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Opening up and closing down citizen participation in the development of a sustainable neighborhood energy system

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Abstract

Background Citizen participation is integral to the governance of sustainability transformations. Long-term participatory processes undergo various phases of opening up and closing down various scopes of the participation—with significant consequences for the legitimacy and impact of the participation process.

Methods To gain a better understanding of these processes, we address the question of how and why participation processes are opened up or narrowed down. Through document analysis and key-informant interviews, we evaluate a case of long-term citizen participation linked to the development of a sustainable neighborhood energy system in northwestern Germany.

Results Results show that normative, substantive, and instrumental imperatives contribute to opening-up dynamics in participation processes. Closing-down dynamics were observed in the narrowing of thematic, spatial, temporal, and methodological scopes, as well as in the range of the actors involved. Reasons for closing down were financial and temporal restrictions, conflicting interests, the need for expert input in decision making about highly technological questions, the institutionalisation of participation, and stakeholder fatigue.

Conclusions This study provides a new framework for analysing citizen participation while highlighting the complexities and interrelations associated with citizen participation within the context of technological and urban development.

Background

Citizen participation has become a vital element in research, technological development, and innovation contexts (e.g., [1–3]), as well as in decision making and planning [4–6]. The approach builds on the democratic idea of participatory deliberation, often pictured as a flexible, unconstrained, qualitative, transparent, inclusive, and democratically legitimate decision-making process [7]. It describes a style of decision making reliant on the mutual exchange of arguments and reflections rather than on the status of the participants, sublime strategies of persuasion, or socio-political pressure [8].

In general, citizen participation is not limited to the "context it is applied in, scope, topic, sector, who is engaged when, what is their role and what is the aimed for outcome" ([5], p. 8), but is necessary in all areas in which potential societal effects are expected (ibid.). In numerous national jurisdictions, formal participation is required, for example, by planning laws with clear organisational guidelines; potentially avoiding conflicts about

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the development in the early stages. Non-formal participation processes are used to actively involve citizens and other actors in planning processes beyond the formal rules and thus achieve several additional goals [9]. While there is invited participation organised by one or more institutions (e.g., public administration), citizens may also self-organise (cf. [6]).

In the context of technological development in energy transitions, the feasibility of public participation is often limited by technical, economic, and regulatory hurdles. Including citizens in actual decision-making demands prior knowledge that informs sound and responsible decisions about technological systems [10]. With political, economic, and organizational commitments already in place in most western countries, the space for meaningful debate has increasingly narrowed [11]. Against the background of the necessary socio-technical transformation linked to the energy transition, open and thorough participatory approaches are of special importance. Simultaneously, transformation processes (especially in the field of climate mitigation) are under time pressure and thus closing-down processes are necessary components in the progress of the development process. However, conceptualisations of opening-up and closing-down processes (e.g., [12, 13]) remain theoretical and operationalisations of the concept hardly exist. In particular, limited studies have been done on the scopes of and reasons for such opening-up and closing-down processes.

The current article looks at a long-term, invited citizen participation process linked to the development of a new energy-efficient residential quarter, identifying both phases of opening up and closing down. Furthermore, we explore the scope(s) within which such processes take place and analyse reasons for opening-up and closing-down processes. In particular, we are interested in answering the question of *when* and *why* participation is deliberately narrowed or closed down. Our goals in this paper are, therefore, threefold, (i) to develop a conceptual framework for analysing opening up and closing down participation processes, (ii) to identify and describe opening up and closing down participation processes using a relevant case study, and (iii) to explain why participation is opened up or closed down at particular stages of a planning process.

We argue that our concept has transferability in other contexts, where invited citizen participation could potentially inform justified decisions about *when* and *how* to open and close these participation processes.

Following an overview of the scientific debate on opening and closing down participation, with a particular focus on specific scopes (Sect. "Conceptual framework"), we present a case study on a long-term participation process that accompanied the development of a new energy-efficient residential quarter in Germany. Sect. "Methods" describes the qualitative methodological approach used for the empirical analysis. In Sect. "Results", we present the results of the analysis, addressing the research questions, and identify scopes and reasons for opening-up and closing-down participation processes. After a discussion on the implications of the results and limitations of the study (Sect. "Discussion"), we draw conclusions and recommendations for future research (Sect. "Conclusions").

Conceptual framework

This study approaches opening-up and closing-down processes by first, developing categories for the different scopes of opening up and closing down, and second, identifying and classifying probable reasons for these dynamics. Stirling [12] introduced a distinction between processes that aim to open up a public debate on technological innovations and those that aim at closing it down. According to this distinction, opening up the policy discourses aims to inform decision making on the basis of various information sources, disciplines, social values, and conflicting interests. Opening-up processes seek to include marginalised perspectives, address neglected issues, consider uncertainties, and highlight new options [12]. By providing plural and conditional advice, this approach ensures decision makers are fully informed about the range of social choices. This requires a participatory process in which participants have the right to set the agenda and have a say in both general and overarching questions (not only in selected details in predetermined thematic scopes). This view refers mainly to the variety of actors and the breadth of questions and topics discussed in the participation process.

Closing down the policy process simplifies decision making by reducing the diversity of views and trying to provide a clear, authoritative recommendation. By identifying salient viewpoints, prioritising issues, and determining the "best" options, it aims to achieve efficient resource allocation, policy coherence, and effective management. This, according to Goldschmid [14] also includes processes of selection and allocation. The result of the analysis is presented as unitary and prescriptive advice, emphasizing clarity in policy implications while potentially overlooking certain assumptions and sensitivities. In view of the mismatch between human aspirations and possibilities and technological and political actualities in a finite world, processes of narrowing down and closure are "necessary, inevitable, and desirable" ([12], p. 284). In practice, there will be times, places, and institutions for opening up and other contexts for closing down the public debate (ibid, p. 285).

