

GENERAL INFORMATION

PETUS description of tool in use						
Name of the case	Solid Waste in Copenhagen					
Name of the tool	Cost Benefit Analysis					
Country	Denmark					
City / region	Copenhagen					
Total area (km ²)	89 km ²					
Population	502, 000					
Density (people/km ²)	5640 people/km ²					
Tool user's profile	R98, The Waste Disposal Company of 1898, is a private, non-profit company led by waste management stakeholders. The company was established in 1898. R98 holds the concession on the collection of household waste from the citizens of the municipalities of Copenhagen and Frederiksberg until 2020.					
a. Organisation name (municipality, NGO, national or regional department, company, etc.)						
b. Field of activity						
c. Detailed contact/feedback (project website, e-mail, address, tel., fax)						
Reviewer, date	Morten Elle, November 19, 2004					
Short description of the case						
<p>A Cost Benefit Analysis was used to support the argument that one system for pre-collection sorting of waste was better than another system. The two competing systems are briefly described in the case. They represent different kinds of systems to be used in a local scale in high-rise, dense urban areas, using advanced involvement of the users. The decision concerning which of the two systems to use in the rest of Copenhagen was more or less overruled by other decisions. Hence, the use of the Cost Benefit Analysis newer got further than the preparatory work. In spite of this, the case illustrates the problems with lack of transparency in Cost Benefit Analysis.</p>						
<p>Why was the case chosen? To which PETUS key-problem is this case study related?</p> <p>The choice of the right system for the pre-collection sorting of waste an essential problem in many cities. The systems in Copenhagen are trying to operate with a high involvement of the users. This case illustrates how a Cost Benefit Analysis can be used to compare two systems – and the lack of transparency of the tool.</p> <p>The case is indirectly related to the PETUS key-issue of waste disposal</p>						
Sector	Waste	Energy	Water	Transport	Green/blue	Building & Land Use
	X	(X)		(X)		
Scale of project	Component	Building	Neighbourhood	City	Region	
			X			
Status of project	Starting up	Ongoing	Finished	Start date	End date (exp.)	
		X		1998		
Key words						
Waste, recycling, household, cost-benefit analysis,						
Project	<p>a. Object (building, city park, wind farm, etc.)</p> <p>b. Type of activity (regeneration, renovation, new development, etc.)</p> <p>c. Type of product (plan, scheme, design project, etc.)</p>					
	<p>a. Pre-collection of waste sorting system</p> <p>b. Management of infrastructure elements</p> <p>c. Solid waste handling plan (part of..)</p>					
Tool	<p>a. Character (according to WP3final0704.doc)</p> <p>b. Benchmarks (qualitative or quantitative)</p> <p>c. Availability (paid/ free)</p>					
	<p>a. Generic tool</p> <p>b. No benchmarks</p> <p>c. Free as it is a generic tool</p>					
Decision-making process	<p>a. Stage of the tool implementation (preliminary, midterm, etc.)</p> <p>b. Level (political, technical, etc.)</p>					
	<p>a. At the end of the projects</p> <p>b. On a technical level</p> <p>c. No public participation planned at this stage</p>					

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>Recycling of solid waste including recycling of household waste has been a part of Denmark's waste handling strategy for the last 20 years. With regard to the total production of solid waste, the recycling percentage is quite high: between 60 and 65 % in recent years. However, household waste has been lagging behind with only 10 % of the daily refuse and 17 % of the bulky waste being recycled.</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>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>a.</p> <p>One of the main challenges has been to involve residents in the pre-collection sorting of solid waste. A basic assumption for the two experiments described in this case is that local organisations like the NGO 'Copenhagen Environment and Energy Office' (KMEK) are more efficient in engaging local residents actively in waste sorting than the rather large waste handling companies. Two pilot projects have been carried out in two parts of Copenhagen: 'Indre Nørrebro' and 'Kgs. Enghave'.</p> <p>In 'Indre Nørrebro' KMEK started the experiment in collaboration with local residential organisations, the Waste Disposal Company of 1898 (R98) and the municipality in 1998. The strategy in Indre Nørrebro is to have many fractions – to be able to sort as many recyclable materials as possible. Local composting of 'green' kitchen waste is part of this strategy.</p> <p>In Kgs. Enghave the professional organisations, the social housing companies, and their relations with R98 dominated the project. Focus has been on the quality of the recycled materials. Local composting on district level was to be part of the project, the 'green' kitchen waste was collected, but the project team was not able to find a technological and economical suitable solution during the project period. The materials were transported to another city for composting. Danwaste Consult has evaluated both the Indre Nørrebro project and the Kgs. Enghave project, using a kind of Cost-Benefit Analysis (without transforming the benefits to a monetary value).</p> <p>b.</p> <p>The sustainability statement focuses on the environmental aspects:</p> <ul style="list-style-type: none"> • Less Waste • More Recycled Materials • More Reuse <p>Social and economic aspects are indirectly touched upon.</p> <p>Before the projects, the recycling % was 17 in Indre Nørrebro and 15 in Kgs. Enghave. In Indre Nørrebro the recycling percentage increased to 35 %, in Kgs Enghave to 32 %. The cost of running the project in Indre Nørrebro is</p>

