

## **BRIDGE CREATES NEW OPPORTUNITIES FOR FOSEN AND TRONDHEIM**

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### **ABSTRACT**

*The population in the Trondheim urban area has grown by 28% over the last 20 years to approximately 200,000 inhabitants. During the same period, the population of Fosen has remained stable at 25,000. There is less distance between Trondheim and the surrounding areas in Fosen than the distance to the growing hinterland of Trondheim - Stjørdal, Malvik, Melhus, Skaun, and Orkdal. We argue that the main difference lies in the road versus the fjord and ferry connection and that consequently there is a correlation between transport time, transport mode, economic development, job creation and population growth.*

*Trondheim has had and still has a strategy to densify urban development within the existing urban structure. It has worked until now, particularly with regard to housing, but its potential is limited. Building in new areas is in conflict with the protection of valuable outdoor or farming areas. Trondheim is located far north and much of the land is north facing. It affects the quality of the land used for residential purposes. A bridge to Fosen will provide available building sites relatively free of conflicts and situated 20 to 30 km from the city center. The available capacity is of the order of several ten-thousands of residents. And important, is largely south-facing with sea views.*

*Trondheim lacks industrial areas close to the fjord or sea. This has made industrial development here nearly impossible while industry is expanding rapidly in the other larger coastal cities in Norway like Bergen and Stavanger. With a short distance to Fosen, Trondheim will also have access to areas with similar qualities as the Bergen connected expanding industry at Sotra.*

*Today 1,200 workers commute from Fosen to Trondheim, and 300 in the opposite direction. These are low numbers compared to the distances and the opportunities within respective labor markets. Increased commuting will increase labor productivity in both areas, and will thus contribute to the local and regional economy. This will also be reflected in the increased value of the properties in Fosen, but will, perhaps, have the opposite effect in Trondheim, at least in the short run.*

### **THE VALUE OF A BRIDGE**

Many bridges have been built in Norway during the last fifty years, mostly in sparsely populated regions with relatively low traffic intensity. There is growing evidence that there is a strong correlation between replacing ferries with bridges or tunnels and economic and population growth. It is therefore worth noting the outcome of previous projects that have a comparable relation to that of Fosen and Trondheim. This may be illustrated by what happened to the population growth in municipalities close to Bergen, Norway's second largest city, when two islands were connected to the mainland by bridges. (Trondheim is Norway's third largest city).

Close to Bergen there are several large islands. Two of these have replaced ferries with bridges 20 and 40 years ago, respectively. Fosen has the same properties as an island regarding connections to Trondheim. Ferries have connected for more than 40 years. A bridge has not been a technical possibility until a few years ago.

The two islands close to Bergen are Sotra and Askøy. Askøy is 12-25 km and Sotra is 15-30 km from the center of Bergen, respectively. Both had about 12,000 inhabitants in 1964.

Fosen is 25-100 (70) km from center of Trondheim. The population was 27 000 in 1964. Neighboring areas with direct road connections, and of a similar distance south and east of the Trondheim, had about 50 000 inhabitants in 1964. Figure 1 shows population growth for the period after 1964 in the respective areas.

