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# Operationalising the 15-minute city with New Mobility services

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## Abstract

The 15-minute city concept has gained significant traction in recent years but faces implementation challenges across diverse geographical, spatial, and political contexts. This 15-minute concept proposes that primary functions should be accessible within 15 minutes by walking, cycling, or public transport. However, it provides little guidance on the placement of these functions or the modalities of access. Additionally, it does not consider various new mobility modes and services, nor emerging technologies such as telecommuting and e-commerce.

The main challenge is that the 15-minute city presents an alternative planning paradigm to the existing automobility paradigm, which has dominated global city planning over the past century. While cars can facilitate all types of trips, no other transport mode can claim the same versatility. To transition to a new mobility paradigm, we must consider unbundling these trips to allow for the rightsizing of vehicles according to trip purposes, better aligning with factors such as cost, environmental impact, and spatial constraints.

This article will showcase how the New Mobility Assessment Framework has been applied to the new development of Hinna Park, outside of Stavanger, Norway. The project provides insights for the public transport authority, Kolumbus, on optimising the deployment of shared mobility services such as bikes, e-bikes, e-scooters, shared cars, and car-pooling. It also provided insights to allow key discussions between Kolumbus and the property developer to plan the new districts to support sustainable modes of transport. The framework aims to operationalise the mobility principles of the 15-minute city through public-private collaboration, assessing market potential, setting ambition levels for behaviour change, and developing pricing and investment strategies.

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## Introduction

The concept of the 15-minute city is rapidly gaining traction as an integral part of contemporary urban planning, driven by the need to create more sustainable, liveable, and resilient cities. Carlos Moreno, who introduced the concept in 2016, envisioned a future where urban spaces are not only efficient but also more human-centric, prioritising quality of life over the convenience of car use. By ensuring that all essential services and amenities are within a 15-minute walk or bike ride from any point, this model aims to reduce carbon emissions, improve public health, and foster a stronger sense of community.

Cities around the world, such as Paris, Portland, Melbourne, Milan, and Bogotá, have begun to embrace this transformative approach, recognising its potential to address the multifaceted challenges of urbanisation. The C40 Cities network's Green and Thriving Neighbourhoods initiative further underscores the global momentum towards implementing the 15-minute city model, highlighting its benefits for sustainability and social equity.

However, despite its promising advantages, the 15-minute city concept is not without its limitations. One of the primary challenges is its focus on local accessibility, which often overlooks the broader mobility needs of urban residents. This includes understanding the intricate network effects of various mobility services and how they interact and adapt to changes in travel patterns. The integration and saturation of services such as bike-sharing schemes, public transport, and car-sharing require planning to ensure they complement rather than compete with one another. Moreover, effective pricing mechanics must be developed to encourage behavioural changes towards more sustainable transport modes.

A critical issue that remains is how to address trips outside the 15-minute city catchment. Many of these longer journeys are currently serviced by private car ownership, creating a barrier to adopting walking, cycling, and public transport. Once a vehicle is owned, individuals often become locked into using it due to sunk costs and convenience, making it challenging to shift towards more sustainable options. Strategies to enable sustainable longer journeys are essential to reduce car dependence and promote the use of public or shared transport.

This article explores the application of a New Mobility Assessment Framework to a new urban development in Stavanger called Hinna Park, which was commissioned by the Public Transport Authority, Kolumbus and completed by Beta Mobility. The framework aims to operationalise the mobility principles of the 15-minute city through public-private collaboration, assessing market potential, setting ambition levels for behaviour change, and developing pricing and investment strategies. By considering the influences affecting modal choice, trip purpose, and capacity, the New Mobility Assessment Framework provides an approach to understanding the network effect and systems layer within a 15-minute area. This article will offer insights and points to further directions into how urban developments can effectively integrate the principles of the 15-minute city, ensuring sustainable and efficient mobility solutions for the future.

