

Article

## Big Science, Ethics, and the Scalar Effects of Urban Planning

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### Abstract

The urban expansion currently under development around the two materials science facilities MAX IV and European Spallation Source in Lund, Sweden, surrounds two meticulously designed research facilities steered by global demands. The new urban area, together with the research facilities dedicated to science and the development of knowledge, expands the city of Lund onto high-quality agricultural land. In doing so, the municipal planning is attempting to align contemporary ideas of sustainable urban development with large-scale scientific infrastructure. This actualizes an ethical dilemma as the urban expansion onto productive agricultural land overrides previous decisions taken by the municipality regarding land use. It can also be understood as going against national land use policy which states that development on productive agricultural land should be avoided. As the planning stands today, the research facilities heavily push local urban development into the area while the intended research outcomes primarily relate to a global research community tied to international scientific demands for materials science. Although the Brunnsbög area is realized through a neutralizing planning strategy, thought to balance and compensate for the development on farmland, the effects of the counterbalancing acts are primarily played out at a local urban level in terms of diverse, exciting, and locally sustainable neighbourhoods. The land use protection policies meant to secure national food production rather operates on a national scale. The argument made in this text is that sustainable development, and the intended balancing acts it involves, ought to be carefully considered in terms of scalar effects. Sustainable planning effects' *scalar extent* should be taken into account through careful assessment of the step between good intentions and expected outcomes.

### Keywords

big science; planning ethics; planning scale; scalar effect; scalar intention; scale; sustainability; sustainable urban planning

### Issue

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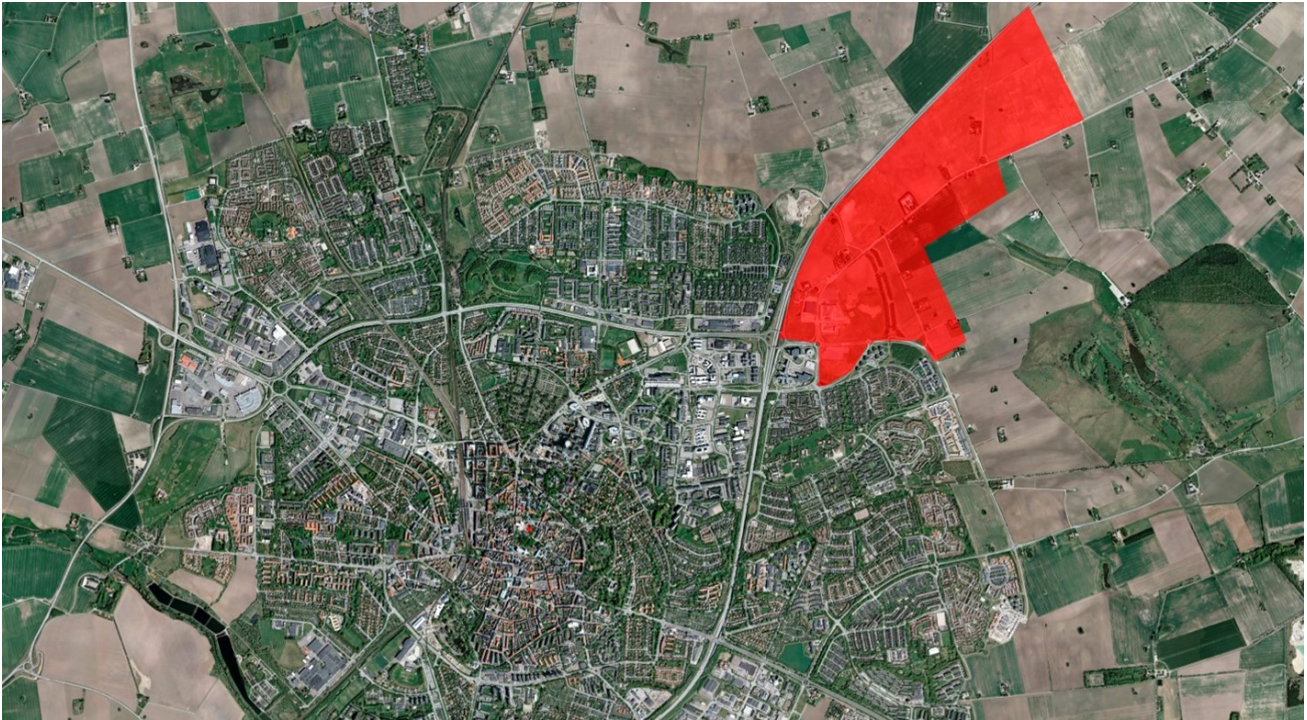
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### 1. Big Science in a Small Town

