

Cycling and Bicycle Planning in Frankfurt am Main and Washington, DC

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The bicycle is a healthy and sustainable mode of transport. Cycling produces no noise or air pollution, and utilizes far fewer nonrenewable resources than motorized transport. In comparison to the automobile, the bicycle requires only a fraction of the space required for driving and parking. Virtually anyone can afford to own a bicycle, which costs private households and public funders far less than either private vehicles or public transport. The energy required for bicycling comes directly from the cyclist. Daily cycling means engaging in regular physical activity and contributes to aerobic fitness and cardiovascular health while protecting from obesity, diabetes, and a variety of illnesses.

Over the past two decades, Frankfurt am Main and Washington, DC, have successfully promoted cycling, and have redesigned their transport systems to make the bicycle an attractive component of mobility offerings. In both cities, this meant a break with the car-oriented planning of personal transport that had prevailed since the end of World War II. In contrast to well-known cycling cities in the Netherlands, neither Frankfurt nor Washington could have recourse to a tradition of cycling or of bicycle planning. This essay discusses the transformation of the transport system, as well as of mobility behavior and transport policies in both cities. The information contained in this text was drawn from interviews with bicycle planners, as well as from analyses of plans, transport concepts, and other publications. To begin with, there is a brief comparison of the two cities, as well as of cycling and mobility behavior overall. We focus on the key considerations that led to the successful promotion of cycling. We conclude by considering prospects for the coming years.

Background, Mobility Behavior, and History

Frankfurt and Washington, DC, have comparable population sizes (765,000 and 705,000, respectively). The municipal area of Frankfurt is however around 40 percent larger, so that population density in Washington is approximately one-third higher (4,000 versus 3,000 people per square kilometer). Both cities have seen strong population growth in recent decades (up 14 percent) (MWCOG

2021; Stadt Frankfurt 2020). Both Frankfurt and Washington are affluent cities, with high average household incomes, and a comparatively high turnover of residents. Both cities are the economic and employment centers of large metropolitan regions, with numerous commuters from the surrounding areas: around 550,000 people commute daily to Washington, the capital of the US government, compared with around 400,000 in Frankfurt, one of Europe's key financial centers (MWCOG 2021; Stadt Frankfurt 2020). Given the absence of high-rises and a cityscape designed by Pierre L'Enfant, Washington, makes a more »European« impression than many North American cities. Conversely, given its skyscrapers, Frankfurt is often referred to as the most »American« city in Germany.

Frankfurt has a lower rate of car ownership per 1,000 residents than Washington (470 versus 510). The average travel distance (6 km) and travel time (21 to 24 minutes) are comparable for both cities (MWCOG 2021; Stadt Frankfurt 2020). In Frankfurt, a smaller number of trips involve private vehicles (33 percent of all trips in the year 2018, compared with 45 percent in Washington for the same time period), and a larger share involve public transport (21 percent versus 16 percent in Washington). Roughly the same proportion of residents in both cities travel regularly by foot (26 percent in Frankfurt versus 29 percent in Washington), but bicycle use is more frequent in Frankfurt (20 percent versus 5 percent in Washington) (MWCOG 2021; Stadt Frankfurt 2020).

In comparison with other German cities, Frankfurt's modal split for bicycles lies in the middle range: it is comparable to Leipzig (21 percent), Dresden (20 percent), Mannheim (20 percent), and Berlin (18 percent). Frankfurt's proportion of daily trips by bicycle is higher than in Dortmund (6 percent) and Stuttgart (7 percent), but notably smaller than in cycle-friendly cities like Münster (39 percent) and Karlsruhe (35 percent). Washington's bicycling modal split for travel to work is higher than in other large US cities such as Miami (1 percent), New York City (1 percent), and Denver (2 percent), and is comparable to Minneapolis (4 percent) and Portland, OR (7 percent), but markedly lower than

small cycle-friendly cities like Davis, CA (19 percent) and Boulder, CO (12 percent).

