Sustainable Design, Innovation, and Climate Change: Design Developer Competition as Governance and Response to Future Challenges

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Abstract
The paper discusses a design developer competition in Sweden. The competition is organized by the Norrköping municipality and has been conducted as a joint effort by the public authority, academia, and private companies. The task was to design and build rental apartments. The winning designs are intended to be implemented in an agreement between the developer and the municipality. The paper will focus on the benefits and drawbacks of early steering in housing design through developing a research-supported competition program for sustainable design and innovative solutions for reducing energy use and climate impact, including the response to these challenges by the winning design team.

Steering Principles
The paper adopts a simple model of municipal governance for the competition process. The model is based on four principles. The first is steering by competitor (design team). The organizer has invited companies to submit expressions of interest along with reference projects and company information, working methods, and an organizational structure for the project indicating professional responsibility for architecture, energy, and climate impact. After prequalification, five out of twelve multidisciplinary design teams were selected for the competition. The second principle is steering by competition program. In this case, the municipality requires the selected design teams to produce design proposals according to a competition program that specifies objectives, delivery demands, and judging criteria. Research-based appendices have been added for descriptions of design strategies that support social sustainability, templates for making climate declarations and presentations of energy solutions, information on circularity (including recycling), and innovative aspects of the proposal. The third principle is steering by design. The jury identifies the overall best solution. Two external experts have been added to a jury of in-house professionals (civil servants) employed at the municipality. The power of picking a winner is thus shared with "outsiders." The developer behind the winning design will be granted access to the site according to the competition program and can implement the proposal after agreement with a municipality. A land allocation agreement has been signed. The resulting contract to transfer ownership of the site to the winning developer is not included in this study.

Aim and Result
The paper has an explorative approach. The aim is to describe and critically examine the first steps in a design developer competition: 1) invitation and prequalification, 2) programming the competition task and constructing design teams, and 3) identifying good solutions and articulating the motivation for the selection of the winning design. The findings in the case study are presented in ten specific conclusions from the process of inviting and selcting design teams to programming the competition and eventually singling out the proposal the the best overall solution. Regarding climate footprint, energy, circularity, and design for flexible apartments, the competition can be seen as successful.

Keywords
Competition, sustainable design, climate declaration, smart energy solution, recycling, innovation, governance

Working paper, presented at the 6th Nordic Challenges Conference in Oslo 24-26 May, 2023.

INTRODUCTION

This paper presents findings and discusses experiences from a prequalified design developer competition in Sweden. The competition was organized in 2022 by the Norrköping musicality. The municipality has 145,000 inhabitants and is located in eastern Sweden. The heart of the municipality is the Norrköping city, whose growing population is driving plans for new housing. The design developer competition is part of an R&D project financed by Vinnova in search of future-oriented design solution to the housing challenges of tomorrow.[1] Two competition formats are tested in the R&D project. The first is an invited competition including four design teams selected after invitation and prequalification.[2] The second format is an open competition with six competing design teams.[3] The global objective in both cases is to promote proposals showing flexible apartments and affordable housing, plus-energy solutions, reduction of CO2 emissions, circularity, and innovation. Approved solutions have been awarded 170,000 SEK. This paper is a case study focusing on the prequalified design developer competition and how the winning design team has responded to the challenges in the competition program.

The R&D project is a joint venture between the *public authority* (Norrköping municipality as organizer of the competitions), *academia* (research support by Chalmers University of Technology and the University of Halmstad), and the *private sector* (design team made up of architects, engineers, and developers/builders producing proposals). From this perspective, the competitions are intended to operate as a professional laboratory and an experimental arena to support creativity and new thinking in architecture and construction. In both competitions, the organizer has been looking for multidisciplinary design teams to address complex and future-oriented challenges. The competition programs described the task and objective, competition sites, judging criteria and jury, delivery demands, and information about the detailed developer plans. The programming is done by the organizer in collaboration with Chalmers University of Technology, Halmstad University, and Architects Sweden (a trade union and professional organization). The programs and their conditions were approved by Architects Sweden. The competitions may thus be seen as a combination of professional practice and research expertise from scholars specialized in competitions, housing, and construction management.

One of the motives in the competition is to test how CO2 emissions can be reduced by early steering in design and construction in a life cycle analysis (Modules A1–A5) for products and building phase. According to the Swedish National Board of Housing, Building and Planning, the construction and real estate industry in Sweden is responsible for 21% of the total emissions of greenhouse gases.[4] Thus substantial reduction of carbon dioxide emissions is an urgent challenge. The average level of CO2 emissions for residential buildings has been set at 318 kg CO2e/m^2 GFA (gross floor area) for the construction of multi-family residential buildings in Sweden (Malmqvist et al, 2021). The objective in the competitions is a 40% reduction in Modules A1–A5, which in the two programs translates to maximum of emission of 191 kg CO2e/m^2 GFA in the design proposals. This is one of the reasons behind the search for multidisciplinary design teams that can find good solutions to "wicked" design problems (Rittel & Webber, 1973). The R&D project also address the need for innovative, climate-smart, flexible apartments (Braide, 2023) and socially sustainable housing (Braide, 2019).

Objectives and Questions

The overall goal is to produce knowledge about the design developer competition and its steering tools. Knowledge is developed out of one case study. This paper focuses on the early management in an explorative context. The specific purpose is to test, understand, and critically reflect on steering and qualities in the winning design. The invited competition allows the organizer to govern the selection of competitors, program the competition, and identify jury members with the required expertise. Based on this starting point, the following four fundamental research questions are to be investigated:

- How has the steering by invitation, prequalification, and selection av multidisciplinary design teams operated in the competition?
- How does the winning design proposal respond to the complex challenges in the competition program and attached appendices?
- How have design qualities been identified, interpreted, and made visible by the jury based on the assessment criteria in the competition program?
- How effective has early governance been in terms of success factors and unforeseen drawbacks in the competition process?

