UN-GGIM: Europe webinar

Showcasing the added-value of geospatial and statistical data integration to compute SDG indicators

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UN-GGIM EUROPE | UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

SDG indicator 11.2.1

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UN-GGIM: Europe website:
https://un-ggim-europe.org/

SDG 11.2.1
Core indicator

SDG indicator analysis – 11.2.1

Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

DEFINITION

- Aims to monitor the use and access of public transportation systems
- The global metadata proposes the access to public transport to be “convenient” when a stop is in walking distance of 0.5 km from a reference point such as a home, school, work…

FINDINGS

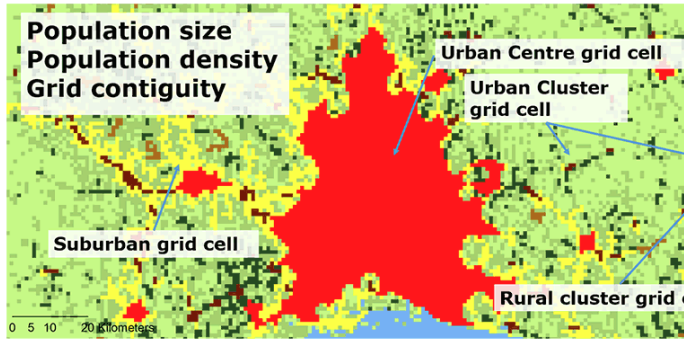
- Low level of divergence in methodology between countries and between national and European level
- Pan-european geospatial data sources are available → Copernicus Urban Atlas, GHSL-BUILT, GHSL-POP...
- Four dimensions have to be tackled for indicator computation:
  - Delimitation of urban areas
  - Identification of public transport stops
  - Creation of service areas
  - Identification of the population served [comparative study showed small differences between using point-based population data versus gridded population data downscaled to Urban Atlas polygons]

SDG indicator analysis – 11.2.1

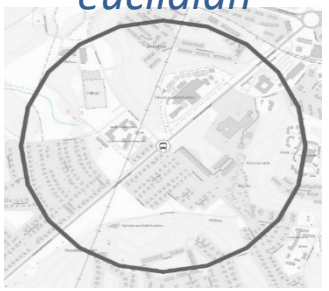
Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

RECOMMENDATIONS

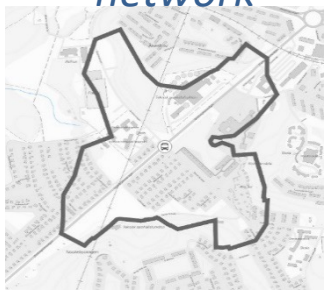
- **Delimitation Urban areas:** Use Global/European harmonised geographies → Degree of Urbanisation to enable international comparisons
- **Public transportation stops:** Use authoritative datasets with stops locations and scheduled timetables for all/major public transport in country/region if possible (discard those with low, irregular, seasonal frequency) and cluster stops very close to each other (e.g. 50 m) to create more homogeneity in the data and enhance comparability
- **Service areas:** Use network distance calculations to define service areas. But only if available network data has good quality! If not, Euclidian distance calculation is better/more stable.
- **Population data at the highest possible spatial resolution:** Point-based data is preferred (more accurate and easier to use). If not accessible, optimised disaggregation processes may be a suitable alternative.



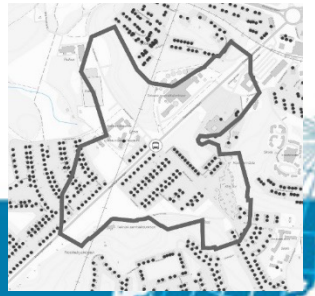
euclidian



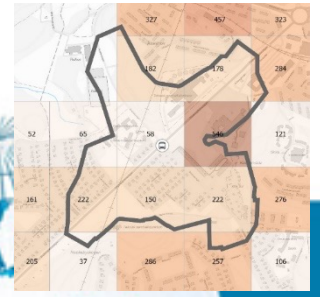
network



point-based data



grid cells



SDG 11.2.1
Extending the indicator framework

Indicator 11.2.1: population segmentation?

