

GENERAL INFORMATION

PETUS description of tool in use						
Name of the case	Evaluation of the Hedebygade Block; a project on Urban ecology					
Name of the tool	Green Accounting					
Country	Copenhagen, Denmark					
City / region	Copenhagen					
Total area (km ²)	89 km ²					
Population	502.000					
Density (people/km ²)	5.640 people/km ²					
Tool user's profile	a. Danish Building and Urban Research (DBUR) b. Research c. Phil.Dr. Senior Researcher Ole Michael Jensen, Danish Building and Urban Research. P.O. Box 119 DK-2967 Hørsholm Tel: + 45 86 55 33; fax: +45 86 55 94; e-mail: omj@by-og-byg.dk					
Reviewer, date	Jesper Ole Jensen, 20.10.03 / July 2004 / January 2005					
Short description of the case						
<i>abstract up to 300 words</i>						
<p>The case is interesting as it shows the tool green accounting of buildings being used as an evaluation tool at one of the most prestigious green urban projects in Denmark to date, the Hedebygade block. As a part of the urban renewal of the Hedebygade block, 12 different projects of urban ecology have been completed. This includes projects in 9 buildings, and 3 projects covering the whole block. The urban ecology in the Hedebygade block has been evaluated on: Economy, resident's satisfaction, industrial and innovative perspectives, architecture and environment. The environmental evaluation consist of: 1. a comparison between the performances compared to the goals that were defined for the projects in the beginning, and 2. green accounts for the buildings, including consumption of energy, water and total CO₂-emissions from the energy use. The evaluation shows that 3 of the projects were able to fulfil the predefined success-criteria on environmental performance. In general, the average CO₂-emissions of the 8 buildings is app. 10% lower than the average of Copenhagen, but very few buildings were able to reach the level for heat consumption in new buildings as defined in the building regulations BR95 (in heat consumption per sqm.). The projects in the individual buildings show very different results, however depending on which measures are used; measuring energy consumption per sqm often gives another result than measuring it per person. Therefore the evaluation also raises questions about which measuring units and benchmarks to use.</p> <p>The Hedebygade block is one of the most prestigious green urban projects in Denmark so far, and one of the few projects that has been evaluated. The conclusions from the project and the evaluation might influence the efforts for sustainable buildings in the future. The case is related to key problems in the building & land use sector.</p>						
Sector	Waste	Energy	Water	Transport	Green/blue	Buildin g & Land Use
						X
Scale of project	Component (x)	Building X	Neighbourhood (x)	City		Region
Status of project (Evaluation of the project finished in 2004)	Starting up	Ongoing	Finished		Start date	End date (exp.)
			X			2001
Key words						
<i>Urban ecology; urban renewal; evaluation; green accounting; benchmarks; interpretation of residential energy- and water-consumption</i>						
Project	a. Object (building, city park, wind farm, etc.) b. Type of activity (regeneration, renovation, new development, etc.) c. Type of product (plan, scheme, design project, etc.)					
	a. building, block b. building renewal, urban renewal c. evaluation of sustainable project					
Tool	a. Character (according to WP3final0704.doc) b. Benchmarks (qualitative or quantitative) c. Availability (paid/ free)					
	a. indicator / monitoring tool and calculation tool b. yes c. free					
Decision-making process	a. Stage of the tool implementation (preliminary, midterm, etc.) b. Level (political, technical, etc.)					
	a. evaluation b. technical c. involvement through green accounting					

c. Public participation	
Other (optional, if needed)	

