

Summary

Land use development potential and E-bike analysis

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Increasing cycling shares is a part of the urban and transport planning mandate for the Norwegian urban regions. The pathways to increase bicycling shares can be plotted at both macro and micro levels. At micro levels, road designs and measures to both improve the conditions for cyclists and make cycling paths safer can lead to potential increase in bicycling. At the macro level, land use planning can assist in increasing bicycling usage. In this report, we analyse the issue at a macro level for the four largest cities in Norway – Oslo, Bergen, Trondheim and Stavanger. Analysis is based on INMAP model, which has previously been employed to estimate the mutual effects of land use plans, infrastructure provision and transportation in Norway.

The White Paper 26, 2012-2013 (NTP) states that any future growth in person transport in the larger cities should be absorbed by public transport, cycling and walking. In order to realize this ambitious goal, government wants to implement measures to stimulate ‘green’ person transport, and one of the popular measures towards this end is through extending financial support for policy packages in the city-networks. This report provides knowledge on how current and proposed land use and transport policies can be effectively interlinked to promote bicycling in the four cities. The results can assist in designing specific measures and paths of adoption for such measures, which can form a vital input for making decisions on policy packaging by the cities.

As per the trip-making characteristics, almost half of the trips registered in the National Travel Survey (NTS 2013/14) of Norway are less than 5 km, and close to 50 percent of these short to medium length trips were taken with cars. This indicates a potential to reduce car use and increase cycling in Norway which can be addressed through suitable land use planning. The results presented in this report can assist in designing specific measures and the paths of adoption for such measures, which can form a vital input for making decisions on policy packaging by the cities.

In this report, we have interpreted the interactions between bicycle accessibility and land use planning through the INMAP methodology. In this methodology, the supply of land is determined by the local municipalities through land use plans, while the demand for the land is estimated as a function of the accessibility to jobs, trade, general services and health services in the areas.

Accessibility with bicycle and E-bike

The methodology for estimating accessibility used in INMAP is based on the approach developed for the Land use and transport interaction (LUTI) model for the metropolitan area of Santander (Coppola et. al. 2013). Accessibility is modelled as a function which combines the willingness to pay (for a given travel cost to a zone) with the number of jobs that can be acquired (from travelling to the zones).

Estimated accessibility for bicycle and E-bike for the four case cities have been plotted and figure S1 presents the case of Bergen. Accessibility is measured as the number of jobs that are accessible within each ward. The top figure depicts accessibility to jobs by bicycle, and accessibility for E-bike is provided in the bottom figure.

