# Improvement of SUMP-Methodology for Climate Mitigation

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**Abstract.** The European transport sector is not keeping on track to reach the Paris Climate Goals. Transport's $CO_2$-emissions in the EU increased by one third during the past 30 years. This is diametrically opposed to the EU Commission's goal of reducing emissions by 55% in 2030 and completely decarbonizing transport by 2050. Since urban mobility accounts for 40% of all $CO_2$ emissions, the question arises on how the EU can achieve its goal to decarbonize these and further create 100 climate neutral cities by 2030. This paper analyses Sustainable Urban Mobility Plans (SUMP), promoted by the Commission to solve urban transport problems, and finds major deficits with regard to climate mitigation. The authors propose a reversal of the SUMP methodology by setting climate targets and backcasting in order to identify appropriate measures for climate protection.

**Keywords:** Sustainable Urban Mobility Planning SUMP · Climate Mitigation in Transport · Planning Methodology

## 1 Climate Targets in Transport Not Achieved

The European transport sector is not keeping on track to reach the Paris Climate Goals (Fig. 1). While most the other sectors have reduced their emissions, the transport sector increased the output of $CO_2$ by 33% since 1990. This is diametrically opposed to the EU Commission's new goals of reducing GHG emissions by 55% in 2030 and completely decarbonizing transport in 2050. This target implies that emissions from transport need to be curbed and, arithmetically, decreased annually by more than 10% to reach the 55% reduction goal until 2030. This is a tremendous task – particularly considering the past performance of the sector. The EU Commission (2020, p. 2) consequently demands, "we must shift the existing paradigm of incremental change to fundamental transformation".

The electrification of the cars' drive system is a necessary but not sufficient condition for a Paris-compatible path in the transport sector. Therefore, "traditional" transport planning, using the avoid-shift-improve approach, has to contribute significantly to climate mitigation.

The new TEN-T regulation (EU) 2024/1679 provides guidance on how climate goals can be achieved on the communal level. "All major cities along the TEN-T network will develop sustainable urban mobility plans (SUMPs) to promote zero and low-emission mobility".

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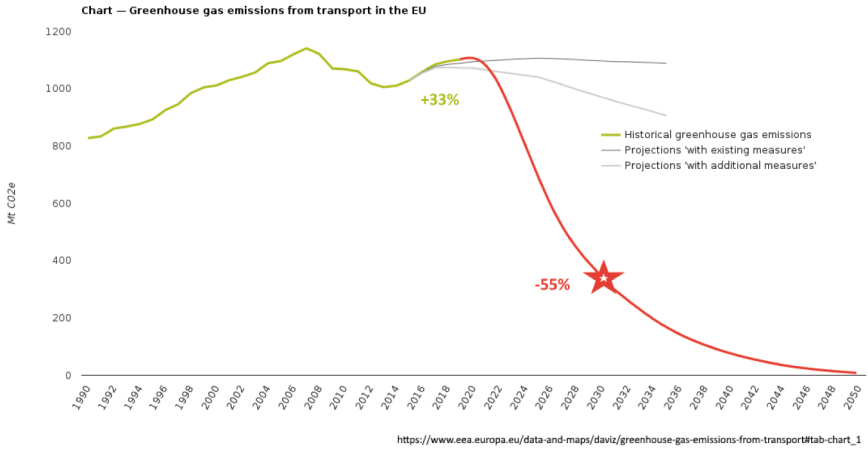


Own graph, data EEA

**Fig. 1.** Greenhouse gas emissions from transport in the EU 1990 -2050

## 2 Communal Practice: Muddling Through Instead of Goal-Oriented Planning

A special report by the European Court of Auditors (2020) criticizes that "there is no clear indication that cities are fundamentally changing their approaches. Although cities have put in place a range of initiatives to expand the quality and quantity of public transport, there has been no significant reduction in private car usage". The evaluation of the 2013 Urban Mobility Package (2021) states, "current trends in urban transport do not indicate a significant improvement in terms of modal share, traffic volume and greenhouse gas emissions".

To shed light on the communal practice, Sutter et al. (2022) have screened 190 Sustainable Urban Mobility Plans (SUMP). The results reveal major planning deficits:

- climate targets are often not compatible with the Paris Climate Goals and are insufficiently quantified or not quantified at all;
- planned transport interventions are often not examined regarding their climate impacts;
- long-term and strategic investment planning is often lacking;
- ex-post evaluation of target achievement and implementation of measures is foreseen in less than half of the SUMPs studied; and
- even if ambitious targets are in place, there is a lack of implementation. So far, ambitious climate change targets have not been achieved in almost all cases.