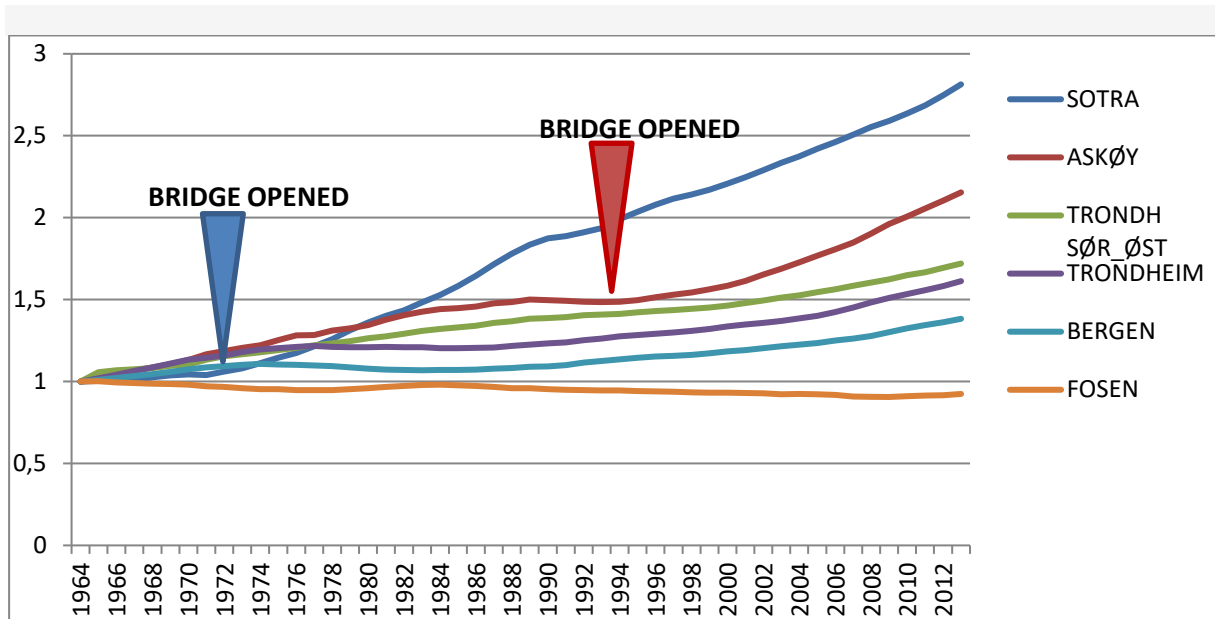


Figure 1 Population development in Bergen, Trondheim and nearby regions 1964-2013. 1964=1

Sotra was the first to get a bridge, in December 1971. Population growth increased shortly afterwards and has grown steadily thereafter. Today, it has increased by a factor of 2.8.

A connecting bridge to Askøy followed in December 1991. The island had experienced population growth in the 70's, but stagnated in the 80's. A few years after the bridge was established, it experienced strong growth at approximately the same annual rate as Sotra. Both these areas have grown at a substantially faster rate than Bergen.

The areas south and east of Trondheim did also experience stronger growth than Trondheim in the same period, but not as rapidly as Askøy and Sotra after the bridges had been built. The municipality of Trondheim has grown faster than Bergen. Fosen, however, has experienced a reduction in population over the same period.

The total population figures for Sotra and Askøy equaled the population of Fosen in 1964. Now these regions have more than twice the population of Fosen. There has been a strong population growth in all regions relatively close to big towns in Norway. Fosen is an exception. We believe that the explanation is closely linked to the lack of a road (and bridge) connection between Fosen and Trondheim..

There is strong evidence of a correlation between having a road, and if necessary bridge connection, and population growth in suburban areas. It does not prove a causal relationship, but few would deny this correlation. Similar experiences can be obtained from the corresponding project in Stavanger, Kristiansand and Ålesund. The knowledge of these experiences and further, that it is now technically possible, forms the basis for the commitment that Rissa Development, Rissa municipality and Fosen region have to secure a bridge across the fjord.

## **SOME URBAN CHALLENGES IN TRONDHEIM**

The town was founded more than 1,000 years ago. It was located centrally in the best agricultural areas north of Dovre. The city has been a trading center, like most ancient cities in Europe as well as a center for public administration. It was Norway's church capital until the Reformation. It has also been a cultural and industrial center. During the last 200 years, education, research and skilled jobs have gained a strong position. Urban growth was rapid until the early 1970's, flattened for a while and then accelerated again in the late 1980's

Trondheim is topographically sandwiched between rich farmland and countryside hills or mountains higher than 250 meters above sea level. This level is considered as a practical limit for settlements with the expectation of a relatively pleasant summer and livable winter conditions.

Building density was relatively low in the period of rapid development of the 60's and 70's, with most development happening on arable land. Only few houses in Trondheim are located at an altitude higher than 200 meters above sea level. These areas are now designated for recreation purposes. Previously exploited areas have subsequently been densified after 1990. Today it is a challenge to find relatively conflict-free development areas, particularly those suitable for land-intensive industrial and other activities.

Trondheim has at least two general topographical disadvantages. As mentioned earlier, Trondheim is on high latitude and much of it north facing. South facing residential areas is desirable at 64 degrees north. Summer is at least one month shorter on the north sloping areas. Short summers and long winters are a significant problem.