DETAILED INFORMATION

A. Detailed description of project and tool	
<p>1. Description of context (existing strategies, laws, policy, action plans, etc.): EU, national, regional, municipal</p>	<p>Hedebygade is a large urban renewal project, including a greening of the buildings. Since 1990 this block has been part of an ongoing urban regeneration of Vesterbro, a central district in the city of Copenhagen. The green part of the project was financed by a national programme on more efficient urban renewal (Projekt Renovering).</p>
<p>2. Description of project</p> <p>a. Background (What caused the initiation of the project?; What was the problem? Who initiated the project?);</p>	<p>a. The Hedebygade Block was officially appointed as the Ministry of Housing's "flagship project" on Urban Ecology. It represented the hitherto most ambitious attempt to demonstrate the potential of "Urban Ecology", and included 12 separate green projects on the buildings in the block:</p> <ol style="list-style-type: none"> 1. <i>Prism</i>. Sunlight canalised into the building through the roof by use of a mirror (heliostat). Also inside and outside facade insulation and energy control have been effected in order to save energy. 2. <i>Flora</i>. Re-circulation of indoor air through plants and reed-beds in order to clean the air and to save energy. Moreover, cabinets chilled by means of cold air were installed. 3. (Given up). 4. <i>'Green' Kitchen</i>. Use of environmentally sound kitchen furniture, vertical hotbeds for growing and arrangement of kitchens in order to save water and energy. 5. <i>Sun wall</i>. Heat recovery by means of a heat exchanger, passive solar energy, insulation, low-emission glazing and air type collectors on the roof. 6. <i>Flexible facades</i>. Covering facades and balconies with glazing elements combined with the use of solar cells (photovoltaics) and other kinds of plate elements. 7. <i>Integrated ecological renewal</i>. Addition of low energy facade element in order to extend existing kitchens, low-emission glazing, low-temperature central heating, ventilation with reclaiming of energy, individual metering of heat, electricity and water consumption, insulation, et cetera. 8. <i>Sun in the urban renewal</i>. Ventilated sun walls with integration of solar panels on transparent insulation, low emission glazing, low temperature central heating, integrated solar cells on the roof, ventilation with heat recovery, more sunlight in the apartments, individual metering of heat electricity and water consumption. 9. <i>Waste sorting</i>. Establishment of cabins for environmentally sound sorting of waste on the block for sorting in eight fractions at least, composition of information material and education of residents and caretakers of the whole block. 10. <i>Shared courtyard and community house</i>. Ecologically



Figure 1. Buildings in Hedebygade seen from inside the courtyard.

<p>b. Objectives/aims (sustainability statement – what issues of sustainability were attacked);</p> <p>c. Time interval and stages of project realization;</p> <p>d. Financing – amount, sources, institutions involved, partnerships, levels.</p> <p>e. Other sectors involved in the particular project/problem (conflicts and/or links)</p>	<p>arranged courtyard for recreational purposes, with rainwater collection, cabins for waste sorting and environmentally friendly planting. The community house, located in the middle of the courtyard, is fitted out with a community room, kitchen facilities and a common laundry with rainwater etc.</p> <p>11. <i>House end project.</i> Establishing different kinds of insulation in combination with solar cells and plant trellises.</p> <p>12. <i>Measurement of consumption.</i> Individual measurement of the heat, electricity and water consumption in order to save energy and water. In this project the goal was to reduce the consumption with 25%, by making the residents about their own consumption through constant information and monitoring.</p> <p>The renovation of the building ended in 2001. It has afterwards been evaluated with respect to economy, innovation, user satisfaction, architecture and environment.</p> <p>b. The project was defined as a demonstration project on urban ecology. The overall objectives of renovating the Hedebygade Block was:</p> <ul style="list-style-type: none"> • to establish a greater demonstration project in Copenhagen of ecological renewal • to contribute to ecological solutions for renovation of old houses • to demonstrate Danish capacity of ecological renovation • to promote commercial utilisation of ecological solutions for urban renewal <p>c. The design was completed in 1996, and the renovation of the building ended in 2001. The evaluation was completed in 2004.</p> <p>d. The Ministry of Housings granted a total of 40 million DKK (app. 5.3 million €) for the greening of the buildings. The funding came from the national campaign "Project Renovation", where a number of different renovation processes and technologies were tested and developed.</p> <p>e. Being a building & land use project, several sectors are included</p>
<p>3. Description of tool</p> <p>a. Character (according to WP3final0704.doc) - calculation tools, process tools, assessment methods, generic tools, simulation tools, guidelines, framework tools, schemes, indicators and monitoring, checklists, case-specific tools;</p> <p>b. Availability of the tool (web-based / paper, paid / free, etc.)</p> <p>c. Based on existing tool or newly elaborated;</p> <p>d. Adaptation of the tool to the local context (are there local experts involved in tool's development?)</p> <p>e. Other tools implemented to support the project development</p>	<p>a. Green accounting is based on the principle of indicators and monitoring, but it also contains a tool for calculating the total CO₂-emissions (based on energy and electricity consumption and fuels of the local energy supplier). Recently, a tool for assessing bio-diversity of green outdoor spaces of the building was included in the Green Accounting-tool. This was used to assess the green outdoor spaces in Hedebygade.</p> <p>b. The tool, "Green Accounts" is available for free from the Danish Building Research Institute (DBUR) http://www.dbri.dk.</p> <p>c. Newly elaborated</p> <p>d. The green accounts were made for the Hedebygade block by DBUR. The green accounts were based on data from one project 12 in the block, measuring consumption of heating, electricity and water in all buildings in the block.</p> <p>e. The evaluation of Hedebygade also included economy, innovation, users satisfaction, and architecture.</p>
B. Tool implementation	
<p>1. Argumentation for choosing the tool</p> <p>a. What were the reasons for the implementation of the tool? (voluntary or requested by what local,</p>	<p>a. The evaluation was a request from the Ministry of Housing and Buildings who funded a major part of the green initiatives.</p>