The number of trips covered by bicycle has increased since the late 1990s in both Frankfurt and Washington: from around 1 percent to 5 percent in 2018 in Washington, and from around 6 percent to 20 percent in 2018 in Frankfurt. The increase in cycle traffic between 2000 and 2018 is also reflected in bicycle counts for both cities: an increase of 320 percent of cyclists crossing bridges crossing the Potomac and Anacostia Rivers in Washington, and an increase of 250 percent along the Innere Kordon in Frankfurt (Alleenring/Mainbrücken) (DDOT 2021; Stadt Frankfurt 2018).

Like other German cities that were partially destroyed during World War II, Frankfurt was rebuilt in a car-friendly style, with broad streets and ample car parking. Moreover, streetcar lines were decommissioned to generate space for automobiles (Müller-Rämisch 1996). In Washington, too, planning measures prioritized the private automobile during the postwar era. This included the broadening of streets, the construction of urban freeways, the creation of adequate parking spaces, and the complete elimination of the streetcar system in 1962 (Schrug 2015).

During the 1970s, the energy crisis and growing environmental awareness had a major influence on transportation planning in both cities (Müller-Rämisch 1996; Schrug 2015). Frankfurt had inaugurated its first car-free pedestrian zones, where bicycles were forbidden as well, and had installed narrow (from today's perspective) cycling lanes along sidewalks (generally intended to allow children to cycle to school). Often, these bike lanes had no downward slopes at curbs, and drivers often had difficulty seeing cyclists at intersections (Bloecher 2021). In Washington, the first cycling plan was published in 1976 (Buehler and Stowe 2015; DDOT 2005). During the 1980s and 1990s, however, its objectives were for the most part not implemented. Most of the progress was achieved through the construction of mixed cycling and pedestrian trails in parks.

The Beginnings

During the 1990s, Washington, had no cycling planner, and cycling played no role in transport planning. Constructed on a regional level were further mixed cycling and pedestrian shared-use trails, mostly in government parks, or along new motorways and federal highways in the surrounding area (Hanson and Young 2008). In Frankfurt, the position of a bicycle planner was created in 1991 (a novelty for a large city), along with the introduction of additional bicycle-friendly measures (GSA 1995). Pedestrian zones were opened to cyclists. During the 1990s, Frankfurt participated in a successful nationwide pilot project that allowed cyclists to ride against the direction of motorized traffic on one-way streets located in traffic-restricted areas. The city inaugurated its first cycle street, with cyclists having priority over motorized traffic. Cycling routes were also opened up in green belt areas. Within the city, cycling routes were identified for future development; these were planned for road spaces rather than sidewalks. Bicycle parking facilities were created at local public transport stops (Bloecher 2021). Following the arrival of a new municipal government in the mid-1990s, most cycling projects were suspended or pursued at a reduced pace (Bolle 2021). By the late 1990s, Frankfurt—like Washington, DC—no longer had an independent cycling planner.

New Departures toward Promoting Cycling

With the new millennium, the situation for cycling changed in both cities. In Frankfurt, cycling became a component of the new overall transport plan for the first time. The plan, published in 2005, included a cycle-friendly scenario that envisioned seeing 15 percent of all trips covered by bicycle by the year 2015 (Stadt Frankfurt 2005). In 2006, the governing coalition, composed of the CDU and the Greens, adopted this as a political objective (Hochstein 2021; Lanzendorf and Busch-Geertsema 2014).

Given that the planning of a comprehensive cycling network had failed during the 1990s due to budgetary and time constraints, it was now resolved that in the future, cycle travel would be integrated into the daily decision-making mechanisms

related to transport planning and transport engineering (Bolle 2021). Cycling was to be given due consideration as often as possible when it came to everyday street renovations and other relevant projects. Step-by-step, as an ordinary mobility resource, the bicycle became an accepted component of transportation planning in Frankfurt—and cycling became more attractive as a result. Moreover, additional one-way streets were opened up to cycle traffic in both directions, bicycle parking was expanded, and the bicycle was promoted as a convenient and efficient transport resource for all user groups (Lanzendorf and Busch-Geertsema 2014; Bautz 2011). Not just substantively, but organizationally as well, cycle traffic was reorganized throughout the city. Created in 2009 in place of a single bicycle planner was a Cycling Office, which was located in the Transport Department, and was positioned as an interface between transport planning, transportation construction, and the implementation of transport-related measures (Bolle 2021; Bautz 2011).