	<p>however considerably higher than in Kgs. Enghave, according to Danwaste's evaluation. (Suggesting, indirectly, that the Kgs. Enghave project is better than the Indre Nørrebro project)</p> <p>The project in Indre Nørrebro has furthermore been evaluated as a part of the LIFE-project Økobyen på Indre Nørrebro – Ecocity (1997 – 2000). The focus of this evaluation was especially the collaboration between the Municipality and the NGO's. The evaluation concluded that this form of project could be a vehicle for new forms of collaboration and stimulation of the local social environment.</p> <p>The recycling percentages of 32% in Kgs. Enghave and 35% in Indre Nørrebro could be compared with the general recycling percentage for similar waste in Copenhagen: 21%. They could also be compared with the average Danish recycling percentage for daily refuse of 10% and bulky waste of 17% mentioned above. In both cases the systems means an improvement.</p> <p>c. Both projects have been implemented gradually in (parts of) the two districts in Copenhagen.</p> <p>d. It is uttermost difficult to describe the financing of the projects. The projects are primarily financed as a part of the entire solid waste handling. There are a number of different interpretations of what the costs of running the two projects are.</p> <p>e. As the waste is incinerated in a plant generating combined heat and power, waste is linked heavily to the energy sector. Incineration is not considered recycling in the Danish context – thus recycling and reuse is partly in conflict with the production of energy. It is particularly discussed whether the organic part of the daily refuse should be used for bio-gas, composted or incinerated – this discussion has being going on in the Danish waste sector for at least the last 15 years.</p> <p>Transport is a factor to take into consideration in relation to waste handling. More fractions of recyclable materials can cause more transport.</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>The tool used is an ad-hoc adaptation of the generic tool cost benefit analysis. In the actual use of the tool, the benefits were not transformed to an economic value because it is stated in the analysis that the benefits of the two projects are equal.</p> <p>The costs are calculated with R98's own tool. It is used to calculate all costs related to waste handling in every part of the city. It is a traditional way of using this kind of very specific tool, especially developed for this purpose. Every movement of the personnel is accounted for in a detailed, tayloristic way. The tool is – for obvious reasons - not available for persons not employed by R98.</p>

