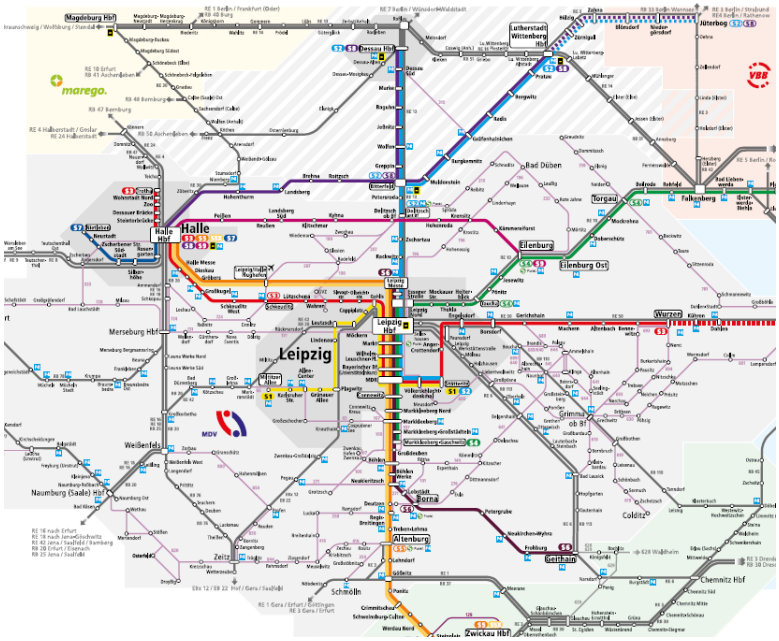
DEMO-EC
Interreg Europe

DEMO-EC: ACTION PLAN FOR THE REGION OF LEIPZIG IN THE CONTEXT OF CENTRAL GERMANY



3/9/2020 | Aufbauwerk Region Leipzig GmbH

Based on the outputs of the Interreg Europe project DEMO-EC (DEvelopment of sustainable MObility management in European Cities) we implement the following actions addressing the Operational program of the Free State of Saxony (2018).

[1] https://www.s-bahn-mitteldeutschland.de/s_mitteldeutschland/view/mdb/s_mitteldeutschland/fahrplan/2020/mdb_307488_liniennetzplan_2020_s-bahn-mitteldeutschland.pdf, retrieved on 21.02.2020.

Outline

ADRESSED POLICY INSTRUMENT

The Aufbauwerk Region Leipzig GmbH (Aufbauwerk) addresses with this action plan *Priority Axis 2: Promotion to Reduce CO2- emissions* of the *Operational Program of the Free State of Saxony (2018)*. The Operational Program contains a specific objective to lower CO2 emissions in the transport sector through promoting public transport, cycling as well as intelligent traffic management and fostering low-emission drive technologies, esp. E-mobility. Therefore, further development of public transport services is important for two main reasons. First, adaptation to demographic change by maintaining mobility of older and elderly citizens and enabling mobility for children. Secondly, making public transport as convenient as necessary and more affordable than individual motorized traffic. For the objective of reducing CO2-emission, there are two output indicators in the Operational Program:

1. Greenhouse gas emissions (CO2) in the transport sector in Saxony (in Mio. Tons) [C3]
2. Share of environmentally friendly modes of transport in the modal split: Passenger transport (bike, train, public transport) and freight transport (train, ship) (in % of transport) [C4] (Staatsministerium für Wirtschaft Arbeit und Verkehr 2018, S. 84–85).

The addressed policy program serves as a guide for urban policy programs, e.g. for the cities of Chemnitz, Dresden or Leipzig. So, to address the operational program, urban policy programs need to be addressed as well. As there are close connections to Leipzig and its rural districts for the DEMO-EC project partners Aufbauwerk (lead partner) and the city of Leipzig (project partner 2), this action plan focuses on Leipzig in the first place. Once the actions are conducted and proven as good practices, the actions will be applied to the other big cities like Chemnitz and Dresden as well. Nevertheless, Leipzig is addressed in the context of Saxony and the area of Central Germany[2] due to its dominant position in terms of population and economic power as well as interconnectedness with the other areas.

INTRODUCTION

The population of cities in Europe is increasing, as it is stated in the application form of the INTERREG Europe Project *DEvelopment of sustainable MObility management in European Cities* (DEMO-EC) (Interreg Europe 2017, S. 1). This trend holds true for the three biggest Saxon cities Chemnitz, Dresden and Leipzig, too. However, it is the opposite for the other regions, on average. For Leipzig, the number of inhabitants increased from 551,871 in 2014 to 596,517 in 2018 (as of each year's 31.12.[3]). Speaking in relative terms, this is an increase of about 8.1%. In comparison, the number of inhabitants in Germany increased from 81.198mio. in 2014 to 83.019mio. in 2018. This is an increase of about 2.2%[4]. These expectations give the City of Leipzig a special role in the state of Saxony and the region of central Germany. Leipzig and the surrounding region consequently become a pioneer example when addressing the selected policy instrument within this action plan.

Based on estimations from 2015, the predicted population development for the city of Leipzig until 2030 forecasts a population of about 680,000 inhabitants in the pessimistic scenario and 750,000 inhabitants in the optimistic scenario (Stadt Leipzig und Amt für Statistik und Wahlen 2016, S. 14). With reference to the forecasted base case of 720,000 inhabitants, Leipzig will face an increase in its population of 30.5% from

[2] The area of Central Germany consists of three German States Saxony, Thuringia and Saxony Anhalt. A graphical representation is provided in Annex 2.
[3] https://statistik.leipzig.de/statcity/table.aspx?cat=2&rub=4&per=q (retrieved on 16.01.2020)
[4] https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsstand/Tabellen/liste-gebietstand.html (retrieved on 16.01.2020)

2014 to 2030. In comparison, the predicted population development for Germany until 2030 forecasts a population of about 83.008mio. inhabitants in the pessimistic scenario and 84.422 inhabitants in the optimistic scenario (DESTATIS Statistisches Bundesamt 2019, 9, 61). For the optimistic scenario, that will be an increase in Germany's population of 3.9%.

