

# *A Key Factor in Vienna Becoming the “Greenest City” in 2020 was the Paradigm Shift in the Transport System 50 Years Earlier*

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## *Abstract*

Until the 1970s, the future of Vienna was planned as usual at that time with highways, large garages, subways to replace the annoying streetcars and without bicycle traffic. However, with the demolition of the Florianikirche in 1965, a landmark of the 5th district, in order to make more room for the car, an awareness arose among the population, of the threat to the city by this means of transport. This had consequences. When the motorway plans were stopped in 1972, a new traffic concept had to be worked out. The practical application of the principles elaborated there leads to a sustainable transport policy and to the reversal of trends in the choice of means of transport. Between 1993 and 2015, the share of car trips was reduced from 40% to 27% and the share of trips made by public transport was increased from 29% to 39%. This was prompted by citizen resistance to a city of freeways and by politicians who were willing to learn. Instead of plans for highways, the city is making plans to reclaim public space for nature. However, recent developments show that successes can lead to a relapse into old mistakes.

**Keywords:** citizen resistance, traffic trend reversal, system dynamics, urban greening, sustainability

## *1. Introduction*

The city of Vienna, now with a population of more than 1.9 million, ranked in the Mercer comparative study of the quality of life of cities in 2009 in first place among all the world cities studied and was able to defend this position until 2019, when the assessment ended [1]. The Economist ranked Vienna 1st in the world again in terms of quality of life in 2022 [2]. Vienna was named the Greenest City in the World in the new “The World’s 10 Greenest Cities 2020” [3] ranking. The ranking was compiled by the Canadian–American consulting agency Resonance. The Resonance

agency regularly produces the “World’s Best Cities Report”, on which “The World’s 10 Greenest Cities of 2020” ranking is based. For the “Greenest Cities” ranking, more than 100 cities worldwide were compared according to criteria such as the proportion of parks and public green spaces in the city, the use of renewable energies, air quality, public transport services, pedestrian-friendly routes and the range of markets with local products. Vienna scored high in the city comparison with “fresh ideas on mobility and public parks” and as one of the few metropolises with a national park within the city limits. A key criterion for the top ranking is the well-developed public transport network: “Vienna is the European benchmark for public transport,” the ranking’s authors note. “Almost half of the city’s population owns an annual pass for the public transport system—and uses it intensively.” More than half a century ago, these were neither the city’s political goals nor its urban planning visions for the future. This good rating is by no means the result of strategic urban planning, as is sometimes portrayed, but rather the result of events that took place between 1965 and 1980, which are briefly summarized here.

In 1970, the vision of Vienna’s transportation future was founded on highways and parking garages and cars as the main mode of transportation (see Figure 1). After the Second World War, Vienna, like most cities in Europe, pursued the transportation policy adopted by the United States of transforming the city to be car-friendly [4]. Streetcar lines were abandoned [5], even a parish church, a landmark of the fifth Viennese district in the Wiedner Hauptstraße, the Florianikirche (see Figure 2), also called Rauchfangkehrerkirche, was demolished despite the wave of protests from the population with over 13,000 signatures for “traffic reasons” to make way for private car traffic [6].



*Figure 1.* Planned urban highways 1971.

Greenery was transformed into gray of concrete and asphalt surfaces, trees were removed to create car parking spaces.

Even at the end of the 1960s, there were doubts about the justification for public transport in the street space, at least in the densely built-up districts. In the



Figure 2. Florianikirche [6] shortly before its demolition in 1965. Fritz Wotruba's Neue Florianikirche is on the left in the picture.

long term, the subway was the main option there. Although as early as 1970, people wanted to save the city from the expected flood of car traffic, “interception” at the edge of the city and parking problems were central issues even then. “The individual traffic flowing into Vienna, especially commuter traffic, should be “intercepted” as far as possible on the outskirts of the city or in front of it” [7]. Politicians and experts, however, still assume demand-oriented traffic planning, i.e. the assumption of accepting the momentum of automobile traffic as a default.

## 2. Streetcars as a disruptive factor

Public transport should go underground and passengers should go on buses. “Trams will not be able to be replaced in Vienna in the long term. However, the main goal of traffic development must be its elimination, especially in the densely built-up area or within the Gürtel, by subway, suburban railroad and buses.” Therefore, the streetcars on the Ring were to be abandoned with the opening of the U2. Regarding the future of the suburban railroads, at that time the Badner Lokalbahn, which runs on streetcar tracks in Vienna, one finds the formulation: “The running on streetcar tracks in the densely built-up area would have to be abandoned in the short term, at the latest in the medium term.” At that time, the streetcars were so severely obstructed by car traffic that during traffic peaks “the travel speed drops to pedestrian speeds (4 to 5 km/h) and below in extreme cases. Because of the heavy obstruction by other means of transport, the theoretically achievable capacity, namely 16,000 seats per hour and direction, cannot be reached either.” In the traffic concept 1970 one finds admittedly the comparison of the space requirement of passenger car:autobus:subway with 203:27:9 m width, in order to transport 40,000 persons h<sup>-1</sup> and direction. In practice, however, this had hardly any effect. The idea of a car-oriented transport system imported to Europe from the USA as the victorious power was too much of a pretence.