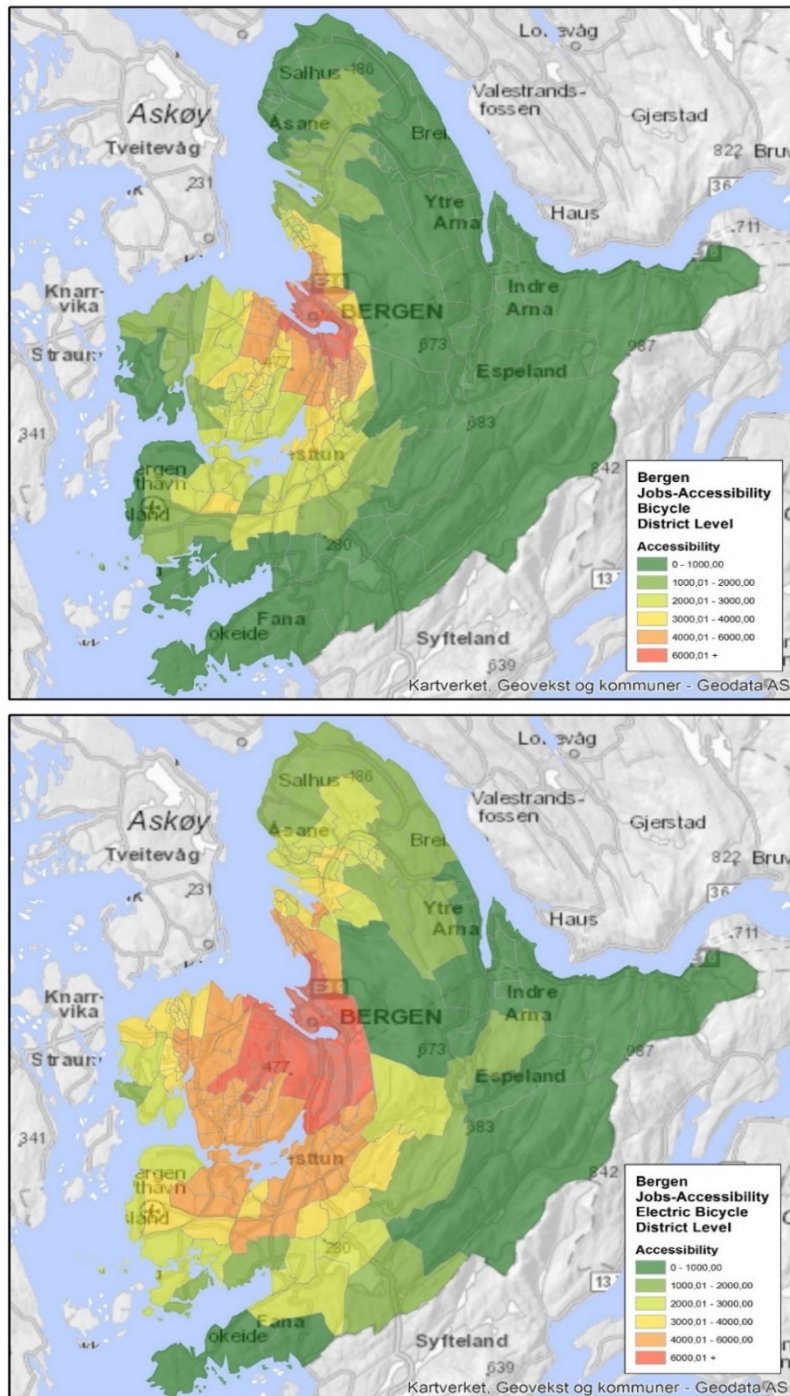


Figure S-1: Accessibility by bicycle and E-bike to workplaces. Bergen.

Growth potential based on land use plans

The INMAP model builds on estimating the growth potential based on existing and future land use plans and strategies. In Figure S-2, the maximum growth potential of inhabitants

according to the strategic general plan of Bergen on district-level has been highlighted. Blue colour marks growth potential of population according to the general plan, while existing population is shown in red. This mapping exercise assists in plotting the potential areas for future development. For example, half of the growth is located to the city center or the adjacent Bergensdalen “Valley of Bergen” (south of the city center). The biggest growth area, apart from the city center is Fyllingsdalen which is southwest of the city center. Other densification areas, such as Arna, Åsane, and the airport/Ytrebygda can be seen to the east, north and southwest. Similar plottings were done for each case city and the results fed into the final analysis and interlinking of accessibility (on bicycle and E-bikes) and land use growth potential.