In the small university town of Lund in southern Sweden local urban materialities develop as consequences of global scientific initiatives. Brunnsbög, a former agrarian area outside the city, recently renamed to the more internationally sounding Lund Northeast Brunnsbög, is currently under development. When completed, it will include two large-scale research facilities for state of the art materials research, a supporting science village located between the facilities, and a whole new urban district—all built on high-quality farmland (see Figure 1). This text aims to discuss various scales, and balanc-

ing strategies, related to the goals of sustainable urban planning. Scale configurations in urban planning and the expected realization of planning are investigated here, not through the problematization of existing urban environments, but through a range of planning *intentions* connected to the ongoing development of the Brunnsbög area.

The OECD and the European Science Foundation, as early as 1998, predicted the approaching decline of neutron scattering capability throughout the world. As a consequence of this threat to neutron science, the two international organizations recommended Europe, America, and Asia to each develop neutron sources to secure fu-



**Figure 1.** Map of Brunnskög (marked in red) and Lund City. Source: Courtesy of Lunds kommun.

ture research on condensed matter (Richter & Springer, 1998, p. 38). After several years of national and international negotiation, Lund was in 2009 agreed upon by a majority of the expected member countries as the candidate for European Spallation Source (ESS), although a formal decision about the funding would demand another five years of negotiation with the solution presented in 2014 (Hallonsten, 2018, p. 26). ESS is scheduled to be opened in 2023 and will have the world's most powerful linear proton accelerator (ESS, n.d.). It is an international collaboration between 13 European nations, including the host nations Sweden and Denmark. In parallel to the ESS negotiations, the first steps were taken towards a new synchrotron laboratory that would constitute the fourth generation of laboratories devoted to synchrotron research at Lund University. In 2009, Lund University together with the Skåne Regional Council, supported by the Swedish funding agencies, the National Swedish Agency for Innovation Systems (Vinnova) and the Swedish Research Council, agreed to build MAX IV (Ek, 2009). MAX IV was inaugurated in 2016 and includes the world's brightest x-ray source (MAX IV, n.d.-a). The combined budgets of MAX IV and ESS are estimated at 2,44 billion Euros (Lunds universitet, 2020).

## 2. Local and Regional Expectations of Big Science

Globalization can be considered to generally result in unbalanced social and geographical effects (Dicken, 2004, p. 5) and also such globalization that includes global transactions of knowledge goods on an international research arena has uneven material- and planning-

related consequences. Someone, somewhere, has to make space, in the Brunnskög case, for the large-scale infrastructure needed for the operations of accelerators used in materials science. This responsibility is considered a privilege from a national, regional, and local political perspective in the case of Lund, Sweden, and benefits are expected to create economic prosperity as well as status and fame for the knowledge environment of a small university town on Europe's outskirts. The over 350-year-old university, cutting-edge research, and the medieval city centre feature in promotional material from the university and municipality summarized under the slogan which describes Lund as 'a city of contrasts.' A 'double optimism' has been present throughout the process of establishing ESS in Lund (Hallonsten, 2012, pp. 13–14): From the start of the process around 2002, Lund has been advocated as the location for an ESS, and "[c]onversely, the ESS has been forcefully promoted as a kind of perfect megaproject for Lund" (Hallonsten, 2012, p. 13).

Lund University, regional policymakers, and local politicians have in unison claimed Lund to be the optimal location for MAX IV and ESS (Hallonsten, 2012 p. 13). Initiatives to strengthen the existing knowledge environment in Lund are backed up by national planning policy: The Swedish National Board of Housing, Building and Planning recognizes higher education environments to be of great importance for regional growth in Sweden (Boverket, 2012, p. 63) and for southern Sweden and the Öresund Region to be, in the future, the greatest of the four multiple core regions in Sweden (Boverket, 2012, p. 33). Local, regional, and national actors collabo-