Figure 3. Pictures from downtown Vienna (1970) Schwedenplatz and Karlsplatz. Source: Archives of the City of Vienna.

How little one believed in the future of the streetcars is expressed in the undergrounding of the Zweierlinie, which is described today as follows: “The unfortunate routing of the Zweierlinien through a 1.8 km long tunnel between Secession and City Hall in the “Lastenstraße” began on October 8, 1966 when Vienna’s first under-pavement streetcar (U-Strab) was opened. From this time on, a detour of the ring lines (all streetcars that run at least a part of the ring are called this way) or radial lines between Schottenring and Karlsplatz (see Figure 3) was no longer possible, because all radial lines leading to or away from the ring now had no track connection to the two-way line. However, it is precisely the frequent events on this section of the line that mean that there is no longer any rail-bound public transport on the surface on the Ring section in question. As a result, the Zweierlinie has been deprived of its important function as a detour route for ring-related streetcar traffic” [8]. There was no priority given to the streetcar at the intersection’s traffic signals at that time.

The bicycle as an urban means of transport does not appear at all in this “Traffic Concept for Vienna” [7] from 1970. In 1954, it was considered unlikely that the level of motorization would exceed 62 passenger cars per 1000 inhabitants. The city councilor in charge, Kurt Heller, expressed this at the opening of the Gürtel underpass with the words “The time of full motorization is behind us”. Science did not know any better at the time. For Germany, full motorization was calculated in the 1954 forecast (Zimmermann) at 62.4 passenger cars/1000 inhabitants, and a year later for Austria at 61.7 passenger cars/1000 inhabitants. Reality exceeded these forecasts so convincingly that the thinking and actions of experts and politicians are still influenced by them today.

In 1970, the parking of passenger cars still followed the demand principle and the need for the resident population, employees, tourists and visitors is dealt with

in detail. The solution is seen in the provision of even more parking spaces in the city, albeit underground. Section 2 of the Reichsgaragenordnung [9] was also adopted by socialist Vienna and is still valid today, even if its demands cannot be implemented in the densely built-up urban area. However, public space is primarily made available to cars. The reciprocal relationship to the other modes of transport was still missing. The sectoral view dominated. The consequences that the cars parked in the garages then appear on the surface and lead to the obstructions with which public transport is devalued in its functions did not seem to be considered [10]. What was written in the preamble of the Reichsgaragenordnung of the Third Reich of April 1, 1939, “The promotion of motorization...is the goal” [11] determined the thinking and actions of those involved in urban and transportation planning.

### 3. *Subway and pedestrian zone in the city center*

In connection with the construction of the subway, the city planning department (MA 18) wanted to design Stephansplatz and the adjoining shopping streets as “pedestrian areas” in order to limit through traffic [12, p. 49].<sup>1</sup> At that time, the goal was not the pedestrian zone that was later established, but a temporary restriction of through traffic with secured access for deliveries. Senate Councillor Engelberger, then head of the city planning department, asked me to work out the basics for this [13]. The main question around which the discussions in urban planning revolved at that time was; where do the cars go when they can no longer drive through the city center? At that time, about 120,000 cars drove through downtown every day.

Between planning and implementation, however, there was still the problem of convincing the citizens and, above all, the business people of the advantages of this solution. These had organized themselves against the project and strengthened with professors of the University of Vienna, in order to repel this attack on their economic existence by the traffic organization compiled and represented by me. What is laconically described in the reports as “1974/1975: First car-free pedestrian zone implemented in historic old town (first district)” was the result of an intensive process lasting several years, which was concerned with the overall organization of the center of Vienna and not just with a few pedestrian streets. Variants that did not seem reasonable to the politicians were unfortunately eliminated, such as the abandonment of the half of the roadway of the parallel Zweierline [13], leading parallel to the Ring, in order to reduce the car traffic of the inner districts. The reason was the design of the surface planned and built only eight years ago with the transfer of the streetcars in the tunnel [12].<sup>2</sup> As a partner in this phase, the city of Vienna had commissioned the architect Viktor Gruen, who had returned from the USA, with the urban planning concept of a car-free inner city [14]. His images of pedestrian-filled streets, disseminated through the media, were helpful in this phase, even though he was not actively involved in the traffic planning and engineering issues.

<sup>1</sup>A plan that goes back to Roland Rainer’s General Transport Plan, which demanded absolute priority for pedestrians and buses in the city center, and the elimination of through traffic. “Adapt automobile traffic to the city, not sacrifice the old town to traffic.”

<sup>2</sup>A consequence of Rainer’s 1958 General Transportation Plan, which rejected subways and recommended lowering the streetcars.