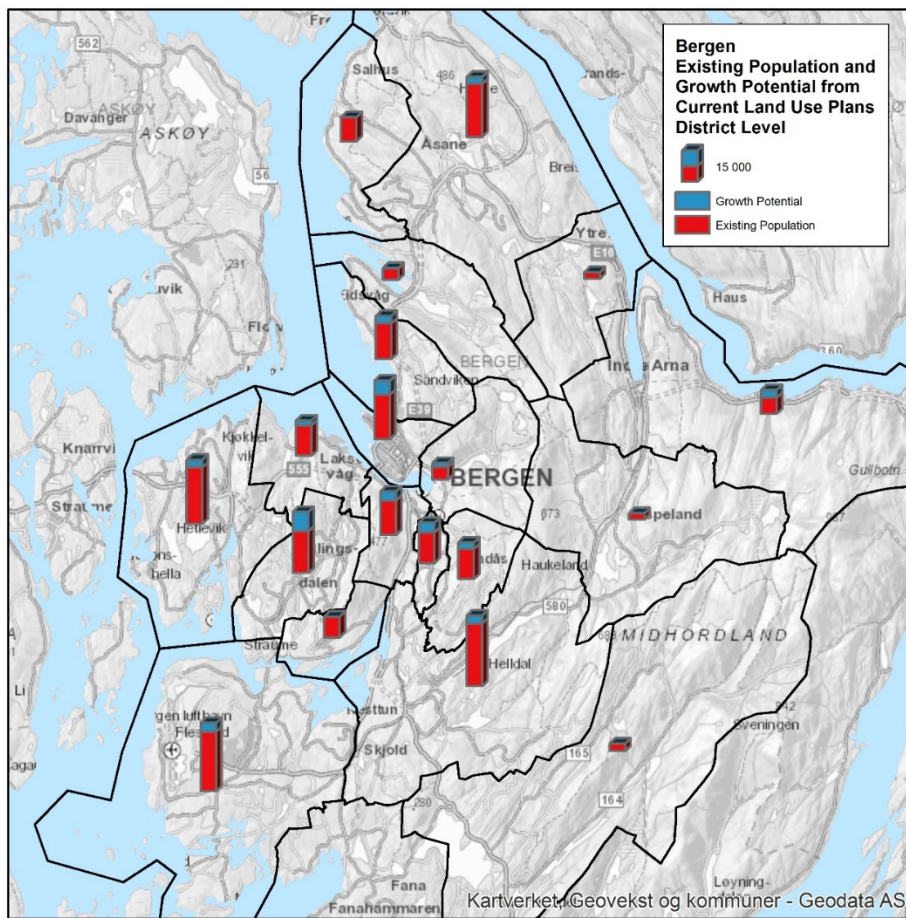


Figure S-2: Estimated growth potential according to the strategic general plan City of Bergen.

Analysis: outlining the interlinkages between bike accessibility and land use plans

For each city, accessibility maps were plotted to highlight the number of jobs that are accessible with E-bikes contra bicycles in the different parts of the city. These figures provide vantage points to critically reflect on the general land use plans for the cities.

For example, the accessibility map for bicycle for Bergen shows access to 6 000 or more jobs in the central parts of the city centre, and an equivalent level of accessibility spreads throughout the city centre and growth areas in Bergensdalen and Fyllingsdalen when E-bikes are inserted in the system. The City of Bergen has already, in the new general plan,

removed limitations on density for the central areas as long as certain criteria are met by the developers. Our analyses support this move by the city authorities.

While the strategic general plan sets out that growth should occur in the city centre, adjacent area of Bergensdalen, as well as local centres and transportation nodes, our analysis (based on E-bike accessibility) suggests that increased accessibility to jobs would be achieved if a larger share of the growth takes place in the city centre and Bergensdalen, along with Nesttun.

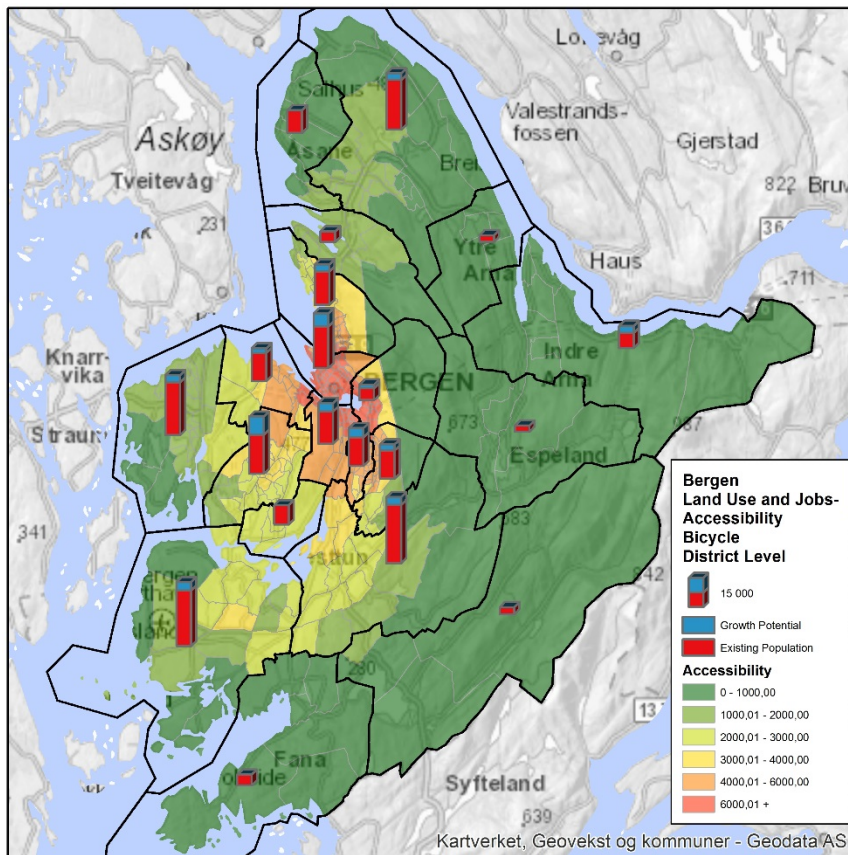


Figure S-3: Accessibility with bicycle and growth potential, Bergen.