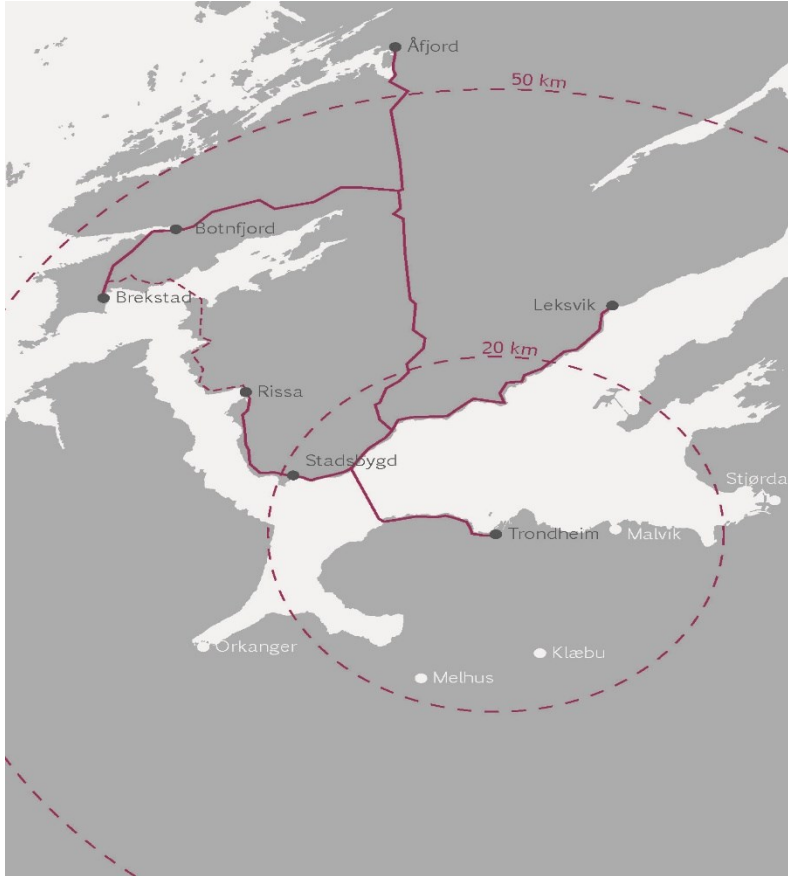
The above mentioned areas of Fosen on the Trondheimsfjord are mostly south facing. There is plenty of space below the contour line 250 that is not in conflict with agriculture or other interests. It has particularly good access to potential business areas associated with sea, which Trondheim is completely lacking. It is important that sectors of industry showing rapid growth in Norway should get the opportunities to establish in or within easy commuting distance of Trondheim.

## **NEW TOWN ON FOSEN (AS AN EXTENSION OF TRONDHEIM) (Proposal by Rambøll Architecture, Landscape & Spatial Planning)**

The location of Stadsbygd, 7 kilometers to the west of the proposed arrival point of the bridge, could offer a solution to many of the problems and opportunities raised above and develop into a significant new primary growth point resulting from the construction of the bridge.

- It has numerous natural and man-made advantages and positive qualities which support the idea of an expanded settlement close to Trondheim.

- With the construction of the new bridge, the driving distance will only be 20 minutes to central Trondheim. (Comparable distance to that of Klæbu, Melhus and Malvik). (*Figure 2*)
- It already has an existing physical, social, economic and cultural infrastructure that one can build onto.



*Figure 2 Distance from center of Trondheim to different parts of Fosen*

Stadsbygd is unique in that it could support the development of a low carbon / high quality town which would look out over agricultural fields to the Fjord and, importantly, the south Sun without impacting on the thriving Agriculture (and fast growing organic sector). (*Figure 3*)

