GEFÖRDERT VOM



Bundesministerium für Bildung und Forschung



### Reducing CO2 Emissions in urban transport: Options for Bielefeld

Learnings from synthesis of best available evidence

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|             |        | Fuß            |    |        | Rad            |    |        | ÖPNV           |    | мі∨    | '-Mitfahr                  | er | МІ     | V-Fahre        | r  |
|-------------|--------|----------------|----|--------|----------------|----|--------|----------------|----|--------|----------------------------|----|--------|----------------|----|
|             | trip # | trip<br>length |    | trip # | trip<br>length |    | trip # | trip<br>length |    | trip # | averag<br>e trip<br>length |    | trip # | trip<br>length |    |
| Brackwede   | 20000  | 1.5            | 16 | 16000  | 5              | 12 | 16500  | 12             | 13 | 59400  | 9                          | 46 | 16500  | 12             | 13 |
| Dornberg    | 6700   | 1              | 10 | 12200  | 5              | 18 | 9300   | 11.5           | 14 | 29000  | 10                         | 44 | 9300   | 10.5           | 14 |
| Gadderbaum  | 5300   | 1.5            | 14 | 5000   | 4              | 14 | 5400   | 15             | 15 | 15600  | 7                          | 43 | 5400   | 13             | 15 |
| Heepen      | 23600  | 1.5            | 17 | 25200  | 5              | 18 | 16300  | 15             | 11 | 61000  | 7                          | 43 | 16300  | 12.5           | 11 |
| Jöllenbeck  | 10400  | 1.5            | 15 | 7300   | 6              | 10 | 7000   | 16             | 10 | 38200  | 10.5                       | 55 | 7000   | 14             | 10 |
| Mitte       | 67500  | 1              | 22 | 65200  | 3.5            | 22 | 40900  | 15.5           | 14 | 87400  | 15.5                       | 29 | 40900  | 16             | 14 |
| Schildesche | 17000  | 1.5            | 11 | 34700  | 4.5            | 23 | 28500  | 11             | 19 | 45200  | 7.5                        | 29 | 28500  | 14.75          | 19 |
| Senne       | 9200   | 1              | 13 | 8000   | 5              | 12 | 7700   | 23.5           | 11 | 35700  | 9                          | 52 | 7700   | 12.5           | 11 |
| Sennestadt  | 10900  | 1              | 15 | 7800   | 4              | 11 | 8400   | 13             | 11 | 37600  | 20.5                       | 51 | 8400   | 13             | 11 |
| Stieghorst  | 9300   | 1.7            | 9  | 12400  | 5              | 12 | 13300  | 15             | 13 | 55200  | 12.5                       | 53 | 13300  | 15.25          | 13 |



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|  |               | Fuß            |              |                  | Rad            |        |        | ÖPNV           |    | МІЛ    | -Mitfahr                   | er   | МІ     | V-Fahre        | e <b>r</b> |
|--|---------------|----------------|--------------|------------------|----------------|--------|--------|----------------|----|--------|----------------------------|------|--------|----------------|------------|
|  | trip #        | trip<br>length |              | trip #           | trip<br>length |        | trip # | trip<br>length |    | trip # | averag<br>e trip<br>length |      | trip # | trip<br>length |            |
| Brackwede                                      | 20000         | 1.5            | 16           | 16000            | 5              | 12     | 16500  | 12             | 13 | 59400  | 9                          | 46   | 16500  | 12             | 13         |
| с<br>G<br>H<br>C<br>J<br>M<br>C<br>I<br>S<br>S | ar sl<br>ties | nare<br>of s   | in E<br>imil | Bielef<br>ar siz | eld i<br>e     | s higł | ner a  | as co          | om | pare   | ed to                      | ) ot | her    | 10.5           |            |
| Sennestadt                                     | 10900         | 1              | 15           | 7800             | 4              | 11     | 8400   | 13             | 11 | 37600  | 20.5                       | 51   | 8400   | 13             | 11         |
| Stieghorst                                     | 9300          | 1.7            | 9            | 12400            | 5              | 12     | 13300  | 15             | 13 | 55200  | 12.5                       | 53   | 13300  | 15.25          | 13         |





### What are the different options to reduce transport related emissions?



| Intervention                    | Examples, subcategories  |
|---------------------------------|--|
| Infrastructure<br>interventions | Bike lanes, bike pathways, cycle tracks, bike boulevards, new<br>BRT line, new LRT line, PT service improvements, Bus Priority<br>Measures |
| Soft (policy)<br>interventions  | travel plans, personalized travel planning, travel awareness campaigns, public transport information marketing                             |
| economic policy<br>instruments  | Personal Carbon Trading, Mobility credits, Fuel tax, Parking fees, Congestion pricing, PT subsidies  |
| Rules & regulations             | TOD, parking regulations, zoning laws, speed limits,   |