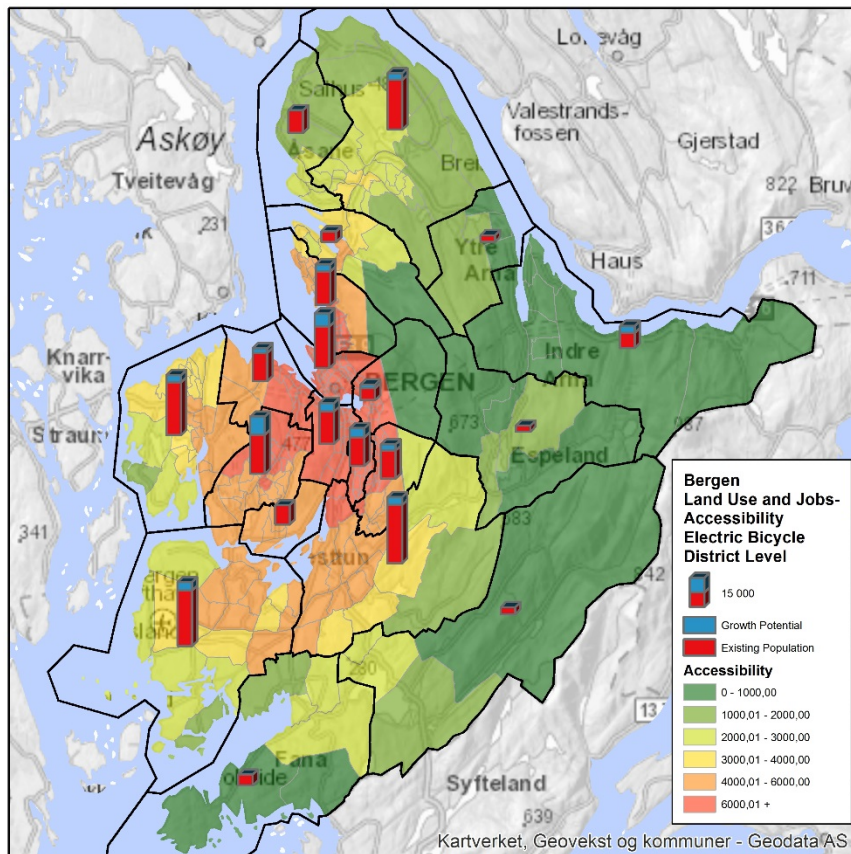


Figure S-4: Accessibility with E-bike and growth potential, Bergen

Conclusion

This report has considered the relationship between job accessibility with bicycle and E-bike, and the land use plans of the four biggest cities in Norway. Understanding this relationship is important as E-bikes allow for a substantially higher average speed than normal bicycles, thus making it a viable option for a larger area than normal bicycles.

From comparing E-bike accessibility with the land use growth potential, we found that it is possible to develop land use strategies to enhance the use of E-bikes. Each city has areas close to the city centre with limited development potential according to the existing plans, but high job-accessibility with E-bikes. High job-accessibility with E-bikes close to the city centres supports the current general strategy of pursuing high density developments or transformation projects in these areas. The findings of this report suggest that these areas should be considered for further development. This is especially true as the green field development areas are, in general, not found to provide any substantial accessibility with E-bikes.

Findings further suggest that the E-bikes may have a bigger impact in Stavanger than in Trondheim and Bergen. Oslo will, by far, have the biggest increase in accessibility.

To conclude, this study strongly recommends integrating the impact of E-bikes with land-use planning processes and decisions. Through active land-use management, the municipalities and regional development authorities can steer urban mobility to a more sustainable direction.