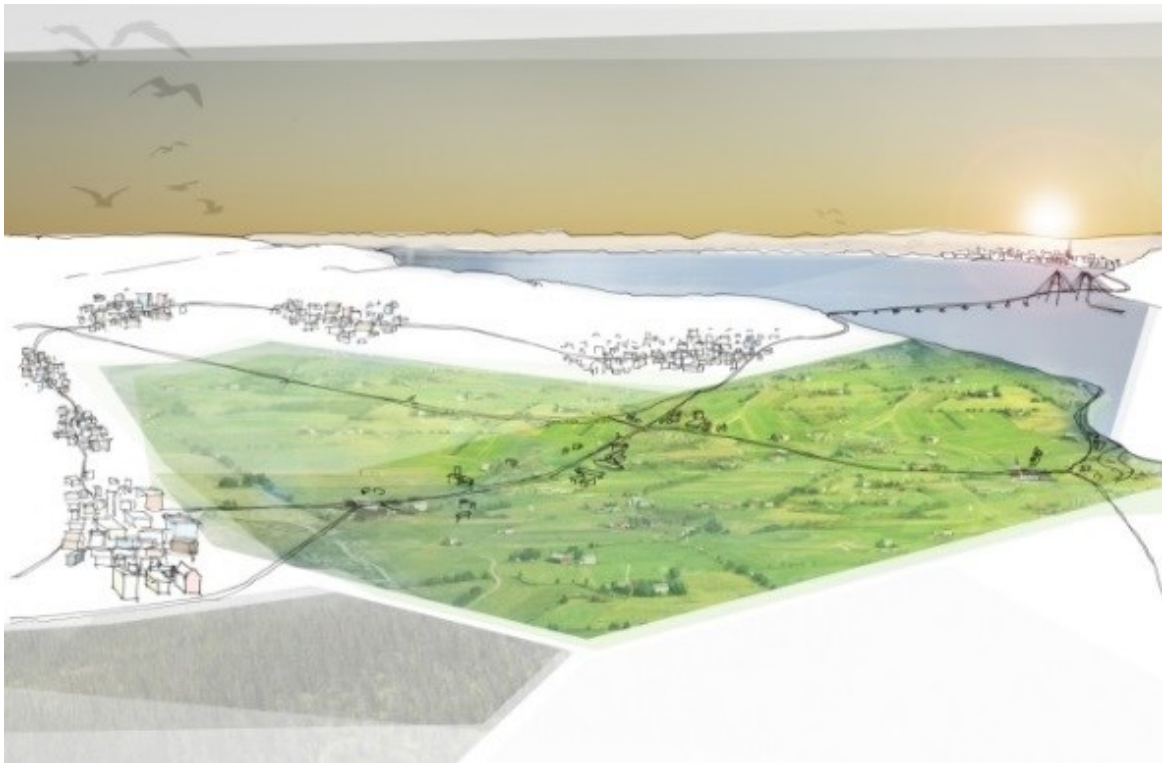


Figure 3 Urban development with view to farmland and fjord.

Further, the location is naturally protected from the cold north winds by forested mountains. The above are positive qualities not available in Trondheim. It further offers a rich cultural heritage:

- Viking history and Archaeology, the outdoor Amphitheatre on the fjord which host many people each year for the performance of ‘the last Viking’ based on the book by Johan Bojers, boat building and coastal heritage Museum, ancient rock carvings of reindeer at the old reindeer crossing spot near the edge of the Fjord and the cultivation of flowers which brings busloads of tourists annually.
- The Stadsbygd valley could support an addition of 15 000 to 20 000 people, with its own schools, health, sporting, business, industrial, cultural and recreational facilities without impacting on the productive and picturesque agricultural area, central to its current existence.
- Importantly, it could provide the opportunity for those with historical and cultural roots in Fosen to remain there while working in Trondheim, preventing the breakdown of social structures built over centuries.
- Its geographical location could also meet the needs of those families who have members working in both Trondheim and Fosen. – for example, one spouse working in Trondheim with the other working in Ørland, Bjugn or Åfjord. It could also provide for a high quality environment for those who would enjoy a micro-urban life in a pastoral setting in close proximity to city life with its greater cultural opportunities.

## GUIDING PRINCIPLES FOR DEVELOPMENT

There are grounds to believe that a low carbon / high quality settlement of 15 000 – 20 000 people is achievable if the following principles are followed:

- The settlement must be economically generative, socially uplifting, culturally vibrant and ecologically restorative.

- The settlement pattern must be executed in a manner that protects and support the thriving agricultural and fast growing organic farming sector.
- It need be designed to protect and build onto the positive assets of Stadsbygd mentioned above.

At a more localized level a main principle is to wrap around the agricultural area so as not to impact on it. (*Figure 4*)



*Figure 4 Development wrap the agricultural area*

The development is to be connected as a series of micro-urban clusters so that each cluster remains strongly connected to nature and each other. (Fig E) The spaces between the settlements serve to ensure that the agricultural land remains connected to the natural landscape at regular points in order to sustain the patterns of pollination and biodiversity.



*Figure 5 Series of micro-urban clusters*

The main transport route between Trondheim and Rissa (and eventually Ørland) is to run through the agricultural area to provide for a direct vehicular route with low gradients. A secondary route which connects the clusters is to have an emphasis on ease and rationality of cycling and public transport so as to reduce car usage within the development. (Figure 6, right)

Mobility within the urban clusters is to be designed around the principle of the five minute city – the idea that most basic cultural, educational, recreational and retail activities are reachable within a 5 minute walking distance. (research showing that to be the rough threshold beyond which people consider using their cars).