The temporal dimension warrants special attention as opening up in early stages can potentially result in a broadly based, and thereby legitimate, authoritative decision at later stages. The available literature highlights the fact that initial decisions must be critically assessed, since they may constrain the options for later decisions [15]. Consequently, Pidgeon and Rogers-Hayden [16] advocate in favour of "upstream" engagement, establishing public participation before significant research and development have taken place, and before firm public attitudes or social representations about an issue have taken shape.

Voß et al. [13] offer a theorisation of a temporal sequence in their concept of reflexive governance. They advocate for a balance between opening-up and closing-down governance. While the opening up of governance accounts for uncertainty, ambivalence, and distributed control, closing-down governance processes enable decision and action (ibid.). *"Opening up governance must be linked in one way or the other to extended participation, since knowledge about different problem aspects and values as well as resources for making measures and options work are distributed among different actors"* ([13], p. 432). Voß et al. [13] further explain that different dimensions of opening up and closing down refer to specific phases in the policy cycle [17] and include problem analysis, goal formulation, and strategy implementation. The concepts of upstream engagement [16], reflexive governance [13], and a sequential decision-making process [15] suggest that the participatory process subsequently closes down until the moment of final decision making. This funnel-like approach, however, presents an unnecessarily rigid view of the flow of the participation process which inevitably narrows down after the opening, neglecting the re-openings. Nevertheless, it is clear that the scope for participation varies along the phases of a policy cycle (cf. [7]). The critical challenge becomes determining which are the most appropriate and acceptable approaches to the participation process at hand as well as critically assessing whether a closing down of participation is necessary and justified.

Conceptualizing scopes of opening up and closing down

Both Voß et al.'s [13] and Stirling's [12] concepts of opening up and closing down refer to the wider policy debate; therefore, it cannot be directly operationalised into participatory scopes. Opening up the policy debate encompasses the choice of policy questions, the setting of agendas, the structuring of the debate, the selection of background material, and the recruitment of participants [18]. This view can be divided into two important scopes: the scope of topics (thematic scope), and the scope of participants (actor scope). Based on the literature and verified by the empirical material of the analysed case, we developed a categorization of five scopes along which opening up and closing down could be assessed:

(a) *Spatial scope:* In the particular case of planning-related participation, this spatial dimension is relevant for the extent to which citizens or other stakeholders can decide or impact decisions in a relevant area [19]. The geographical (or technical) area under consideration for a participatory process can be extended or reduced.

(b) *Temporal scope:* The temporal scope is often set by "real-world deadlines for decisions" that are determined by law, budgets, or competing work ([20], p. 129). The regularity and the duration of the participation process may put a limit on the participation methods and the actors involved. The process may also be deliberately prolonged by individual actors to pursue their own interests. In such cases, it would be prudent for the convening organisation to adopt or impose constraints once all the required information has been elicited and the viewpoints and perspectives aired and adequately discussed (ibid, p. 130).

(c) *Actor scope*: Participation can be inclusive by integrating numerous relevant stakeholders or interest groups and possibly a large number of individual citizens. On the other hand, it can also be limited by including only a small number of participants. This, however, has implications for the legitimacy of the results [21, 22]. The reduction in the number of participants and their interests would indicate a closing-down dynamic [14].

(d) *Thematic scope:* The topics and aspects of the problem to be discussed and possibly decided in the participatory process can be broad or narrow, with the former pointing to an opening up and the latter to a closing down. The sorting and selection of options as one key aspect of closure ([14, 21], p. 90) falls into this category.

(e) *Methodological scope:* Through the choice of the participatory method and the way processes are being chaired and moderated, significant effects on opening-up or closing-down dynamics can be generated [23, 24]. For instance, a lecture-style engagement with simple questions and answers often reduces the opportunities to co-determine frames, knowledge bases, or actual decisions. By contrast, inclusive methods such as World Café, Open Space, or Scenario processes generally allow for opening-up dynamics to bring in more ideas, visions, bodies of knowledge, and values [25, 26].

Each of the scopes gives an indication of the varying levels of participation. The level of influence of participants in decision-making processes has been categorized as *informative*, *advisory,* and *decisive* [27]. While in informative participation, participants are in a passive position as the recipients of information, their role becomes more active in advisory participation. Here, they assume the role of information contributor, advising the innovation process. Nevertheless, it is important to emphasize that more open forms of participation are primarily defined by the right to co-decide or co-determine, both not necessarily represented within this theorisation of scopes.

Conceptualizing reasons for opening up and closing down

The integration of public participation in research [28, 29], innovation processes [12, 30], and policy making [31, 32] can be motivated by normative, substantive, and instrumental imperatives. The normative rationale relates to democratic ideals, the substantive rationale to increasing the breadth and depth of the information gathered, and the instrumental rationale to strengthening of the credibility and legitimacy of decision-making processes. Although conflicting to some extent [12], these objectives provide general guardrails or evaluation criteria for the use and effectiveness of participation processes.

Stirling [7] notes that ideas regarding what constitutes a desirable, appropriate, or effective way to design participatory processes are guided by the extent to which organisers are motivated by normative, substantive, or instrumental rationales. From the normative perspective, significant strands of the literature call for participatory processes to be as open, broad, and comprehensive as possible, including a variety of viewpoints, representation of all possible perspectives, and inclusion of less-privileged groups (e.g., [8, 14]). Where democratic ideals for participation are concerned, equity of access, empowerment of process, and equality of outcomes are normatively desirable [33], providing a genuine motivation for greater participation [7]. The more instrumental the approach, the more a 'closing down' is regarded as appropriate, rather than the 'opening up' of wider policy discourses (ibid.).