The political and administrative conditions in the municipalities imply that local transport planning is often not very systematic and geared towards solving short-term problems. Political cycles usually comprise four to five years, strategic long-term plans 10 to 20 years, while the Paris agreement is even focusing on 2050. In their totality, the planned measures are usually not suitable for bringing about substantial reductions in

traffic-related GHG emissions. Thus, the next sections develop an approach with a new paradigm and the reversion of the planning process.

## 3 The New Paradigm Requires the Reversal of the Planning Methodology

Mobility planning is usually determined by future transport demand that is estimated by trend extrapolation. Infrastructures are designed according to this future demand and environmental impacts are merely a byproduct of the process. Instead of influencing future transport demand, the plans generate traffic by supplying additional infrastructures. Thus, transport plans have rather the character of a self-fulfilling prophecy but not enabling a vision of a sustainable mobility.

In order to meet the challenges of climate change, a rethinking in municipal planning is needed. Instead of planning according to "where will we go?", the question is "where do we want to be in 20 years?". A number of cities[1] have already changed their planning philosophy across transport mode boundaries with evaluable objectives as part of an overarching urban and spatial development strategy. E.g., the German State of Baden-Württemberg has developed a SUMP-based planning methodology called Climate Mobility Plans[2]. The goal is to create incentives for communities to develop plans that meet the state's climate targets.

We call this methodology a "Climate SUMP". Focusing on climate mitigation does not mean that the existing SUMP methodology (Rupprecht Consult 2019) should be entirely altered. On the contrary, SUMPs tackle a large number of important issues, such as accessibility, pollution reduction, traffic safety and urban livability that are indispensable for sustainability. However, the achievement of climate targets should be a "conditio sine qua non" for the approval of the plan. Which means, if total future $CO_2$ emissions do not decline according to a pathway defined by the Paris goals, the whole plan is not considered as sustainable, even though it might include many positive aspects.

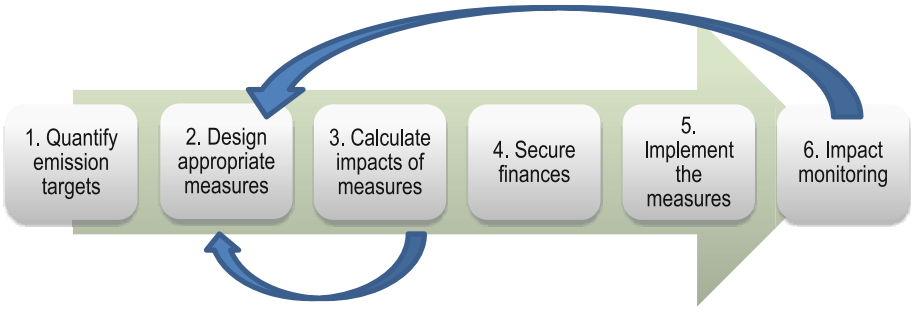


**Fig. 2.** Procedure for planning and implementation of a Climate SUMP

[1] Zurich (2023), Vienna (2023), Paris, Pontevedra, Umeå (2018).

[2] https://www.klimaschutz-bewegt.de/klimaschutzorientierte-verkehrsplanung/klimamobilitaetsplan/.

## 4 Methodology of Climate SUMPs

This new paradigm requires a reversal of planning procedures, from forecasting to backcasting, as depicted in Fig. 2. The backcasting approach (Gemeinsame Forschungsstelle 2008) sets future maximum emission levels as target values. This implies to cap future $CO_2$ emissions from transport, for example by setting an allowable annual $CO_2$ budget that is reduced over time and finally leads to decarbonization of the transport sector by 2050. The salient planning question is which measures can most efficiently reduce $CO_2$ emissions to the required level. Six planning steps may be identified:

**1. Quantification of emission targets**: The basis for a successful Climate SUMP is a political agreement on the climate goals for communal transport planning. The communal council agrees on quantitative targets for the transport sector, which may be based on the 55% goal of the European Commission or a national target. This refers to Phase 2, Step 4 in the official SUMP guidelines (Rupprecht Consult 2019, p.81ff).

**2. Design transport measures according to climate goals:** The planned transport interventions should focus on the achievement of the goals set in step 1.