The population development in Leipzig strongly differs for certain age groups. The most rapid growing age group is the one of the elderly (90 years and older). Forecasts estimate an increase in 130% from 2015 to 2030. The second most rapid growing age group is the one of children of school age (6 to under 15 years) for which an increase of 60% from 2015 to 2030 is predicted. An increase above average is also predicted for the number of pre-school children (under 6 years of age) for which an increase of 35% from 2015 to 2030 is expected (Stadt Leipzig und Amt für Statistik und Wahlen 2016, S. 17). On a regional level, the population development in Leipzig and its surrounding strongly differs, too. While the communities in the immediate vicinity of Leipzig are growing, a further decline in population is occurring in the more distant communities (Stadt Leipzig und Amt für Statistik und Wahlen 2016, S. 21).

As there is such an expected increase in population, the number of jobs in Leipzig is expected to increase significantly, too. However, this number of jobs is expected to grow less strongly than the number of inhabitants. This is forecasted for the number of employed people living in the city as well. Conversely, the number of jobs in the outlying areas of the city will not decline at the same rate as the number of inhabitants and employees. Some of these jobs will therefore be taken up by employees from the city of Leipzig. In the immediate vicinity of Leipzig, increasing numbers of jobs are expected, too (Industrie- und Handelskammer zu Leipzig 2017, S. 6). Thus, there will be an increase in commuting people.

The expected structural and economic development will lead to a significant increase in road traffic in Leipzig. This applies to both passenger traffic and commercial traffic. Thus, the number of vehicles in Leipzig is rising continuously, too. In 2017, there were 255,091 vehicles registered. Of these vehicles, 223,733 were passenger cars, of which 88.6% were private cars. So, private passenger cars account for 77% of the all registered cars. Out of the passenger cars, there were only 0.1% electric cars. The passenger car density in general at the end of 2017 was around 379 cars per 1,000 inhabitants (Stadt Leipzig, Amt für Statistik und Wahlen 2018, S. 157). Referring not to cars but to traffic, private passenger traffic accounts for 69% of the overall traffic whereas commercial traffic accounts for 31% (Industrie- und Handelskammer zu Leipzig 2017, S. 3).

Accounting all types of mobility in a modal split, the car is the most frequently used means of transport. 38% of Leipzig's inhabitants used motorized individual traffic in 2017, followed by walking and cycling with 38% and public transport with 24% (Stadt Leipzig, Amt für Statistik und Wahlen 2018, S. 160). So, the modal split for 2017 is roughly 60 to 40 when contrasting walking, cycling and public transport (summed up to environmental alliance) against motorized individual traffic. By 2025, the modal split is aimed at 70 to 30 according to Leipzig's urban development plan. According to this plan, the 70% should be composed of 27% foot traffic, 20% cycling and 23% public transport (Stadt Leipzig 2016, S. 25). Reducing motorized individual traffic is relevant, because CO2-emissions caused by this type of traffic have been increasing since 1990 up to a maximum of 36% in 2011 (no more recent data available)[5].

Since going to work with a motorized vehicle is a habit for 45% of the commuters (2017), traffic has been increasing and will increase accordingly (Stadt Leipzig, Amt für Statistik und Wahlen 2018, S. 160). However, motorized traffic could be reduced by using more non-motorized vehicles such as bicycles because 50% (2015) of the work-related commuting distances in Leipzig are shorter than 5km (Stadt Leipzig 2015, S. 8). So, using more often non-motorized vehicles seems reasonable for people working

[5] https://www.leipzig.de/umwelt-und-verkehr/energie-und-klima/energie-und-klimaschutzprozess-eea/klimabilanz-fuer-leipzig/ (retrieved on 16.01.2020)

and living in the city of Leipzig. Likewise, seems reasonable for incoming and outgoing commuters too since most of the distances in the city of Leipzig between place of living, station for public transport or place of work are less than 5km, too. Usually, the bottleneck is the way outside the city of Leipzig, so either for incoming commuters from their place of living to the next station of public transport or for outgoing commuters from the station to the place of work.

State of the art

Regarding the Operational program's priority Axis 2, Leipzig and its surrounding rural districts benefitted from several funding programs. For instance, Saxony, including the city of Leipzig, is one of eight "Electromobility Model Regions" in Germany, which were supported by the Federal Ministry of Transport and Digital Infrastructure. As part of being such a model region, several projects[6] focused on public transport using electric propulsion and its connection with intermodal services such as car sharing, bike rental and charging points for electric vehicles. More precisely, one project aimed at a uniform access and billing system for charging infrastructure. Another project[7] was concerned about linking the electric vehicle fleet to public transport (Stadt Leipzig 2016, S. 20). Taking the linkage of transport ways to a higher level, another project[8] dealt with the inter- and multimodality of public transport.

The city of Leipzig has focused on the topics of E-public transport and charging infrastructure, especially (Stadt Leipzig 2016, S. 13). So, there is a *Measures and implementation concept* called "Leipzig – City for intelligent mobility", for instance (Stadt Leipzig 2016). Its fields of action are, amongst other: E-Fleets, E-bike sharing and E-Public transport. These fields of actions are addressed by Leipzig's *Local transport plan*, which posits in particular the diversification of mobility possibilities as well as its linkage (Stadt Leipzig 2016, S. 23). Related to the diversification of mobility possibilities, Leipzig's *Cycling Development Plan* as part of the *Measures and implementation concept* states how bicycle traffic can fill new niches in the city, such as small-scale freight transport, courier services, bicycle taxis or the rental of E-bikes or pedelecs. In principle, pedelecs and E-bikes are seen as a good way of implementing sustainable mobility, also to reach new user groups (Stadt Leipzig 2016, S. 24).

Considering the described situation of Leipzig with its surrounding rural districts in the context of Central Germany[9] and linking it to the insights from the DEMO-EC project, the Aufbauwerk sees the best fit amongst the two for the topics of multimodal transport and non-motorized transport. The main described challenges Leipzig is facing, which can be addressed from the DEMO-EC context, are:

1. Increasing the environmental alliance from 60% to 70% by 2025
2. Increasing the non-motorized fleet as part of the public or private vehicle sharing

6 For example „SaxHybrid - RegioHybrid - SaxMobility"
7 „SaxMobility II"
8 "Leipzig mobil – new ways to public mobility"

ACTIONS

For targeting the two previously described main challenges, there are four relevant areas of good practices from the DEMO-EC project: *Public transport*, *Car reduction, walking and cycling*, *Behavior change* and *Governance and participation*.

