

# EASY RIDE - AUTOMATED DRIVING IN URBAN AREAS.



Motivation: Proactively shape autonomous future mobility in Munich, Shape regulatory frameworks for ACES

Development of future scenarios for Munich, 2035: “Autonomous driving and suitable regulatory frameworks”

Discussion of regulatory frameworks for autonomous driving in the city

Development of on-demand Mobility tech stack and conduction of pilot

Demonstration of autonomous test vehicle

# DESCRIPTIVE SCENARIOS

---

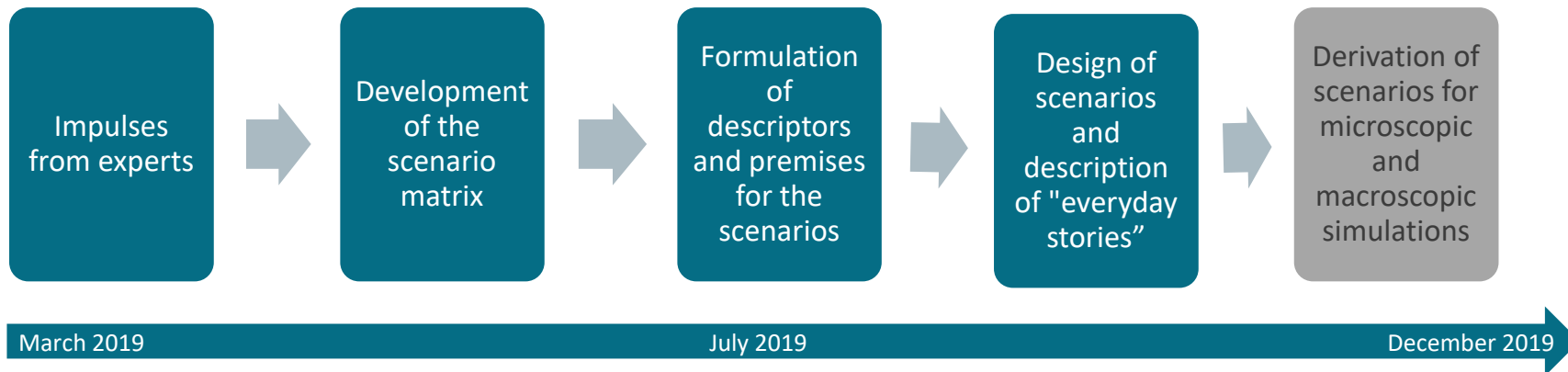
WORK STATUS 16.10.2019

## DEVELOPMENT OF SCENARIOS

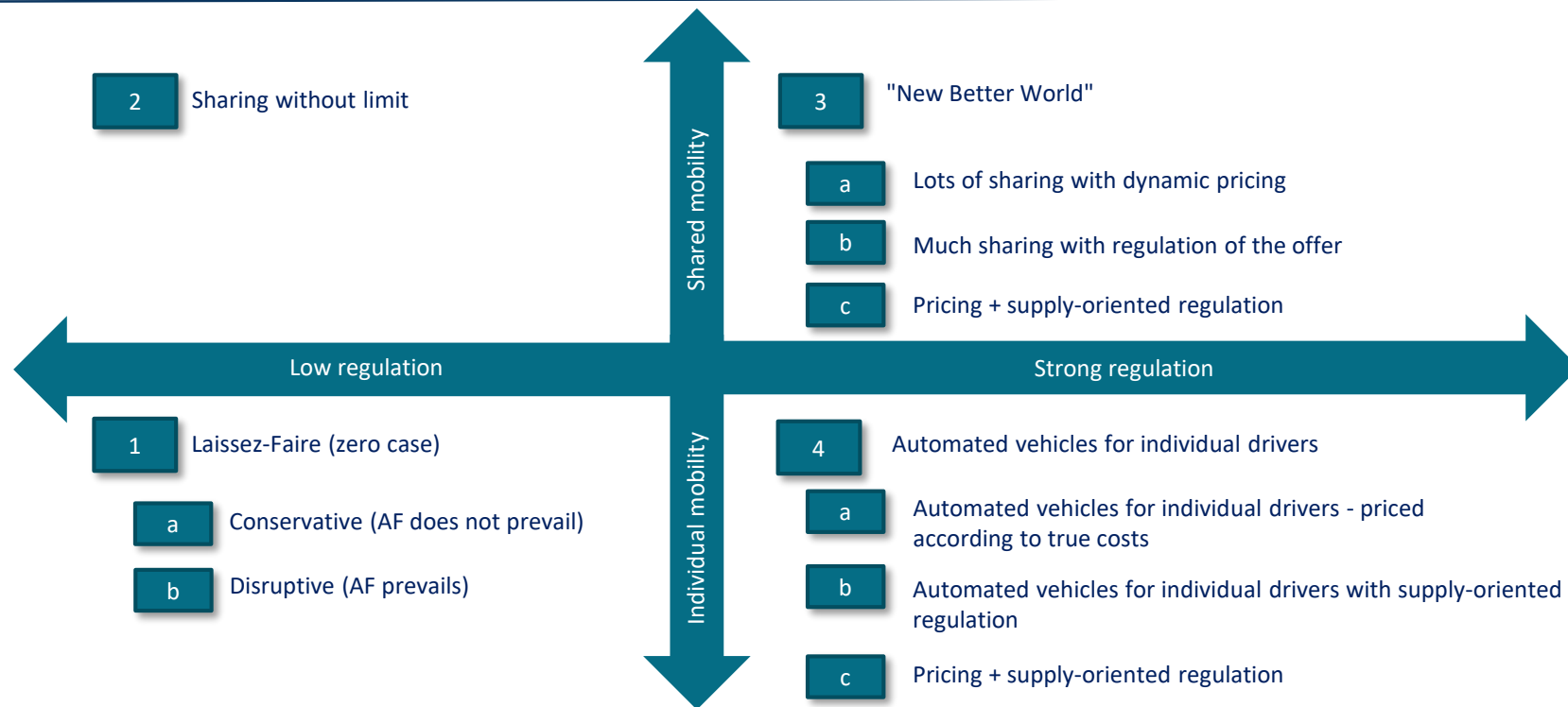
**Question:** "What does urban and environmentally compatible mobility in Munich look like in 2030/2040?"