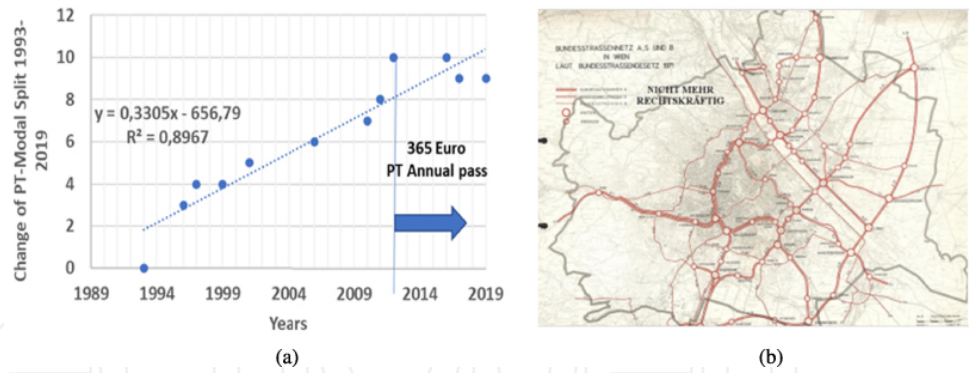


Figure 4. Poster of the “Krone” against the highway projects. Photo: Gruen, archive B. Lötsch “Krone”.

#### 4. The cause of the turnaround: citizen resistance and political learning

In 1970, increasing resistance began to form among the population and young environmental and transportation scientists against the planned freeways in the city, which the project designers tried to counter by renaming them “high-performance roads.” A ploy that did not succeed at the time and intensified the resistance, which was also supported by the influential Kronenzeitung [15].

Slavik caused a great stir in the media on September 2, 1972, when he said at the Alpbach Forum that he was an “absolute opponent of both the Belt and the Danube Canal Motorways” (the term “high-capacity roads” was used [16]), thus de facto burying the relevant plans of the 1960s [17]. This decision, which was also taken in the municipal council,<sup>3</sup> can be described as the starting point for a change of direction in Vienna’s transportation policy. Parts of the freeways, such as the Brigittenau Bridge or the Gürtel exit, were already under construction at that time.

Initially, work continued according to the proposals of Gruen (see Figure 4), who suggested a “pedestrian protection area” for the inner 1st district, surrounded by the Ringstrasse and branching off from its underground garages for cars. Among other things, an underground garage under Heldenplatz.

#### 5. 5000 cars under the Heldenplatz

To replace the space reclaimed from car traffic, the city planned a large garage with 5000 parking spaces under the historic Heldenplatz. For safety reasons, public garages must be able to be evacuated within certain specified times, which requires proof of performance for the entrances and exits. The location of the entrance and exit ramps was specified by the city planning department: The routes of the

<sup>3</sup>Federal Minister Rudolf Edlinger, then a member of the municipal council “We have recognized that we must not impose these burdens from car traffic on the population.”

streetcars on the ring road. According to the concept—and the models behind it—these were no longer necessary after the opening of the U2 subway line.

<sup>4</sup>Since, for political reasons, a contract could not be awarded in which the decision documents could possibly be tampered with, the contract had to be carried out under the title “Reorganization of public transport after the opening of the U2.”

However, the (insubordinate<sup>4</sup>) check in the model calculation showed that the surrounding road network cannot cope with the peak loads of this garage and the garage will be built in this form, but the operation will lead to problems in the surrounding area. The project documents also included the models showing that the loop lines would be made redundant by the subway. However, this model was not behaviorally sensitive, meaning that passengers were not allowed to react to changes in their paths such as transfers. The recalculations with the behavior-sensitive models showed that the ring lines are indispensable for the future of public transport in Vienna and should be served by existing and new diameter lines instead of being abandoned. With these results it was possible to convince the city planning to keep the ring lines even after the opening of the U2. For Wiener Linien, they are now among the most heavily used “trunk lines” in the streetcar network [18]. In 2008, lines D and J as well as 1 and 2 were connected to form cross-city lines [19]. Decades later, the passenger increase of over 30% confirmed the results of the work 30 years earlier. One can imagine the consequences that sticking to the previous “decision bases” would have had for the entire public transport system in Vienna. However, this work also broke the inherently unjustifiable principle of “discontinuing streetcars and replacing them with subways and buses.”

## *6. The observatory park in Vienna, a turning point in the perception of green space*

The term of office of this mayor also saw a decisive turning point in green space policy: In the observatory park, a 58,891 m<sup>2</sup> area around the Vienna University Observatory in the so-called cottage quarter of Währing, the new building of the zoological institute of the university was to be constructed in the early 1970s, which would have meant a reduction of the green space by 3615 m<sup>2</sup>. A citizens’ initiative of local residents opposed the construction project and demanded that the park be opened to the public. The referendum initiated by the mayor—a novelty for Vienna, in which he and his party, sided with those interested in the construction—resulted in a defeat, because a majority of 57.4% rejected the construction [20]. The mayor had to resign and nature became a politically sensitive issue in Vienna.