In order to make *Public transport* more attractive to individual motorized transport, it must become reachable and accessible, convenient and reliable as well as reasonably priced. Key to success are complex planning approaches as well as the integration of several public transport services (Interreg Europe 2019, S. 89).

In order to achieve *Car reduction*, multi modal transport needs to be fostered. Therefore, clear strategies and concepts must be put in place to achieve modal split goals (Interreg Europe 2019, S. 69). On the one hand, the environmental alliance must be promoted. On the other hand, its combinability must be fostered to make walking, cycling and public transport more attractive.

To increase sustainable travel behavior regarding walking, cycling and public transport, there needs to be a *Behavior change*. This can be done by soft and hard actions. Soft actions influence people's beliefs, habits and attitudes directly. Hard actions, in contrast, affect people's behavior indirectly by making their life easier, e.g. by setting the legal framework or providing infrastructure. To change people's behavior successfully, it is recommended to combine soft and hard activities. Moreover, these activities should consider:

1. Motivation: People must have reasons to change.
2. Ability: People must have the knowledge, skills and confidence to change.
3. Opportunity: People must have the resources, support and environmental conditions to change (Interreg Europe 2019, S. 9).

Last but not least, sustainable *Governance* of transport systems refers to the engagement of citizens and stakeholders in planning and decision-making (Interreg Europe 2019, S. 29).

Overview of the actions

Based on a selection of good practices from the four relevant areas, three actions will be implemented addressing the two challenges mentioned previously. An overview of these actions is shown in Table 1.

TABLE 1: OVERVIEW OF THE ACTIONS.

Challenge	DEMO-EC Reference	Action
▫ Increasing the environmental alliance	Area: Public Transport ▫ Integration of passenger transport (SI) ▫ Lazo Card (ES)	▫ Action 1: Central German Transport Association Plus
▫ Increasing the non-motorized fleet	Area: Car reduction, walking and cycling ▫ Bicycle-sharing based on a mobile application (PL) ▫ The bike-sharing service powered by solar energy	▫ Action 2: Extended shared bicycle

▫ Increasing the environmental alliance	Area: Behavior change ▫ The bicycle master plan in Zaragoza (ES) ▫ Traffic snake game (SI) Area: Governance and participation ▫ The school roads project for active mobility (ES)	▫ Action 3: Multimodal road safety education

Action 1 focuses on Leipzig but covers other parts of Saxony as well. Action 2 and 3 are explained for Leipzig, due to its special pioneer role in the area, but can be easily modified for other Saxon cities as well.

Action 1: Central German Transport Association Plus

Intro

As elaborated in chapter Introduction, Leipzig and its surrounding rural districts aim at a modal split of 70 to 30 by 2025 in favor of the environmental alliance. So, the topic of this action is public transport. So, Leipzig's *Local transport plan* aims at the linkage of transport possibilities, in particular. The existing support offers concentrate on the area of the Central German Transport Association (MDV)[10] in which several public transport means are combined. This means that one can use bus, tram and train in this area with paying only for one area. Outside this area, however, one needs to pay for the other areas.

For the area of the Central German Transport Association, there are two platforms helping with planning multi modal routes and buying the respective tickets all in one. Reachie allows multi-modal navigation and shows the respective CO2-emission. Once selected the route with its transport means, Leipzig mobil allows buying tickets for several transport means including bus, tram, train, bike sharing, carsharing and taxi all in one app. The provision of information on parking space occupancy is still in progress (Stadt Leipzig 2018, S. 27). The advantage is that for all costs occurred due to the different means of transport, there is only one total bill per month.

As the reachability map of Annex 1 shows, the area of the Central German Transport Association covers almost all destinations reachable from Leipzig in 90 minutes by using public transport and bicycle. Since 15.12.2019 there is the extension Central German Transport Association North (MDV Nord), as depicted in Annex 3. As a result, the Central German Transport Associations are considered as one area. Thus, one reaches 90-minute distant destinations to the north of Leipzig with paying only for one area, too.

Nevertheless, there is room for improvement because there are still areas within the 90-minutes reach which are not included in the network region. Within these unintegrated areas spanning over Central Germany, there are some important cities in term of inhabitants and economic power such as the Thuringian cities of Erfurt and Jena (Annex 1). Moreover, the other most important Central German cities are missing in the

[10] For an overview of the included districts, please see Annex 3.

network area, namely Magdeburg in Saxony-Anhalt as well as Dresden[11], Chemnitz and Zwickau in Saxony.

The issue with the several transport associations is that they charge the passengers for travelling through their area. Hence, the more areas of transport association are crossed the higher the price even if the distance will be the same as travelling within one area. Another hindrance to convenient multi-modal transport is that bicycle and pet transport is regulated differently within the transport associations, even within one German state such as Saxony. So, in some transport associations bicycle transport is free of charge, in others not. Moreover, transport is regulated differently when crossing several transport associations, even if the transport associations don't charge for bicycles themselves. For instance, for journeys between the transport associations within Saxony, a daily bicycle ticket must be purchased in principle[12]. A similar hindrance to multi-modal transport is that some local public transport associations, such as the one in Leipzig (LVB), require a ticket for pets, if they cannot be carried in a box, and for bicycles even though trams and even sometimes busses have dedicated areas for bicycles.

Related to booking platforms, there is an increasing "proliferation" of isolated solutions of digital information by third-party developers even though there is the *Leipzig mobil app*. Although intended, *Leipzig mobil* doesn't serve as central customer interface for all mobility participants in Leipzig and in relevant peripheral locations.

DEMO-EC reference

Within the pool of good practices from the DEMO-EC project, two good practices are especially inspiring, namely *Integration of passenger transport (SI)* and *LAZO Card (ES)*. The first one is an integrated public passenger transport (*IPPT*) system, which enables passengers to use different means of public transport without the need to buy separate tickets. Its advantage is, that it enables automated fare collection and data management (Interreg Europe 2019, S. 96). This *IPPT* is based on an electronic card on which the tickets are saved rather than an app such as Leipzig mobil. Therefore, the *IPPT* seems to be a perfect complement to the app *Leipzig mobil*, especially for those who don't use mobile devices with mobile data.