<p>national, etc regulation) b. Who took the initiative for choosing /elaboration the tool? c. What were the criteria for choosing the tool? d. Was there knowledge of other tools and were they considered?</p>	<p>b. See a. c. There is no other general method available to evaluate green buildings. d. There was no knowledge of other tools. BEAT 2000 is a tool for assessing sustainable buildings, but is mainly used to assess buildings in the design phase (not in operation).</p>																																										
<p>2. Barriers for the tool implementation What were the main problems in the tool implementation? (Regulation, information available, public awareness, lack of clear SD definitions and benchmarks, communication etc.)</p>	<p>Data availability was a main problem. There were many technical problems related to the measuring-program that gave input to the green accounts.</p>																																										
<p>C. Influence of the tool on the decision-making process</p>																																											
<p>Description of the decision-making process/ procedures</p>	<p>The environmental evaluation includes two levels: a. Comparing the predefined success-criteria with the actual performance of the building b. Assessment based on Green Accounting (using different benchmarks)</p> <p><u>a. Comparing the predefined success-criteria with the actual performance of the building</u> In nine projects, the developers had defined success-criteria for the project. These criterias used in the varaious projects were quite different, and related to different standards; some of them relate to the norms in the Building Regulations (i.e. comparing with new buildings), others to "buildings that has not been renovated", or "traditionally renewed buildings". Of the nine projects where success-criteria were defined, three were able to meet the criterias (corresponding to a success rate on 33% for Hedebygade) – see table below.</p> <p>Table 1. The goals defined in the individual projects in the Hedebygade block</p> <table border="1" data-bbox="842 1167 1528 2018"> <thead> <tr> <th>Project</th> <th>Goal</th> <th>Achieved?</th> </tr> </thead> <tbody> <tr> <td>1. <i>Prism</i></td> <td>Heat consumption as for new buildings (as defined in BR95), electricity consumption 20% below, and water consumption 10% under normal.</td> <td>No</td> </tr> <tr> <td>2. <i>Flora.</i></td> <td>Not defined. Tests have been made to verify the rinsing capacity of the Flora module</td> <td>-</td> </tr> <tr> <td>3. <i>Given up</i></td> <td>-</td> <td>-</td> </tr> <tr> <td>4. <i>'Green' Kitchen</i></td> <td>2% water savings and 20% heat saving</td> <td>no</td> </tr> <tr> <td>5. <i>Sun wall</i></td> <td>50% saving of heat compared to a non-renewed house</td> <td>No</td> </tr> <tr> <td>6. <i>Flexible facades</i></td> <td>Reduce heat consumption with 25% compared to a traditional urban renewal</td> <td>Yes</td> </tr> <tr> <td>7. <i>Integrated ecological renewal</i></td> <td>Heat consumption as for new buildings according to building regulations (BR95)</td> <td>No</td> </tr> <tr> <td>8. <i>Sun in the urban renewal</i></td> <td>Heat consumption on 9 MWh per 100 m²</td> <td>No</td> </tr> <tr> <td>9. <i>Waste sorting</i></td> <td>Reduce waste amounts with 60%, compared to today</td> <td>No</td> </tr> <tr> <td>10a. <i>Community house</i></td> <td>No</td> <td>-</td> </tr> <tr> <td>10b. <i>Shared courtyard and community house</i></td> <td>No</td> <td>-</td> </tr> <tr> <td>11. <i>House end project</i></td> <td>No</td> <td>-</td> </tr> <tr> <td>12. <i>Measuring consumption</i></td> <td>Reduce the consumption of heat, electricity and water with 25%</td> <td>Yes</td> </tr> </tbody> </table> <p>The low success rate indicates a gap between the expectations of</p>	Project	Goal	Achieved?	1. <i>Prism</i>	Heat consumption as for new buildings (as defined in BR95), electricity consumption 20% below, and water consumption 10% under normal.	No	2. <i>Flora.</i>	Not defined. Tests have been made to verify the rinsing capacity of the Flora module	-	3. <i>Given up</i>	-	-	4. <i>'Green' Kitchen</i>	2% water savings and 20% heat saving	no	5. <i>Sun wall</i>	50% saving of heat compared to a non-renewed house	No	6. <i>Flexible facades</i>	Reduce heat consumption with 25% compared to a traditional urban renewal	Yes	7. <i>Integrated ecological renewal</i>	Heat consumption as for new buildings according to building regulations (BR95)	No	8. <i>Sun in the urban renewal</i>	Heat consumption on 9 MWh per 100 m ²	No	9. <i>Waste sorting</i>	Reduce waste amounts with 60%, compared to today	No	10a. <i>Community house</i>	No	-	10b. <i>Shared courtyard and community house</i>	No	-	11. <i>House end project</i>	No	-	12. <i>Measuring consumption</i>	Reduce the consumption of heat, electricity and water with 25%	Yes
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the initiators (consultants) and the actual goals achieved. The defined goals might have been defined very optimistic, as the projects were competing with others in a selection process; all in all 16 projects were proposed, and only 8 selected. This might have caused the consultants to produce very ambitious goals (to increase the chance of implementation). The lesson is that such success criteria should be looked critically upon, which could lead to more realistic criteria.