Besides these intrinsic motivations to open up or close down, participatory processes are inevitably subject to constraints of time and resource influence in a world of unequal power relations [34]. These constraints limit the scope in which participation can be opened up. Consequently, while there are numerous reasons for a 'closing down', there is also a closing down of participation serving institutional legitimation and decision justification [7].

Methods

Case description

To answer our research questions and explore the applicability of our conceptual framework, we analysed the case of a series of participation processes. The participation processes were conducted as part of a development of a former military air base ("Fliegerhorst") into a new combined residential and commercial city quarter in the city of Oldenburg in northwestern Germany. The study follows a case-study approach [35, 36], examining multiple interlinked participation processes (see Table 1). The participatory processes analysed took place between 2015 and 2023 and all concerned the development of the new residential area on the former military air base, with a special focus on the energy system from 2018 onwards. Therefore, thematically and spatially the different participatory processes can be seen as one long-lasting participation process.

Oldenburg is a medium-sized city in northwestern Germany, with 169,605 inhabitants (2020). The growth of the city has resulted in the continued development of residential areas. The case study presents the development process of an abandoned area at the northern fringe of the city, where roughly 1000 residential units are to be built in the new district in response to housing needs [37]. The masterplan developed for the area can be accessed online [38].

The participation process was initiated by the municipality of Oldenburg with the aim of creating acceptance, understanding citizens' interests, and allowing co-design of the planning for a future-oriented, new district. Different groups of citizens were the focus of the participation activities and, with the exception of a formalised and legally required process, all citizen participation processes analysed are not legally required. In the case of this new neighborhood, technological innovation is strongly linked to social and spatial questions, such as community, equality, and quality of life.

In 2018, the research and development project ENaQ (Energy Neighborhood Quarter), funded by two German Ministries[1] was launched by a consortium of more than 20 partners from public administration, research, and industry (including a housing association and an energy provider) with the aim of designing a smart and energy-optimized neighborhood in one 3.9 ha sub-area of the Fliegerhorst.[2] In the 380 residential unit neighborhood, energy should ideally be produced and consumed locally and used efficiently by responsible consumers. The units

[1] Federal Ministry of Education and Research (BMBF) and Federal Ministry for Economic Affairs and Climate Action (BMWK).

[2] The authors received funding within the ENaQ project for the design and evaluation of participatory measures within the project.

Table 1 Overview on participation phases, objectives, scopes and results of citizen participation in the case study

Participation processes	Objectives	Participation scopes					Results
		Thematic scope	Actor scope	Methodological scope	Spatial scope	Temporal scope	
April 2015: Bike and bus tours, idea cards	Raising attention, approaching and involving citizens, collecting first ideas from a wide public	Housing, neighborhood life, economy, infrastructure, leisure, and open spaces	700 participants in the bike and bus tour (altogether more than 3000 people took part in bike tours) 450 submissions of idea cards and e-mails with around 1300 suggestions and requests	Bike tour, exhibition, "idea cards"	193 ha "Fliegerhorst" area (property of the municipality of Oldenburg)	Several events over a period of several weeks	Collection of ideas
June 2015: "Stadtwerkstatt" (City workshop)	Collecting ideas, needs, and wishes from invited citizens	Community life, identity, architecture, nature, landscape, water, recreation/leisure opportunities, mobility, sustainable economy	Affected or interested people, three groups in particular: (1) school pupils, (2) representatives of associations and experts, (3) randomly selected citizens (1200 citizens were invited, between 60 and 80 people participated)	Planning carpet workshops on specific topics	193 ha "Fliegerhorst" area (property of the municipality of Oldenburg)	One-time event 5-day workshop	10 guiding principles for the development of the Fliegerhorst area
November 2015 and February 2016: "Innovation Camps"	Implementation of the guiding principles in a concrete plan	Spatial planning with different scenarios on the topics mobility, water management, energy, and sustainability	Invited citizens (first innovation camp 80 participants and second innovation camp 60 participants)	Discussing three different scenarios (Innovation Camp I) intensive work on different topics of consensus plan (Innovation Camp II)	193 ha "Fliegerhorst" area (property of the municipality of Oldenburg)	Two events of the duration of 1 day	Masterplan
Inclusion of project members and citizens in formal planning processes ("Bauleitplanung")	Giving stakeholders and the public the opportunity to comment on detailed spatial plans	e.g. use of roof areas and facades for solar modules, reduced restrictions to give research projects the freedom to try things out	First project consortium then the public (three response statements from the public)	Open display of plans and opportunity to submit response statements	Inclusion of project consortium for the sub-area "Helleheide" (3.9 ha)	2016–2019	Detailed building plan
Since January 2018: ENaQ project internal participation within the project consortium	Early and comprehensive participation to ensure a high level of public support and needs-based orientation of technology	Participation methods, participants, and intensities	21 partners from industry (including the local energy provider, housing company, science, and administrative bodies)	Regular meetings, workshops, thematic working groups	Sub-area "Helleheide" (3.9 ha)	2018–2023	ENaQ participation concept; four participatory "arenas"

Table 1 (continued)