## **The Main Barrier Against the 15-Minute City: The car**

The dominance of automobility in urban planning is one of the main barriers to achieving the vision of the 15-minute city. Since World War II, cities have been designed and constructed with car use at their core, prioritising road networks and parking facilities over pedestrian pathways and cycling infrastructure. This car-centric urban development has evolved with the separation of functions, where residential, commercial, and industrial areas are distinctly zoned, necessitating the use of cars for daily commutes and errands. Such planning has entrenched the reliance on private vehicles, making it challenging to shift towards a new mobility paradigm that emphasises proximity and accessibility.

Transitioning to a new mobility paradigm faces several significant challenges. One of the primary reasons is that the car is an all-in-one vehicle. It provides the flexibility, convenience, and distance coverage that other modes of transport cannot match entirely. As our lives become increasingly complex, with changing living and working areas, flexible work patterns, and increasing recreational and travel demands, the car has become essential to conduct our lives. While increasing proximity and the density of essential functions may reduce the need for automobiles for certain purposes, people purchase cars not just for their daily commutes and shopping, but for a variety of reasons. For instance, owning a car is seen as essential for visiting summer homes, maintaining family connections when relatives live far away, or commuting to workplaces not adequately serviced by public transport. Once a household purchases a car, they become locked into using it due to sunk costs, tax incentives, and a pricing structure that makes it cheaper the more it is used, making it challenging to shift towards more sustainable options.

Even in urban areas that were developed before the invention of the car, we continue to see a rise in car ownership. These areas often have all the characteristics of a 15-minute city, with a dense mix of residential, commercial, and recreational facilities within easy reach. However, the convenience and perceived necessity of car ownership persist, especially when trip demand cannot be met by sustainable mobility supply. Take Copenhagen, Denmark, for example, a city that exemplifies many of the attributes of the 15-minute city: dense mixed-use urban fabric, an extensive cycling network, and high public transport coverage. In the last 20 years, there has been a 30% rise in the number of cars in the city. While this could be explained by population growth during the same period, the statistics show that car ownership is growing faster than the population. When the municipality surveyed residents about why they decided to buy a car, the number one reason was owning a summer house. No investment in cycling infrastructure, increased public transport service, or increase in density can solve this demand issue.

Accommodating a life without private car ownership, especially for trips beyond the 15-minute catchment area, is essential to fully realise the 15-minute city lifestyle. New mobility services are instrumental in achieving this goal by offering flexible, sustainable, and convenient transport options for longer journeys. To operationalise this vision, it is crucial to develop a comprehensive service layer that addresses the diverse mobility needs of urban residents. This involves evaluating journey purposes, such as commuting, leisure, and errands, to tailor transport solutions accordingly. In the following section, I will outline the New Mobility Assessment Framework and its application to the new development area in Stavanger called Hinna Park.

### Case Study: Hinna Park, Stavanger

Hinna Park in Stavanger, located in southwestern Norway, is a new urban development area spanning approximately 300 acres. The project plans to include 1,500 new housing units covering 130,000 square metres and 6,000 new workplaces across 148,000 square metres. This development aims to cater to an estimated population comprising 9,400 residents and 11,000 employees. The development of the area is being undertaken by Hinna Park Utvikling, a joint venture partnership between Stavanger Utvikling, OBOS Nye Hjem, Camar Eiendom, and Entra Eiendom.

While Hinna Park embodies the principles of the 15-minute city by integrating residential, commercial, and recreational spaces within close proximity, the City of Stavanger doesn't explicitly use the term 15-minute city. Instead, this is expressed through the "nullvekstmålet" (zero-growth goal). The nullvekstmålet is a national policy in Norway aimed at ensuring that the growth in passenger transport in urban areas is absorbed by public transport, cycling, and walking, rather than by private car usage.