## *7. A new way to obtain the basics for urban- and transport planning*

Initially, the city administration no longer had a valid traffic concept, and Slavik’s successor, Mayor Gratz, dared to attempt to have scientific bases for the 1980 traffic

concept developed by experts who could be assumed not to be guided by personal economic interests in the process. At that time, this was a principle of the city in order to prevent solutions from being proposed that would serve the future order situation of those working on projects rather than the city and its population. The foreword of the publisher, the Municipal Department 18 to the volume *Cycling*: “*The changed conditions in the transport system and the rapidly increasing demands on it made the preparation of a transport concept necessary. This can be seen as a continuation of the 1970 Transport Concept and the 1972 Urban Development Enquete, as well as one of the 13 chapters of the Urban Development Plan. However, the traffic concept differs from the other chapters in that, beyond the objectives of the other chapters, it also aimed to propose short- and medium-term measures to cope with the partly critical conditions in Vienna’s traffic system. In addition, it was necessary to develop medium- and long-term objectives from the point of view of the controlled spatial development of Vienna.*”

*In order to ensure that the results of the traffic concept are consistent with the objectives of the urban development plan, it was necessary to address the objectives of the urban development plan in a mutually influential opinion-forming process and to incorporate them into the traffic concept as a guiding principle.*

*Therefore, in addition to the working committee on the urban development plan, a working group on the traffic concept was formed, which was headed by MA 18 and included representatives of the Austrian Federal Railways, the Federal Ministry of Transport, the Federal Ministry of Construction and Technology and the managing director of the Transport Association Organization Company as well as the responsible departments of the City of Vienna (MA 4, MA 18, MA 22, MA 28, MA 38, MA 39, MA 46 and the WVB).*

*Professors Raimund Dorfwirth, Peter Faller, Hermann Knoflachner and Rupert Schickl were commissioned as independent experts. They worked on the respective subject areas with the responsible departments in a “small working group” and submitted proposals for measures based on foreseeable development trends from the point of view of the expert. The traffic-technical processing of the network variants (traffic reallocations) for the public traffic were accomplished in the context of a current order by Univ. Prof. Dipl. Ing. Dr. E. Engel.*

*The measures proposed by the consultants served as an essential basis for the decisions on the weighting and ranking of the bundles of measures made in Part B of the traffic concept Vienna, December 1980” [21].*

My team had to work on pedestrian traffic, stationary traffic (parking), traffic light signal systems, acceleration of streetcars and traffic safety. Since I was lacking in bicycle traffic, I went to the responsible city councilor to draw his attention to this deficiency and received the following answer: “What do you want with bicycle traffic, I had to go from Vienna to Prague by bicycle during the war,



that was enough for me”. And this also corresponded to the general situation in Vienna at that time. Through the support of the vice-president of the ARBÖ, Ing. Hans Hobl [22], it came then nevertheless still to the treatment of this important means of transport, as mentioned above. The work is documented in several volumes [23].

Although the objective advantages of public transport were well known among experts, there was a lack of scientific and empirically sound bases for the implementation of the necessary measures across all modes of transport and, consequently, of the means to effectively oppose the dynamics of individual motorization and its lobbyists. Over a period of four years, the available literature was collected and analyzed for the topics, local and international data was evaluated, and the person rather than the passenger car unit was introduced as a common reference unit that allows objective comparability. On these bases, some measures were already implemented during the processing. The share of pedestrians, stated at that time as 35%, still underestimates its central importance today, because it does not count all access, transfer and departure routes to public transport, but also to parking lots in public spaces. If these routes, which are important for the design of the city and the transport system, are taken into account, the proportion of pedestrians in the public street space is over 70% [24]. And pedestrians have completely different demands on the design of public spaces. However, this was not incorporated into traffic organization until many years later.

The principle for the priority of the means of transport was decisive for the sustainable traffic organization: “With regard to the priority of the individual means of transport, only the performance indicated in passenger trips per time unit is valid as a measure. The system of measuring passenger car units per unit of time should be abandoned as a matter of principle, since it does not allow adequate consideration of local public transport. *Priority is to be given to the mode of transport that has or is to have the greatest capacity in each case* [25].

Instead of planning to adapt to the inherent dynamics of automobile traffic, goals should be set that not only correspond to operational and economic conditions, but must also fulfill ecological, urban planning and environmental conditions. Here, a fundamental break is made with the then—and in many cases still today—prevailing practice of traffic engineering work, but also with the common teaching in the relevant disciplines. With this work, public transport was provided with a factual and scientifically sound basis that has led to a change in thinking and action to this day.

Thus, on the basis of quantitative indicators, automobile traffic was deprived of the priority it had previously enjoyed in the organization of public road space. In line with this, measures were also proposed to clear the streets of parked vehicles by means of a general parking fee, and to place cars in garages at a distance not less than that to the public transport stop [26]. The report on stationary traffic still has

contradictions in its conclusions due to the knowledge of the dynamics between parking supply and population shift at that time. However, the adoption of charging for parking cars in public spaces and the reclamation of spaces for uses compatible with the city and the recommendations for reorganizing truck traffic and commercial traffic were important.