Participation processes	Objectives	Participation scopes					Results
		Thematic scope	Actor scope	Methodological scope	Spatial scope	Temporal scope	
Since January 2019: Information and discussion formats in the frame of the ENaQ project (e.g., formats *OSCAR* [a] and "Energiewende weiterdenken")[b]	Raising awareness for specific topics, informing the public	Topics *OSCAR*: Smart living/smart home, mobility, smart district energy supply, city of the future/sustainable cities, smart water; Topics *Energiewende weiterdenken:* electricity consumption, hydrogen, citizen energy or energy giants, load management	*OSCAR*: different actors in the energy sector of the region *Energiewende weiterdenken:* All interested citizens	Rather informational character (talks with discussion)	General	Events of 1–2 h each On a regular basis (several times a year)	Diffusion of ideas and results from previous participation and planning processes, general discussions on new ideas
Public events for discussion and co-design • Sept 2019: "ENaQ-Dialogforum Helleheide": Exhibition/marketplace and workshops on mobility and energy • Oct 2020: Dialogue Days: Live-stream presentations and expert discussions on various topics (with very few participatory options), guided tours of the Fliegerhorst area • Summer fairs 2021 and 2022: Exhibition/marketplace • Sept 2023: Final event	Information transfer and exchange, discussion, and co-design of solutions with relevant stakeholders	Topics: Mobility, energy cooperatives, climate smart urban planning, Community life, Exhibitions of different partners of the consortium	Interested citizens of Oldenburg, many of them with interest to live in the new quarter	Various methods: workshops, exhibitions, talks, guided tours, complemented by online formats during the COVID-19 pandemic	Sub-area "Helleheide" (3.9 ha)	1–2-day events on a yearly basis	Strategies for energy system and mobility in Helleheide; Idea for regular citizen workshops

Table 1 (continued)

Participation processes	Objectives	Participation scopes					Results
		Thematic scope	Actor scope	Methodological scope	Spatial scope	Temporal scope	
Institutionalization February 2020 to December 2023: "ENaQ- Bürger*innen-Werkstatt" (citizens' workshop)	Intensive co-work with a focus on housing, community, etc.	Topics: Community life, community rooms, communal outside areas, mobility, electronic platforms and devices (energy signal light, community platform, sharing portal), energy cooperatives, tenant electricity, local supply	A stable group of ca. 50–90 interested citizens, most of them with interest to live in the new quarter, most of the regular participants were over 60 and slightly more identified as women	Diverse participatory methods; Experts from different fields present planning and developments, participants work with plans and other haptic material (e.g. lego bricks)	Sub-area "Helleheide" (3.9 ha)	Monthly event of approximately 2 h each	Optimizing plans for buildings and outdoor area
2019–2021: Online surveys	Understanding peoples' preferences and wishes in regard to specific fields (e.g. mobility, community, energy trade, etc.)	Topics: mobility (2019), power supply of the future (2019), "Good" neighborhood (2020), Energy trading among neighbors (2021), areas suitable for district heating (2021)	Between 100 and 500 participants each	Online surveys (mainly used in the time of the COVID-19 pandemic)	Surveys had different and not always specific reference areas	Surveys were open for several weeks	Optimizing designs (e.g., for energy-trading app)

[a] *OSCAR* (Short for Oldenburg Smart City and Region) is an informative format organized by the Oldenburg Energy Cluster (OLEC)

[b] *Energiewende weiterdenken* (in English: "Energy transition - thinking ahead") is an informative format organized by the municipality of Oldenburg

would be contained in eight buildings were 50% of the surface area of the roof would be dedicated to electricity generation. To optimize energy provision and supply, technological solutions were developed and additional focal areas of the project included mobility, sustainable living, and social and digital innovations such as a digital platform.

Case analysis

Figure 1 illustrates the methods used to respond to specific research goals. To address the first research question, we used a literature review to conceptualise opening up and closing down processes and single out the five scopes (thematic, actor, methodological, spatial and temporal scope), in which an opening up or a closing down can happen (see Sect. "Conceptual framework"). The second research question was addressed through a document search and analysis regarding the participatory processes in the area. The analysed materials comprised documents detailing participatory processes conducted in the case study area, funding calls, and concepts that were developed within the ENaQ project (see annex). On the basis of these documents, we developed a structured overview of participation processes (see Table 1).

We define a participatory process as a thematic or methodological entity of participatory activities. The distinction between different participatory processes (as in Table 1) was primarily made by identifying differences in one or more of the five scopes derived from the literature in step 1. With reference to these scopes, moments of opening up and closing down from one participation process to the next were identified. For example, to classify a moment of methodological opening up or closing down, an increase or a decrease of methods used in a participatory process, compared to the earlier participatory process, had to be detected. Hence, the criterion for classifying a moment of opening up or closing down was an increase or decrease in spatial scope, temporal scope, topics addressed, methods used and/or actors involved.

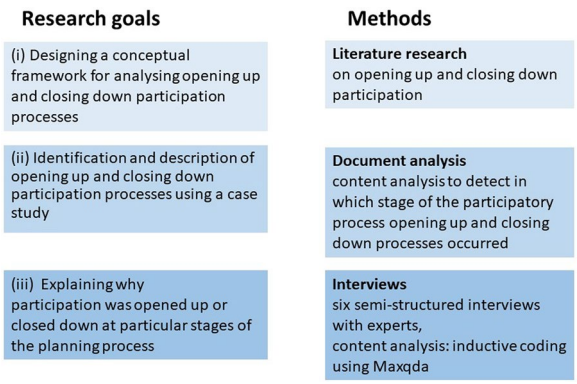

Fig. 1 Case study design (source: own)