Case Study and Action Research

The competition is a case study that must be understood in its local context (Groat & Wang, 2002; Johansson, 2000) and in a more general context of contests in architecture and construction (Flyvberg, 2006). The competition in Norrköping is presented as a *thick description* to maximize the learning from this single case (Stake, 2000). The research group (Braide, Koch & Rönn) has both participated in the preparation of the organizers invitation and played an active role in designing the competition programs. The active involvement in the programming of the invited competition is supported by Engaged Scholarship (Van de Ven, 2007) and action research approaches (Carlsson & Koch, 2014). This participation in the competition processes requires a distance to the research object, critical reflection on the findings, and awareness of the researcher's role in R&D projects when findings are identified and results are presented. Action research in this case study involves the research group testing the design developer competition as a municipal approach for the development of innovative thinking and creative solutions to housing needs.

Data

The data collected are primarily documents from the Norrköping municipality, interviews of professionals on the winning design team, field notes from the jury meetings, and information on websites. The data includes competition documents from *step one* (invitation by the organizer, twelve applications, and selection of competitors) and from *step two* (competition program, four design proposals, and jury report). Complementary documents governing the competition include: *Guidelines for Municipal Land Allocation in Norrköping Municipality (Riktlinjer för kommunala markanvisningar i Norrköpings kommun), Action Plan for Land Allocation for Housing Construction (Handlingsplan för marktilldelning vid bostadsbyggande)* and *Architecture City Norrköping (Arkitekturstaden Norrköping)*. Websites for previous design developer competitions in Norrköping have been investigated. Seven indepth reviews with members of the winning design team have transcribed and provide useful accounts of personal experiences. Additional information has been received from officials who were involved in the selection of design teams. This information is a response to an email.

Method of Analysis

The collected documents have been analyzed in terms of content with the support of close reading (Brummet, 2019). These analyses examined clearly expressed statements in municipal guidelines, the competition program, the design proposals, and the jury report as well as implied intentions in drawings, models, and illustrations of architectural designs. The demands expressed in the invitation from the organizer and the design teams' applications give meaning to the outcome of the prequalification phase. The application is a document produced with the intention of being selected to sell services to the client.[5] The organizer's intention was to invite a variety of design teams with the required profession qualifications. Competing teams present their design proposals to convince the jury that they have the best overall solution to the task. Delivery demands are included in the competition program to give the jury the necessary information about the solutions presented in the site plan and landscape design and the architectural drawings (building and individual apartment plans, elevations, sections), illustrations. and digital model. The proposals must also include a short description (300 words or less) of their architectural qualities and underlying ideas, design strategies, innovation, construction, and energy solutions as well as a separate calculation and a climate declaration following a template. Kippendorff (1989, 2004) makes no major distinction between qualitative and quantitative content analysis of documents. In both cases, a predetermined system may be used for coding text. In this paper, the invitation, applications, selection of design teams, competition program, design proposal, and jury report are all vital competition documents for analysis together with policies, field notes from inside the jury room, and transcriptions of interviews. The analysis of data follows the R&D challenges expressed in the competitions.

Framework of Understanding

The design developer competition is a special type of competition. In Sweden, the design developer competition started during the deregulation of the 1980s, and the format reflects the trust in market solutions of that era (Rönn, 2016). There are no national standards or competition rules approved by professional associations for consultants and construction companies. The competition is controlled locally by municipalities in three specific ways: a) *politically* through guidelines for land allocation, b) *professionally* through competition programs, and c) *administratively* through implementation agreements with the developer behind the winning proposal. The winning design can be further developed in connection with building permitting and adjusted to the detailed development plan. The municipality is the decision maker in both cases and may organize competitions either ahead of an approved detailed development plan for the competition site or after the plot has been regulated by a land-use or zoning plan. In this case, the Norrköping municipality organized the competition in an already finalized detailed development plan, hoping to make it possible to construct the winning design with no unexpected delays in the planning process.

The municipality has a decisive influence in the design developer competition in its role as organizer, landowner, and planning authority. The competition site is a fundamental asset controlled by the organizer. According to the law (SFS 2014:899), the municipality need only report its objecttives and general conditions for the allocation of land, processing routines, and principles for pricing land in its governing policy. The municipality determines the competition format. It may be open to all companies or only to a selection of invited participants. The competition program describes the task, prerequisites, and conditions. The responsibility of the jury is to identify the best overall solution. One proposal is seldom superior in all aspects. Finding a winner can there-

fore be difficult. Elected officials decide whether to allocate the land based on the jury's choice of the first prize winner. The municipality has a strong position as property owner of the site in the negotiations that follow on transferring land to the winner. The implementation of the design proposal is regulated by the municipality in agreements with the developer. According to municipality guidelines, property is transferred to the developer through market price and conditions depending on leasing form for housing (Rönn & Koch, 2022a).

In the design developer competition, the developer and building companies normally compete at their own expense. The profit lies in getting access to buildable land. This is an investment in potential future profit through housing development projects. How the design teams regulate their internal development costs in the competition is seen by the organizer as a private matter for each company. The competitions in Norrköping deviate from common Swedish practice by offering financial compensation for approved proposals. The sum of 170,000 SEK (about 15,000 euros) may be assumed to cover half the cost for a fully paid team to produce a proposal capable of winning the competition (Rönn & Koch, 2022b).

The Swedish National Board of Housing, Building and Planning provides a housing market survey showing how municipalities allocate land to companies through competitions according to design quality and price tender on land. In the 2022 survey, 24 municipalities responded that price is the dominant factor in allocating property to developers.[6] The company that pays the most for the land gets to build their project at the site. 57 municipalities use both price and quality as the basis for ranking proposals. In these competitions, the jury must weigh the identified qualities in the design against tenders for the land. 42 municipalities use quality criteria as a reason for transferring land to companies. The developer behind the best overall solution can buy the land and implement the winning design on the competition site. By reporting the price of the property in the competition program, the organizer intends for design teams to compete based design qualities rather than through high offers for the land.