rate to secure the offshoot of the unprecedented investment, in a Swedish context, in research infrastructure. Early on the Skåne Regional Council, the city of Lund and Lund University joined forces to safeguard land use for future development through the company Lundamark (Swedish for Lund land). In 2013 Lundamark was turned into Science Village Scandinavia AB, owned by the same stakeholders (Science Village Scandinavia, 2013), possibly for the sake of changing the associations from land use towards a more international and science-oriented content. The regional mobilization includes a number of initiatives to secure the expected benefits from the research facilities in terms of corporate and labour-market returns. The vision- and strategy-oriented consortium 'ESS MAX IV in Southern Sweden—TITA' was managed by the Skåne Regional Council during 2010–2012 and had as an aim to identify potential benefits in the region. Besides corporate associations, it included all of the County of Scania's municipalities, Lund University and other institutions of higher education in the region, as well as the site-specific ESS AB. The goal with the consortium was to safeguard "growth and employment opportunities as a result of the establishment of the research facilities" (ESS MAX IV i regionen—TITA, 2010; OECD, 2012, p. 107).

The expectations connected to MAX IV and ESS are held together by a coherent metanarrative, or a discourse coalition, that has allowed actors to reproduce statements and maintain a stakeholder network (Tahvilzadeh, Montin, & Cullberg, 2017). The narrative has functioned as a vehicular idea in political phrases and slogans to move the process forward. In discussions about the research facilities' spin-offs, for example in such contexts as TITA, the benefits of increased job opportunities and growing small businesses were primarily mentioned in economic terms; the content of those jobs and the local conditions for the future workers were not discussed in further detail (for example at a TITA Partnership Meeting on June 15, 2011, and at the Foresight Feast "How to Create a Dynamic and Innovative Research Environment?" on January 13, 2012).

These jobs seem to be seen as a service entirely conditioned by the main goal of the establishment—the research. In this perspective, the facilities are thought of as dominant, and the facilities are what primarily matters in the narrative about the area. Hopes of global scientific success is paired with expectations of an ecomodernization that is seen as a combination of innovation and sustainable thinking that will help solve environmental problems within existing economical systems (Kaijser, 2016, p. 77).

### 3. Expansion of Knowledge Environments

For Lund University the current development has created an opportunity to extend the urban development beyond the Brunnsåshög area and develop what is conceptualized as a 'Science Road.' The Science Road is a

path along which the university's departments and institutions, as well as knowledge-producing businesses connected to the university, are clustered. It begins in the city centre and continues along a route to which 30,000 students commute daily and where 25,000 workplaces are located. The distance includes Lund University Hospital, the campus of the Faculty of Engineering at Lund University, and Ideon Science Park, which also has a close connection to the university. Supported by Lund Municipality's Structural Plan acting as a platform, the main actors in the Science Road undertaking are the Skåne Regional Council, Lund University, Akademiska Hus (a major real estate company that manages the university's real estate) and the research centre Medicon Village. The municipality has stated that the anticipated benefits of the Science Road on an urban scale include "[i]nnovative energy solutions, densification of the university campus, sustainable mobility focusing on people's needs, a green city, and a new sustainable meeting place" (Lunds kommun, 2017). The Science Road corresponds to the extent of the new tramway, to be inaugurated in 2020, that runs all the way to ESS. The Science Road and the tramway have, despite the optimism among stakeholders, caused heated debate both in local media and within a Swedish academic context: Ethical concerns include the university depopulating the city centre and leaving its current locations in favour of the Science Road (Kärrholm & Yaneva, in press; Nebel, 2014). The uniform theme, and the concentration of activity to certain times of the day and year, have been pointed out as other potential problems (Kärrholm, 2014, p. 56).

The strategy communicated by the city of Lund regarding the planned expansion projects is to strive for a leading position among the world's knowledge environments by generating Swedish world-class sustainable planning at the local level in Lund (Lunds kommun, 2012a, p. 3). The municipality of Lund has ambitious plans, and, throughout the planning process, the goal has been to create an area with strong connections to the older parts of Lund, for example by the Science Road and tramway. Other research environments such as CERN in Switzerland (which is currently the world's largest particle physics laboratory and placed outside urban areas) were discussed at early stages as being bad examples, for example by the former, founding CEO, Colin Carlile at a lecture on a sustainable ESS. Visions of "Scandinavian elegance and modesty" (C. Carlile, November 29, 2011) in combination with good working environments were imagined for the new facilities. The architectural and urban designs have, besides the municipality's planning, been developed through engaging high-profile architecture firms during the early 2000s. The science village between MAX IV and ESS is intended to have supporting functions for the facilities and provide service to researchers, as well as promote and inform the public about scientific activities and achievements on site. The specific architectural design of key buildings in Science