To address the third research question (identify reasons for opening-up and closing-down processes), we carried out six semi-structured expert interviews. The interview partners (IP) were representatives from organisations that were responsible for the participatory process at different stages. In 2017, two interviews were conducted with representatives from the municipality of Oldenburg who initiated the participatory process in 2015 (IP 1 and IP 2). In 2018, two interviews were conducted, one with an individual from an institute for participatory processes (IP 3) and one with a representative from an urban planning office (IP 4). The former was responsible for conducting the "City Workshop" in 2015 and the latter was involved in the two "Innovation Camps" in 2015 and 2016. Two additional interviews were conducted in 2022 with members of the ENaQ project, who were in charge of organising participatory activities from 2018 onwards (IP 5 and IP 6). The interviewees were selected based on their relevant expertise and their position within institutions that had organised or had been involved in the assessed participation processes. Furthermore, all IPs had experience with other participation processes, which allowed them to assess the process at hand in a comparative manner. Key talking points for the interviews included the origin of the participation process, the goals of participation, the population groups involved, participation methods, as well as success factors and challenges. The interview data was transcribed and inductively coded using MAXqda software. The coding system was developed and re-evaluated during the coding process. After a first cycle, we were able to categorise reasons for opening up and closing down, relying on qualitative content analysis [39].

Results

Identifying opening up and closing down along the participatory process

Since the end of the 1990s, discussions were carried out on how to develop the 309 ha Fliegerhorst area. As the area was under military use as an airport until 1993, it had to be assessed for dangerous materials and was not accessible to the public. The municipality of Oldenburg initiated the involvement of citizens in 2015, before further development took place. Those involved in the participation process were different citizen groups, particularly young- and low-income groups from Oldenburg. The initial participation measures included an exhibition about the Fliegerhorst area, public bike tours of the area, and so-called idea cards, which were spread throughout the city to enlist ideas and suggestions on how the area should be developed.

In addition, a participatory event called "City Workshop" was organized in June 2015. During five 1-day-workshops, ideas, wishes, and needs were collected from 155 participants from different social groups. The institute that led the workshops designed a specific method called 'planning carpet'. Participants brought up a wide range of topics that reflected their concerns and interests, such as community life, mobility and infrastructure, labour, recreation, and green spaces. Together with the participants, ten guiding principles for the development of the area were ultimately generated [40] (see Fig. 2).

In addition to the topics discussed, the idea of a decentralized energy supply from renewable energy sources was raised (ibid., p. 51). With the *spatial* frame already set, this process opened participation in *thematic, spatial, methodological,* and *actor scopes*.

In the next phase, the municipality of Oldenburg aimed to develop a first master plan. A professional planning office was hired to develop a masterplan of the area in a participatory manner. In November 2015 and February 2016, participatory "Innovation Camps" were organized by the planning office. In this context, citizens were invited to co-work on specific topics of the master plan. This superordinate plan represented a first decision on the concrete spatial division and land use, and in essence was a closing down process in *spatial* and *thematic scopes,* due also in-part to *temporal requirements*. Participants discussed topics such as mobility, water management, energy, sustainability and community during the innovation camps. The master plan was unanimously adopted by the City Council of Oldenburg in August 2016 and served as the basis for the further development of the district. In this process, participants developed the goal that the new district should be CO_2-neutral, and the idea of an experimental "Smart City Lab" was developed ([41], p. 79). This can be interpreted as a closing down of the *thematic scope*.

In response to a research call by two ministries, a consortium of 21 local organisations from the fields if of public administration, science, and from the private sector developed a proposal for a research-and-development project under the acronym "ENaQ". Initiated in January 2018, the project aimed to develop a district energy system in one sub-area of the Fliegerhorst. The project eventually led to a closing down of participation in the spatial and thematic scopes. Initially, the area of interest was reduced to a sub-area of 3.9 hectares, today known as 'Helleheide', which includes 124 residential units. To foster a vibrant community of diverse ages and income groups, community rooms such as a laundry café and a communal kitchen were planned in collaboration with interested citizens. The central component of the project was the provision of energy and heat through locally generated renewable sources including rooftop and balcony solar panels, heat pumps, and partnerships with a local energy cooperative. In addition, energy efficiency among residents

1. **Diverse building culture:** A diverse building culture should be created at the air base for existing and new buildings.
2. **Recreational quality**: The recreational qualities of the air base should be used in organized and unorganized forms.
3. **Resilience and sustainability:** The creation of a resilient and sustainable neighbourhood, with sustainable structures for the next generation.
4. **Sustainable mobility:** At the air base, mobility should be thought of in terms of people.
5. **Functional centers:** Functions should be centered at the air base.
6. **Nature - landscape - water:** Urban development at the air base should be based on the natural and landscape conditions and their existence.
7. **Social mixing:** The air base should enable different groups to coexist in its residential structure and in the public space.
8. **Unique selling points and identity:** The unique selling points and the special identity of the air base should remain visible in the new quarter.
9. **Interconnections:** The new district should be interwoven with its surroundings.
10. **Experimental spaces:** Experimental spaces for financing, process and life models are to be created in the new district.

Fig. 2 Ten guiding principles for the development of the Fliegerhorst area as agreed on during the City workshop. Source: Stadt Oldenburg [40], own translation

was encouraged through incentives such as energy signal lights and various digital services.

The next step was to narrow down the relevant themes to strengthen the emphasis on technological (energy and IT) questions. During the course of the project, diverse formats for participation and communication were implemented, showing an openness in *methodological* and *actor scopes*. To institutionalise participation, a monthly citizen workshop was implemented by the housing company and one project partner in 2020 to address planning questions, e.g., of the common spaces in the quarter. Although this institutionalisation process allowed a more intense co-design, it also contributed to a third closing down process that narrowed down the scope of the actors. Allowing only online participation, the COVID-19-pandemic forced a further closing down in terms of *methodological scope* and, subsequently, *actor scope* from March 2020 to July 2021. The *methodological scope* was opened up again after the pandemic.