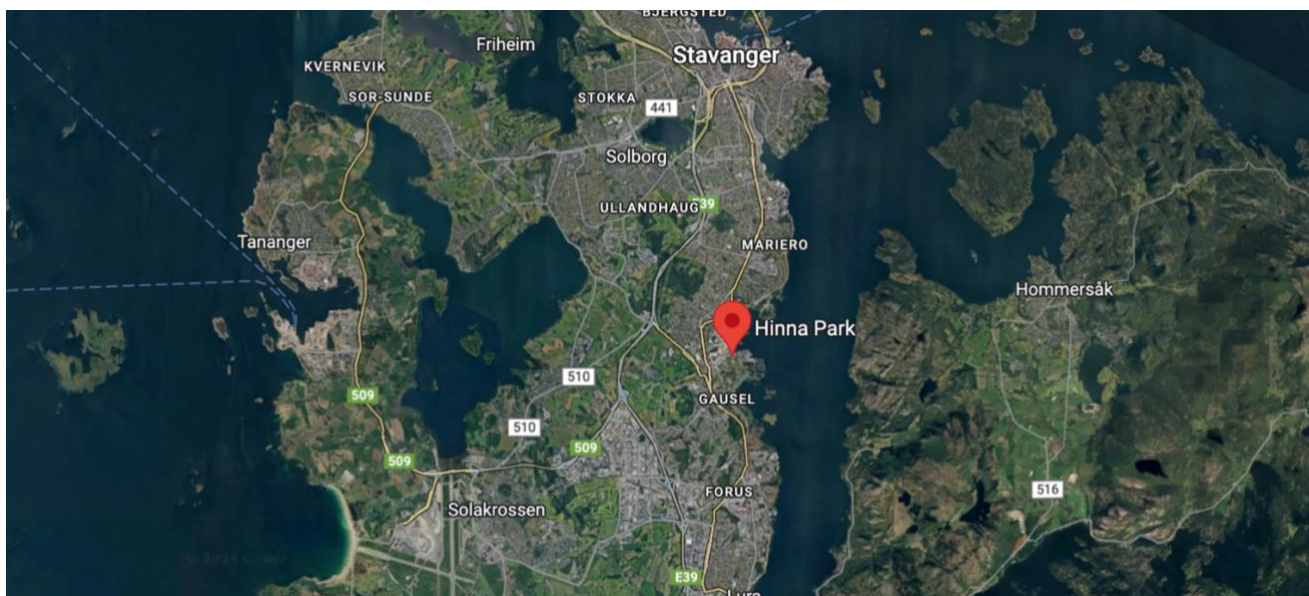


Figure 1: Hinna Park in relation to Stavanger. Image: Google Maps

Kolumbus, the public transport authority (PTA) in the Rogaland region, plays a crucial role in supporting this vision by offering a suite of sustainable mobility solutions. Unlike many PTAs around the world, Kolumbus has expanded its service offering beyond a network of bus routes, passenger ferries, and local trains to include shared city bicycles and car-sharing services. Furthermore, Kolumbus has developed a business-to-business mobility scheme called HjemJobbHjem, specifically aimed at reducing car use in urban areas. This mobility scheme offers a tailored mobility plan to company employees, including yearly travel habit surveys and access to mobility advisors, free access to the city bike service, and the option to buy discounted monthly public transport passes.

Hinna Park Utvikling and Kolumbus have been in ongoing discussions throughout the development of Hinna Park. A mobility plan was developed indicating the necessary integration of public transport and shared services into the area to meet the nullvekstmålet. However, the mobility plan lacked the specificity needed to help Kolumbus make decisions regarding service levels. This included questions such as: "Where do we put the mobility hubs? How many people do we move with what vehicle assets? What does the saturation of city bikes need to be? How do we optimise the capacity/utilisation of the new Bus Rapid Transit (BRT) line?"

To help answer these questions, Kolumbus procured Beta Mobility's services to provide a better foundation for understanding new mobility, including supply and demand related to new area development. Beta Mobility's response to this task was to develop a New Mobility Assessment Framework.

## The New Mobility Assessment Framework

While transport models play an important role in the planning of future areas, they typically focus on the capacity of different infrastructures. The New Mobility Assessment Framework enhances these tools by adding insights into which services will be used by whom and for what purpose, hypothesising on how they will be used in combination to understand the network effects of multiple services. Essentially, the framework unbundles trips by length and purpose to propose a mobility system that right-sizes vehicles, leading to an overall reduction in the number of private cars.