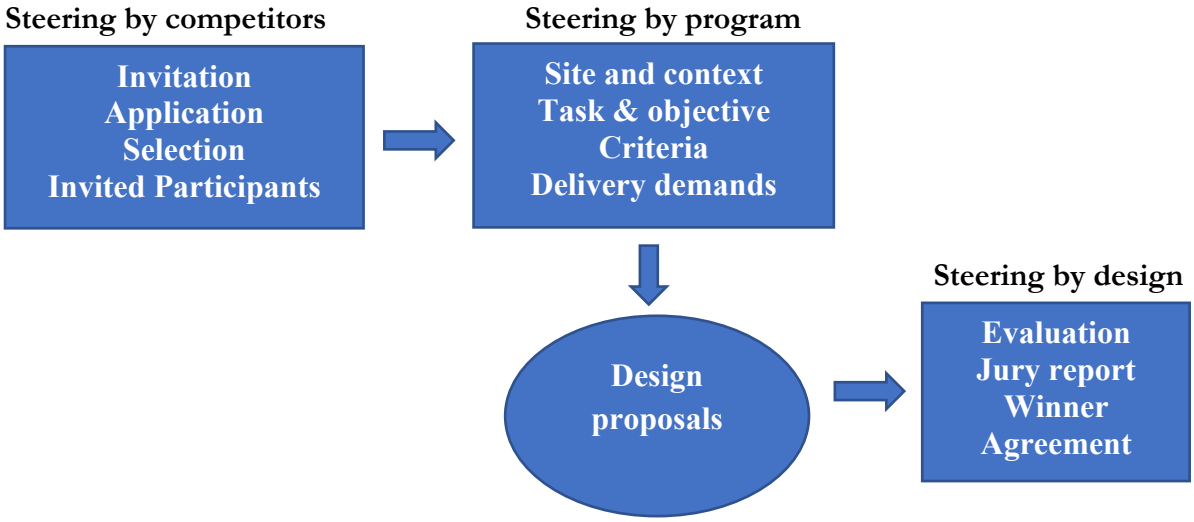
The survey published by the Swedish National Board of Housing, Building and Planning shows that the design developer competition is a municipal practice even if it doesn't contain any data on the competition format. There is no statistical tracking of whether developers get assess to land through open or invited competitions. The vocabulary used in describing developer competition among municipalities is ambiguous, vague, and imprecise.[7] This problem is transferred into the classification of competitions presented in the survey. In particular, conflicting architectural intensions may be expressed in a municipality's competition program. A more precise concept for the competition format needs to be prioritized (Menteth, 2018). In this paper, the design developer competition is defined as a competition that (a) is organized by a municipality; (b) has a competition program that stipulates that the competition task must be presented in architectural drawings (site plan, elevations, floor plans, sections) and stipulates the criteria for assessing and evaluating proposals; and (c) gives the developer behind the winning proposal access to the com-petition property through (d) an agreement with the municipality that regulates the implementtation. We suggest that only competitions that meet these criteria should be defined as design developer competitions (Rönn & Koch, 2022).

The design developer competition emerged in Sweden, Finland, and Austria during the deregulation of the 1980s and 1990s (Rönn, 2012; Östman, 2014; Liske, 2008; Kazepov & Verwiebe, 2022). Surprisingly, there is no connection to Sweden's Public Procurement Act (2016:1145) even though the organizer is a public entity. This gives the municipality a much freer position in choosing a winner, appointing jury members, and reporting the results from the ranking of proposals compared to design competitions that are subject to the act in Chapter 18. Since there is no national standard, the rules of the game vary a lot in design developer competitions at the local level.

The research on competitions in architecture and urban design is dominated by the traditional architectural competitions, which are regulated by international, European, and national guidelines. There are few studies focusing on invited design developer competitions and the selection of competitors through prequalification. The research on prequalification covers the procurement of construction development projects by both private and public clients (El-Swalhi, Eton & Rustom, 2007; Adewunmi Oluwatayo, 2016). Few investigations of the selection of competitors in invited architectural competitions have been conducted in Denmark and Sweden (Kreiner & Gorm, 2008; Rönn, 2011; Rönn, 2013; Rönn, 2014). From this point of view, the examination of the invited competition in Norrköping and the winning contribution adds new knowledge to the research area.

A Model for Municipal Steering of Competitions

A model describing steering has been constructed showing the competition process from invitation to the awarding of development rights after the jury's selection of a winner. The purpose is to frame the collected data, make sense of it for analysis, and visualize how the government operated in the investigated design developer competition.



Model: Steering principles in design developer competitions.

The model covers the process from invitation and selection of competitors to programming, evaluation of design proposals, and project implementation. These steering principles provide a toolbox for administering competitions. The three steering principles operating in the paper can be described as follows:

Steering by competitors: At the heart of this strategy is the selection of competitors through the prequalification of professionals and companies. Central to this governance are (a) the organizer's

invitation presenting the task, required information, and selection criteria; (b) the application through which competitors express their interest, qualifications, and financial recourses; (c) the selection committee; and (d) the selection of participants for the competition. These steps are typical for invited competitions. The invitation corresponds to the idea of early steering in architectural design and construction. The purpose is to minimize the work expended on the design developer competition while allowing the organizer to check the professional qualifications and financial standing of each company that applies. Since the organizer determines the submission requirements, the invitation can easily be adjusted to the specific competition task. The organizer can assess qualifications with the support of CVs and reference projects. However, this opportunity for control may trigger excessively strict submission requirements that exclude small construction companies and young architectural firms. Risk is a companion of new thinking and creativity in competition that can't be fully controlled by prequalification. Organizers who play it safe are seeing only advantages in companies that have a good reputation and demonstrably sound finances.

Steering by program: This governance principle operates through the organizer's programming of the mission, prerequisites, and conditions in brief. At the heart of the competition program are descriptions of (a) the task, site, and context; (b) the goal and intentions; (c) the assessment criteria; (d) the submission requirements; (e) the access to the land; and (f) the jury members. Design teams must submit their proposals anonymously to guarantee fair play (justice and equal conditions). In this case, the property had already been regulated in a detailed development plan, and the price of the plot was set at 3,500 SEK per m^2 of RFA (residential floor area). The winner can buy the site and implement the winning design. The housing form must be rental apartments. The building permit drawings must be developed in consultation with the City Architect. The developer cannot change architects or make major alterations to the winning design without acceptance by the Norrkoping municipality. The assessment criteria have a general character and must be interpreted when applied to evaluating design proposals. The objective of the brief is for the competition to deliver housing of high quality in terms of architecture and apartment planning, fit to surroundings, CO emission (max. 40%), circular processes in architecture and construction, contribution to social sustainability through flexible apartments that allow households to grow and contract over time, affordable housing with energy-smart ecological solutions, and creativity and new thinking in design, construction, and management of housing. The risk is that the organizer wants too much in the competition. The task may become too complex. The design team must prioritize among all the objectives in search of a winning proposal.