The initially very open process, which served to assess what people wanted, was subsequently narrowed down in the planning and development phase. The diversity of participatory formats and phases are illustrated in Table 1. The long-term process covered all five scopes of participation (spatial, temporal, thematic, actor, and methodological scope), rendering this case well suited for our interest in opening-up and closing-down dynamics. In the following sections, we analyse the reasons for these closing-down and opening-up processes in different scopes.

Reasons for opening up participation

The results of the interviews confirm that the participation process started off in a very open way in 2015. The only requirement set by the municipality was that a new residential district should be created, which should meet the requirements of the future (IP3).

Creating initial trust and acceptance for the development project

For the early development process (2015 to 2017), the interviewees argued that early involvement of citizens helped to build trust and avoid potential opposition to the project. Opening up the initial participation was thus motivated by creating acceptance and a smoother development process that would avoid the pitfalls of other major developments (such as the development of the central station in Stuttgart) that faced public resistance.

Understanding citizens' interests and needs

In addition to their intrinsic motivation, interviewees highlighted a normative intention to understand citizens' interests, needs, aspirations, and concerns during the early stages and prior to initiating the development process. Participatory mechanisms were employed to provide citizens with opportunities to express their opinions, propose ideas, and offer recommendations. Nonetheless, interviewees noted that the recommendations and solutions generated through these processes were only advisory in nature, as their implementation ultimately depends on political decision-making. Politicians, however, are generally encouraged to consider the majority of recommendations stemming from participatory processes, as failing to do so could lead to increased frustration and resentment, thereby undermining future engagement efforts. In the later phase (post-2018) when the development of an efficient energy system became the primary focus, participation was opened up to ensure that technological solutions were aligned with citizens' needs and expectations. In addition, prospective residents were included in the detailed planning of buildings and outdoor spaces.

Improving the quality of the plans and results

At the outset of the participatory process, the municipality aimed to implement a thorough and well-funded initiative to co-develop ideas and concepts for designing a new district. Interviewees highlighted the openness of the process with regard to the results, and the broad scope for discussion in the initial stages. In the first participatory process ("City Workshop"), goals and principles for the development of the new district were formulated. The subsequent "Innovation Camps" held in 2015 and 2016 aimed to transform abstract ideas into tangible spatial plans while exploring citizens' preferences for various options. Nevertheless, participants were encouraged to pursue new ideas and topics that emerged during these sessions. Within the ENaQ project, a range of stakeholders—including housing associations, scientific institutions, and the municipality—employed various participatory formats, such as workshops and surveys to refine ideas and optimise spatial and technological planning to meet user needs. In addition, these formats facilitated feedback on prototypes, and iterative improvement of the results. This iterative process was exemplified in the citizens' workshop, where plans for shared facilities were adapted and redesigned based on participant inputs.

Public interest in the development project

The development of the Fliegerhorst drew significant public attention, and regional actors attached high expectations to the project. Thus, opening up all scopes of participation played a critical role in incorporating the project into the public discourse. People expected a high level of transparency regarding the progress of the

development, including the criteria guiding it, particularly when changes to the original plans occurred. Participants clearly expressed a desire to remain involved and to be kept informed about future developments. Several participants requested the establishment of a permanent, on-site participatory planning office to ensure citizens could receive continuous updates about the projects.

Reasons for closing down participation

The interviews showed that, besides processes of opening up participation, there were also processes of closing down, ultimately having implications for different scopes of participation.

Financial and temporal restrictions

Participatory processes require time and financial resources. In the case study, the participatory processes in 2015 and 2016 were co-funded by the city of Oldenburg and a grant from two German ministries[3] [42]. The ENaQ project (2018–2023) was granted within the funding call "Solar construction/Energy efficient city" also funded by German ministries[4] [43]. The respective funding calls also set specific thematic priorities. While the "Future city" ("Zukunftsstadt") funding initiative served to support municipalities to shape change towards sustainability in an overall constructive and effective manner, the funding programme on "Solar construction/Energy efficient city" aimed at making the building sector more energy efficient. The goal of the funding measure was to reduce energy consumption, promote sector coupling and gradually decarbonize the entire system through the integration of renewable energies. Both grants had fixed sums and specified cost categories had to be met, whereas only the development (not the realisation) was funded under this measure. The financing of the citizens' ideas proved to be a practical challenge, as illustrated by the statement: *"we also have to keep an eye on economic efficiency when developing the Fliegerhorst in Oldenburg"* (IP 1, 40:11).

Financial requirements were closely intertwined with time constraints, each carrying significant implications. The allocation of funding was tied to specific timeframes, complicating efforts to adjust schedules for unplanned changes or spontaneous participant demands. In addition, accommodating the time preferences of all involved groups proved challenging. For instance, the organisers of the participatory formats endeavoured to schedule the workshops inclusively, ensuring accessibility diverse demographics, however, scheduling conflicts persisted. so that all different types of people could take part. Events (Innovation Camps) that took place on Saturdays, posed difficulties for school pupils, many of whom were involved in sporting activities. Conversely the "City Workshop " was scheduled during school days, with participants being excused from classes, resulting in substantial participation from this groups (IP 4, 18:57). These observations demonstrate that financial and time restrictions may lead to closing-down processes in terms of thematic actor and methodological scopes. Reflecting on these challenges, one of the organisers of the City Workshop stated: *„You always have to decide what is organisationally possible. What resources are there?"* (IP 3, 43:10).