- Indicator 11.2.1: Proportion of population that has convenient access to public transport by sex, age and persons with disabilities

  - Core indicator: how many people live within walking distance to a public transport stop?

  - Location of population by sex, age,…?

  - Accessibility of stops and vehicles by people with reduced mobility?



population
+ street network
+ stops location

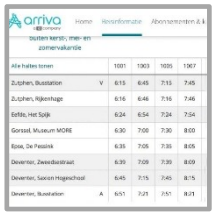
+ population characteristics

+ transport timetables

Are frequent public transport services available nearby?

- Population distribution according to the number of departures at nearby stops and stations
  - 500 m to bus or tram
  - 1 km to metro or train
- Summarised in a typology of frequency of departures: to which level of services frequency do people have easy access?



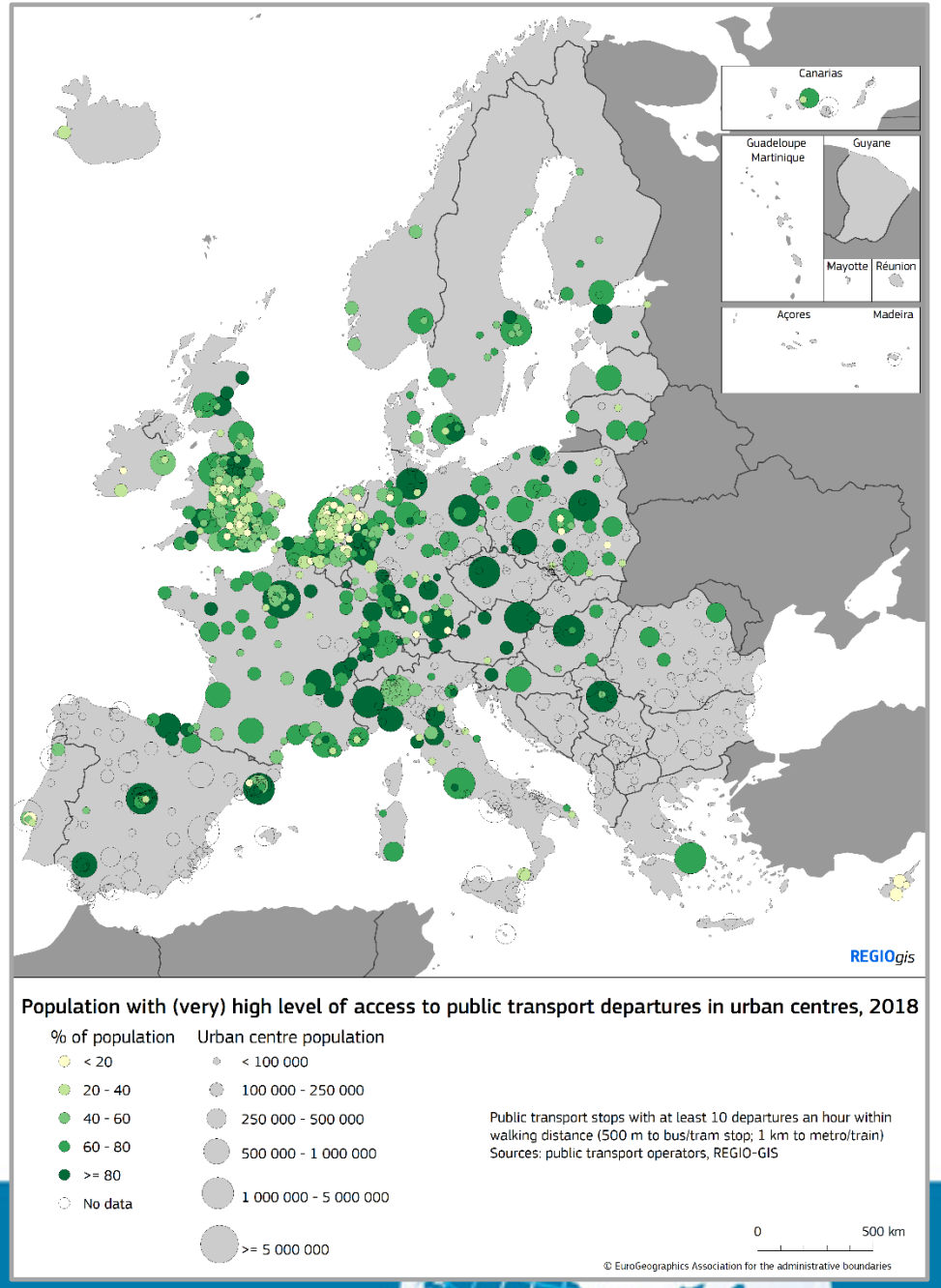



population
+ street network
+ stops location
+ timetables

		Metro and train			
		High frequency (> 10 dep./hour)	Medium frequency (between 4 and 10 dep./hour)	Low frequency (less than 4 dep./hour)	No services
Bus and tram	High frequency (> 10)	**VERY HIGH**	**HIGH**	**HIGH**	**HIGH**
	Medium frequency (4 to 10)	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**
	Low frequency (< 4)	**HIGH**	**MEDIUM**	**LOW**	**LOW**
	No services	**HIGH**	**MEDIUM**	**LOW**	**NO ACCESS**

Population with (very) high frequency of departures within walking distance

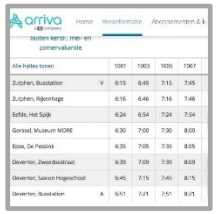
- Share of population having access - within walking distance - to stops where at least 10 departures an hour are available



How does public transport perform in providing access to people within a certain area?

- **Performance = accessibility / proximity**
- **Performance**: the share of population in a certain radius that can be reached within a certain travel time (%)
  - Applied to grid-based urban centres (a.k.a. high-density clusters)
  - For trips up to 30 minutes within 8 km radius
  - For trips up to 45 minutes within 12 km radius