Village Scandinavia were chosen through international architectural competitions. As a result, Fojab arkitekter (Sweden) designed the building for MAX IV and Snøhetta (Norway) did the landscaping. The ESS facility was designed by Henning Larsen Architects (Denmark), while the architecture firm COBE (Denmark) won the competition to design the Lund Science Centre, a symbolically important building for communication and public access to science. Arguments for openness, and a sense of proximity to the scientific activities in the area, have pushed the architectural expressions towards transparent and accessible appearances in order to, at least figuratively, welcome the public and stimulate interest in science and knowledge production. The science centre, to be completed in 2024, is described as a “public knowledge and experience centre where mostly interactive solutions show how nature works, where new research findings and innovations are presented, and where facts are put into context” (Lunds kommun, 2019, my translation). At the same time, safety measures are taken to prevent the public from coming too close to the actual science being performed, for example through ha-ha walls preventing public access to the ESS facility.

#### 4. Attracting the International Visitor

In its planning, the Lund municipality has targeted the visiting researcher as likely to be attracted by “the world’s prime research and innovation environment” (Lunds kommun, 2012a; Region Skåne, 2012; Science Village Scandinavia, 2013, my translation) as well as by Lund’s and Lund University’s “general scientific attractiveness, status, and prestige” (Granberg, 2012, p. 113). The arguments often emphasize the necessity to attract an international group of visitors—researchers who can take Lund into the future—and make them stay in the area. Much like a ‘creative class,’ the researchers are believed to be attracted by environments that are dynamic, diverse, and open (Florida, 2003, p. 27). The researchers are understood as helping to boost the economy, and spontaneous contacts and interaction are thought to move knowledge and ideas without cost in an “urban environment that opens up for business development and contacts, culture, research, everyday life, play, and innovation” (Lunds kommun, 2012a, p. 5), as well as being thought to result in an “exciting environment for people with different backgrounds, interests and professions” (Lunds kommun, 2012b, p. 5). In contrast to the above, following contacts with researchers and individuals close to the day-to-day operations at MAX IV and at the future ESS, one can detect a certain discrepancy between the municipality’s expectations of a lingering researcher’s prolonged visit, bringing family to Sweden as a result of the attractive urban environment, and the streamlined time schedules of assigned beam time which result in intense shift work at the research facilities. Those targeted as future users in the municipal planning actualize an ethical dilemma of whose needs are considered and

what the arguments behind those decisions are (cf. Chan, 2018, p. 2). The focus on materials science researchers can mean that the less time you are expected to spend in the area, the more you become a target in the urban visions drafted for the area’s future public life (Kopljär, 2016, pp. 101–102).

#### 5. Sustainable Planning On-Site

Ecological and social sustainability is incorporated into every project design and strategic material mentioned above. The shift in Sweden from seeing sustainable development as a problem in nature to regarding sustainability as a societal issue aligns with the case in Lund, in that the emphasis is not only on ecological factors but also on ethical choices for socially sustainable environments embracing inclusiveness, equality, and well-being (cf. Isaksson, 2006, p. 107). This is confirmed by the local planning developed by the City Planning Office in Lund where local arguments for building the new area include societal benefits beyond mere scientific achievement. The plan is that the urban development will add 40,000 inhabitants active in work or studies to Lund’s current population of 125,000. The anticipated success and prosperity have been communicated to the local community and visual material of a future Brunnsköp has been used as an illustration of Lund’s future in general, for example in advertisements for election debates in the local paper (“Framtidens Lund,” 2014). Effort is put in designing an urban environment that encourages meeting points and interaction between residents and visitors in order to enhance the social sustainability of the area (Lunds kommun, 2018a, 2020). Besides meeting places, climate impact and land use, together with sustainable design of waste management, energy consumption, and transport are the main sustainability factors discussed in the planning documents from the City Planning Office in Lund (Lunds kommun, 2018a). The area is promoted as an example of local sustainability at the forefront combined with the picture of Sweden as a secure and modern country leading to the opportunity of a comfortable lifestyle based on a mix of sustainable, ethical, and lifestyle choices through the prospects of “a stimulating urban environment [including] a good quality of life, well-developed service functions, forward-looking sustainability solutions and interesting innovations” (Lunds kommun, 2018a, p. 5). The foundational principles for the work with sustainability on site are to *minimize* the impact on global climate change, to *balance* the building on fertile soil and to *maximize* city life and sensory perceptions (Lunds kommun, 2012a, p. 17, 2012b, pp. 10–11). It is thought that the area will help the city of Lund cut carbon dioxide emissions and become an energy generator for both buildings and transport by prioritizing renewable energy sources such as wind and solar (Lunds kommun, 2012b, p. 23). These achievements are intended to help the municipality adhere to the UN’s Sustainable Development Goals that are part of the 2030