Taking concrete decisions amid diverging interests and claims

Participatory processes often generate a wide range of diverse and sometimes conflicting ideas and opinions, making it impractical to satisfy the expectations of all participants. When concrete decisions are required, certain alternative ideas and viewpoints must inevitably be set aside. This underscores the challenging and sometimes sobering nature of implementing citizens' ideas. Nevertheless, there are cases, where compromises between seemingly conflicting ideas could be achieved. In some instances, a general agreement was reached, with flexibility maintained for addressing more specific details at a later stage. This approach is exemplified by the following statement: „There *were some voices who wanted […] the streets to be a bit meandering and not that straight. Then we said: «Let's just reserve a space for the street. How it is designed in detail inside this frame, can still be changed. But first of all, 15 m are reserved as public space for the street» "* (IP 1, 32:30).

Expert knowledge necessary when taking decisions about highly technological questions

Expert knowledge, provided by individuals with extensive expertise on relevant topics, can play a crucial role in avoiding potential pitfalls, introducing new ideas, and addressing uncertainty. Furthermore, such expert and scientific knowledge can help participants to understand the complexity of the questions and solutions discussed and to make citizens *"experts for certain things"* as one interviewee commented (IP 4, 16:40). Interview partners 3 and 4 emphasized the extreme importance of all relevant actors, such as municipal experts, representatives from utility companies, or other external partners. Their involvement ensures that plans are realistic and actionable, making sure *"not build castles in the air that we can't get to the ground later on"* (IP 4, 13:15).

[3] The Federal Ministry for Education and Research and the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.

[4] The Federal Ministry of Economic Affairs and Energy and the Federal Ministry of Education and Research.

The difficulty of bringing everyone to the same level of knowledge is especially relevant when it comes to technological and highly specialised issues. To discuss technological topics with citizens, extensive background knowledge on these topics is required, and conveying this large array of knowledge is a time-intensive task. Where topics could not be discussed in depth, complex issues were simplified, leaving out specific aspects. This led to a general closing down in participation intensity.

Likewise, we observed that participatory formats with a technological focus tend to attract specific groups of people while deterring others. In contrast, participatory formats that focused on housing and neighborhood aspects, successfully engaged elderly individuals and women. However, this target group tended to have little interest in discussions related to technological issues. This observation suggests that highly technological topics may contribute to a closing down of the actor scope and thus limit the participation intensity.

Institutionalization narrows the number and diversity of participants

During the participation process, the future residents of the quarter were still unknown and could, therefore, not be directly targeted by the participatory formats. This proved to be both a challenge and an opportunity for the planning of the new district. To institutionalise participation, the housing company and one facilitating project partner of the ENaQ project formed a stable group of interested citizens (citizen workshop). From 2020 onwards, the group met on a monthly basis to discuss concrete questions concerning the future neighborhood. The mailing list was open to anybody and, over time, more than 90 people registered, with about 20 people (most of them interested in living in the new quarter) regularly participating in the meetings. Within that format, building and design ideas and concepts could be discussed in detail, ensuring the citizens could be included in the planning process. Additional topics included communal areas in the quarter, and the formation of a vibrant neighborhood. Regular evaluations of the format revealed that both organisers and participants perceived it as very helpful and positive. This was largely due to its facilitation of constant and intensive collaboration between developers, planners, and interested citizens. However, establishing this format inadvertently excluded certain participant groups, such as individuals with limited time resources, including families or full-time employees. This example demonstrates that, despite the high-level of collaboration enabled by a regular format, it inevitably contributed to closing down the actor scope.

Stakeholder fatigue

The interviews indicated that participation should be concluded before participants start to feel bored or tired. As one interview partner put it: *„At some point the air is out"* (IP 2, 48:39). Consequently, the organisers of the initial participatory process concluded that *„participation should not become too much "* (IP 2, 49:12). One member of the municipality observed that participation rates steadily decreased with every workshop. He described great public interests at the very beginning (City Workshop in June 2015 with about 155 participants). However, even though the same people were invited to the following innovation camps, only 80 participants attended the first „Innovation Camp " in November 2015, and only 60 attended the second in February 2016. Due to low numbers of registered participants, additional people had to be invited to the Innovation Camps. An interviewee explained that declining participation was the result of people having articulated all their desires and ideas during the first event (IP 2, 49:12).

Discussion

Our research aimed at identifying and describing opening up and closing down processes using the case of a long-term participation process in the context of urban development. To operationalise opening up and closing down processes, we developed five scopes, namely spatial, temporal, thematic, actor, and methodological. Later, we analysed why participation was opened up or closed down in the specific case study.

In the case studies, closing-down participation took place in a spatial (focus on Helleheide area), temporal (project runtime), thematic (focus on district energy system and IT platforms), methodological (restriction of methods during the pandemic), and actor scope (e.g., through the formation of a stable group).In the past decades, reasons for opening-up participation have been extensively discussed in the literature on transdisciplinary research and technology development (e.g., [31, 44, 45]). Barreteau et al. [15] confirmed that some stages are more consequential than others, e.g., funding calls and project descriptions create irreversibilities that limit the introduction of some new sets of research questions and scopes of outcomes (ibid.).

Our analysis shows that the reasons for closing down participation can be manifold. Similar to this study, the literature describes hurdles to participatory processes, such as external specifications [11, 21], conflicting interests and claims (e.g., [20, 46–48]), and stakeholder fatigue [49, 50].

External limitations should be assessed critically, because these are often predetermined by more powerful

stakeholders, a criticism that is frequently discussed in the literature [51, 52]. Another criticism is that participation often follows project logics with clearly limited activities and budgets [53]. Projects tend to focus only on those aspects of people's lives that are of direct concern to the respective project.