**3. Calculation of the impacts** is imperative since a qualitative assessment of the effects is mostly not sufficient. If impacts are not compliant with the targets, measures need to be reformulated.

**4. Secure finances:** The planned transport measures need to be included in long-, medium- and short-term investment plans. Adequate financial plans should be developed that include budgeting of future households, credit uptake and donor financing. Good planning needs to assess financial sustainability of the system, including integration into existing programs and assurance of operations and infrastructure maintenance. Werlan and Rudolph (2019), Werlan et al. (2019) and Rupprecht Consult (2019) discuss the complex procedures of funding and financing of SUMPs.

**5. Implement the measures**. Here a political backlash might occur, since often political agreements taken before do not hold when it comes to implementation.

**6. Plan for monitoring:** Monitoring is not regularly included in many SUMPs, but may be important, especially if climate targets are not met. The cities of Vienna (Stadt Wien (2023), Zürich (Stadt Zürich 2023), Paris and Umeå (Umeå Kommun 2018) have already implemented a monitoring and feedback processes. These processes check at previously defined intervals whether the planned measures have been implemented and whether the measures have achieved climate targets. If the monitoring reveals that the climate targets have not been met, it is necessary to refine the previous plans in order to achieve the targets. In our approach, this implies a switchback to Step 2.

The SUMP revision process identified a number of important methodological issues that shall not be concealed to the reader since they are important for sustainability (Fig. 3).

## 5 How Can National and Regional Governments Support Climate SUMPs?

First, municipalities must be motivated to draw up a Climate SUMP. For this purpose, federal and state governments should create incentives for the implementation of Climate SUMPs through funding programs, which include not only contributions to planning

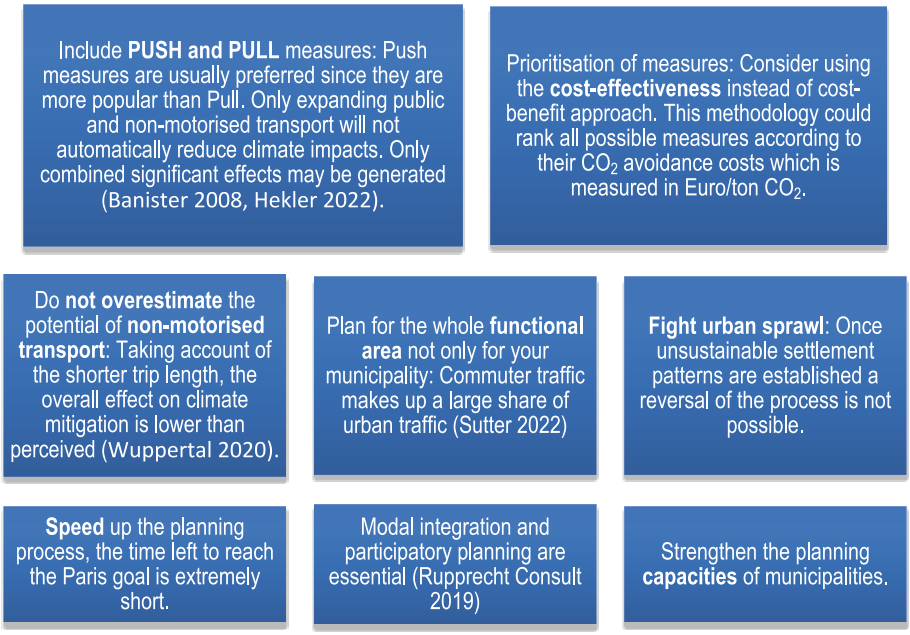


**Fig. 3.** Recommendations for SUMP improvement

costs, but also investments. Funding should be only provided if the plan proves that its impacts comply with climate targets. The achievement of climate targets may be quantified using the SUMI indicators. Additionally, monitoring of implementation and impacts is necessary. Municipalities need support and guidance for a moderated process to establish a Climate SUMP and implement it. For this purpose, sufficient funds and qualified personnel is necessary.

Federal governments should create a legal basis for Climate SUMPs including binding planning standards and determine how climate targets are defined for federal states and municipalities. This may be done by defining $CO_2$ budgets. Consequently, larger public subsidies for municipal investments should only be granted if a Climate SUMP is in place. This also means, for example, that no local bypass should be built without a climate mobility plan.

The EU may support this transition process, by funding support to the development of Climate SUMPs. This would at the same time ensure that the mobility planning is not an end in itself but fulfills the needs of the local community.

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