Steering by design: It is the duty of the jury to identify the best overall solution. The design proposals are presented anonymously. The jury knows the names of the invited design teams but not which is responsible for each proposal and will only get this information after the winner has been appointed. In picking the winning design, the individual jury member has a moral responsibility to (a) carefully examine each proposal, (b) compare the solutions, (c) evaluate and rank the contributions according to the assessment criteria, and (d) finally single out an best overall solution as winner. The evaluation must therefore have a temporary organization, and the jury should agree upon a process. Identifying a winner is a collective decision. Juries composed of members representing varied fields of expertise can be expected to prioritize different aspects of design during the evaluation. The graphical visualization of each design proposal is presented in a seductive manner. The jury members' com-bined skills and professional ability to identify good solutions and to be able to distinguish between pros and cons in solutions is of vital interest in steering by

design. Ultimately they must select a winner. In this case, the jury needed three face-to-face meetings and one partly online meeting to reach consensus in choosing the winning proposal. Very seldom do jury members express dissent-ting opinions in jury reports, at least in the Nordic tradition (Kazemian & Rönn, 2009). The final step is implementation of the winning design through contracts. A land allocation agreement has been signed by the Norrköping municipality and the developer to implement the design proposal. The next contract is going to transfer the ownership of the site to the winning developer. This agreement will be signed later and is not included in this study.

THE CASE STUDY

Policy for Land Allocation

The Norrköping municipality published guidelines in 2015 and 2018 that regulate the planning and design of housing competitions. The guidelines are adopted by elected officials in the Urban Planning Committee (Stadsplanenämnden), which represents the municipality as a landowner, planning authority, and decision-maker on land allocation. The 2015 guidelines are a brief policy document. According to the policy, land for housing construction should be allocated to companies through tenders or competitions. Direct allocation can only occur in special circumstances. When transferring land to companies, the municipality must consider the developer's capacity, finances, and long-term interests. The decision may also be affected by how the developer has carried out prior projects. In the role of property owner, the municipality should sell ready-to-build land. The value of the land is a question of supply and demand. The price of the property must correspond to the market value. The land should either be sold to the company with the most economically favorable offer or at a price determined by an expert valuation.

The 2018 guidelines contain more in-depth information, with a clearer presentation of roles in the allocation of municipally owned land for housing construction. This time, the elected officials have placed the responsibility for land allocation with the Urban Planning Office (Stadsbyggnadskontoret) and its division for land and development. The municipality expects continued growth in population and finds it particularly important that the allocation of land is characterized by "transparency, equality, clarity and predictability" (*Action Plan*, p. 5). The guidelines are promoted on the website so that both new players and established companies can be aware of the rules of the game for land allocations.

In the 2018 policy, *land allocation* is a term for the transfer of municipally owned land through sale and leasehold. The transfer is regulated in an agreement with the developer. The municipality should promote competition and diversity, allocate land at market prices, and offer new developers the same access to land as well-established companies, while assessing the capacity, financial resources, and long-term interests of developers. There is no regulation in the policy concerning financial compensation to competitors for their development of approved proposals. Companies must compete at their own expense.

The basic principle of the policy is that land should be allocated to developers through a competitive process. The municipality should create competitive market conditions by organizing competitions. The Urban Planning Office must present proposals for such competitions for the elected members of the Urban Planning Committee for approval. Subsequently, a competition program will be produced with information on the competition project, submission requirements, form of submission, assessment criteria, jury, and proposed agreement with the winner. The competition program must be advertised on the City's website and sent to companies according to a mailing list. The jury will identify a winner. The

Urban Planning Committee, whose members are elected, decides on agreements with the companies. In prequalified competitions, an evaluation group will select companies for the contest.

The policy distinguishes between requirements and criteria. Requirements are conditions that developers must fulfil to get access to land. Applications that do not fulfil the requirements will be rejected. Criteria form the basis for assessments used in competitions to determine either the most favorable bid for the land or the best solution for developing it. The criteria must be as clear as possible and translatable into contracts with developers. There is no further specification. The policy encompasses both competitions in which the price of the land is the decisive criterion and those with design ambitions. In areas where architecture is seen as important, the municipality will produce special aesthetic programs as a foundation for design and construction. There is no link in the policy to the planning and design of detailed development plans. However, the municipality's architectural policy is supposed to be used in the development of detailed development plans and the assessment of applications for building permits.

Invitation to Pre-qualification

In 2022, the municipality published an invitation to prequalification as an announcement of a design developer competition. The competition plot is located outside the city center and close to a large hospital. The detailed development plan allows three-story buildings. The neighborhood consists of a preschool, playground, detached houses, semi-detached houses, row houses, and apartment buildings. After prequalification, five design teams will be invited to participate in the competition (Invitation 2022-04-01). Approved competition proposals will be reimbursed 170,000 SEK. The aim of the competition is to create housing that:

1. produces more renewable energy than it uses during the year;
2. minimizes CO2 emissions and promotes circular processes in architecture and construction;
3. contributes to social sustainability through residential buildings that have flexible apartments for households/families that grow and shrink over time and provide space for communal activities;
4. offers tenants affordable rent, so that citizens can demand climate-smart and ecologically sustainable housing;
5. provides residential qualities, functions, and experiences of beauty to support everyday life;
6. meets the challenges of the local community with creative solutions and innovation in design, construction, and management.

