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## Green infrastructure in growing station towns. Two case studies from Norway

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### Introduction

Experiences from the past 25 years have shown that there are some major conflicts between the densification policy that has been predominant in Norway and the desire to preserve urban green spaces. Auditor General expressed e.g. 2007, concern for downsizing of urban nature. According to Statistics Norway, the proportion of the population with acceptable access to recreational areas has dropped by 3% in the period 1999- 2009. Today, also smaller municipalities in metropolitan regions in our country are growing in population and some are pointed out as centers for growth in regional plans. Thus, there is also a huge pressure on nature and green areas in these centers.

When the current policy is to increase density, efficient use of the urban land is more important than ever. In order to prevent badly planned development, regional planning authorities emphasizes that these centres must establish borders to stop urban sprawl. They should also locate new urban development to selected nodes in the communication system and maintain an efficient green infrastructure within built-up areas. This is however often small municipalities with weak traditions of green infrastructure planning and no established ideas about how a system of green spaces should be accommodated. We assume that this is a general problem, which not only applies to Norwegian conditions. The purpose of this study is therefore to examine how these municipalities meet the new challenges and how they are working to establish green infrastructure as a concept in planning.

### Background/Literature Review

In Norway the concept 'green structure' was established in the early 1990ies defined as a «web» of large, and small vegetation covered areas in the cities/towns. Water and the entire hydrological system was also included and referred to as blue-green structure. It was emphasized that the green structure is an important element of sustainable urban development and a multi-functional system to ensure recreation and outdoor life, landscape aesthetics, biodiversity, local climate, flooding and storm water issues etc. Hereafter we use the term green infrastructure or blue green infrastructure, which is used in international literature today. (see for example Benedict & McMahon, 2002)

The multifunctional perspective implies that planning for green infrastructure not only can relate to public spaces, but all vegetation-covered areas, regardless of ownership. Our approach is in other words wider than the greenway concept as described by (Ahern, 1995; Fábos, 1995; Turner, 2006 etc.) because it also involves the private blue and green areas. The approach is thus more holistic and attends to urban nature whether it is 'natural' or manmade and important at a landscape scale level according to the European landscape Convention (Thoren & Ruggeri, 2015).

The starting point of this article is a study in which we compared the Oslo and Trondheim green infrastructure planning to see which dimensions in the sustainability discourse that has prevailed and which battles taking place when green infrastructure is to be implemented (Thoren & Saglie, 2015). The purpose of this article is the same, but now focusing on how smaller towns with weak green infrastructure traditions meet the challenges.

We have conducted a simple literature review to examine the implementation of green infrastructure in the planning of small towns with weak green planning traditions, and pressure on land due to urbanization / densification. We assume that in these towns is particularly important to establish traditions for green infrastructure planning and that conflicts are common due to pressure on land. We used Web of Science with keywords greenway planning, green infrastructure planning with an emphasis on urban areas. We found surprisingly little research literature that focused on conflicts connected to implementation of green infrastructure. The literature appears largely to be of methodological nature or emphasizing the different values and functions as blue and green areas in urban areas.

Matthews and Byrne (2015) also summarize this, albeit the main topic in their article apply to green infrastructure for climate change adaptation. Even in a review article in which the focus is challenges and strategies for urban green-space planning in cities undergoing densification is the theme of conflict and discourses not dealt with (Haaland & van den Bosch, 2015). It seems in other words to be a lack of knowledge of the implementation of urban blue green infrastructures and especially about the conflicts and discourses at stake in cities/towns that are growing and densified.

### **Goals and objectives**

The present study is a part of the SUSPLAN project funded by the Norwegian Research Council. The main aim is to examine how discourses about green infrastructure in overall plans for the compact city with emphasize of small towns takes place.

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- How do the municipalities deal with green infrastructure in their plans?
  - Which discourses related to expansion of urban areas versus preservation of green infrastructure outside the developed area are central to overall planning for small municipalities in urban regions which grow?
  - Which discourses related to densification versus preservation of green infrastructures are central to overall planning within smaller towns, which grow?

## **Methodology**

### Case study methodology and selection of cases

To shed light on the questions we have conducted case studies in Sola and Ski, two small municipalities in regions with extensive urban development. This enables a comparative approach to what we call information-oriented and critical cases in a Norwegian context (Flyvbjerg, 2004).

Sola is located in the Nord-Jæren region in the southwestern part of Norway. Up until now, this has been one of the key growth regions in the country due to oil industry. The municipality borders the regional capital Stavanger and is located in one of the country's main agricultural areas. The landscape is flat, open, green and the coastline characterizes the area. The population is today approximately 26 000 and the number of workplaces almost the same.