The second selected good practice is the *LAZO Card*, which is a transport consortium of the metropolitan area of Zaragoza, Spain. It is not just a unified ticketing system like the Slovenian *IPPT* or the *Leipzig mobil* app but even a mobility-transport network. This network controls and monitors the intercity lines that connect Zaragoza with its rural districts, as well as the line between Zaragoza and the airport. In this regard, it is like the Central German Transport Association. The *LAZO card* can be used within the mobility-transport network on trams, urban and interurban busses, trains (Renfe Cercanias), shared bicycles (BIZI) and parking meters. Beyond the scope of the IPPT, Leipzig mobil and the Central German Transport Association, the *LAZO card* offers even an integrated tariff framework for the provided transport services within its network. In addition to these hard actions of setting the framework with the mobility-transport network, soft actions like promotion and evaluation are carried out.

[11] Dresden is the mostly frequented main train station in Central Germany and the 11th most frequented one in terms of daily passengers (2017: 64,000)[11].

[12] https://www.bahn.de/p/view/service/fahrrad/bahn_und_bike_sachsen.shtml, retrieved on 26.01.2020.

Action

Based on the Spanish *LAZO Card*, the Aufbauwerk aims at extending the area of the Central German Transport Association, as it was done partly in December with the extension to northern destinations, already. The action is about extending the area to all destination within the 90-minutes reach, at least. In the next step, the local transport associations of the most important Central German cities will join forces. So, the aim is a Central German Transport Association, which really covers most parts of Central Germany. The area of the Central German Transport Association Plus is depicted in Annex 3. The city of Leipzig and even its surrounding rural districts will benefit from the enlarged area since it is the center of Central Germany in terms of geographic location, infrastructure, population and economic power. Regarding regional development theory, this extended area with its composition of the cities as central hubs reminds of Von Thunen's circles in its regional land use model.

Based on the Slovenian *IPPT* system, action 1 encompasses offering a physical card with an electric chip, too. This will complement the currently existing app *Leipzig mobil* with a system which doesn't require a mobile device with mobile data connection. Referring to the outlined Central German Transport Association Plus, the app *Leipzig mobil* and, now, its *card* will be usable for the whole area of the Central German Transport Association Plus. The advantage of the card will be for both children and elderly, especially. As the forecasts on population growth in chapter Introduction show, these are the age groups with the highest growth rates until 2030. Moreover, tourists will benefit from this offline system, too.

In terms of usability, action 1 will enable the users of booking rides for other passengers, too. This will raise the convenience, especially when travelling with people who don't have this card such as friends, relatives or guests in general. Moreover, it is planned that tickets are available at all existing selling points, e.g. machines at stations or in trams and trains. However, tickets will be purchasable with cash (coins and bills), credit card and *Central German Transport Association Plus-card*.

In summary, action 1 consists of the *Central German Transport Association Plus* supported by an app and a card, the *Central German Transport Association Plus-app* or *card*, respectively. The goal is to provide an overall system allowing to technically connect and integrate further partners in addition to the previously implemented forms of mobility such as public transport, bike sharing, car sharing and taxi.

Participants

- **Governments** of the three Central German states Saxony-Anhalt, Saxony and Thuringia
- **City councils**, esp. Leipzig, Magdeburg, Dresden, Chemnitz, Zwickau, Jena and Erfurt
- **Supra-regional transport associations**, esp. *Central German Transport Association* (North), marego, Verkehrsverbund Berlin-Brandenburg, Verkehrsverbund Oberelbe GmbH, VMS Verkehrsverbund Mittelsachsen GmbH, Verkehrsgemeinschaft Mittelthüringen GmbH
- **Local transport associations, esp.** Leipziger Verkehrsbetriebe, Zweckverband für den Nahverkehrsraum Leipzig, Magdeburger Verkehrsbetriebe, Dresdner Verkehrsbetriebe AG, Chemnitzer Verkehrs-AG, Städtische Verkehrsbetriebe Zwickau GmbH, Jenaer Nahverkehr GmbH and Stadtwerke Erfurt Gruppe
- **Public railroad companies**, esp. Deutsche Bahn, Abellio and Erfurter Bahn
- **Bikesharing**, esp. Call a bike, nextbike and sz-bike
- **Carsharing**, esp. teilAuto
- **Taxi**

Timeline and costs

Time	Milestone	Expected external costs
06.-09.2020	Creation of the transport consortium through an inter-administrative cooperation agreement	
10.-11.2020	Overall update of the Leipzig mobil website and the Leipzig mobil app for the prupose of Central German Transport Association Plus	20,000
12.2020-03.2021	Integration of REACHIE or Google Transit Services for real time consultation of waiting times at stops and incidents on the transport lines	5,000
01.-03.2021	Integration of further partners via an application programming interface	5,000
01.-04.2021	Coordination of the lines, esp. the inter-regional lines	15,000
05.-07.2021	Pilot phase for Central German Transport Association Plus app and card	30,000
08.-09.2021	Evaluation of the pilot phase	20,000
09.-11.2021	Promotion/Public Relations	30,000
10.-11.2021	Revision according to the evaluation	30,000
12.2021	Launch of the Central German Transport Association Plus	
	10% price variance of the overall costs	
Sum		**EUR 170,500**

Financing

The *extension of Central German Transport Association North* highlights both the relevance of the transport network and the State's in such an extension. Consequently, action 1 will be the continuation and development of the *Central German Transport Association*. The *Central German Transport Association Plus* will be financed by the respective local transport associations with the helping hand of the States' governments, as it was the case for the north-extension, already.

Action 2: Extended shared bicycle fleet

Based in Action 1: Central German Transport Association Plus, Action 2 tackles the topic of car reduction, walking and cycling.

Intro

As explained previously, the city of Leipzig aims at achieving the modal split of 70 to 30. Out of the 70% of the environmental alliance, 20% should account for cycling. To do so, Leipzig's *Cycling Development Plan* states how different bicycle traffic can raise the general usage of bicycles, such as small-scale freight transport, courier services, bicycle taxis or the rental of E-bikes or pedelecs. In Leipzig, there is no public bike sharing. Instead, a private company called nextbike offers bikesharing. Nextbike has fleets in more than 60 German cities and in 25 countries worldwide. In Central Germany, nextbike has bicycles, apart from Leipzig, in Dresden and Erfurt. In these cities, nextbike has the monopoly. All systems operated by nextbike can be used with one account. A bike can be booked via smartphone app, website or hotline. They provide a daily inspection and maintenance of the bicycle fleet by a strong service team on site. In Central Germany, there is only one more Bikesharing service – Call a bike, a service of the Deutsche Bahn. They have the monopoly in the cities of Magdeburg, Halle and Weimar. What both nextbike and Call a bike lack is a variety of bikes. They simply offer their muscle powered bikes.