The price of the competition property is 3,500 SEK per m^2 RFA (residential floor area). The idea behind the fixed price of the land is that selected design teams "will compete with quality and goal fulfilment in the competition" (Ibid, p. 5). Actors who want to be invited to the competition should submit an application (expression of interest) with a brief presentation of the companies in the design team, including CVs for professionals in the roles of (a) agent for the developer, (b) responsible architect, (c) responsible landscape architect, (d) responsible energy expert, (e) responsible climate expert, and (f) responsible expert for sustainability and circular processes. In addition, the application must include a letter of intent describing how the team intends to fulfil the purpose of the competition, implement the winning design, and manage the housing in the long term. The application should also have three reference projects with contact details. One of these must be built. Finally, companies must document that they are in good standing with tax authorities and have access to the resources necessary to implement the competition proposal.

Requirements and Criteria

The organizer's invitation states that a "diverse mix of qualified design teams is selected for the competition" (Ibid, p. 7). Applications are evaluated in two stages. First, the applications are assessed for compliance with the submission requirements. Accepted applications then proceed to a second stage for ranking and selection. The selection committee, appointed by the organizer, makes an overall assessment of the applications regarding "the ability to design functional residential neighborhoods with high architectural quality that create a whole with the surrounding buildings, which requires quality at all stages from sketch to implementation and excellence in ecological and sustainable solutions, energy, innovation, climate footprint and circular processes" (Ibid). According to the invitation, the organizer may consult the research group when choosing teams. However, this has not happened. The selection committee chose to appoint design teams for the competition on its own.

Evaluation and Selection

The call generated twelve applications from companies. All applications met the submission requirements. The selection committee needed two meetings to choose five design teams for the competition. One of the invited teams later declined to submit a proposal. Out of the five invited teams, four multidisciplinary design teams delivered approved proposals. The actors in the selected teams include developers, design firms, builders, and development and property management companies. They include a mix of small local businesses, medium-sized companies, and large corporations with international operations. From this point of view, it appears that the invitation generated design teams with the desired expertise in architecture, engineering, construction, and management.

The Competition Program

The competition program is a nine-page document supplemented by five research appendices and municipal guidelines. Under the heading of goals and objectives, the organizer states that the competition will generate housing that (a) has high architectural quality and takes advantage of the surroundings; (b) produces more renewable energy than it uses during the year; (c) reduces CO2 emissions by 40% compared to the average multi-story building (191 kg CO2e/m^2 GFA); (d) promotes circular processes in architecture and construction; (e) contributes to social sustainability through flexible apartments that meet a diversity of needs of households that grow and shrink over time and provides space for communal activities; (f) has an affordable rent and simultaneously fulfilling demands for climate-smart and ecologically sustainable housing; (g) supports housing qualities, functions, and experiences of beauty; and (h) meets challenges in the local municipality with creative solutions and innovation in design, construction, and management. Thus, the program presents a complex challenge for design teams, which explains the demand for expertise in the organizer's invitation.

Kick-off Meeting and Submission

The competition program follows the rules for architectural competitions. The program has been reviewed and approved by Architects Sweden. The housing will be rented, but it is up to the design team to propose the size and composition of the apartments in the project. The competition site covers 8,400 square meters. The language of the competition is Swedish. The competition started with a kick-off meeting on June 7, 2022 where the organizer presented the task and gave a tour of the competition site. The proposals had to be presented anonymously to the jury by September 30, 2022. Entries had to be labelled with a motto submitted in a sealed envelope indicating the companies and individuals involved in the development of the proposal.

Jury and Assessment Criteria

The jury for the competition consists of seven people, five appointed by the municipality and two external members chosen by the research group. The jury will assess and rank the proposals by weighing eight criteria: (a) architectural quality, (b) energy use, (c) climate footprint, (d) circular processes, (e) social sustainability, (f) affordable rent, (g) innovations, and (h) developability. The criteria for energy and climate are measurable, so the degree of goal achievement can be quantified. The other six criteria are more subjective and interpretable, which is typical of architecture and urban design competitions. The jury must interpret and clarify these criteria while assessing the design contributions.

Submission Requirements

The competition proposals have to be presented on five A1-format posters. In addition, the proposals should also be presented on a USB stick for printing and presentation on websites. Entries should include drawings, illustrations, models, and descriptions. The submission requirements include (a) a site plan at scale 1:400 with courtyard environments; (b) a perspective illustration showing the buildings in their setting; (c) a perspective illustration of the courtyard and outdoor design; (d) two sections at scale 1:400 of the residential buildings and outdoor landscape; (e) elevations at scale 1:400 indicating materials and colors; (f) detailed drawings at scale 1:50 showing material transitions; (g) apartment layouts at scale 1:200 that can vary in size, with one solution furnished; and (h) a digital model of the buildings. The proposal must contain brief descriptions of architectural qualities and fundamental ideas, design strategies, energy management, circularity, innovations, and construction methods. In addition, the proposal must contain three appendices: (a) a summary of energy management according to a provided template, (b) a climate declaration reporting CO2 emissions according to a provided template, and (c) a report on the rent cost and number of apartments. To support the development of an energy positive solution, the organizer offers one hour of consultation with an external energy expert.

Exhibition of Implementation

In the competition program, the organizer promises to exhibit the contributions so that citizens can see the proposed design solutions. Architects Sweden, the Norrköping municipality, Chalmers University of Technology, and Halmstad University may publish the competition documents (program, proposals, jury report, and expert evaluations) on their websites. The municipality clearly states the intention to transfer the land to the developer behind the winning proposal. This agreement will require that the building permit be prepared in consultation with the City Architect. The developer may not change the architect or redesign the winning proposal without approval from the municipality. The requirements are a first step for the municipality to control the implementation of the winning qualities through conditions of contracts and building permits.