Agenda for Sustainable Development (Lunds kommun, 2018a, p. 7; United Nations, 2015).

The sustainability goals have been set high also at the building level. The ESS facility has a zero-impact vision with, e.g., systems designed for the facility's treatment of polluted stormwater which lead water back to natural streams. A report on ESS's energy consumption declares that not only will ESS be a world-leading research facility, it will also be "the first large-scale research facility that will be environmentally sustainable" (ESS, 2013, p. 3). MAX IV has a system for the reuse and recycling of heat from the cooling systems used for the Linear Accelerator as well as solar panels on the office roof to produce renewable energy. Steps have been taken to keep, and use, excavation masses from the building process on-site and a vibration-absorbing hilly landscape have been laid out around the MAX IV buildings. MAX IV has been certified as a Green Building by the Sweden Green Building Council in accordance with environmental guidelines (MAX IV, n.d.-b).

## 6. Contested Land Use

Regardless of the options for financial payback to the local community and region, for scientific outcomes, or the lofty goals of sustainability, the establishment of such large-scale structures as MAX IV and ESS actualize concrete land use problems. The whole city of Lund covers 2,652 hectares and the larger urban district of Brunnsög, including the research facilities and Science Village Scandinavia, will add 225 hectares. The combined size of the facilities and their supporting functions make it impossible to fit the development in an existing urban context—MAX IV's ring takes up the same space as the Colosseum in Rome, with a 528-metre circumference. However, the decision to build on Sweden's best farmland is controversial as the soil quality is of the highest productivity class (9–10; Carlie & Lagergren, 2012, p. 14) and the land use question has been one of the most highly debated matters regarding the development. The urban expansion partly overturns Lund City Council's directives in 2010's Master Plan:

The City Council has adopted terms of reference prior to the work of the Master Plan. These terms state that *'The Comprehensive Plan will help coordinate the objectives of social, economic, ecological, and cultural sustainability. The ecological dimension provides a framework and the necessary prerequisite for all other development.'* It is therefore important to conserve the land, especially high-quality farmland, and to locate new development mainly along public transport routes with existing and planned rail transportation. (Lunds kommun, 2010, p. 3, original emphasis, my translation)

In cases where sustainability objectives are compromised, a *balancing principle* in the policy documents,

e.g., in the Master plan from 2010 (Lunds kommun, 2010), indicates that procedures that have a negative effect on nature and recreational values should be compensated. The aim is to avoid negative effects, and if such effects cannot be avoided to minimize their impact. If this is not possible, the strategy is to equalize the effect in a broader functional context. The last step in the balancing principle ladder is to replace functions and qualities that have been removed as a consequence of planning initiatives (Lunds kommun, 2018b, p. 65). At a national level, the Swedish National Board of Housing, Building and Planning states that according to The Swedish Environmental Code "agricultural land that is worthy of use can only be used for development purposes if the building/facility is of significant interest to society and other land cannot be used" (Boverket, 2012, p. 103, my translation).