For bicycle traffic, at that time not an issue of transport policy in Vienna, a network of more than 600 km was proposed for the first phase as a result of bicycle surveys (bicycle planning can only be done if one cycles) and analysis of topographic and structural conditions, etc. In 1975, there were only 11 km of so-called “memorial bike paths” in Vienna, (paths that only existed in the files anymore) and as it turned out, were either already taken over by nature or used as parking lots. The created documents, worked out in detail, for the initiation of measures that would accompany the turning point towards the path to sustainable transport in Vienna described by Bühler (2019).

## *8. The long path to practical implementation*

Already in 1978, finished plans for traffic calming measures for the inner districts 3 to 9 were available to redesign the street spaces according to the above principles [27]. Measures that were contrary to decades of habits, expectations and practice, i.e. taking away space from the car in order to plant trees instead of providing it with more space than before. For the administration and politics a daring step, as it turned out. When asked where to start implementation, we were advised to present the measures in the 3rd district, with a solid socialist majority at the time. The presentation of the measures in the district committee was met with a massive rejection at the time. The implementation of the paradigm shift needed strong nerves, humor and a lot of patience and was a risk for project-dependent freelance offices.

## *9. The exceptional situation in Vienna in the 1970s*

The situation as it existed in Vienna between 1972 and 1980, where administration and politics were open to new ways and willing to implement scientific findings against the prevailing world of thought at that time, was and remained an exception, but with an effect that lasted for decades. For the success that can then be reported only occurs under certain conditions.

One can describe this with the formula  $\text{success} = \text{expertise} \times \text{administration} \times \text{politics}$  or  $1 = 1 \times 1 \times 1$ . However, this formula must fulfill the following conditions:

- First-class representatives must act in all three areas, both professionally and morally.
- They must be independent.

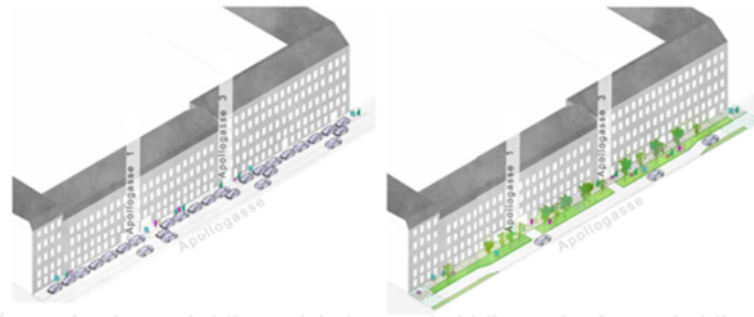


Figure 5. The highways planned in 1971 with the access to the west are taken out of the network [28].

- There must be sustainable trust on and between all sides.
- The administration must be in a position to implement the measures in the best possible way for the benefit of the city, its residents and economy within the framework of the legal and financial constraints.
- Politicians must have the courage to allow this new approach and support it through laws and regulations—if necessary.

The fact that this was possible in Vienna for a long time is due to the actors of the time and a stable political majority of the Social Democrats. One of the decisive measures of this scientifically based paradigm shift in transportation was the abandonment of further planning and construction of freeways in the city. The highways planned in 1971 (see Figure 5) were gradually removed from the plans starting in 1983, as can be seen in the following network from 1996.

The city was able to maintain both the quality of its urban structures along these routes because of the foundations that were developed. Instead of the freeways, subways now serve these areas.

A separate resort was set up in the magistrate's department for bicycle traffic, the monitoring of delivery times in the pedestrian zones of the inner city was improved, a ban on nighttime truck driving for the entire city was implemented together with the Vienna Chamber of Commerce [29], and parking management [30] was introduced for the 1st district in 1993, to mention just a few of the measures from the consultants' reports that were "set in motion." However, these had an impact beyond his tenure.

## 10. A new planning method [31]

This was developed in connection with flood protection for the city of Vienna. "The competition on the Danube basin (1972) is the first and successful example of a new, dynamic and process-oriented planning. It concerned one of the most complex large areas of Vienna, in which urban expansion had reached a new dimension. With it,



Figure 6. The 21 km long Danube Island separates the main stream from the so-called “New Danube” on the right [32].

however, the planning requirements had also changed. The initial engineering project for the expansion of the Viennese flood protection system on the Danube was linked to the urban planning goal of bringing “Vienna to the Danube”. In an iterative planning process, the experts of the different fields of knowledge, the representatives of the administration, the authorities and political parties as well as those affected by the planning—the population, district and interest groups, and users. Interested parties—were brought to the table in recurring discussions (“couplings”) and thus jointly developed planning and projects.”

The project organization operated from 1974 to 1977. A Danube Advisory Council was appointed from 1977 to 1979 to ensure implementation of the recommendations. Overall, the innovative planning process transformed an initially technocratically conceived “spillway” into a new natural and recreational space of citywide significance. In 1981, the 21-kilometer-long Danube Island (see Figure 6) was partially opened as a recreational area, and in 1983 it was declared a protected recreational area. Parts of the entire area—between Floridsdorfer Brücke and Steinspornbrücke—were designated as the “Wald- und Wiesengürtel (SWW) Protected Area”. An important step in sustainable urban development, the island became not only the most popular recreation area for the Viennese, but also an unforgettable experience for visitors to Vienna. The Danube Island can be reached from the city center in just a few minutes by the U1 and U6 subway lines.