In 2001, a cycling planner was again appointed in Washington, DC, as part of an initiative designed to enhance quality of life in the city. The first milestone was the publication of a Bicycle Master Plan in 2005 (DDOT 2005). The aim of the plan was to construct more and better cycling infrastructure, to implement bicycle-friendly measures, to expand bicycle training and education in schools, and to increase the promotion of cycling and bicycle safety. By 2010, 3 percent of commuters would hopefully travel by bicycle, and by 2015, 5 percent. In Washington as well, the cycling planner was positioned as an interface between transport planning, transport, construction, and overall urban development. As in Frankfurt, the master plan served as a guideline for integrating cycling into as many transport and urban planning decisions as possible. Up to the year 2010, Washington was able to implement a number of elements of the master plan. In 2010, for example, sixty miles of cycling lanes were constructed—a twenty-fold increase in comparison with 2001 (DDOT 2014). There was also a highly successful advertising campaign (goDCgo), which was addressed primarily to commuters and major employers (Sebastian 2021).

The Steady Growth of Bicycling

During the subsequent ten years, from 2010 until 2020, both cities were able to implement further cycle-friendly measures, and bicycle use continued to increase. Between 2010 and 2019, the network of cycling lanes in Washington DC was expanded by more than fifty miles. In contrast to cycling lanes of the 2000s, a portion of these new installations consisted of protected cycling routes that separated cyclists from motorized traffic (seventeen miles). These facilities are safer and more attractive for a larger proportion of the population, but they also require more space, and are hence more politically difficult to achieve (DDOT 2014). In addition, the city installed nineteen cyclist traffic lights at intersections, which compares well with the single cyclist traffic light found there in the early 2000s. Like Frankfurt, Washington began opening up one-way streets to cycle traffic in both directions (five miles). Inaugurated in 2010 was the bicycle rental system Capital Bikeshare. The system grew from 100 docking stations in 2011 to 500 in 2018, with more than 3.5 million bicycle trips annually (CaBi 2012).

In 2014, cycling was integrated into the new, comprehensive transport plan MoveDC (DDOT 2014). The cycling component of the plan is a further development of the master plan of 2005, which envisions a network of cycling routes that is denser, better interlinked, more comfortable, and safer. In 2015, Washington resolved to introduce a »Vision Zero« policy, with the ambitious goal of reducing the number of cycling and pedestrian deaths to zero by the year 2024 (DDOT 2015). In 2020, as part of the »Vision Zero« program, the general speed limit for the city was reduced to twenty miles per hour (ca. 30 km/h)—unless otherwise indicated by signage. Like Germany, Washington, DC, also introduced bicycle education into the elementary school curriculum. In the 2010s, bicycle parking was reorganized, and the integration of cycling with public transport resources improved. In 2018, 7.6 percent of all commuters traveled to work on bicycles, and 5 percent of all trips in Washington were covered on bicycles (MWCOG 2021).

By the year 2012, Frankfurt, had already achieved its goal of a bicycle modal split of 15

percent—three years earlier than originally planned (Stadt Frankfurt 2012). As in Washington, the years 2010 to 2019 saw a continuation and intensification of the promotion of cycling pursued during the 2000s. As ever, the goal was to make cycling a progressively more attractive aspect of everyday life. Introduced in 2010 was a reporting platform that has allowed Frankfurt cyclists to register more than 1,300 problems or suggestions for improvement. More than one hundred bicycle repair stations—with tire pumps and tools for use by all cyclists—were installed between 2012 and 2020. Opened in 2016 was a weatherproof parking garage at the main train station. Bicycle parking was reorganized and qualitatively improved at many other local transit stops and at other major points throughout the city—often with roofed bicycle parking spaces (Stadt Frankfurt 2016). The offering of simple bicycle parking lockups has been successfully expanded. Often, parking lockups were installed close to intersections on former auto parking places, enhancing traffic safety through improved visibility between cyclists, pedestrians, and car drivers.