The framework follows a four-step process:

- **Mapping the Area:** A combination of open-source and municipal spatial data surrounding Hinna Park was mapped using QGIS geospatial software. This step identifies the relationship between Hinna Park and the surrounding transport infrastructure, settlement patterns, and amenities, including shops, schools, and industrial areas.
- **Building Persona Profiles:** Utilising macro data, including the national transport habit survey (Den nasjonale reisevaneundersøkelsen (RVU)), personas were developed to represent the residents and commuting employees of Hinna Park. This helps in determining their mobility habits and needs.
- **Calculating Trip Generation and Transition Potential:** This step involves calculating the generation of new trips from the Hinna Park development and assessing the maximum potential of these trips to transition to new mobility modes, active mobility, and public transport. The aim is to provide a quick market analysis to build business models where a level of investment can match the desired modal split ambition of the Stavanger Municipality.
- **Evaluation Against Development Plans:** The results are evaluated against the development plans to ensure alignment. This step assesses how the maximum potential of trips supports the market analysis, informing business models and investment levels that align with the desired modal split ambition.

## Purpose of the Framework

The New Mobility Assessment Framework is a model and an Excel-based tool designed to estimate the potential for new mobility in a specific area. Its aims are:

- Understanding Impact: Providing a basis for understanding how implementing new services affects mobility in the area.
- Evaluating Business Cases: Assessing the business case for various mobility offerings.
- Sustainability Potential: Serving as a foundation for evaluating the sustainability potential through behavioural changes.

For example, if the framework identifies a high number of workplaces or residences outside of a 400m catchment area, but within 1km, Kolumbus might prioritise the development of bike-sharing stations in strategic locations to improve last-mile connectivity, thus directly influencing infrastructure investment decisions.

## Framework Limitations

New Mobility Assessment Framework has several limitations:

- Potential Assessment, Not Prediction: The model assesses potential rather than providing exact predictions.
- Data Dependent: The accuracy of results depends on the quality of the data inputted. It is designed to be updated with new baseline data, such as travel surveys, number of travellers, and utilisation rates.
- No Definitive Answers: The model does not provide definitive answers but reduces complexity in understanding specific trips, transport mode distribution, and capacity proposals.
- Focus on Shared Solutions: It considers shared mobility solutions, excluding private vehicles.

These limitations highlight the need for continuous data collection and updates to refine the framework and its outputs.

## Framework Analysis Results: Hinna Park

To achieve the "nullvekstmålet" (zero-growth goal) in passenger transport, Stavanger Kommune needs to reduce the share of car trips by 5%. For Hinna Park, this translates to transitioning 2,775 daily trips to walking, cycling, or public transport. The New Mobility Assessment Framework analysis indicates that this goal can be achieved through a combination of new public transport lines, dense urban development, the placement of micromobility hubs at public transportation stops, and car-sharing services.