The common feature of this so-called “new planning method” with the planning of traffic development is that in both, the citizens of the city of Vienna together with representatives of science and administration could decisively influence the “planning from above”. Resistance from the population, who want to protect their city from the interests of investors or corporations, should always be a reason not only for the administration and politicians to examine and, if necessary, revise the usually already



Figure 7. Accumulation of high-rise buildings around the subway station on the left bank of the Danube.

outdated ideas of traditional experts. Both in transport and green space planning, this period was decisive for the development of the city in the next three decades.

### 11. External and internal resistance

With scientific findings and its empirical evidence, it cannot be assumed, even in the “pure sciences” such as physics, that it will be accepted by those not involved in the work [33].<sup>5</sup> This is even less the case in areas where the findings influence massive economic interests. Lobbies of the powerful car-, energy-, construction-, cost- and profit-interested corporations that wanted to preserve and expand the automatisms of traditional traffic planning try to influence each of the three areas, the audit reports from audit offices show. Vienna is no exception. The stopping of the freeways at the Gürtel in 1972 was no reason for the construction corporations not to look for ways and means to get lucrative contracts after all. If a freeway over the Gürtel was not possible, a traffic problem was created in the media with experts who conformed to the project in order to push through a tunnel solution, which fortunately did not succeed [34].

The construction of the Danube Island could have been prevented, but the investors on both banks of the Danube around the subway stations with high-rise projects (see Figure 7) [35], not planned for Vienna, through which the skyline of the city was fundamentally changed according to the international scheme of capitalist urban planning [36].

A positive example is the repair of the failed 1996 redesign of Mariahilferstraße through the commitment of the Greens in coalition with the Social Democrats in 2016 (see Figure 8).

Today, also under the political pressure of the districts governed by the Greens, measures for greening the city and unsealing asphalted and concreted areas are

<sup>5</sup>Max Planck “A new scientific truth does not tend to establish itself in such a way that its opponents are convinced and declare themselves to have been taught, but rather in such a way that its opponents gradually die out and that the rising generation is made familiar with the truth from the outset”.

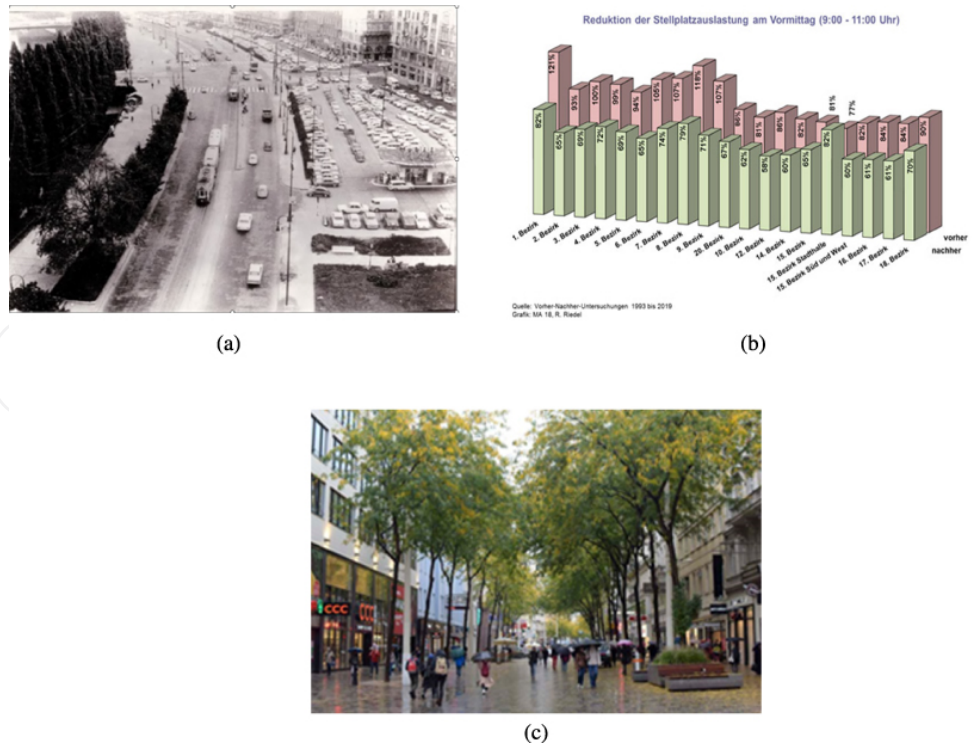


Figure 8. Mariahilferstraße before 1990, after 1996 and after 2016 (Photos <https://www.wienschauen.at/mariahilfer-strasse-die-wiederentdeckung-der-fuesse-verkehr> and <https://www.derstandard.at/story/2000045493786/die-transformation-der-mariahilfer-strasse>).

implemented more easily, because not only in the transport sector, but above all among the population, the knowledge for sustainable technologies and reconsideration of the ecological integration of the city, is becoming more and more prevalent. Thus, Wiener Linien has successfully launched a comprehensive program for sustainable technologies and greening of its entire facilities [37]. Research for the future, settlement of bees, 100% green electricity, electromobility, greening for cooling, solar energy, maintenance plans for each individual area: protective measures for biodiversity and the public transport network is to become a network of biodiversity.