After 2010, compared to the first decade of the new millennium, the bicycle has progressively come to be regarded by the majority of political parties as a crucial and useful transport resource. To be sure, the network of cycling routes in Frankfurt still displays numerous gaps, and bicycle users on designated routes must come to terms with infrastructure of uneven quality, and at times with missing connections. Overall, however, the encouragement of cycling has been highly successful. In 2018, 20 percent of all trips were covered using bicycles, and the city featured 1,400 km of cycling routes, while more than 90 percent of one-way streets have been opened to cyclists moving in both travel directions.

The year 2019 was a major turning point for bicycle users in Frankfurt. The city's three governing parties adopted a packet of measures known as »Fahrradstadt Frankfurt« (Bicycle City Frankfurt) (Stadt Frankfurt 2019). This was a response to the public petition »Radentscheid Frankfurt« (Frankfurt cycling referendum) which was signed by more than 40,000 people to pressure the

municipal government to do more to promote cycling. The central component of the plan is the construction of forty-five kilometers of new, separate cycling routes by the year 2023. The protected cycling routes should be at least 2.3 meters wide, and be spatially separated from motorized traffic. In 2022, moreover, fifteen major intersections are to be redesigned in ways that take cyclists into greater consideration through infrastructural measures and traffic light signal times. The city also plans to connect express cycling routes from the outskirts directly into the city, providing direct, fast, safe cycling options. Beyond this, Frankfurt is reconfiguring up to ten kilometers of neighborhood streets annually in order to prioritize cycling traffic through bicycle priority streets and restricted access for motor vehicles. Car-restrictive measures are given explicit consideration with regard to all redesigns of roadways and intersections. At the same time, the city has appointed a working group consisting of eighteen new full-time positions in the municipal administration, charged with promoting a »Bicycle Friendly City.« In the years 2020 and 2021, an additional twenty million euros has been devoted to bicycle projects (Stadt Frankfurt 2019).

Conclusion

Despite their histories as car-friendly cities, both Frankfurt am Main and Washington, DC, have succeeded in promoting cycling, and in adapting traffic systems and traffic planning for this purpose. In both cities, the current success of cycling promotion has its roots in the early 2000s, and with similar planning approaches: both pursued objectives in a stepwise fashion. One aspect of this approach was a focus on integrating the bicycle into daily decisions concerning transportation, transport technology, and urban development. This allowed cycling planners to recognize options for implementing bicycle-friendly measures early on, and to improve conditions for cyclists step-by-step over time.

Both cities used a combination of infrastructural and other incentive measures. Regarding infrastructure, both cities introduced and qualitatively enhanced bicycle parking, installed cycling



Fig. 1 Cyclists on a cycle street on Neue Mainzer Straße in Frankfurt's city center (Source: Andreas Blitz)

Fig. 2 Cyclists on a cycle street on Pennsylvania Avenue between the Capitol and the White House in Washington, DC (Source: Ralph Buehler)



routes, including (more recently) protected ones, as well as reduced-traffic neighborhood streets where cyclists could share the roadway with small numbers of motorized vehicles traveling at reduced speeds. These measures were supported by the corresponding marketing tools, public relations efforts, and cycling training. Found among these were cycling maps, bike-to-work programs, coordination with employers, options for public participation, and bicycle training in schools. Both cities improved integration of cycling into public transport through bicycle parking places at transit stops and public transport stations; Washington also integrated bike racks in buses.