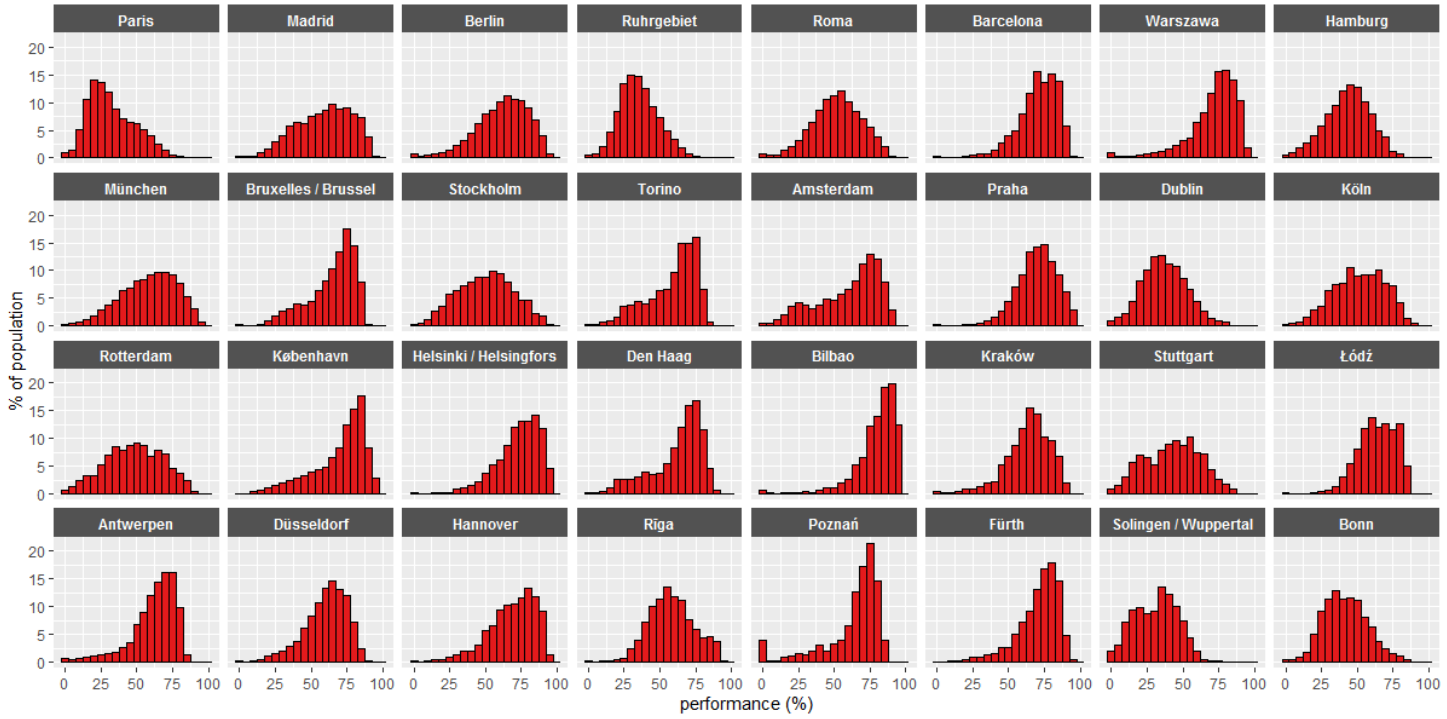


population
+ street network
+ stops location
+ timetables
+ public transport routes

Performance profiles by urban centre

- Population by level of transport performance for trips starting at their residence
- Summary performance metric by urban centre:
  - Population-weighted average of the grid-based performance figures



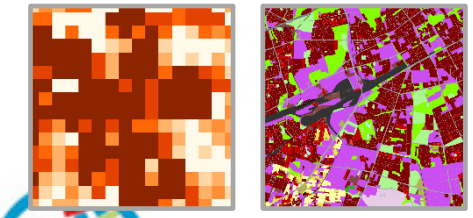
Share of population by level of performance (for trips up to 45 min.) in urban centres with more than 500 000 inhabitants