b. Assessment based on Green Accounting (using different benchmarks)

The "Green Accounts" is a concept developed by DBUR (Danish Building and Urban Research). It can be used both as a process-tool (for monitoring the consumption in the building) and as an evaluation-tool (to compare the consumption level to other buildings). Recently, a tool for assessing bio-diversity of the green outdoor spaces of the building was included in the Green Accounting-tool. This was used to assess the green outdoor spaces in Hedebygade.

The green accounts were made to compare the individual buildings to each other (on energy-and water consumption and CO₂-emissions), and to compare the buildings' performance to different benchmarks:

- heat consumption to the goals defined in the building regulations for new buildings, BR95
- The goals described in the municipality's "Guidelines for green urban renewal"
- the measures in the ELO-certification, a national annual environmental audit for all multi-storey buildings larger than 1.500 m²
- to an ordinary building in the block (DP14)
- the average for Copenhagen

For each of the 7 buildings in Hedebygade with a green project (DP1, DP2, DP3, DP4, DP5, DP6, DP7), the consumption in 2003 was used as a baseline for the evaluation. For each building the consumption of heating, electricity and water per person was calculated, as well as the CO₂-emissions (see example in figure 2).

Table 2. Key figures from the evaluation

	Heat MWh/100 m ²	Electricity kWh/person	Water Litres/ person
Hedebygade, lowest consumption	7,8	1.073	89
Hedebygade, highest consumption	13,7	2.232	153
Hedebygade, average	11,0	1.515	120
Normal building in Hedebygade	12,0	2.039	120
Buildings with ELO-certificate	11,9	-	-
Average in Copenhagen	12,5	1.501	126
Goals for environmental guidelines in Copenhagen	10,0	App. 2.000	110
Building Regulations BR95	7,5	-	-

Only two buildings were able to reach the level for heat consumption in BR95 (heat consumption per sqm.), or lower. As an average, the CO₂-emission of the 7 buildings was app. 10% below

the average of Copenhagen.

The evaluation shows that there are significant differences between the buildings (see chart below as an example).

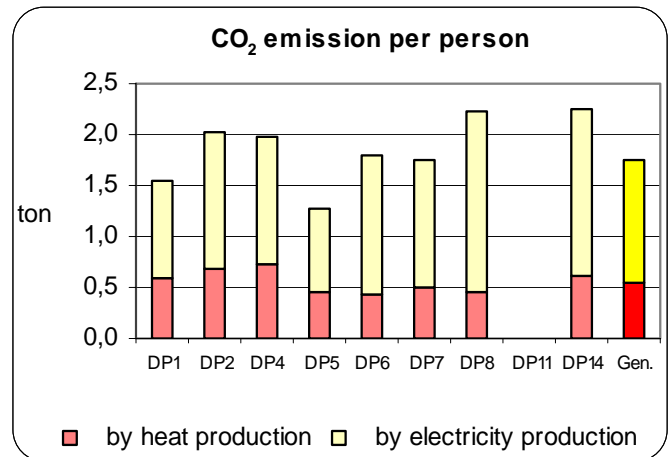


Figure 2. One illustration from the green accounts in Hedebygade, comparing the CO₂-emissions in the 7 green buildings with a reference building (DP14) and the average in Copenhagen.