Ski is located in the Oslo region, only 20 minutes from Oslo by train. Ski is an inland municipality that also has important areas for agriculture. The municipality is otherwise characterized by large forested areas and is located in a more hilly landscape compared to Sola. The municipality has pr. 2016 about 30 000 inhabitants and the population will increase in coming years because the town of Ski is pointed out as one of the new regional towns. Ongoing improvement of railway capacity is a major driver for growth

### Discourse theoretic approach

Discourse theory is a useful tool when understanding background for and arguments for densification policy, green structure planning and conflicts connected to the policy. Hajer (1993 : 44) defines a discourse as “ a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities”. Through the establishment of which ideas, concepts and categories that are acceptable, a certain discourse establishes rules that an activity ought and should follow. The Norwegian discourse on the sustainable city has underlined compact development, facilitating non-motorized as well as public transport, and protecting the urban

green infrastructure within as well as outside the built-up area. The discourse on green infrastructure is thus a part of the discourse on urban development, but is also a separate discourse in itself, as it is seen as multi-functional as described earlier. However, within certain elements are underlined, or whether the green infrastructure “inside” or “outside” the built-up area is underlined, may vary according to the local situation.

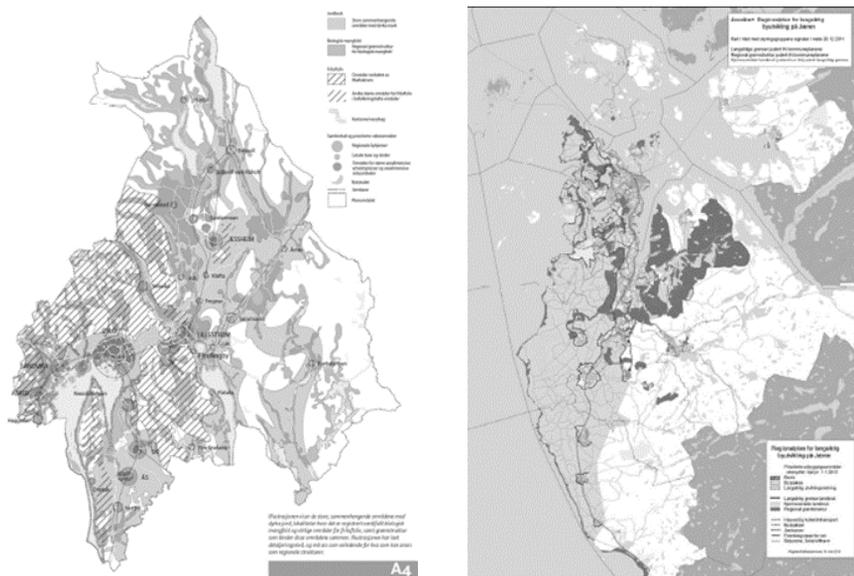
In each of the two municipalities, we study which arguments the various actors use to preserve nature and green areas, and which “green” values and functions that win through. We mainly build on document studies, where the main sources are municipal plans with public hearing documents. In addition, we interviewed the person in charge of planning in the municipal administrations.

## **Results. Densification and green infrastructure in plans for Sola and Ski**

### Green infrastructure in regional plans

Stavanger as well as Oslo area have regional plans that provide guidelines for land policy in the two metropolitan regions where densification and compact urban development are central themes. The guidelines also have major consequences for the green infrastructure outside and inside built up areas in our case municipalities. In both regions, there is a central objective for municipalities to limit urban growth and thereby preserving the overall core areas of agriculture, green infrastructure, biodiversity and cultural values. This strategy contributes to safeguard larger interconnected green areas, but leads to pressure on the blue green infrastructure where people live.

The Stavanger region has traditions dating back to the 1990s to see transport planning and planning for green infrastructure together. Current Regional Plan for Nord-Jæren 2013 - 2040 continues these ideas. The plan for the Oslo - Akershus area is of quite recent date adopted in December 2015. It has been difficult to get the municipalities in this region to cooperate, and the Parliament ordered in 2008 the counties of Oslo and Akershus to decide on a joint regional plan for land use and transport. The aim was to prepare a more comprehensive development policy that could help to achieve national goals for climate, transportation, agricultural land and biodiversity. The plan demonstrates that development has to be localized around nodes in the public transportation system, primarily related to the railway.