**Assumption:** Level 5 vehicles can be used across the board

**Procedure :**



# SCENARIO FRAMEWORK



# SZENARIO 1 - LAISSEZ-FAIRE

## Low sharing preference & no regulation

Scenario 1 describes that the sharing preference and regulation will not change compared to 2019. Consequently, the status quo of settlement structures, spatial design and modal split is maintained.

	1 a - conservative	1b - disruptive
Difference to 2019	Autonomous vehicles are available but do not penetrate the market	Autonomous vehicles penetrate the market
Differences between 1 a and 1b	<ul style="list-style-type: none"> <li>The costs for automated vehicles are so high that private individuals can only afford them in individual cases.</li> <li>There are major reservations about the automated offers.</li> <li>Automated vehicles are predominantly only used in fleet operations by commercial mobility providers.</li> </ul>	<ul style="list-style-type: none"> <li>Private individuals buy autonomous vehicles and use them as their preferred means of transport.</li> <li>Empty driving increases traffic problems.</li> </ul>
Similarities between scenarios 1a and 1b	<ul style="list-style-type: none"> <li>The municipalities and the legislator neither influence the offers, nor will the infrastructure be significantly expanded in comparison to 2019.</li> <li>Due to the high preference for individual mobility, the private car remains the preferred means of transport.</li> <li>Automated mobility services focus on inner-city and economically viable areas; due to the preference for individual transport and low demand, prices for automated ODM services are high.</li> </ul>	

## SCENARIO 2 - SHARING WITHOUT LIMIT

---

### **High Sharing Acceptance & Low Regulation**

In society, there is a preference for sharing, which reduces the number of private cars and increases the use of automated vehicle pooling. Daily vehicle kilometers are increasing. The large variety of offers due to the free market access to a subjective improvement but also to qualitative limitations of the overall transport system. Public transport remains in high demand due to cost and time advantages.

### **Differences to 2019:**

High number of automated sharing and pooling offers and great willingness to use due to convenience and service.

### **Characteristics of the scenario:**

- No networking among the providers or integration into the public transport tariff due to lack of specifications by the municipalities.
- The public authority does not influence the market, but intervenes 'only' in matters of vehicle safety.
- Only a few automated vehicles are privately owned, as the acquisition costs are high.
- The rural area remains largely unplayed, as the responsible authority does not initiate the expansion of the required infrastructure.
- Specialized services are established for all user groups, but travel requests are only accepted or rejected for economic reasons.

## SCENARIO 3 - "NEW BETTER WORLD"

### High sharing preference & regulation

	3a - A lot of sharing with dynamic pricing	3b - A lot of sharing with regulation of the offer
Difference from 2019 and between scenarios 3a and 3b	<ul style="list-style-type: none"> <li>Dynamic pricing of road space using external effects to reduce noise and emissions while increasing the efficiency of the transport system.</li> <li>The inner-city space can be reused to improve the quality of life by reducing the amount of flowing and stationary traffic.</li> <li>Greater acceptance of sharing.</li> </ul>	<ul style="list-style-type: none"> <li>Market access for automated ODM offerings will be regulated and operators will be subject to various requirements through an offer regulation.</li> </ul>
Similarities between scenarios 3a and 3b	<ul style="list-style-type: none"> <li>High market penetration of privately-owned and fleet-operated automated vehicles.</li> <li>Ride-pooling offers are accepted and used by citizens.</li> <li>Reduced MIV and car ownership.</li> </ul>	

# SCENARIO 4 - AUTOMATED VEHICLES FOR INDIVIDUAL DRIVERS



## Low sharing preference & regulation

	4a - Automated vehicles for individual drivers - priced according to true costs	4b - Automated vehicles for individual drivers with supply-oriented regulation
Difference from 2019 and between scenarios 4a and 4b	<ul style="list-style-type: none"><li>• Negative effects of road traffic are priced dynamically</li><li>• Improvement of air quality with the same area distribution and the same number of vehicles (if dynamic pricing is high enough).</li><li>• Dynamic pricing creates advantages for ODM offers that are conducive to services of general interest; a broad range of offers is developing.</li><li>• Pooling for cost reasons.</li><li>• There is no networking between providers due to legal requirements (no mobility platform available).</li></ul>	<ul style="list-style-type: none"><li>• Market access for automated ODM offerings will be regulated and operators will be subject to various requirements.</li><li>• Zone access restriction for individual journeys.</li><li>• Specification of operating areas and operating qualities.</li><li>• Pooling for reasons of accessibility and zone restriction for MIVs.</li><li>• There is a central mobility platform and it is possible to book the entire route chain (including public transport).</li></ul>
Similarities between scenarios 4a and 4b	<ul style="list-style-type: none"><li>• Automated and networked driving is available in all categories of road and rail vehicles.</li><li>• Reduced MIV and car ownership.</li><li>• Ride-pooling offers are not wanted but used anyway.</li></ul>	



Next steps:  
Micro-/macro-simulation.