The different units used to assess the buildings (consumption per m², consumption per person, CO₂-outlet per person) give very different results. For instance, the building with the highest heat consumption (project 5) is the one with the lowest CO₂-outlet per person; this is because the high heat consumption is out-weighted by low electricity consumption and a low consumption of space (the flats have not been merged). Only in few cases these assessments give the same indication of successfulness of the project. A main reason for the differences is probably population density – in buildings where more residents share the same facilities, the consumption per person decreases. As a part of the urban renewal, some of the flats were merged, and others remained relatively small, including DP5, which has the overall lowest CO₂-emission of the 7 buildings.

Recent studies have shown that the residential composition strongly influences the consumption rates per person (Gram-Hanssen & Jensen, 2000; Jensen 2002). This adds some insecurity of whether the Green accounts reflect the green efforts or the residential composition, and makes it difficult to precisely estimate the effects of the ecological project as a whole, and of the individual technologies. One reason for the relatively high consumption in Hedebygade is probably that the renovated flats in Hedebygade are relatively small (50-60 m²), and occupied by relatively few persons per dwelling, which notoriously gives a higher consumption of electricity, heat and water per person (Gram-Hanssen & Jensen, 2000; Jensen 2002). Indicators on space are, however, not systematically included in the evaluation, perhaps because there is no tradition for using this in environmental assessments. Thus, one has to be careful about interpreting the green accounts, if they are used for evaluation of technical issues. Also, the residents in this area generally do not live long time the same place, and might not have an “owner-attitude” that includes a responsibility for the operation and maintenance of the buildings, including the possibilities of reducing consumption and environmental effects. Indicators on space are, however, not systematically included in the evaluation, perhaps because there is no tradition for using this in environmental assessments.

<p>a. Stages</p> <p>b. Levels (political, technical, etc.)</p> <p>c. Sources of information used during the dmp;</p> <p>d. Who are the decision-makers?</p> <p>e. Who made the final decision for the project implementation? Was it political or technical decision?</p>	<p>The courtyard project (10b) was evaluated on qualities of the local nature, and assessed with a method for measuring bio-diversity. This assessment showed an improvement of the bio-diversity, as the biofactor before was 0.43, and after 0,53 (this includes an addition value for trees and local percolation and reuse of stormwater). Generally it was assessed that the green outdoor areas in Hedebygade so far is the best example, compared to other similar projects (in Slagelse og Kolding).</p> <p style="text-align: center;">****</p> <p>a. The evaluation was carried out after the project was finished. In this way, the evaluation had no direct influence on the decision-making process in the individual projects.</p> <p>b. The evaluation was carried out at a technical level, but on the political level (mainly in The National Agency for Enterprise and Construction), the conclusions will be used for future policy formulations).</p> <p>c. The results of the evaluation was communicated in a report (available at the homepage of the The National Agency for Enterprise and Construction, http://www.naec.dk/) and an open conference on the evaluation, held d. 02.02.2005, where the main results were presented.</p> <p>d. The following main actors were involved in the project:</p> <ul style="list-style-type: none"> • The residents of Hedebygade: Living in the buildings, central in the design-process, and in using the renewed buildings and green solutions after they were completed. • SBS: Urban Renewal Company, functioning as consultant for the Municipality of Copenhagen and as initiators for the Urban Ecology Project • The Municipality of Copenhagen: As local authority, appointing Hedebygade as an urban renewal area, and approving the individual projects (including budgets and financing). • The Ministry of Housing and Building, represented by "The National Agency for Enterprise and Construction": Donating funding for the green elements through "Project Renovation". • Various consultants and architects, designing the renewal of the individual buildings, and the green elements of them (Wormslev A/S being the company responsible for the project about measurement of consumption). • DBUR: In the design phase as an advisor for the Ministry of Housing and Building on which green solutions to recommend (out of various suggestions, proposed by the consultants). In the evaluation, by using the Green Accounts. <p>e. The Ministry of Housing and the Municipality of Copenhagen, represented by The National Agency for Enterprise and Construction (political decision)</p>
<p>2. Tool in decision-making process</p> <p>a. At what stage was the tool implemented? By whom? (experts, politicians, etc.)</p> <p>b. How did the tool output influence the process (added or skipped levels/stages in the existing decision-making process, etc.)?</p>	<p>a. The evaluation was made after the buildings in the block were completed. The evaluation was made by experts (DBUR).</p> <p>b. The evaluation had no direct influence on the decision-making process in the individual projects. The evaluation might, however, influence future projects on sustainable building, and the policy formulation on this. Using the tool has indicated the environmental results of the flagship-project on Urban Ecology, and pointed out weakness and strengths in it, by exposing the consumption. It has also contributed to making residents and other more aware and responsible for reducing the consumption of energy and water in the building, and thereby decreased the consumption in the block.</p>