Figure 6 Transport routes and internal mobility

The major commercial activities are to be located in the larger clusters at the two entry points to Stadsbygd and thus facilitating maximum client opportunity. (Figure 6, left) Together with allied industrial development, this will provide additional employment and self-sustainability for the town.

Only limited and selective recreational, historical and cultural activities will be situated within the agricultural area. The clusters are to be located above and around the agricultural land on the slopes of the valley to maximize on the magnificent views across the agricultural landscape to the Fjord (sunny south-facing) – so as not to impact on the agricultural land. (Figure 7)

As far as possible, the main public spaces are to be located in a position which can benefit from the magnificent views and sun.

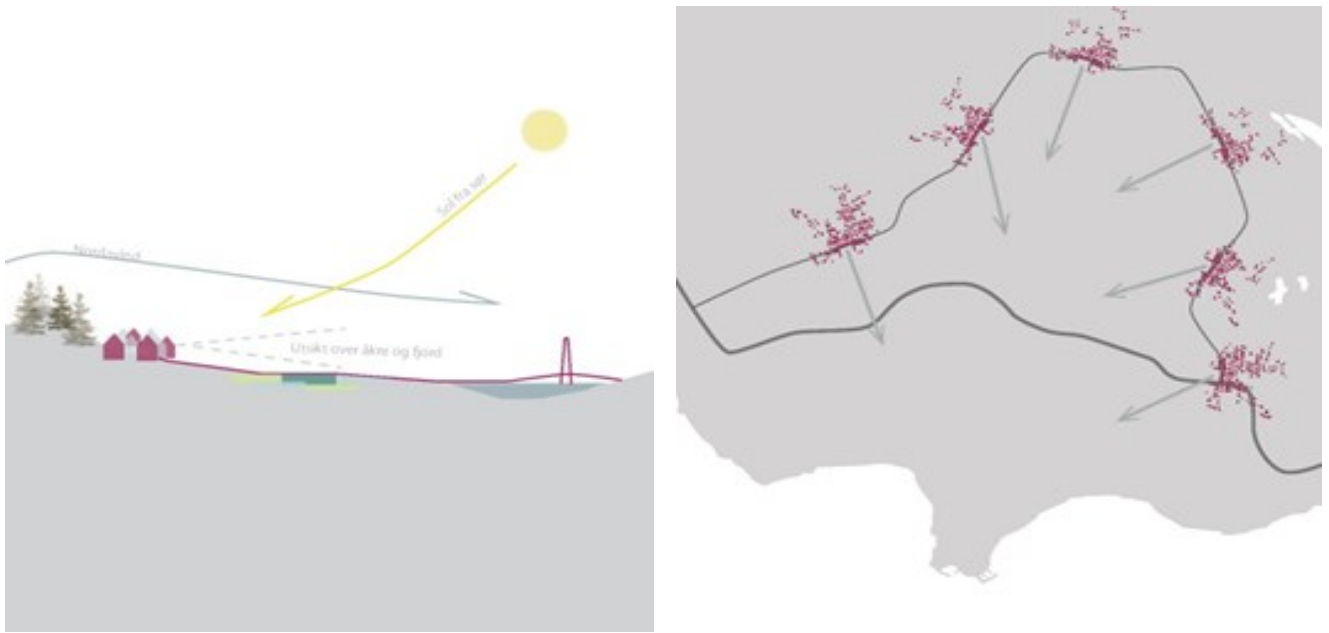


Figure 7 Agriculture area and fjord view in south

The settlement needs to provide for a range of different housing types and forms of ownership to suite different living requirements. It will also need to encourage opportunities for different scale players – large developers, local authorities, small developers and self-builders to facilitate a diversity of environment and income opportunity. (Figure 8)



Figure 8 Different public service and building opportunities

The sizes of the clusters are estimated to be between 2 000 and 5 000 people. The holding capacity of the natural systems, requirements for infrastructure, projected heavier rainfall, and the optimization of local energy provision and waste management need closer inspection in this regard. So is the question of the optimum required facilities (health, education, retail, etc.) and activities (cinema, sport, library, restaurants, coffee shops, etc.) to provide for a sustainable, dynamic cultural life. (Fig L