	The estimation of the costs is not very transparent in the analysis – R98's internal figures are used with only a few comments.
B. Tool implementation	
1. Argumentation for choosing the tool a. What were the reasons for the implementation of the tool? (voluntary or requested by what local, 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>The tool was, as mentioned above, used for comparing competing waste-handling systems. The economic dimension is important, especially for the waste handling company R98. The initiative to use the tool was R98.</p> <p>In the R98 organization there are a number of persons knowing about other tools. The tool used was, however, much more simple to use than more complex tools. It could have been a full Cost Benefit Analysis with estimations of the economic value of all the different social and environmental values. Another possibility would have been using a multi-criteria model.</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.)	There were no real barriers for implementing the tool in the form it was used. Time (and economy) would most likely have been a major barrier for developing a full Cost Benefit Analysis – What is for instance the monetary value of the increased public awareness concerning sustainability and waste sorting?
C. Influence of the tool on the decision-making process	
1. Description of the decision-making process/ procedures a. Stages b. Levels (political, technical, etc.) c. Sources of information used during the dmp; d. Who are the decision-makers? e. Who made the final decision for the project implementation? Was it political or technical decision?	The decision to be taken was whether to promote one or the other system as the system to use in entire Copenhagen. The CBA was used in an internal procedure among technicians. The whole procedure was, however, overruled by a general stop for support of composting and biogas systems (se the XXX case)
2. Tool in decision-making process a. At what stage was the tool implemented? By whom? (experts, politicians, etc.) b. How did the tool output influence the process (added or skipped levels/stages in the existing decision-making process, etc.)? c. Quantitative goals or benchmarks defined? (If YES, which – and what were they compared to?) d. Was the tool used to support argumentations?	<p>The Cost-benefit analysis was made at the end of the projects, as a part of finding out which system to use in the entire city (in this respect the projects could be considered large pilot projects). The tool was meant to support the technicians' suggestion to promote one of the systems. Other decisions meant, however, the both systems are neither promoted, nor cancelled in the Solid Waste Plan.</p> <p>It is hard to say how the tool influenced the decision-making process. The process was paused due to the continuing debate on how to handle the organic waste.</p> <p>The two systems continue in parallel, and the latest Solid Waste Plan for Copenhagen Municipality does not include a debate on which system to develop further.</p>
3. Transparency of decision-making process 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.) b. How was the public involved? c. Was there a public discussion over the project and at what stage of the project development?	<p>The public has not been involved in the decisions and the decisions have not been disseminated.</p> <p>The public has however, been very involved in debates prior to the start of the two pilot projects, locally elected representatives of all the involved uses have agreed on being a part of the pilot projects.</p>
D. Expert assessment/analysis/comment of the tool effectiveness	
1. Assessment by tool users a. Were there measurable improvements as a result	Not relevant.

<p>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>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>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 case illustrates how difficult it is to incorporate benefits like:</p> <ul style="list-style-type: none"> • Creating new ways of collaborating • Creating new local organisations • Strengthening local social networks <p>- in a cost benefit analysis. It is difficult to put a price on these soft values (and they are hard to investigate in depth). The need for transparency is evident. There is no doubt that cost benefit analysis is a tool that has a potential. There is, however, a need of finding procedures to make the tool more transparent, and ways of discussing the benefits and costs that are left out of the analysis. Furthermore one could ask oneself if a cost benefit analysis is a good tool to use if it is mostly soft values that are in focus in the decision process.</p>
<p>E. Additional information on the case study available</p>	
<p>Websites</p>	<p>Copenhagen Solid Waste Plan 2008: http://affaldsplan.hybris.pil.dk/ (in Danish only)</p>
<p>References concerning the case but also the key words or problem (papers, articles, reports, laws, etc.)</p>	<ul style="list-style-type: none"> • Miljøstyrelsen: Affaldsstatistik 2002, (Solid Waste Statistics, in Danish only), Orientering fra Miljøstyrelsen, Nr. 6., Miljøstyrelsen (Danish Environmental Protection Agency), Copenhagen, 2003 • Hoffmann, Birgitte and Elle, Morten: Økobyen på Indre Nørrebro – evaluering af et projekt om nye samarbejder (Ecocity Indre Nørrebro – evaluation of a project concerning new forms of collaboration, in Danish only), Technical University of Denmark, Lyngby, 2000, to be found on http://www.rentskrald.dk/bibliotek/rapporter/okobyen_in_e_valuering_nye_samarbejder.doc • Danwaste Consult: Beskrivelse af Agenda 21 affaldsprojekterne på Indre Nørrebro og Kongens Enghave (Description of the Agenda 21 Waste Projects in Indre Nørrebro and Kgs. Enghave, In Danish only), Danwaste Consult, Copenhagen, 2002 • Ringsing, Anita and Forskov, Torben: Grøn affaldsordning I Kongens Enghave 2000-2003 (Green Waste Sorting in Kgs. Enghave 2000-2003, in Danish only), Kvarterløft I Kgs. Enghave, Copenhagen, 2003 • Miljøstyrelsen: Skal husholdningernes madaffald brændes eller genanvendes? (Are the Organic Waste from Households to be Incinerated or Recycled? In Danish with English Summary), Miljøprojekt 814, Miljøstyrelsen, Copenhagen, 2003 • Larsen, Anna Warberg and Lindwall, Hanna Kristina: Beboerdeltagelse I kildesortering (Involvement of Residents in Waste Sorting, In Danish with English Summary), Students Project, Department of Civil Engineering, Technical University of Denmark, Lyngby 2002 <p>Photos: Courtesy of Anna Warberg Larsen</p>
<p>Other sources (Interviews, conferences,</p>	

discussions, etc.)	
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