The land use at Brunnsög, the investments in research infrastructure by national funding agencies, as well as the buildings themselves have for the last decade been scrutinized, and often criticized, in the media as well as in debates within the academic community in Sweden. This has possibly contributed to the MAX IV and ESS administrations' thorough communication of building processes, safety measures taken, and environmental concerns (cf. Kaijser, 2016) during the building phase as well as in an operational stage. The research facilities, and their budgets, are big enough to handle extensive sustainability assessment procedures, and the ambitious handling of soil that has been excavated on-site, biodiversity plans, quality of work environment, and the renewable and reusable energy solutions are communicated on their homepages. Although many of the Agenda 2030's sustainability goals, such as ensuring sustainable energy, fostering innovation, or making cities inclusive and resilient are included in the Brunnsög plans it is hard to ignore such a large expansion onto farmland. Questions regarding land are essential in sustainable development. Concretization of political mottos and formulations is expected to be recognized in the realization of the built environment and land use—examples from the planning practice demonstrate the actual result of general sustainability goals (Isaksson, 2006, p. 108). Furthermore, land management is a particularly important matter in a Scania context, and when it comes to ethically sustainable design choices, the extensive land use can be considered to be one of the toughest compromises of the Brunnsög development. Half of Sweden's food industry is located in Scania and half of the food produced in Sweden is produced in Scania (Region Skåne, 2018). Sweden's national food production has been increasingly debated in light of the current Covid-19 pandemic. Trends among the Swedish population to stock up on food as a result of the fear that the food supply chain could be disturbed by closed borders have resulted in demands to increase Sweden's self-sufficiency. The southwest part of Scania (and the western part of the Lund municipality) has the highest quality of soil

for agricultural use in Sweden; only a few kilometres to the east within the municipality the soil quality decreases (Holmer, 2013). The location of large-scale research facilities on less fertile soil would probably have been possible still within the vicinity of the city of Lund, maybe even within the municipal borders—such a location would perhaps be less practical but it would also reduce the radiation risk connected to the ESS facility (Kaijser, 2016, p. 87).

## 7. On Scale Intentions and Ethicality

Scale in architecture is under-theorized (Lahoud, 2014, p. 300) and although “every scale always exists as a multiplicity, which binds small and large together” (Lahoud, 2014, p. 300), the scale discussion within the field of architecture could benefit from looking beyond its own discourse. Contemporary human geography offers a scale discussion that investigates space as ‘scalar’ and explores how spatial scales are expressed and interrelated (Latham & McCormack, 2012, p. 53) which is relevant for an urban discourse. Human geography handles a variety of positions: Regarding whether globalization is a productive concept, Dicken (2004) challenges the idea that the concept of globalization alone can explain causality of happenings in the world and that it is rather used to package contemporary trends without differentiation of causes or consequences (Strange, 1995, p. 293). Various interrogations of scale made in relation to the urban, transnational or global are developed through the contested scale of the urban fabric (Brenner, 2019), in the abandonment of scale as a concept entirely (Marston, Jones III, & Woodward, 2005) “into multiple sites of practices, relations, events and processes which are both situated in place and extended through space” (Jonas, 2006, p. 399), or in the flattening of scale in favour of networks (Latham & McCormack, 2012). Massey explores the connection of the local to the global through ‘articulated moments’ (DeLyser, Herbert, Aitken, Crang, & McDowell, 2009; Massey, 1993) and Peter J. Taylor—sometimes considered the founder of scale-based urban geography—contributes with a “Vertical Division by Scale” into the trio ‘World Economy/Nation-State/Urban’ and a “Horizontal Division by Area” into ‘Periphery/Semi-periphery/Core’ (Taylor, 1982, p. 25) in the sub-disciplinary field of political geography.

Future effects of *scalar intentions* are the result of looking into and imagining a desired future—ungraspable still—but nevertheless used as a rhetorical vehicle to move sustainable arguments forward and create a *raison d’être* for large-scale urban expansion. In discussions about the theme of globalization, “economic geography has prioritized the understanding of *processes* over the evaluation of *outcomes*” (Bridge, 2002, p. 361, original emphasis). Similarly, I want to turn the attention to the outcomes of planning processes and their significance as *environmental effects with scalar extent*. The argument made here is not favouring one scale

over another—it is not (only) a plea for being more attentive to local outcomes of powerful global initiatives (cf. Dicken, 2004, p. 9). It is a request that we attend to the discussion of scale in urban sustainable development and that the consequences of global and national initiatives be intentionally targeted by an ethically founded urban planning practice.

The planning of the Brunnsjön area relates to multiple scales when welcoming and expecting the best international participants in the scientific production on-site, promoting research through the view of the world as global, and recognizing Brunnsjön as a “significant part of that globality” (cf. Latham & McCormack, 2012, p. 61). Nevertheless, the relationship between the *scale of a sustainability problem* and the *scale of the proposed remedy* for that particular problem is a question that needs to be more closely attended to. There are ever-changing interrelations between scales, but as illustrated in the examples above, sustainability-oriented arguments are used to drive and argue for urban expansion and therefore their ethical motivations need to be scrutinized in relation to their scalar outcomes.