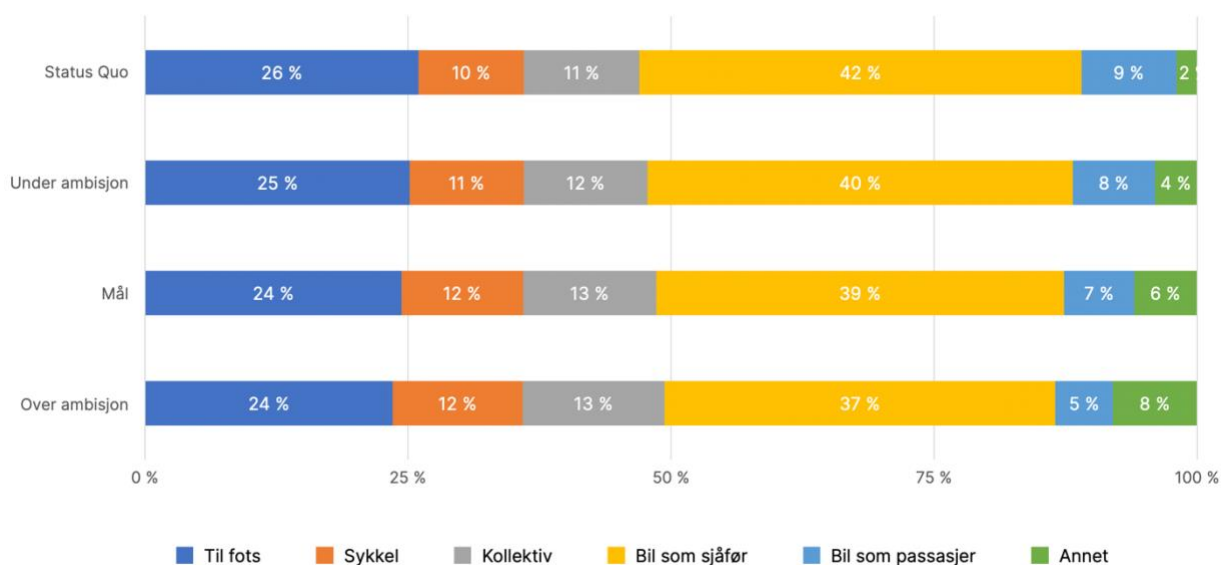


Figure 2: Chart visualising modal split goals in Stavanger Municipality according to different ambitions levels.

To achieve this shift, the framework suggests a minimum coverage of 327 shared bikes, 143 shared scooters, and 259 shared cars. The analysis also shows that the greatest potential lies in dividing these vehicles into five primary hubs, strategically placed to maximise accessibility and convenience for users. These hubs will be built as the development progresses. Initially, two additional mobility hubs are proposed to the one that is already planned.