Jury Statement and Winning Proposal

The jury consists of members with specialized expertise in architecture, urban planning, and energy. As support to their evaluation, the jury has access to two independent expert reports regarding energy solutions and the credibility of the reported CO2 emissions. Both these documents are based on provided templates to ensure comparability on equal terms. All four proposals present solutions that produce more renewable energy than the energy they use in a year, two of them just barely. The climate declarations show that CO2 emissions are reduced by more than 40% and are significantly lower than the objectives. From this point of view, the competition is a success. As the proposals meet the energy and climate targets, the assessment of how the entries respond to the other challenges became crucial in

selecting the winner. The jury members needed to discuss the contributions in four meetings to agree on a winner. The decision is formulated as follows in the jury's statement:

> After completing the assessment, the jury has concluded that BoroBoro is the proposal that most convincingly combines architectural quality and the high goals of the competition and recommends the proposal for further processing and implementation. The proposal is an exciting design concept including reuse, with a strong character of its own. Getting the calculated climate impact to be this low, it is necessary to implement these solutions or climatically equivalent design in future phases of the project. The jury is aware that a great deal of humility about reuse is required. The industry is facing a forthcoming journey in this area, which put demands on the continued process, but it is nonetheless important that reuse becomes a fundamental starting point in the development of innovative climate-smart housing. (Jury report, p. 4)

The comments from the jury on the winning proposal contain both descriptions and evaluative judgements. This is typical when architecture criticism forms the basis for finding the best solution in architecture and urban design. The following are some of the qualities and values highlighted in the jury report to explain the choice of the winner. The proposal has three coherent and carefully crafted building volumes, which are well-balanced on the site and meet the surroundings in a considerate way. The jury is attracted by dwellings that have entrances facing both the street and the courtyard. The design shows a semi-private space in the urban design. Three large buildings enclose the outdoor design. One side the courtyard is open to the local preschool. There are also critical notes in the jury report. According to the jury, the design can be improved by expanding the common indoor entrance area, possibly by removing apartments on the ground floor. Since the proposal has more apartments than the other three solutions, this change is seen as an improvement.

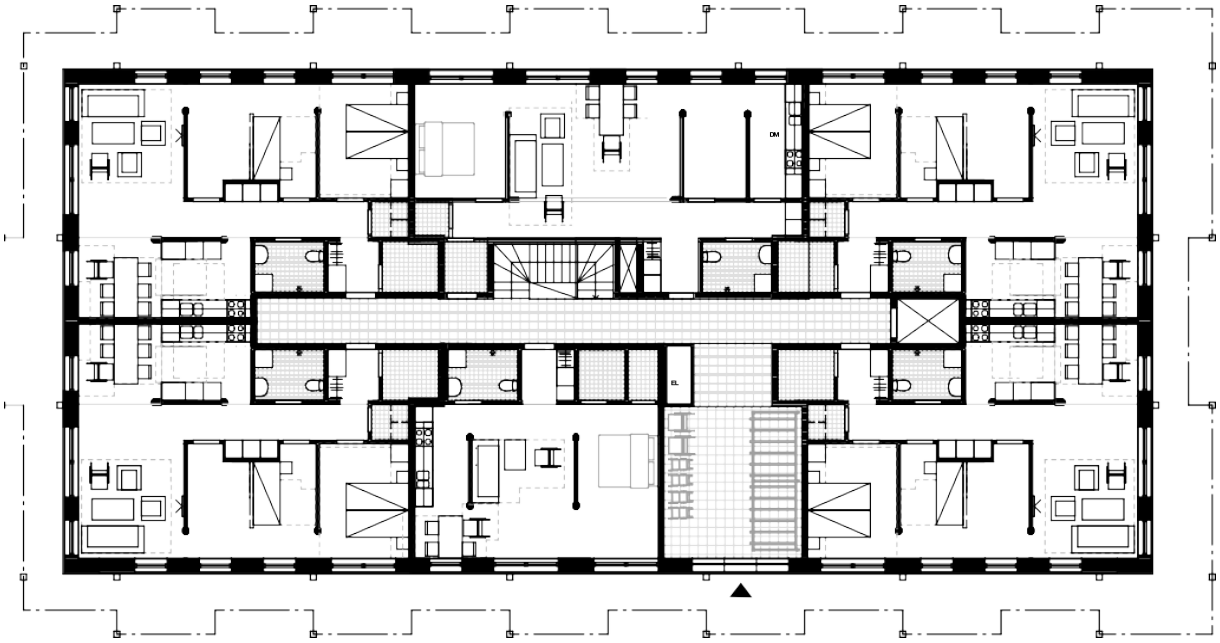
The jury finds that the design demonstrates a strategy for reusing materials. This is elegantly expressed in the architecture. The drawings show a wooden framework with a balcony filled with windows and recycled materials. The jury thinks that the implementation of the model will look as presented in the illustrations. Somewhat surprisingly, the jury report does not comment on the design team's demand for active participation by the municipality in their proposal for developing circular processes in architecture and construction. However, this is a new kind of request that was given considerable space in the jury's internal discussions and which the design team clearly presented in their proposal. The design team wants circularity to become a joint venture in the implementation of the winning design.

The flexibility of the 93 apartments presented in the proposal confers housing qualities and social sustainability, according to the jury. The design features efficient apartments with sliding patitions and open balconies that become extra room during the summer. The apartments have rooms that can be divided off to function autonomously as a separate rental unit or a workplace. The jury does not comment on the thickness of the buildings, with double-loaded corridors and single-sided apartments, though this arrangement is normally seen as a drawback. Instead, the jury prioritizes the flexibility of the apartments. The design team had a choice between thin buildings of apartments with two-way views and thick buildings that facilitated an energy-positive solution. The response to this dilemma was single-sided apartments designed for alteration in thick buildings with solar panels on the roof, in-floor heating, individual heat exchangers for ventilation, and geothermal heating. Architecture and technology emerge as a guiding combination.

View along the main street in the area. The façade is designed as a framework filled with recycled materials. Design team: Spridd, Nivå Landskap, Incoord, and Kvarnstaden.

View of the outdoor environment with stormwater detention system. Design team: Spridd, Nivå Landskap, Incoord, and Kvarnstaden.

Plans over one of the residential buildings showing design principles behind flexibility and alterations of apartments in the proposal. Design team: Spridd, Nivå Landskap, Incoord, and Kvarnstaden.



Ground floor in one of the building types. Design team: Spridd, Nivå Landskap, Incoord, and Kvarnstaden.

View through apartment along the facade. Design team: Spridd, Nivå Landskap, Incoord, and Kvarnstaden.

