool if the visitor wants quantitative answers to the five indicators focusing on energy. For inspiration, five calculation examples are downloadable.



## Find more inspiration on RealdaniaBy.dk for sustainable urban development

- › **INSPIRATION TIL BYUDVIKLING** (Inspiration for urban development), which contains several project examples of sustainable solutions from Realdania By's partnership projects FredericiaC and Køge Kyst (in Danish).
- › **ENERGILØSNINGER I BÆREDYGTIG BYUDVIKLING** (Energy solutions in sustainable urban development), a catalogue for inspiration (in Danish).
- › **FREMTIDENS BY** (Town of the future), an analysis and a tool for acquiring an idea of trends and needs in urban development of the future (in Danish).
- › **BYMILJØETS BETYDNING FOR VIRKSOMHEDERS VÆRDISKABELSE** (Impact of urban environment on companies' value creation), a report (available in both Danish and English).
- › **UDVIKLINGSPLANEN FOR KØGE KYST** (Development plan for Køge Kyst), an overall plan for urban development containing, e.g., a strategy for sustainability as well as a physical plan (in Danish).



TOOL FOR SUSTAINABLE URBAN DEVELOPMENT  
Realdania By, January 2013

Layout: Make®  
Printing: Arco Grafisk A/S  
Illustrations: Køge Kyst, FredericiaC and Realdania By  
Contact: info@realdaniaby.dk