The promotion of cycle traffic mirrors the process of a change of consciousness concerning the utilization of public space and the image of the city that calls into question the absolute priority of the automobile—often with positive effects that go far beyond cycling itself. For example, bicycle parking spaces are positioned at intersections on former automobile parking spaces, thereby improving

visibility axes between all roadway users and improving traffic safety. Reduced speed limits and lower levels of traffic on many streets improve traffic safety for cyclists and pedestrians alike. At the same time, noise pollution is reduced for residents. Now, urban design measures are no longer oriented primarily toward accommodating private motorized vehicles, while other aspects—including quality of life, environmental protection, and sustainability—acquire greater importance.

In contrast to Washington, Frankfurt has a longer history of implementing measures designed to make the use of private cars more expensive, slower, and less attractive. In the 1990s, for example, Frankfurt had already begun reducing car parking spaces in city center areas and introducing traffic-calmed residential districts. Washington has also begun reducing car parking spaces but started at a later point in time. Moreover, it was only in 2020 that Washington reduced its general speed limit on side streets to twenty miles per hour.

In coming years, both cities will be pursuing similar goals when it comes to expanding their network of cycling routes, in particular with protected cycling and an improvement of bicycle traffic safety, especially at intersections. Cycling has received a big boost through municipal policies designed to transform Frankfurt into a bicycle city. Additional financial resources, increased

Chart 1. Milestones in the development of bicycle traffic in Washington, DC, and Frankfurt am Main, 1990-2020

Washington, DC	Frankfurt am Main
1990: During the 1990s, there is no cycling planner.	1991: Establishes the position of cycling planner (the first ever in a major German city). Pedestrian zones are opened up to bicycle traffic for the first time.
1998: The regional planning organization publishes its envisioned future for cycling.	1993-1996: Part of a successful nationwide pilot project that allows cyclists in traffic-calmed residential areas to travel against the direction of motorized traffic on one-way streets.
2001: Appoints its first full-time cycling planner.	2003: Bicycle Traffic Scenario (15 percent). The plan, published in 2005, contains a bicycle-friendly scenario that envisions seeing 15 percent of all trips covered using bicycles by the year 2015.
2005: Publishes a bicycle master plan.	2009: Establishes the Cycling Office; located in the traffic department, it functions as an interface between transportation planning, transportation construction, and the implementation of transport-related measures
2014: Bicycling integrated into a new overall transport scheme "MoveDC."	2015: Installs of electronic signs promoting cycling.
2015: Adopts a "Vision Zero" policy with the ambitious goal of reducing cycling and pedestrian deaths to zero by the year 2024.	2018: 20 percent of all trips are covered using bicycles; Frankfurt now has 1,400 km of cycling routes, and more than 90 percent of all one-way streets have been opened to cyclists in both travel directions.
2018: The bicycle rental system Capital Bike-share registers more than 3.5 million bicycle trips annually.	2019: The city's trio of governing parties passes a packet of measures called "Fahrradstadt Frankfurt" (Bicycle City Frankfurt) in response to the public petition "Radentscheid Frankfurt" (Frankfurt cycling referendum), which was signed by more than 40,000 people in order to pressure the municipal government into doing more to promote cycling.
2020: Reduces its general speed limit on side streets to just 20 m/h.	2020-2021: An additional €20 million is devoted to bicycling projects in the years 2020 and 2021.

personnel, and the political will to prioritize cycling over other means of transport have the potential to make the bicycle the preferred mode of transport to an increasing degree.

In both cities, the COVID-19 pandemic generated new opportunities for more sustainable transport and for cycling. In Frankfurt, for example, the Mainkai was close to motorized traffic. During the lockdowns of 2020, bicycle use increased by 30 percent in Frankfurt, with 1150 percent more children using bicycles (Pandit et al. 2020). The experience with closing the Mainkai to car traffic contributed to strengthening plans for a shared space, and for temporary evening closures of the Mainkai to cars. During the COVID-19 crisis, neighborhood streets were closed to through traffic in Washington, DC, and many restaurants use parking spaces as outdoor seating for guests. It seems highly probable that such measures showed residents how a city with less traffic and less parked cars might look, encouraging intensive discussions of these topics in the future.

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