For corporates, the city council of Leipzig has set a budget of 150,000 euros for the years 2019/2020 for the support program "Lastenräder für Leipziger Unternehmen und Tagespflegepersonen". With this program, the city not only wants to contribute to environmental protection and minimize traffic density, but also support alternative transport and logistics services for companies[13]. However, offers for private usage are scarce. In February 2020, there were only four cargo bikes offered in Leipzig. In addition, the bikes are only available during the hosts' office hours, for instance at the BUND Regionalgruppe Leipzig from 9am to 3pm on working days. So, it is almost impossible to rent such a bike for people working full time.

What is missing for all mentioned providers in general, are bikes with child's seats, E-bikes and pedelecs. This might be one of the explanations for the lack of usage of bikesharing systems. In Leipzig, as in other larger German cities, the usage is at a low but stable level: rented bicycles are used by 2% of the inhabitants less often and never by the remaining 98%. As of today, it is still mainly younger people and those with higher incomes who are slightly more frequent users of the rental systems (Stadt Leipzig 2016, S. 18).

DEMO-EC reference

There are two good practices from the DEMO-EC project from which ideas were borrowed to tackle the challenge of *Increasing the non-motorized fleet* , Bicycle-sharing based on a mobile application (PL) and the bike sharing service powered by solar energy (IT). The interesting part of the good practice from Milanówek for us is that the local government installed bike stands at central places and signed an agreement with a private operator to run the entire system for three months. According to a conducted survey, one driver for people's satisfaction were low costs. These costs could be guaranteed to the customers due to subsidies by the town hall (Interreg Europe 2019, S. 83). Similar to the good practice from

[13] https://www.leipzig.de/wirtschaft-und-wissenschaft/unternehmensservice/foerderung-und-finanzierung/lastenradfoerderung/, retrieved on 25.01.2020.

Milanówek, the city of Berlin funded the company nextbike to extent their fleet. They will receive 7.5 million euros for the expansion of its services in the contract period from 2017 to 2022[14].

What is great to learn from the municipalities of Camogli, Portofino and Santa Margherita, that there are 45 E-bikes and 15 traditional bikes available for citizens and tourists. In comparison, in Leipzig there are no E-bikes offered through bikesharing. Moreover, it is impressive to see that the E-bikes are powered by a photovoltaic system. From a financing point of view, it is remarkable that the system received co-financing from national funds. From a cost perspective it is worth mentioning that the service is free for the first half hour and costs 1€ per hour for the following hours. Referring to the restricted accessibility of the cargo bikes in Leipzig, the Italian municipalities make the service available for 24 hours a day at eight automatic stations (Interreg Europe 2019, S. 85).

Action

To increase the means of bike transport and, thus, to reduce private car transport, action 2 is about extending the bicycle fleet in Leipzig with E-bikes and E-cargo bikes and bicycles with child's seats. Both the E-bikes and the E-cargo bikes will be powered by a photovoltaic system. Based on a five-years average (2014-2018), photovoltaic in Saxony is meaningful[15]. In the year 2019, Saxony even had the most sun hours in Germany with 1970 hours which is 170 hours above average[16]. Action 2 is about building stations for the E-bikes including the respective photovoltaic system and contracting a provider, e.g. nextbike as the local provider, with running the stations. Moreover, action 2 pushes the City of Leipzig taking a leaf out of Berlin's book by funding the extension of nextbike's fleet with E-bikes, E-cargo bikes and bicycles with child's seats. According to calculation 1, there is an investment required of 24 cargo bikes, 130 E-bikes and 200 bicycles equipped with child's seats. Referring to the E-bike stations, there will be 26 stations so that there are on average five E-bikes per station. These stations will be attached to already existing infrastructure, e.g. train or tram stations for multipurpose usage of the generated electricity.

After successful implementation in Leipzig, this action can easily be extended to other cities in the State of Saxony, such as Dresden and Chemnitz.

Participants

- **Government** of the Free state of Saxony
- **City council** of Leipzig, esp. Verkehrs und Tiefbauamt
- **Supra-regional transport associations** Central German Transport Association (North)
- **Local transport associations** Leipziger Verkehrsbetriebe and Zweckverband für den Nahverkehrsraum Leipzig
- **Bikesharing provider** nextbike

[14] https://taz.de/Mietraeder-mit-Landesfoerderung/!5603901/, retrieved on 25.01.2020.
[15] https://www.sonnenseite.com/de/umwelt/langzeitvergleich-deutlich-mehr-sonnenstunden-in-deutschland.html, retrieved on 25.01.2020.
[16] https://de.statista.com/statistik/daten/studie/249925/umfrage/sonnenstunden-im-jahr-nach-bundeslaendern/, retrieved on 25.01.2020.

Timeline and costs

Time	Milestone	Expected external costs
06.-08.2020	Due Diligence	
09.-10.2020	Conceptualization of the bike fleet extension	20,000
11.-12-2020	Contract negation between the actors	2,000
01.-09.2021	Procurement of 24 cargo bikes, 130 E-bikes and 200 child's seats	30,000* (cargo bikes) 80,000* (E-bikes) 7,500* (Child's seats)
01.-09.2021	Construction of 26 stations	260,000*
10.2021	Pilot phase for renting and maintaining the E-bikes	10,000*
11.2021	Evaluation of the pilot phase	10,000*
09.-11.2021	Promotion/Public Relations	
12.2021	Revision according to the evaluation	10,000*
12.2021	Launch of the Central German Transport Association Plus	
	10% price variance of the overall costs	49,700
Sum		**EUR 546,700**

*Financial split of 50% between the city of Leipzig and nextbike considered already.

Financing

Action 2 is financed by a financial split between a consortium of public institutions and the operating partner nextbike. The consortium consists, ideally, of the following partners: city of Leipzig, the Central German Transport Association (North), Leipziger Verkehrsbetriebe and Zweckverband für den Nahverkehrsraum Leipzig.