By offering a regular format with a stable group of people, the institutionalisation of the participatory process was perceived very positively by both project members and participants. This made it possible to continuously collaborate with citizens on plans offering a greater intensity of participation. At the same time, this format included a smaller number of people and excluded people with scarce time resources. The literature also provides reasons to critically examine the institutionalisation of participation. According to Steen & Van Bueren [54], formalising participation can diminish participants' private sense of ownership and responsibility. In the case of the ENaQ project, the institutionalisation of participation through a regular format with a stable group of people was accompanied by a closing down of the actor scope. This experience shows that closing-down processes can be helpful and positive parts of the development process. For every participation process, it is essential to consider which opening of scopes is sensible and necessary.

Our analysis shows that the perceived need for expert input can be framed as one reason for closing down participation. However, Sterling [55] strongly supports the assumption that expert input is needed to inform technological appraisal. Gudowsky & Peissl [5] argue that there are limits to both public engagement and purely expert-based assessments. Sterling [7] questions the supposed dichotomy between expert-based and analytic decision-making procedures on one hand, and participatory processes on the other, emphasising that both processes are interlinked and share many commonalities. We also observed the integration of citizen participation and expert-based analyses in our case study. For example, many workshops included both "experts" from various fields within the project as well as citizens. Furthermore, in the examined case, a broad range of stakeholders participated as part of the project consortium.

One of the most frequently quoted reasons for closure is the need to take concrete decisions amid diverging interests and claims [12, 13]. With regard to participatory research processes, Barreteau et al. [15, no page numbers] confirmed the potentially large discrepancies between implementation realities and participants' expectations: *"participants' expectations may be diverse, with some keen on being involved in decision making, some unwilling to share responsibility for future outcomes, some wishing to prevent the process from coming up with undesirable options, some seeking recognition of their own knowledge, some taking the opportunity to interact with other specific participants, and others being merely curious about what is happening."* This was also observed in our case in which the master plan had to be concluded and decided.

The question as to whose interests and claims "win" in multi-stakeholder processes has been critically debated in the literature on participation. Sterling [7] pointed out that in an ideal speech situation within a participatory process, an orientation towards a consensual resolution of conflicts will inevitably reduce the evaluative diversity. If a consensus is not feasible, a decision in favour of one solution will inevitably lead to other ideas being discarded. This poses the risk that external forces may significantly influence the construction of knowledge, potentially leading to predetermined assumptions about the distribution of power and who should be empowered [56]. In the context of "smart cities", some scholars argue that "smartness" is often equated with efficiency [57], placing a premium on the inclusion of actors who have proportionally greater resources, financial capabilities, technical knowledge, and competences. This approach may exclude others who are affected [58]. The actors who are responsible for organising the process inevitably shape the design of the co-creative process, leading to power asymmetries that favour administrative and institutional structures [59, 60]. Furthermore, the (self-) exclusion of specific actors or actor groups distorts the effectiveness of the process ([61], p. 50). Any implicit or explicit closure in terms of participants and thematic scope should, therefore, be critically assessed.

One limitation of this study lies in the choice of methodology, particularly the reliance solely on expert interviews with organisers of the participation processes to understand the reasons for moments of opening up and closing down. This approach may have introduced a bias, as it primarily reflects the perspectives of the organisers rather than those of the participants. Future studies concentrating on the perception of participants would, therefore, be valuable.

Conclusions

This study analysed scopes and reasons for opening up and closing down participation processes. To conceptualise opening up and closing down processes, we identified different types of scopes, namely, spatial, temporal, thematic, actor, and methodological scopes. These scopes are interlinked and thus are mutually dependent. The categorisation of scopes can function as an analytical concept to operationalise opening-up and closing-down processes in public participation. We employed a case study approach to identify and describe opening up and closing down participation processes in the case of a long-term participatory process for the development of

a new residential quarter in Oldenburg, Germany. The opening up of participation processes can be explained by the motivation to create initial trust and acceptance, to understand citizens' interests and needs, to improve the quality of the plans and results, and to respond to public interest in the development project. Closing-down processes can be explained by financial, and temporal constrains, the need to take decisions amid conflicting interests, the need for expert knowledge, the institutionalization of participation, as well as stakeholder fatigue.

Our insights from a long-term process of citizen participation in the context of technological development shed light on the complexities and interrelations linked to such processes. One unanticipated finding of the study was that conflicts often arise when ideas must be transferred into tangible and feasible designs that work in the long term, for instance, when the detailed layout for the community is made. Participation closures should not be understood or ignored as project-specific deficiency but should rather be viewed as a necessary part of the negotiation process. Nevertheless, it remains difficult to say which closing-down processes are necessary and well justified. The question of why the actor scope is explicitly or implicitly narrowed down warrants particular attention. In practice, the negotiation of interests should be professionally facilitated to ensure that all voices are heard. When ideas derived through participation cannot be implemented due to external specifications, it should be communicated transparently[21].

We can assume that similar considerations play a role in other participation processes that are linked to technological and urban development. Consequently, a more in-depth analysis of these often implicit interests and constraints, and their growing effects is necessary. Case studies from other regions could be used to support or challenge our findings and explore how different contextual conditions affect participatory processes. The developed scopes of participation may serve as a conceptual framework for future analyses.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13705-025-00515-1.

Additional file 1.

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Author contributions
Conception and design of the work: B.S., T.G., M.W Data collection and analysis: M.W Drafting the manuscript: M.W. Substantive revision of the manuscript: B.S., T.G.

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Data availability
The raw data used for the analysis of this article will be made available by the authors upon request.

Declarations

Ethics approval and consent to participate
Not applicable. No medical research was conducted. Interviewees participated in their roles as representatives of the respective institutions. Interview transcripts were anonymized and audio recordings were deleted. The documents used for the document analysis were freely available. No ethical approval was required.

Competing interests
The authors declare no competing interests.

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