This text does not principally aim to criticize power patterns or hierarchical structures—it is perhaps understandable that economic forces at the national and international level, and global research agendas and initiatives would influence small-town local planning, and in the Lund case, we can identify a strong university and upsurge of a knowledge environment tied to the local planning. Even if sustainable development can at times be considered to have been taken hostage by “the interests of the entrepreneurial supportive state and its institutions” (Gunder, 2006, p. 209), the problem that is dealt with in this text is how the local planners deal with the power and tools they *do* have by acknowledging what they aim to handle and what they do not.

Planning is a normative endeavor entailing choices between alternative courses of action and sets of foreseen outcomes. Associated with these choices are ethical issues, which range from procedural questions such as conflicts of interest to substantive questions such as whether planners should advocate the rights of minority groups. These and related issues require planners to make decisions that conform, implicitly or explicitly, to established perspectives of what constitutes ethical behavior. (Hendler, 1991, p. 99)

When choosing between different paths the planning practice must take into account evaluations of proposed plans—the planning is always planning for *something* that does *something in a particular setting*. My request is to consider this particular setting through a deepened scalar inquiry. The planning practice obviously cannot practice a one-to-one strategy of problem solving—one less acre of agricultural land perhaps cannot be compensated for within the municipal borders. While exact measurements of traffic flow, energy consumption,

or the amount of hard surface are evident elements to discuss in relation to planning ethics and sustainability, scalar effects of planning proposals are less problematized. According to Fisher, philosophical ethicists categorize behaviour as having “good or bad consequences or as brought about by good or bad intentions” (Fisher, 2000, p. 170). It is precisely in between good intentions and, to put it in a simplified way, good or bad scalar consequences, that the planning discussion about scalar effects is needed. If we accept that “the approach to the built environment of tomorrow requires abandoning the ambition of a generally valid spatial model in favor of generally valid ethical approaches to its conception” (Basta & Moroni, 2013, p. viii), then we need to support the introduction of critical concepts for an evaluation to be done by the planning practice itself. This text aims to support planning’s understanding of what it needs to be critical of (in terms of wider scalar implications) where a notion of scalar intention can be used as a critical concept for such a discussion.

The sustainable planning efforts related to the Brunnsög development are handled at the local municipal level when relating to global and national sustainability policies, with three main scales being used in the description and preparation of the urban area’s future. The globally-oriented point of departure is the worldwide scale which targets the international science community as well as acting as a motor for the total urban development. At the regional scale, the Öresund Region and southern Sweden are recognized as an expansive region. At the local scale, that directly experienced by residents and visitors, the consequences of the research facilities are handled practically through the City Planning Office’s activities, while keeping grand visions such as diversity, integration, and transparency of knowledge and research in the forefront (Kopljar, 2016). The municipality declares that the intention is to “match the realization of the [research] facilities in such a way that the gain for Lund and the region becomes as large as possible” (Lunds kommun, 2012c, p. 5) with the additional goal of developing knowledge also in the field of sustainable development (Lunds kommun, 2012c). An effort in sustainable planning “might increase one aspect of sustainability on one scale...while decreasing it on another” (Kärrholm, 2011, p. 98). In planning, sustainability arguments might be contradictory and also used primarily to push a process that does not relate to immediate urban environments but rather to the status of a knowledge environment, or effects on a global research market, as in the case of Brunnsög. Lahoud (2014, p. 300) points out that design projects must be treated as “composites in which contradictory and often paradoxical forms of rationality sit side-by-side.” Such an acceptance of every design intention’s multi-scalar complexity is of course fundamental. Nevertheless, I want to point to ethical dilemmas of using a multiscalar (that risks becoming non-scalar) rhetoric as an argument for sustainable design choices. In other words: The planning has to explicitly address

what the planning aims to regulate. Scale impact may be produced on contingent scales but planning intentions need to target actual sustainability problems. Such inconsistency in the handling of scales points to a need for an increased scalar awareness in urban planning and attention to various scalar effects.