Action 3: Multimodal road safety education

Action 3 is assigned to the topic of Behavior change and it aims at increasing pupil's competencies in driving several types of bicycles.

Intro

Almost 40% of the journeys made by children and young people are made by car, many of them in the "mom/dad-taxi" on the way to school, sports or music lessons. Alternative offers should be sought here and be tried to leverage independent socialization of our young people in the city at an early stage (Stadt Leipzig 2016, S. 8). If we want independent children who travel independently and safely, there needs to be proper sensitization and education.

In Germany, road safety education is compulsory in primary school for the sake of pupil's safe participation in road traffic. It is necessary that they know the traffic rules as well as the correct behavior on the road. In order to support parents in conveying this elementary information, traffic education in primary school forms a cross-curricular and cross-year element in the curriculum. The highlight of this topic for many pupils is the bicycle exam in the 4th grade. The required knowledge is taught to them through both theoretical and practical road safety education. The theoretical education is usually provided by the schools. The practical education is completed in a safe area, usually in youth traffic schools or in the schoolyard[17].

As cycling is about participating in real traffic, trips into traffic should be an integral part of cycling education in all schools. However, this is rarely the case due to a lack of experienced personnel and risk of accidents. Moreover, the road safety education only teaches cycling with traditional bicycles. It neglects all other means of non-motorized transport, such as E-bikes, cargo bikes and E-scooters. This is problematic because the handling differs amongst these transport means. Thus, the road safety education should be extended to these means of transport. As a result, pupils will be sensitized for these transport means, will acquire the necessary skills and, thus, will feel more confident and save on the roads. Furthermore, pupil should be thought in how to combine several transport means, especially a combination of public transport and bicycle.

DEMO-EC reference

The idea of this action stems from three good practices out of the DEMO-EC project: The bicycle master plan in Zaragoza (ES), Traffic snake game (SI) and School roads project for active mobility (ES). In the bicycle master plan, for instance, emphasis is placed on providing the foundations upon which the appropriate habits will be built, as well as on working to develop attitudes to favor safe behavior when traveling as pedestrians or as cyclists (Interreg Europe 2019, S. 15). The Traffic Snake Game aims at breaking this vicious circle by encouraging schools, children and parents to walk, cycle, use public transport and share cars when travelling to school. By increasing the number of sustainable trips, the Traffic Snake Game moves efficiently towards a less car dependent lifestyle (Interreg Europe 2019, S. 18).

Action

Action 3 will provide a pool of E-Bikes, cargo bikes and E-scooters for schools to extent the current practical bicycle education by further means of unmotorized individual transport. Since the schools cannot rent these vehicles from anywhere else so far, as they can for traditional bicycles in contrast, these vehicles need to be provided. Otherwise, there will be no chance in training the handling of these vehicles. According to

[17] https://www.lvw-sachsen.de/home/angebote/grundschulkinder/radfahrausbildung.html, retrieved on 24.01.2020.

calculation 2, four sets of vehicles are required consisting of 2 cargo bikes, 5 E-bikes and 5 E-scooters each. Once the bicycle pool for schools is extended, the usage of these vehicles will be included in the road safety education as well. Based on a cooperation contract, Deutsche Verkehrswacht will maintain and distribute the bike pool. In addition, action 3 aims at including multi-modal transport in the road safety education. This means that the pupils are taught in combining different transport means, esp. the combination between bicycle/E-scooter and bus/train. Finally, the lessons learnt in the road safety education will be applied in real life. Hence, undertaking the Traffic Snake Game is the last corner stone in the extended road safety education.

Participants

- **Government** of the Free state of Saxony
- **City councils** of the respective cities, esp. city of Leipzig
- **Police**
- **Further stakeholders** Deutsche Verkehrswacht Sachsen