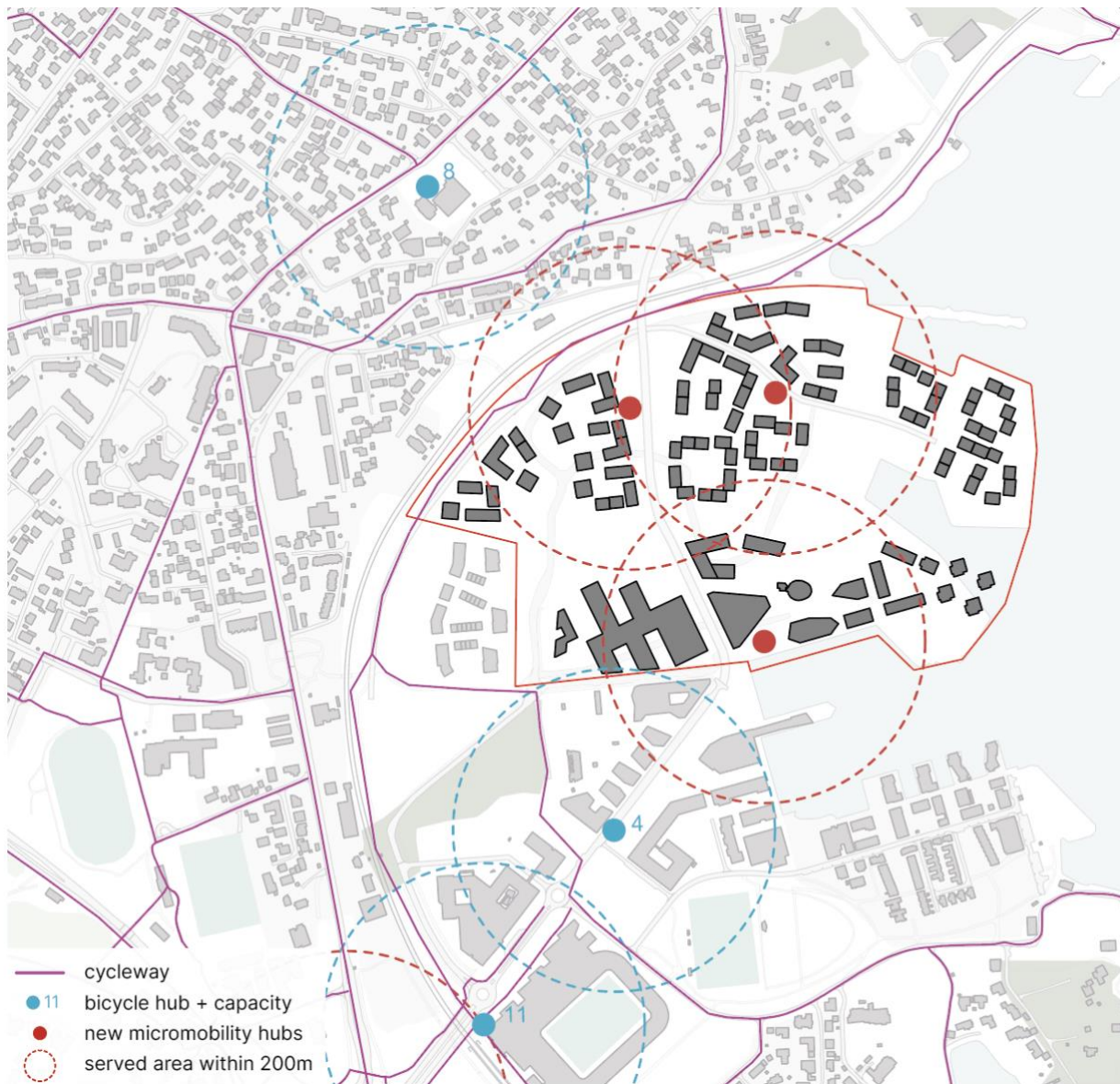


Figure 3: The placement of the three initial mobility hubs. Two additional hubs are placed in the north.

## Reflections on Analysis

The analysis of the New Mobility Assessment Framework application to Hinna Park reveals several key insights and considerations crucial for successfully implementing the 15-minute city concept.

### Scope and Mobility Understanding

The extensive scope of the Hinna Park project and the significant number of employees necessitate a comprehensive understanding of incoming mobility needs. This requires looking beyond the project's immediate boundaries to ensure effective integration with the wider transport network. This is a crucial insight in the development of the 15-minute city concept where commuting employees may fall outside of the 15-minute catchment area.

## Transport Mode Shift Potential

While the shift in transport mode distribution might seem modest at first, the substantial number of trips involved shows significant potential for micromobility solutions and car-based shared mobility. Significantly, the analysis shows that the provision of car-sharing services is fundamental to widespread adoption of public transport and shared micromobility as access to a shared car reduces lock-in tendencies to car use. This highlights the importance of implementing diverse mobility options to reduce car dependency.

## Diverse Mobility Needs

Given the varied mobility needs and the relatively large and diverse area of Hinna Park, there will be a demand for a wide range of new mobility services. This includes shared bikes, scooters, and cars, as well as efficient public transport options. Catering to these diverse needs is crucial for the success of the mobility strategy.

## Conclusion

The New Mobility Assessment Framework underscores the importance of local accessibility in realising the vision of the 15-minute city. While promoting high-density, mixed-use areas is foundational, the framework extends its application by addressing broader mobility needs. It highlights the necessity of integrating various modes of transport to create a robust mobility network supported by both active travel, public transport, and new mobility modes. This integration supports local accessibility and encourages a shift from private car use to more sustainable options.

One of the framework's significant contributions is its ability to illustrate the interdependent network effects of providing various mobility services. By understanding how different transport modes complement and reinforce each other, urban planners can design more efficient and cohesive transport systems, which can be utilised by property developers when building new neighbourhoods. This view is essential for accommodating trips outside the 15-minute city catchment area, thereby reducing reliance on private car ownership.

The New Mobility Assessment Framework offers a structured approach for public and private sectors to collaborate effectively. By providing a quick market analysis, it enables stakeholders to build robust business models and investment strategies. This collaborative effort is essential for implementing the principles of the 15-minute city, ensuring that mobility solutions are both economically viable and socially equitable.

In conclusion, the New Mobility Assessment Framework builds on the 15-minute city concept by addressing its limitations and enhancing its core principles. Through strategic integration with public transport, appropriate deployment of shared services, and showcasing network effects, the framework offers a solution for contemporary urban mobility challenges. By facilitating public-private collaboration, it ensures the vision of sustainable, liveable, and resilient cities can be realised, reducing car dependency and promoting a more human-centric urban future.