FINDINGS AND CONCLUSIONS

This case study focuses on the early steering of architecture and construction through a pre-qualified competition with invited design teams. This steering operates through the selection of competitors, programming of the competition project, and selection of a winning proposal by a jury. The findings can be summarized in ten conclusions:

1. The submission requirements in the organizer's invitation reflect three overall objectives for an early steering in competition by prequalification. First, the invitation is intended to be on offer to companies. The organizer wants to attract professional actors who have the required expertise to the competition. This is done by looking for design teams with specific fields of expertise, along with their CVs, and to provide reference projects. Second, the organizer is searching for qualified design teams with the ability to deliver solutions with the required qualities in architecture, technology, and construction. The application should also include a presentation of the team's organization for the project and a letter of intent describing its ambitions. Third, the organizer is trying to find competitors with the financial capacity to implement the winning proposal and manage the housing in a long-term perspective. The organizer seeks to minimize risk by requiring proof of good standing from the tax authorities and at least one reference project that has been built. In case of uncertainty, the organizer may check the developer's financial status before selling the land. In retrospect, it appears that the requirements for long-term management may become a surprisingly new challenge. The municipality would like to transform winning design qualities into measurable demands in the agreements with the developer. However, A closer check reveals that housing management appears to be unresolved in the proposal.

2. The invitation from the organizer resulted in twelve applications from multidisciplinary design teams—enough qualified applicants for a successful outcome. Seen from this point of view, the steering by invitation, prequalification, and selection of multidisciplinary design teams adapted to the competition task seems to be an effective and successful method of early management. The invited companies include local businesses as well as corporations with international projects. A somewhat larger number of applications was expected by the researcher, given that the organizer promises both buildable land and compensation of 170,000 SEK for approved design proposals. One conceivable explanation for why the organizer didn't receive more than twelve applications may be that the objectives of the competition seemed difficult to fulfil. It is likely that only a limited number of firms were confident enough in their ability to respond to the challenge to apply for prequalification. This interpretation is supported by interviews, and the fact that one of the invited multidisciplinary design teams chose to drop out of the competition may also be a consequence of the organizer seeking out cutting-edge practices in architecture, technology, and construction.

3. The winning design team is assembled out of four companies: (a) Spridd, an architecture firm with a separate developer organization; (b) Nivå Landskapsarkitektur, a landscape architecture firm; and (c) Incoord, a mechanical engineering firm. These three companies have collaborated previously and have personal knowledge of one another. The fourth member of the team is Kvarnstaden, a small, newly established project development firm in Kalmar that has connections to a local builder that

has been collaborating with Spridd in another project. The team has been assembled according to the required expertise and experience. It was Spridd, the architecture firm, that contacted the other three actors and invited them to join the competition. As the driving actor, Spridd did the architectural design and managed the climate declaration and issues regarding implementation together with Kvarnstaden. Nivå, the landscape architect, designed of the outdoor environment. Incoord developed the energy positive strategy. Kvarstaden calculated rent levels and investigated financial solutions. Since Spridd was able to act as both architect and developer with in-house expertise in climate issues, the company played a dominant role in the development of the proposal. The work has therefore been unevenly distributed among the team members. Invited actors (Nivå, Incoord, and Kvarnstaden) designed minor specialized parts of the proposal at their own expense and in hopes of being hired in the event of a win. Kvarnstaden was reluctant to continue participating in the implementation due to rising interest rates and a weak market for the construction industry and was replaced in the land allocation agreement by Livi Fastigheter.

4. All four proposals present credible proposals that have CO2 emissions more than 40% lower than standard buildings, and all produce more than enough renewable energy to operate the buildings. Thus, the competition program seems to support the development of smart solutions. The competition shows that contemporary technologies have significant potential. The CO2 emissions of the winning proposal are 169 kg CO2e/m^2 GFA, which is 47% better than the average level of 318 kg CO2e/m^2 GFA for standard buildings in Sweden. The control by a hired energy expert indicates that the energy-positive solution in the winning design generates a surplus of 25.3 kWh per m^2. The proposals report rents that are at the 2020 average level for new apartments in multistory buildings in Sweden. In this case, energy-smart housing with strong reduction of CO2 emissions has not resulted in more expensive apartments. The difficulty of achieving affordable rents is partly a result of a new government withdrawing support for residential buildings. If the subsidy had remained, the standard rent for rental apartments in the winning proposal would have been 1450 SEK per m^2 instead of 1850, according to the interviews.

5. The development of flexible apartments that accommodate a diversity of households is a winning concept, as highlighted by the jury in its statement. The organizer sought apartments suitable for households that grow and shrink over time. The idea is that flexibility contributes to quality of life in the home and to social sustainability in the neighborhood. The design team's response to the challenge is thick buildings with a double-loaded corridor in the center that has entrances to the apartments. The building entrance is presented as a space for social meetings. Both the jury and the design team refrain from highlighting the disadvantages of single-sided apartments. The focus is on living spaces with sliding partitions that allow the apartments to change and vary without major remodeling. For example, rooms can be partitioned off to be rented out or for some other use. This type of flexibility may optimize the use of housing in an era of high land prices and rising construction and financing costs. Both the jury and the design team acknowledge this scheme as an innovative response to the challenge of the competition program.

6. Circular processes in architecture and construction in the competition program are met by design and a reuse strategy. The first response is an architecture with a wooden frame of windows and balcony that is visible in the façade as a structure filled with recycled material. The architecture includes different components and colors that form a varied whole. The jury notes that the solution

can be a challenge when checking building permits. The second response is a strategy of circularity expressed as principles such as (a) maximizing reuse, (b) incorporating products rejected by other projects, (c) longer life of materials, (d) materials that can be modified over time, (e) design for repair and maintenance, and (e) minimizing waste. This principle is also applied to the courtyard, with a stormwater detention system involving recycled concrete blocks and stones in water to create an inspiring play environment for children. A key element of the strategy noted by the jury notes in its evaluation is that the design team invites the municipality to play an active role in the circularity as a property owner with access to land for storage of materials for recycling and as a decision maker for demolition permits with information about possible donor buildings. Circularity is a design quality stated in the land allocation agreement and will also most likely be included in the contract when the property is sold to the company that will implement the winning design.