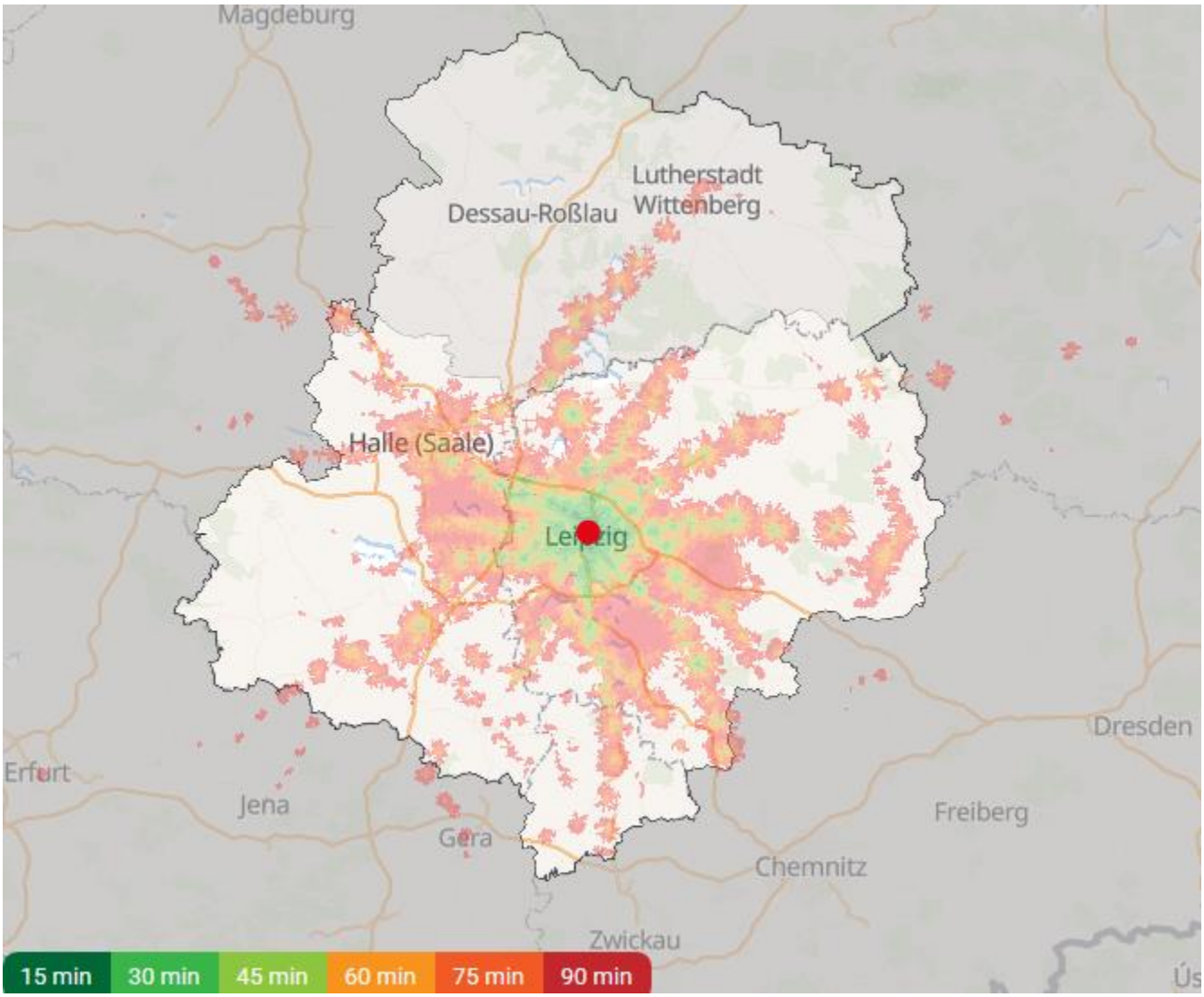
Timeline and costs

Time	Milestone	Expected external costs
06.-08.2020	Due Diligence	
09.-10.2020	Conceptualization of the extension	20,000
11.-12-2020	Contract negation between the actors	2,000
01.-06.2021	Procurement of 4 sets á 2 cargo bikes 5 E-bikes and 5 E-scooters	 24,000 (cargo bikes) 35,000 (E-bikes) 4,000 (E-scooters)
01.-08.2021	Implementation of the conceptualized changes in the curriculum	20,000
09.-10.2021	Pilot phase for renting and maintaining the E-bikes	10,000
11.2021	Evaluation of the pilot phase	10,000
12.2021	Revision according to the evaluation	10,000
12.2021	Launch of the Multimodal Master Plan	
	10% price variance of the overall costs	12,500
Sum		**EUR 137,500**

Financing

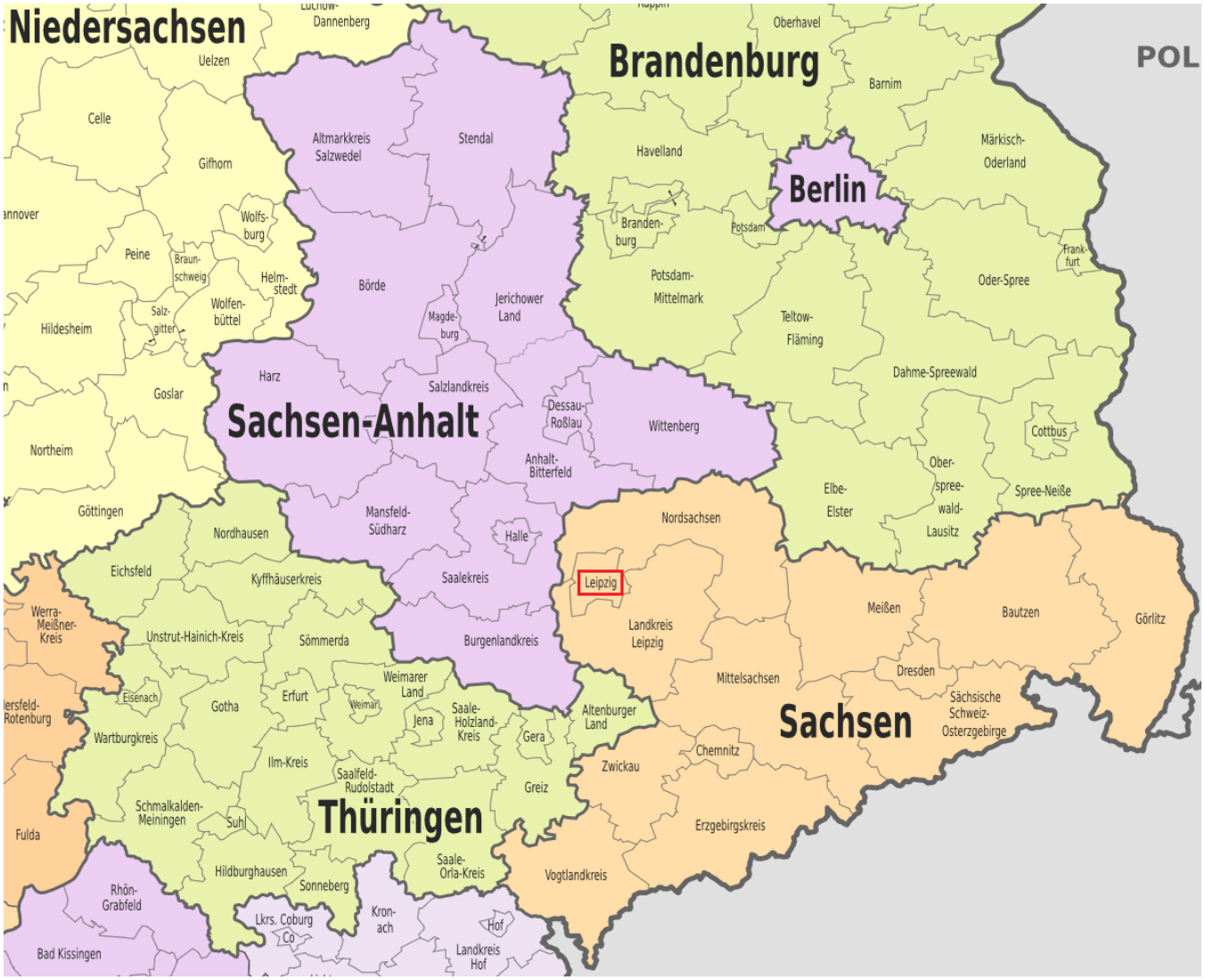
All costs will be covered by the Free State of Saxony since education is the task of the federal Länder in Germany.