## 12. Endangering the outstanding position of the city of Vienna

The freeway bypass of Vienna, which dates back to the 3rd Reich, was deleted from the Federal Roads Act [38] in 1983 as a consequence of the new concept and did not reappear until 2003, as the worst rated alternative of the project options available for it [39]. A related study commissioned by Shell on “Sustainable Transport

Development in the Vienna area” [40] would, as the review by a system-related impact analysis showed [41], not make the desired goals of the city achievable, in contrast to the continuation and intensification of the measures already initiated in Vienna from the 1980 concept. Above all, the Danube Floodplains National Park [42] project jeopardizes the “Green Lung” of the city, where the National Park was the unique selling point of Vienna in the international ranking 2020, which allowed it to achieve this top position. As early as 2004, it was apparent that the decades-long path in a sustainable direction was in jeopardy. This is also evidenced by excerpts from the report “Supply creates demand—intelligent mobility also in Vienna?” by DI Georg Kotyza, the head of department in MA18 for many years and a contributor to the urban development plans in 1984 and 1994. It shows the inside view, the perception and evaluation of change of the political boundary conditions in the course of this period of a leading civil servant.

*“In the case of the new traffic concept for Vienna, under the zeitgeisty title “Masterplan Verkehr”, the old dilemma of Viennese traffic planning becomes apparent, namely the gap between theory and practice, between aspiration and reality, which has already led in the past to ambitious and progressive planning being thrown overboard without hesitation when implemented in the form of construction projects.”*

*“Previously, this dilemma only became apparent at a later point in time, when the traffic concepts had long since been forgotten; this time, the contradiction between objectives and expansion measures is already an elementary part of the concept. From the 1994 traffic concept, the commitment to the priority of environmentally friendly modes of transport was taken over, as it has also been a stereotypical part of every Sunday speech on traffic policy for decades.”*

*“One would now expect a significant boost in investment in public transport and corresponding restraint in road construction. The opposite is the case: although three extensions to the outskirts of the city are included for the next expansion phase of the subway (U1 Rothneusiedl, U2 Flugfeld Aspern, U6 Stammersdorf), they can only be justified with a massive and undesirable urban expansion push. There are no statements on priorities, they are reserved for a future new urban development plan.”*

*“If one now analyzes the expansion measures in the road network, one believes oneself transported back to the sixties and seventies, when the car-friendly expansion of the city was elevated to the guiding principle of traffic policy. On several pages, the projects are listed in detail by developer (Asfinag or state) and by start of construction. Here, contrary to all the introductory incantations, no expense is spared in expanding Vienna’s road*

*network so generously that no Viennese citizen has to do without his or her free ride. (...) The generous freeway and expressway network will be supplemented by an abundance of expansion measures in the rest of the high-ranking road network, whereby—again in contrast to the introductory incantations—additional incentives for car use but also for urban development will take place away from the areas that are well accessible by public transport.”*

*“How is the share of car traffic to be reduced if, at the same time, a tremendous surge in investment drives the expansion of the road network? (...) How is the additional supply of car-friendly locations—on greenfield sites—supposed to stop urban sprawl? (...) In response to these contradictions, there is only the terse reference that the “risk of peripheral migration and urban sprawl must be counteracted by spatial planning policy measures”. Once again, the Viennese urban planning builds up the illusion that one can counteract with measures of spatial planning, i.e. with the instruments of zoning and development plan, and prevent conversions of grassland into building land. The experiences of the last decades have shown often enough that this life lie of spatial planning cannot be sustained in the face of corresponding economic pressure, whose motor are individual interests, because time and again the planning determinations committed to the common good were overrun by the real political-economic forces” [43].*

The analyses of the current urban development projects, such as the heavily promoted Urban Lakeside, lead to the conclusion that the expectations attached to them cannot be fulfilled with the planned structures. However, a more in-depth presentation would go beyond the scope of this article.

### *13. The decisive approach for the success of public transport: parking space restrictions*

Short-term parking zones had already existed in Vienna since 1959, and from 1975 they were also subject to charges. The recommendation to rid public street space of parked vehicles and to introduce a general parking fee was not put into practice until 14 years later. Implementation was gradual, starting with the city center in 1993, creating parking pressure on surrounding districts, which then had to follow suit by extending the general parking fee. In two-year steps, the general parking fee was thus extended further and further until finally, on March 1, 2022, the entire public street space in all Viennese districts was declared a chargeable short-term parking zone—as a contribution to climate protection. The foundation for this had already been laid 43 years earlier in the scientific fundamentals.