**Figure 1. Regional plans for Oslo- Akershus region (Left) and Nord- Jæren region (Right). Both plans indicate core areas for recreation and agriculture**

### Green infrastructure in municipal planning of Sola

The last municipal plan of Sola was adopted in 2015, and pinpoints that most of the growth has to come in two designated centers. Core areas of agriculture and the regional green structure from the regional plan is fitted in. According to the local planners, the regional green infrastructure can be seen as fingers with axes north - south and east - west. The same thinking repeats at detailed level in the municipal plan where 'green infrastructure' is defined as a network of natural areas, recreation areas and parks. Outdoors and recreation are in other words a main motive to adapt green areas in this plan. The plan emphasizes the need to examine the existing green infrastructures aiming at expanding and linking them together. To safeguard green areas today the municipality has decided on norms for outdoor space and through planning at a detailed level. To a certain extent, the plan has a multi-functional perspective on green infrastructure. In addition to recreational values, the blue elements (coastline and watercourses) and functions as habitat for animals and migration routes for wildlife should be preserved. The municipality has conducted extensive mapping of habitats etc., but the connection between this survey and the green infrastructure is not evident.

### Green infrastructure in municipal planning of Ski

Ski municipality introduced green infrastructure planning as early as in 1996 only two years after national guidance on the field. The Green Zone Plan, albeit only for the town of Ski had a multi-functional approach. The reason why the plan was prepared was due to the municipality's densification policies, to preserve the town Ski to maintain a rural identity and due to biological diversity. Protection of farmland and delimitation of urban settlements is an important intention in current municipal plan and in line with the regional plan, which was under preparation. Some of the main strategies for the plan deals with green infrastructure, based on aforementioned Green Zone Plan. The municipal plan states that green infrastructure is important to enhance efficient use of land, to form appropriate distinctions between developed areas, and to safeguard cultural landscapes. Green fingers and park systems are according to the plan mainly for recreation. They form a meeting point between the town and the open land outside built up areas. Knowledge foundation to explain green infrastructure's significance is missing. Concepts for green infrastructure in the built up area is largely implemented in plans at detailed levels.

### **Discussion. Which discourses are winning?**

Conflicts are mainly between agriculture and development for housing. Sola got far more suggestions from private developers to build in areas of value for protection compared to Ski. Still the study has revealed that the winning arguments are for protection of green infrastructure outside the urban areas. This is in line with results from similar studies of Oslo and Trondheim (Thoren & Saglie, 2015) and should be seen in the context of the hegemonic discourse on the compact city. Table 1, reveals that mainly regional authorities are involved in the discourse on preservation values outside the building zone and on keeping the border. The latter is particularly true for Ski. In Sola, they are primarily interested in the core areas of agriculture and the regional green structure.

Although we do not have strong traditions for national or regional planning in Norway compared with other European countries, the regional level still have strong tools provided through the Planning and Building Act. They can for instance object to local plans that are contrary to overriding interests, and can thus stop development projects. The regional plans have provided even stronger mandate, which they have used in our two case municipalities as basis for objections. The situation is thus to some extent similar to what (Mell, 2014) has summarized showing that the regional level is of great importance in Europe in terms of discussion on green infrastructure principles, which also may affect planning policy.

**Table 1. Overview of actors who argues for 1) protection of green infrastructure (GI) outside urban areas, 2) binding border and 3) GI within the urban areas.**  
**Dark gray: extensive, light gray: to some extent**

	Ski			Sola		
	GI outside		GI inside	GI outside		GI inside
	Protection	Border		Protection	Border	
National						
Regional						
Local nature						
Local other						
Inhabitants						

Inside the urban areas, primarily local organizations and individual citizens have been involved but only to some extent. This is also different from Mell's overview (Mell, 2014 : 614) showing that discussion of green infrastructure principles are extensively influenced by advocacy policy and is also advocacy led.

In Ski as well as in Sola, we have seen that green infrastructure inside the towns is not an overarching guiding element, but is established from bottom up almost incremental. This is different from what we found in the study of Oslo and Trondheim. In the municipal plans for these two cities, it is obvious that green infrastructure is a key topic. Both cities have clear concepts for green infrastructure and in Oslo also for a multifunctional structure. They have long traditions in this area, particularly in Oslo where they also have strong promoters. This is different in Sola and Ski where they lack visions and visualized concepts for green infrastructure inside the towns. The knowledge base is missing, and there is no strong promoters to address this either.

## Conclusion

The main conclusions that can be drawn from this study is that

- Densification policy and preservation of green infrastructure outside the urban areas have been successful and should be regarded as a hegemonic discourse in the small towns in regions with pressure.
- Green structure inside the densely populated areas are developed incremental, has few supporters, lacks vision, have poor knowledge base.
- Future of green infrastructure is created now and should be taken more seriously. They should learn from the large municipalities for instance like Oslo and it is also necessary that the national level is more involved with guidance.

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