ANNEX



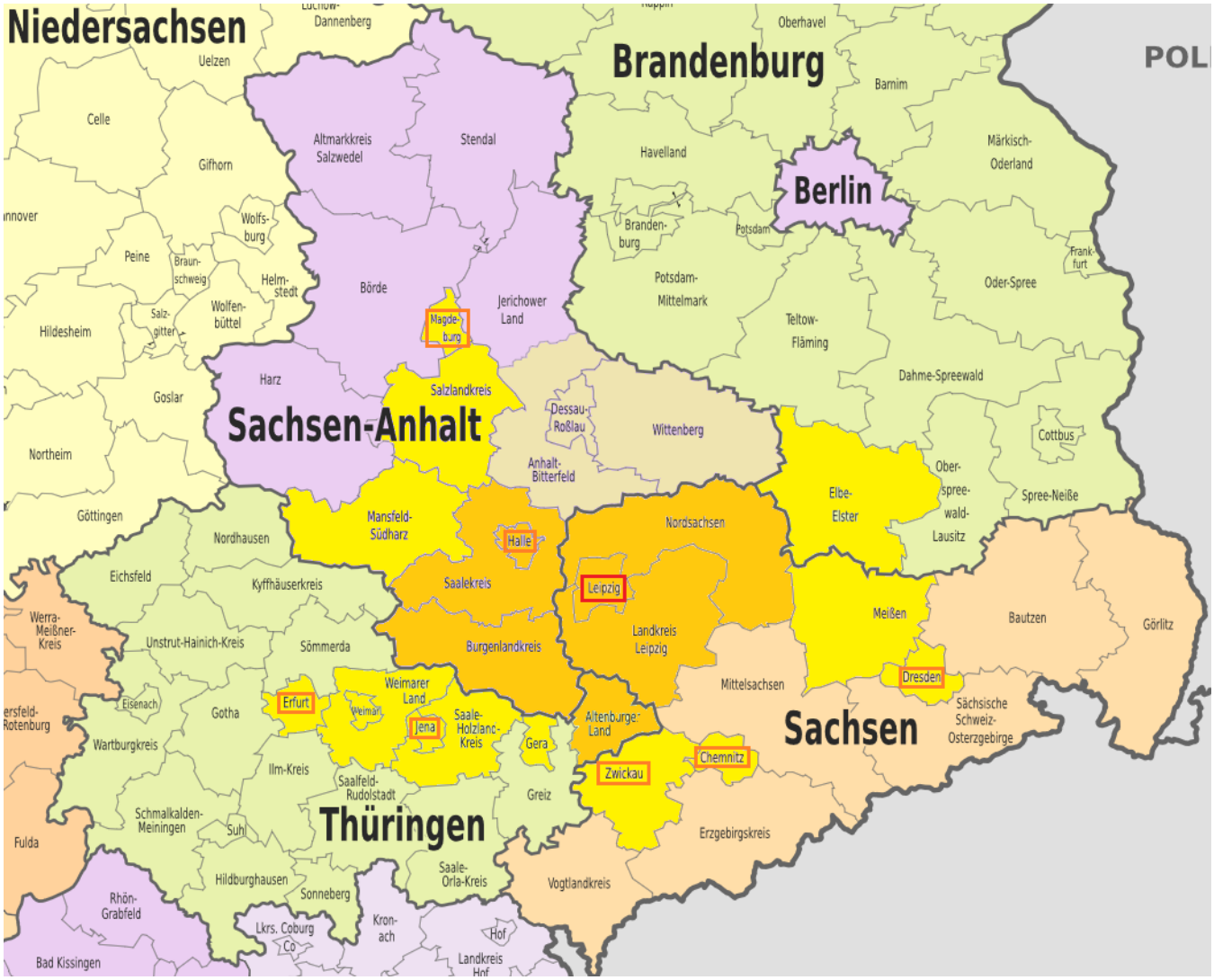
ANNEX 1: REACHABILITY IN THE CENTRAL GERMAN TRANSPORT ASSOCIATION (MDV) [BRIGHT] AND CENTRAL GERMAN TRANSPORT ASSOCIATION NORTH (MDV NORD) [DIM][18].

[18] https://www.mdv.de/informationen/projekte/eu-projekt-low-carb/reachie/, retrieved on 26.01.2020



ANNEX 2: CENTRAL GERMANY: 'SACHSEN', 'THÜRINGEN' AND 'SACHSEN ANHALT' AND ITS RURAL DISTRICTS[19].

[19] Map based on: https://upload.wikimedia.org/wikipedia/commons/e/e5/Germany%2C_administrative_divisions_%28%2Bdistricts%29_-_de_-_colored.svg, retrieved on 26.01.2020.



ANNEX 3: CENTRAL GERMAN TRANSPORT ASSOCIATION (ORANGE) WITH ITS NORTH-EXTENSION (OCHER) AND ITS EXTENSION PLUS (YELLOW)[20].

CALCULATION 1: CALCULATION OF BIKE-FLEET EXTENSION.

$$24\ [cargo\ bikes] = 680{,}000\ [inhabitants\ in\ LE] * 3\%\ [bikesharing\ user] * 10\%\ [cargo\ bike\ user] * \left(\frac{5}{365}\right)[uses\ per\ year] - 4\ [available\ cargo\ bikes] \quad (1)$$

$$100\ [E-bikes] \approx 45\ [E-bikes\ in\ GP] \Big/ \frac{15{,}410[inhabitants\ in\ the\ 3\ GP\ municipalities\ (2015)]}{680{,}000\ [inhabitants\ in\ LE]} * 5\%\ [users] \quad (2)$$

[20] Map based on: https://upload.wikimedia.org/wikipedia/commons/e/e5/Germany%2C_administrative_divisions_%28%2Bdistricts%29_-_de_-_colored.svg, retrieved on 26.01.2020.

$$201\ [child's\ seats] = \left(\frac{30{,}000\ [children\ below\ 6] * 1.35\ [growth\ rate]}{680{,}000\ [inhabitants\ in\ LE] *\ 3\%\ [bikesharing\ user] * 3\%\ [child's\ seat\ user]}\right) * \left(\frac{12}{365}\right)[uses\ per\ year] \quad (3)$$

CALCULATION 2: BIKES FOR THE BIKE POOL

$$4\ [sets] = 76\ [primary\ schools\ in\ Leipzig]/20\ [weeks\ suitable\ for\ road\ education] \quad (4)$$

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