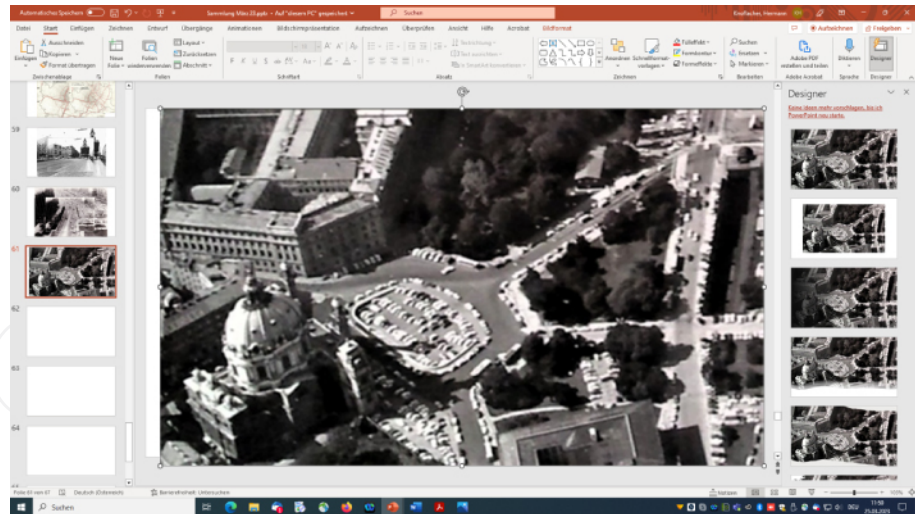


Figure 9. Change in modal split shares in Vienna 1993–2019.

An analysis, on the other hand, confirms the scientific expectations of paid parking, but not the effect of the reduced-price annual pass.

However, the question of how the 365-euro annual pass affects the modal split and thus the climate impact, which is estimated to be high by experts and politicians, still needs to be investigated. This financial “structural change”, a 19% price reduction of the annual pass, increased the number of owners by about 80%, but had no impact on the modal split.

#### 14. Green space design as a means of transport policy (see Figure 9)

An untapped opportunity, for nearly three decades, has been the effect of metered parking on parking utilization. Metered parking frees up more than 30% of parking spaces in public spaces and can easily be used to increase green space through tree planting in a climate-responsive manner (see Figure 10) [44].

For this, along with the preparation of the fee obligation, the re-planning of the public spaces in the sense of the environmental goals must be carried out in order to use the optimal time for the constructional measures immediately after the introduction. If this is not done, it will be more difficult to reclaim the spaces for green areas. In order to implement the measures in the master plan for greening [45] and the “Vienna Urban Heat Islands Strategic Plan” [46], it is necessary to intervene in the current distribution of traffic areas.

If adaptation to climate change is to be achieved, a city’s main networks of green zones (see Figures 11 and 12) and open space connections must be given absolute priority over the climate-damaging former networks for automobile traffic.



Figure 10. Effects of parking space management.



Figure 11. The main network of priority open space and green connections [47].

The justified demand of a car-free city also coincides with the necessary transformation of cities from the need for climate adaptation.

### 15. Conclusion

Although in most cities transport planning is integrated in the urban planning unit, with the increasing motorization of society, it determined the thinking and actions of those responsible for planning and thus the design of the city and its public spaces. While urban development concepts addressed all modes of transportation, investments in automobile transportation infrastructure dominated. Citizen resistance arose in Vienna as a reaction to these interventions, leading to a halt to



Figure 12. Transformation of street spaces into green zones. (Master Plan Green—Streetscape 2020, pp. 35 and 38.)

highway planning and construction in 1972 and necessitating a reworking of the basis for the 1980 transportation concept. The four years between 1975 and 1979 were not about the “way to a sustainable traffic system”. The defense of existing parks against building by the authorities in 1972 already showed a trend reversal against the destruction of nature in Vienna at that time. Sustainability was not yet an issue at that time. It was about the fundamentals of conventional traffic planning, which were recognized as wrong, and their consequences and the preservation of the quality of life in the city districts.

Today, this is considered a paradigm shift in transportation. With the knowledge of the system behavior it was now possible to take target-oriented programs and measures. The analysis shows, however, not only how long it takes until verifiable effects appear in the essential indicators such as the modal split, but also that a coordinated combination of measures to push back car traffic and to expand the offers for public transport, pedestrians and bicycle traffic and the spaces for nature is needed in order to stay on the path of sustainable traffic development. In this context, it was possible to complement and improve the bases developed for the 1980 transport concept with further experience and analysis, thus stabilizing the path in a sustainable direction. This report not only shows the expectations after the paradigm shift in the years 1972 to 1979, but also the threats on Vienna’s way to sustainability. The experiences of the past decades have shown that the improvement of green spaces in the city would not be possible without appropriate interventions in the transport system. With the scientific tools available today, implementation technologies and strategies can be used that allow both the transport system to be made sustainable and the re-greening of sealed surfaces in public spaces, buildings and roofscapes.

## Conflict of interest

The author declares no conflict of interest.

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