Population distribution and spatial structure of the city

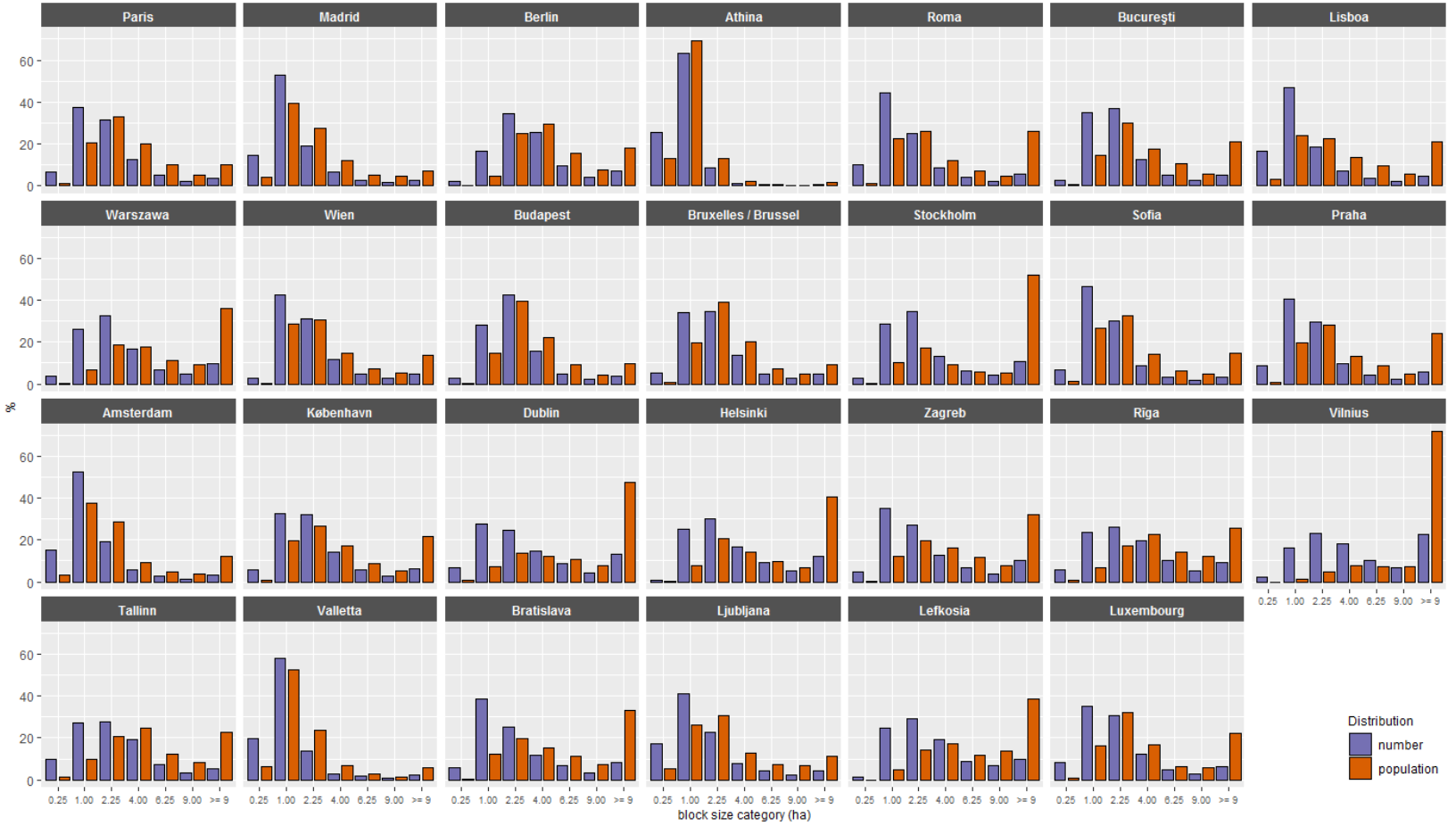
- How does the structure of a city facilitate access to public transport?
- Does population density allow for an efficient public transport provision?
- Additional indicators can help to provide answers.
  - Distribution of population by block size (block = an area surrounded by streets) as a proxy of walkability of the city, facilitating walking access to destinations
  - Share of population living in areas with (very) high population density, allowing for a more cost-efficient provision of public transport

Population by the size of urban blocks

- Urban block = an area surrounded by streets
- Number of blocks by block size
- Population distribution by block size



population
+ land cover layer
(or street network)