<p>c. Quantitative goals or benchmarks defined? (If YES, which – and what were they compared to?)</p> <p>d. Was the tool used to support argumentations?</p>	<p>Also, the concept of the evaluation might set standards for coming evaluations on sustainable buildings.</p> <p>c. The green accounts were made to compare the individual buildings to each other (on energy-and water consumption and CO₂-emissions), and to compare the buildings' performance to different benchmarks:</p> <ul style="list-style-type: none"> - Maximum heat consumption as defined in the building regulations for new buildings, BR95 - the goals in the municipality's "Guidelines for green urban renewal" - the measures in the ELO-certification, a national annual environmental audit for all multi-storey buildings larger than 1.500 m² - an ordinary building in the block (DP14) - the average consumption for households in Copenhagen <p>d. No. As the tool was not a part of the decision-making process in the project design, it was not used to support certain solutions in the process.</p>
<p>3. Transparency of decision-making process</p> <p>a. How was the information of the dmp disseminated? - directly (decision makers – public) or indirectly (decision makers - NGO, PR company, etc. - public); sources of dissemination used (mass media, internet, brochure, etc.)</p> <p>b. How was the public involved?</p> <p>c. Was there a public discussion over the project and at what stage of the project development?</p>	<p>a. The tool was used in the final evaluation, and therefore had no influence on the decision-making process. The results of the evaluation was communicated in a report (available at the homepage of the The National Agency for Enterprise and Construction, http://www.naec.dk/) and an open conference on the evaluation, held d. 02.02.2005, where the main results were presented.</p> <p>b. The public (= the residents) were involved in the project, as it was a part of the urban renewal project. The process and the participation from the residents in Hedebygade were strongly influenced by the urban renewal process. In the beginning of the process the consultants had promised the residents that the number of flats would not be reduced through merging. However, the Urban Council overruled this and demanded that a number of flats were merged, meaning that a number of families would have to leave the block after its renewal. This caused many protests from the residents, and resulted in a general mistrust towards the renewal process. A questionnaire completed in 2002 discovered a general dissatisfaction amongst the residents about the planning process of the Urban Renewal in Hedebygade. Also the views on the green projects are mixed. Generally, the green initiatives have made the residents more aware about environmental issues, but there is also dissatisfaction with some of the projects. For instance, project 2 (Flora) has been met with some complaints that it does not function as planned, and in several buildings the heat regeneration system has been turned off (to reduce noise).</p> <p>c. see above.</p>
<p>D. Expert assessment/analysis/comment of the tool effectiveness</p>	
<p>1. Assessment by tool users</p> <p>a. Were there measurable improvements as a result of the tool implementation? If YES, what? If no: why not?</p> <p>b. Were there any spun-off's or unintended consequences?</p>	<p>a. There have been no measurable results as a consequence of the evaluation. However, the evaluation pointed out some of the improvements gained by the green features in Hedebygade.</p> <p>b. Generally, the projects in Hedebygade have given the participants important experience and strengthened their expertise. Also, the demands for documentation and evaluation of the projects have been an advantage. As an example, one of the more experimental projects had to document the claimed benefits of the project (project 2, "Flora": Re-circulation of indoor air through plants and reed-beds in order to clean the air and to save energy.). The documentation, however, has eventually proved to give the company a strong competitive advantage in Europe.</p>