## 8. Conclusion

This text treats ethical questions tied to various scales of sustainable urban planning through the case of Brunnsög, an area currently under development in Lund, Sweden. The case concerns a multiscalar process initially set in motion by the planning, and development of, the large-scale research facilities MAX IV and ESS. The facilities are built as answers to globally identified scientific needs, with both national and international initiatives activating and supporting the process. The consequences of the local planning relate to a range of scales where the municipality of Lund’s balancing strategy is used as a guideline for handling local trade-offs within sustainable urban planning. The research outcomes of the facilities operate on an international research arena while the establishment of the facilities in the urban, or currently non-urban, environment becomes a strong local and regional driver for research and urban development. In this process, several overlapping and interconnecting planning scales exist in parallel as exemplified by the introduction of a Science Road, the focus on visiting international researchers, the locals’ interest in science, and by international architecture firms who shape the environment and buildings and aim to produce world-class sustainable planning. The overall goals of the area thus mix local, regional, and global effects as they express visions of the “world’s best research facilities,” of a “European example of sustainable urban development” and a “regional destination for science, culture, and recreation” (Lunds kommun, 2012c, p. 5).

The expectations and realization of the research facilities are undisputable prerequisites that have moved the development and discussions forward, sometimes faster than actual political decisions were being made or finances for the projects secured. In this process, the municipal planners adhere to some of their own policies and go against others, while the global research community, big budgets and status of Lund University push the research infrastructural argument forward. At the same time, the planning and building of the area has an underlying compensating aspect as it tries to make up for the loss of productive agricultural farmland to scientific infrastructure and urban expansion, and for the climate impact of both the urban expansion and creation of large-scale research facilities. Global sustainability goals are comprehensive and several relate to people’s basic needs, such as the aim of eliminating poverty and hunger or securing access to water (United Nations, 2015). The sustainability aims for Brunnsög are explicitly declared as relating to the UN’s 17 goals for sustainable develop-

ment (Lunds kommun, 2018a) and several key elements that should guarantee that the urban district is sustainable are incorporated into the planning: water infrastructure, easy access to public transport, and reduced car dependency. It is hard to make a definite prediction of whether an area will be sustainable as underlying sustainability goals can turn out to conflict with each other (Kärrholm, 2011, p. 98). The goal connected primarily to the production of knowledge by the research facilities, which relates to goal 9 of the UN's 17 goals, to foster innovation, at Brunnskögd stands in conflict with the goal about preserving high-quality farmland (goal 2 about promoting sustainable agriculture through increased productivity). In the same way, it is difficult to determine how to ethically navigate when cutting-edge research, which may lead to more sustainable material production or more sustainable energy use, is put against the need for ecological and local land use and food production.

The concept of scale is not primarily used in this text to describe the interconnectedness of scalar systems, but rather with the intention that it functions as a conceptual tool for the investigation of intentions and outcomes in urban planning. The Agenda 2030's goals of innovation or land use or social sustainability goals of inclusive and diverse environments relate to a range of intersecting scales—in the Brunnskögd development exemplified in scales ranging from the local urban neighbourhood scale to global expectations of scientific results. While compromise is at the heart of the urban planners' daily activities, I want to encourage a scale awareness when trade-offs in sustainable urban planning are being made—sustainability aims cannot be set against each other without careful considerations of potential outcomes on various scales. Intentions at the municipal planning level, i.e., close to the actual building of urban environments should problematize the scales relating to the envisioned outcome in order to make it possible to scrutinize consequences and recognize unaligned compromises. As it happens in this case, the particular soil quality at Brunnskögd, and the Scanian domination of food production in Sweden, make land use a national issue. This results in the compensatory strategy formulated for the development at Brunnskögd being in danger of missing its target. The compensation for lost agricultural land through implementation of energy efficiency, diverse neighbourhoods, and destinations for the communication of science, tries to compensate for a loss at a *national* scale with actions that influence mainly an urban development at a *local* scale. Scale-related consequences of planning and legislation need to be addressed openly by problematizing not only general, ethical, sustainability matters but also a *scalar sustainability* and ethicality in formulated plans. The reflections in this text use somewhat crude scales—local, regional, national—that go hand in hand with legislation and realization of urban development in Sweden, a similar evenness and proportionality of scales, although at a lower level, as in Taylor's (1982) early division men-

tioned above. Despite the chunkiness of these scales, I suggest that discrepancies in planning intentions can be initially discussed through such a basic scale division as it makes it possible to identify where planning intentions do not match, and where *a bad thing* is simply counter-balanced with *a good thing* without considering the further scalar impact.

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### Conflict of Interests

The author declares no conflict of interests.

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