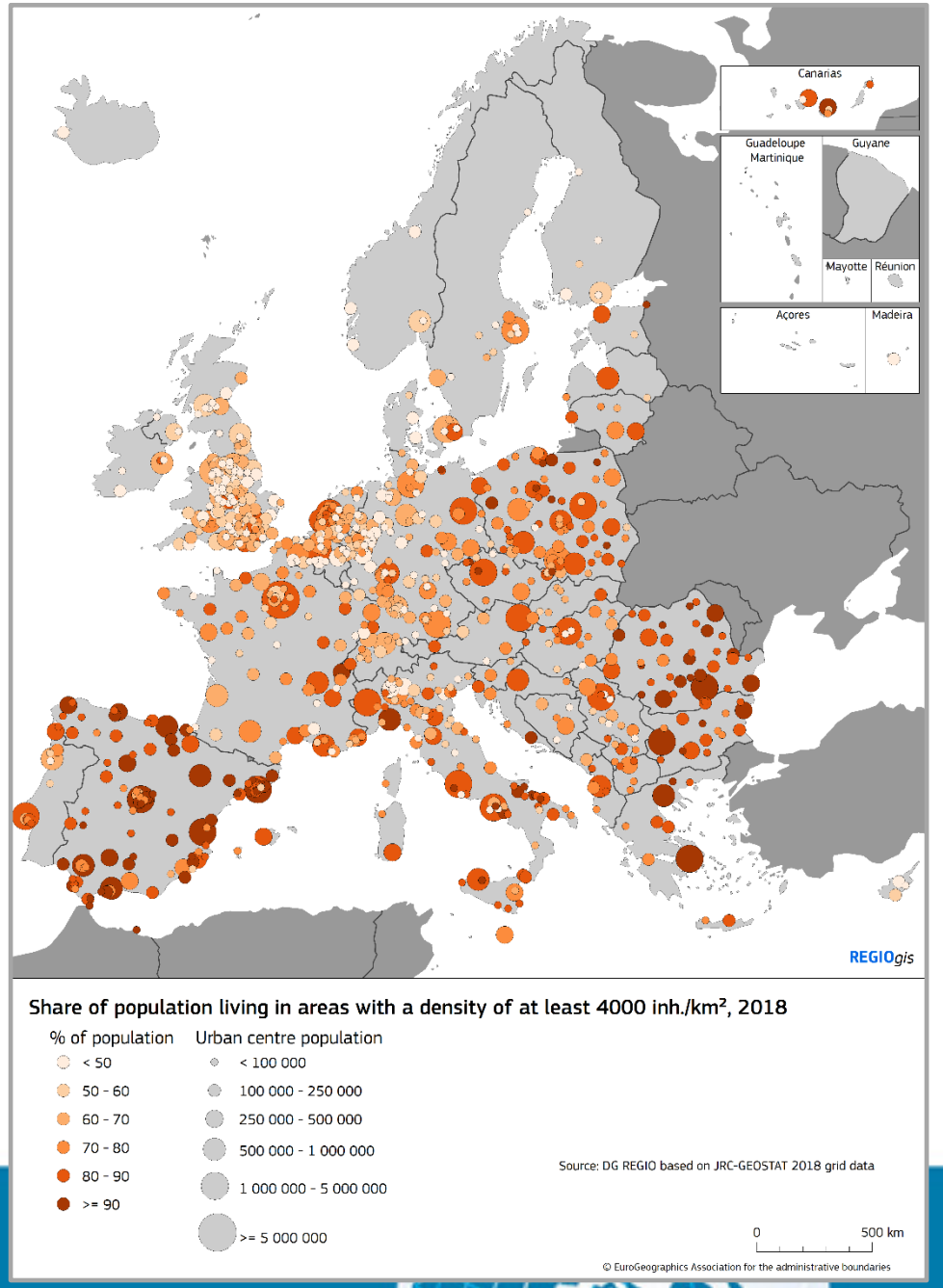


Share of the number of blocks and their population by block size category in EU capital cities (DG REGIO based on Copernicus Urban Atlas 2018)

Population in areas with (very) high density

- Share of population in areas (grid cells) with a density of at least x inh./km²

population by grid cell



Concluding remarks

- Indicators on access to the public transport system, accessibility and performance can be combined in a single, flexible indicator framework
- Data requirements vary according to the different components of the framework
  - The framework can be built up progressively, relative to the availability of required data sources
  - Continued promotion of open, machine-readable data, in particular on timetables and related public transport characteristics is required

References

- SDG 11.2.1 metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-11-02-01.pdf
- Assessing performance of urban public transport using grid data (EC DG REGIO technical paper): https://ec.europa.eu/regional_policy/sources/work/assessing_performance_of_urban_public_transport_using_grid data.pdf

  Interactive map: https://ec.europa.eu/regional_policy/assets/scripts/map/regio-gis-maps/public_transport/city_acc_grid.html
- Measuring urban accessibility for low-carbon modes (EC DG REGIO working paper) https://ec.europa.eu/regional_policy/information-sources/publications/working-papers/2020/low-carbon-urban-accessibility_en

THANK YOU!

Questions?

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