# What are the different scenarios for reduction of transport related emissions in Bielefeld?

### **Bielefeld** emission reduction scenarios



Applied Sciences

Mercator Research Institute on

Global Commons and Climate Change

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| Intervention                      | Туре                       | Emissions reduction potential |  |  |
|-----------------------------------|----------------------------|-------------------------------|--|--|
| extension of bike lanes           | Infrastructure             | Medium                        |  |  |
| Bike lanes connectivity           | Infrastructure             | High                          |  |  |
| Density                           | Rules & regulations        | Medium to high                |  |  |
| Street connectivity and design    | Infra+ Rules & regulations | High                          |  |  |
| Parking and end use facilities    | Infra+ Rules & regulations | Medium                        |  |  |
| Car bans                          | Rules & regulations        | Medium                        |  |  |
| Pricing                           | Econ. policy instruments   | Medium                        |  |  |
| Individualized travel plans       | Soft policy instruments    | Low to medium                 |  |  |
| soft policy interventions         | Soft policy instruments    | Low to medium                 |  |  |
| Bike promotions                   | Econ. policy instruments   | Medium                        |  |  |
| E-bike (introduction & promotion) | Infra + legal              | Medium                        |  |  |









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| Intervention                                 | Туре                     | Emissions reduction potential |  |  |
|--|--------------------------|-------------------------------|--|--|
| PT extension                                 | Infrastructure           | High                          |  |  |
| Service connectivity                         | Infrastructure           | High                          |  |  |
| increase in service frequency/reliability    | Infrastructure           | Medium                        |  |  |
| price reduction for<br>different groups (PT) | Econ. policy instruments | Low to medium                 |  |  |
| Parking fees                                 | Econ. policy instruments | Medium                        |  |  |
| Pricing                                      | Econ. policy instruments | Medium                        |  |  |
| Individualized<br>marketing and<br>promotion | Soft policy instruments  | Low to medium                 |  |  |
| Soft PT<br>improvements                      | Soft policy instruments  | Low to medium                 |  |  |
| ICT integration                              | Soft policy instruments  | Low                           |  |  |
| Density                                      | Rules & regulations      | High                          |  |  |





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| Intervention                        | Туре                                       | Emissions reduction potential |  |  |  |
|-------------------------------------|--|-------------------------------|--|--|--|
| Density promotion                   | Rules & regulations                        | Medium to high                |  |  |  |
| Street connectivity and design      | Infrastructure<br>+ Rules &<br>regulations | High                          |  |  |  |
| Pricing                             | Econ. policy instruments                   | Medium                        |  |  |  |
| Parking fees                        | Econ. policy instruments                   | Medium                        |  |  |  |
| Car bans                            | Rules & regulations                        | Medium                        |  |  |  |
| Speed limits                        | Rules & regulations                        | Medium                        |  |  |  |
| Individualized travel plans         | Soft policy instruments                    | Low to medium                 |  |  |  |
| Recreational and walking facilities | Infrastructure                             | Low to medium                 |  |  |  |
| Personal Carbon<br>Trading          | Econ. policy instruments                   | Medium                        |  |  |  |





## What can be done to reduce transport related emissions in Bielefeld?



#### Public transit (Tramline) extension



< Source: Alternatives for the prolongation of line 1 | © moBiel https://www.urban-transport-magazine.com/en/additional-high-level-platforms-androute-extensions-for-stadtbahn-bielefeld/ >

- the mode shift from car to PT is estimated to be on average 22.0 (±14.3) percentage points
- this impact can be enhanced on the margins by improvements in soft factors, (such as user focused measures of comfort & safety) and better information provision





### Bike lanes, Cycle tracks, Bike paths

Intersections, traffic light crossings

- 10/15 kms of additional bike infrastructure may lead to ~10% increase in bike share
- important for ensuring that bicycle users feel secure
- However, harder to determine whether they have a substantial impact on attracting new users





#### Bike promotion interventions

- "Information campaigns & One-off events" can lead up to 1-5% change in mode share.
- Best estimates for Individualized Marketing campaigns show that these campaigns can reduce car use by 0.5-2% percentage points.
- on average TFP in school setting can reduce car-use by 2-5% percentage points



### **Summary**





Improvements **in transport infrastructure** are important for reducing transport related emissions reduction the impact of infrastructure can be enhanced when paired with **soft interventions** such as targeted promotion and marketing

**Push policies** such as restrictions on parking spaces, car-free zones, low-speed zones are crucial for restricting car use