7. The winning design team highlights three innovations in the proposal: (a) flexible planning and construction at an early stage, (b) innovative collaboration with the municipality, and (c) a thorough process for how apartments and construction can change over time. In parallel with the architectural design, the team wants to monitor the reuse market and create a dedicated organization to work on circular processes. In collaboration with the municipality and future builder, the developer will be looking for efficient and cost-saving solutions for logistics, storage, and documentation of materials for reuse. As a social innovation, the design team has described a scheme of apartments that can increase and decrease in size during management. The ability to adapt functions and the size of the dwelling is seen as a method for retaining a core of tenants when family constellations change, supporting feelings of safety, and managing housing in the long term. In terms of innovation, the proposal envisions a combination of process innovation and design innovation with social purposes.

8. The jury worked to evaluate the proposals during four meetings. The assessment had several phases that are typical of a jury trying to identify the best solution among several proposals. Drawings and renderings of the scheme as a built environment help them judge the designs. During their meeting, the jury members repeatedly weighed the pros and cons of the design, apartment quality, outdoor environment, and carbon footprint of each proposal in search of a winner. The following phases of evaluation have been noted inside the jury room: (a) learning about the jury members and adapting to accommodate the skills of each in order to address the joint task, examining the assessment criteria, trying to develop a joint understanding of fundamental features in the proposals, checking whether the proposal meets the submission requirements, and visiting the site to get a sense of the surroundings; (b) identifying qualities, shortcomings, and ambiguities in the proposals; (c) highlighting differences between the proposals by repeated comparison; (d) ranking the solutions by preliminary scoring solutions based on the assessment criteria to produce a shortlist of the best; (e) attributing design qualities and architectural values to the proposals for a final round; and (f) explaining and justifying the choice of the winner in a written statement. Inside the jury room, these six typical phases have been made visible to varying degrees during the assessment of the design proposals.

9. The evaluation started without a clear structure and roles such as chair, rapporteur, and secretary responsible for the jury report. Those roles became clarified during the process. The first jury decision concerned whether the submission requirements had been fulfilled. All the competition proposals were approved by the jury and would thus be awarded 170,000 SEK in compensation.

One design team had to make a minor addition. After the members had introduced themselves to one another, the jury started to review the proposals and examine how the design teams had responded to the competition task based on the assessment criteria. The members were then given the task of scrutinizing the proposals in detail on their own. The meeting concluded with a timetable for the forthcoming jury work. Before the next review of the proposals, the members were asked to form an independent opinion about the best overall solution. The discussion of the proposals in the jury then continued at meetings and can be characterized as a joint knowledge-building review prior to the selection of the winner. The members posed questions to the design proposals and looked for responses in the schemes based on their different fields of expertise and individual preferences. The review covered both the detail and the whole. Since all entries met the energy and climate objectives, the other challenges were given a lot of space in the discussions. The final assessment was determined by questions about how the design teams solved the demand for flexible apartments and presented housing qualities. A test of scoring confirmed the ranking by architectural critique. One proposal received the highest score. Finally, the jury discussed the judgement. Should only qualities be emphasized, or should the jury also highlight shortcomings in the winning proposal that need to be addressed in the next step of design? In summary, the jury report is a typical expression of architectural critique, combining descriptive statements and value-based judgments of the design. The jury suggests some minor alterations to the architectural design.

10. The Urban Planning Committee reaffirmed the jury's selection of winner on December 15, 2022. This decision by the committee is in accordance with the land allocation policy. In the subsequent land allocation agreement, dated May 15, 2023, the municipality uses requirements and appendices as steering mechanisms to achieve qualities in the winning design proposal. Five key documents are added to the agreement: a) competition program, b) jury report, c) design proposal, d) detailed development plan, and c) legal map of the property. Two demands refer to architecture and construction. First, the application for a building permit must be reviewed and approved in advance by the City Architect. Second, the developer will get access to a space for circularity though a separate transaction. The municipality promises to provide space close to the property for materials that are to be re-used in the buildings. The contract transferring ownership of the property to the developer must be signed no later than March 31, 2024. However, this date may be extended. Including the key documents from the competition as appendices in the land allocation agreement allows the municipality to be much more effectively transfer qualities of the design proposal into the contract when the property is sold to the developer. This contract represents the final step in the design developer competition.

Acknowledgment

This working paper is part of an R&D project financed by Vinnova, Sweden's innovation agency. Vinovas mission is to strengthen Sweden's innovative capacity and contribute to sustainable growth.

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[1] See: https://www.vinnova.se/en/p/design-developer-competition-as-tool-for-climate-adaptation-in-building--innovative-solutions-for-dwellings/

[2] See: https://norrkoping.se/arbete-och-naringsliv/lokaler-mark-och-byggande/marktilldelning/inbjuden-tavling---framtidens-innovativa-boende-bjorkalund

[3] See: https://norrkoping.se/arbete-och-naringsliv/lokaler-mark-och-byggande/marktilldelning/oppen-tavling---framtidens-innovativa-boende-inre-hamnen

[4] See: https://www.boverket.se/sv/byggande/hallbart-byggande-och-forvaltning/miljoindikatorer---aktuell-status/vaxthusgaser/#:~:text=Bygg%20och%20fastighetssektorn%20svarade%202019,stora%20utsl%C3%A4pp%20utomlands%20genom%20importvaror

[5] The application from companies should include information in five categories: 1) brief description of the companies in the design team, 2) CVs of required specialists, 3) letter of intent, 4) reference projects, and 5) evidence of financial resources and paid taxes.

[6] See: https://www.boverket.se/sv/samhallsplanering/bostadsmarknad/bostadsforsorjning/kommunernas-verktyg/mark/

[7] Reported competitions on the Norrköping municipality website calling for architectural drawings (site plan, elevations, section, floor plans) in submission requirements appear under three different names: land allocation competition (marktilldelningstävling), design developer competition (markanvisningstävling), and architectural competition (arkitekttävling).