<p>c. General view on the tool? Lessons learned?</p> <p>d. Potentials for further use of the tool?</p> <p>e. Will the actors recommend it or use it in other cases - why / why not?</p>	<p>c. The characteristic of green accounts is that it is based on actual consumption, and not calculated (theoretical) benefits. This is a largely accepted method amongst the actors in the sector. It means that the actions of the residents are taken into the evaluation, giving a more realistic picture of the environmental benefits. However, it can be a difficult and time consuming process to collect reliable data for all flats in all building. Moreover, is also difficult to interpret the data collected. As mentioned before, the data can show very different results depending on the measure unit chosen (per m2 or per person).</p> <p>d. There is a large potential for evaluation of sustainable projects, and the green accounts that actually measures the consumption, is one possible tool. Applying green accounts for all green projects with public subsidies would provide a much better basis for comparing projects and initiatives. However, the green accounts have primarily been used in relation to operation of "normal" buildings, and to initiate as process of making the residents more environmentally aware.</p> <p>e. They would probably recommend evaluations, with this method or other available methods.</p>
<p>2. Reviewer's assessment of the tool (usefulness, sustainability relevance, who are the actors excluded? etc.) Suggestions and needs for further development of the tool</p>	<p>The characteristic of green accounts is that it is based on actual consumption, and not calculated (theoretical) benefits. This is a largely accepted method amongst the actors in the sector. It means that the actions of the residents are taken into the evaluation, giving a more realistic picture of the environmental benefits. However, it can be a difficult and time consuming process to collect reliable data for all flats in all building. Moreover, is also difficult to interpret the data collected. As mentioned before, the data can show very different results depending on the measure unit chosen (per m2 or per person).</p> <p>Conclusions / lessons learned:</p> <ul style="list-style-type: none"> • The evaluation generally gives a positive picture of the Hedebygade project, although the environmental efficiency is not overwhelming, and the residents' satisfaction limited. One of the main positive features is that architecturally and aesthetically Hedebygade gives a more modern impression compare to the "traditional" picture of urban ecology as something alternative, homemade and messy. • Green accounting is strongly influenced by residential composition. Benchmarks for different types of families should be developed, in order to make the green accounts comparable, and to provide a more clear evaluation of technical initiatives and residents behaviour. • The evaluation raises questions on how such projects should be evaluated: In relation to the criteria defined by the initiators themselves – or by the effectiveness in terms of overall-effect on the buildings green performance? • There is a need to develop more clear guidelines for evaluations (including which benchmarks, references and goals to be used), and to develop guidelines for interpreting the green accounts.
<p>E. Additional information on the case study available</p>	
<p>Websites</p>	<p>An early description Hedebygade (in English) can be found at the COST8-cases: http://www.cardiff.ac.uk/archi/programmes/cost8/index.html</p>
<p>References concerning the case but also the key words or problem (papers, articles, reports, laws,</p>	<p>Erhvervs- og Byggestyrelsen (2004). <i>Hedebygadekarréen - Tolv byøkologiske demonstrationsprojekter i Hedebygadekarréen</i>, Ydre</p>

<p>etc.)</p>	<p>Vesterbro, København. Projekt nr. 002.</p> <p>Erhvervs- og Byggestyrelsen (2004). <i>Hedebygadekarréen – Et byøkologisk forsøgs- og demonstrationsprojekt</i>. Projekt nr. 002. Baggrundsrapport.</p> <p>Gram-Hanssen, Kirsten & Jensen, J.O. (2004). Green Buildings in Denmark – From radical ecology to consumer oriented market approaches? In: Guy, S. & Moore, S.A. (eds) (2004) <i>Sustainable Architectures</i>. Spon Press.</p> <p>Jensen, O.M (2003). <i>Visualisation turns down energy demand</i>. Paper for the eceee 2003 Summer Study Saint-Raphaël, France.</p>
<p>Other sources (Interviews, conferences, discussions, etc.)</p>	<p>Interview with Mr. Ole Michael Jensen, DBUR, d. 20.6.2004</p> <p>Conference on the evaluation of Hedebygade d. 02.02.2005.</p>
<p>Contact details for further information</p>	<p>Phil.Dr. Senior Researcher Ole Michael Jensen, Danish Building and Urban Research. P.O. Box 119 DK-2967 Hørsholm Tel: + 45 86 55 33; fax: +45 86 55 94; e-mail: omj@by-og-byg.dk</p>