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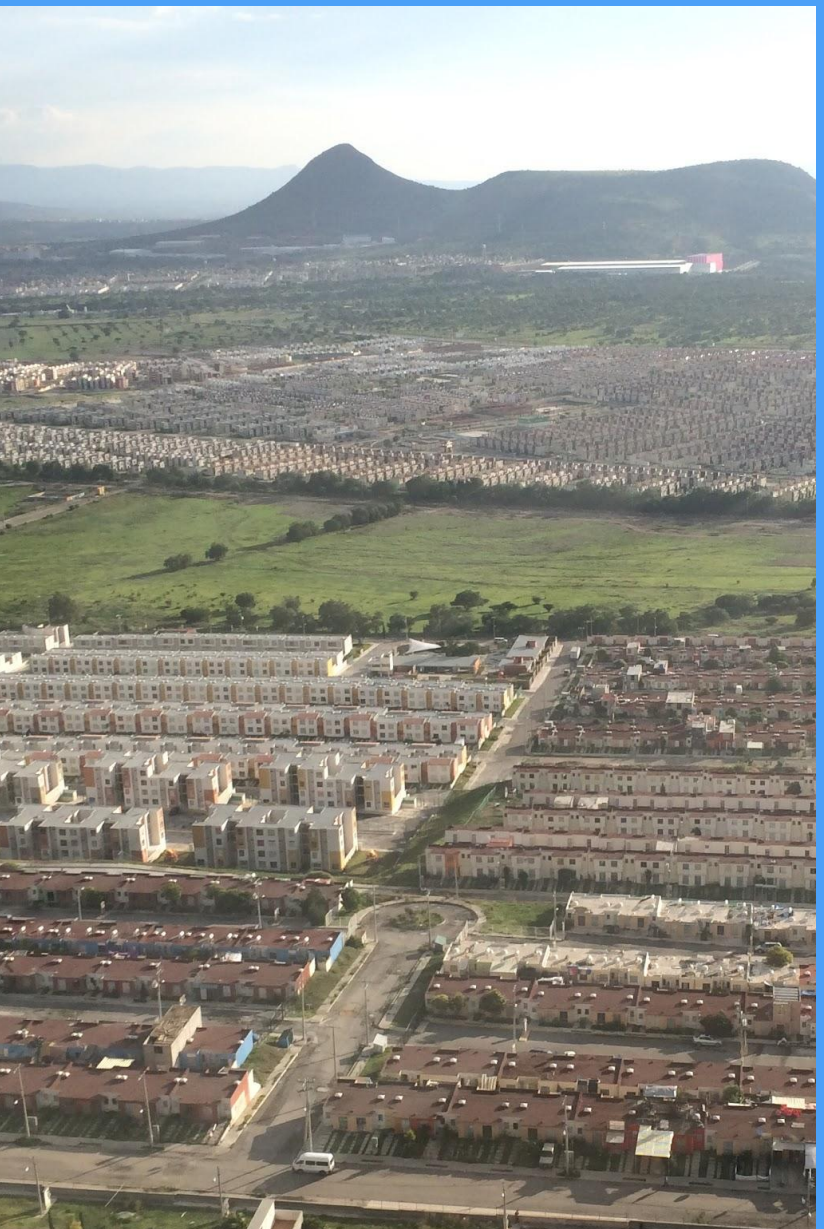

Measuring accessibility with open source tools

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ITDP México

March, 2022

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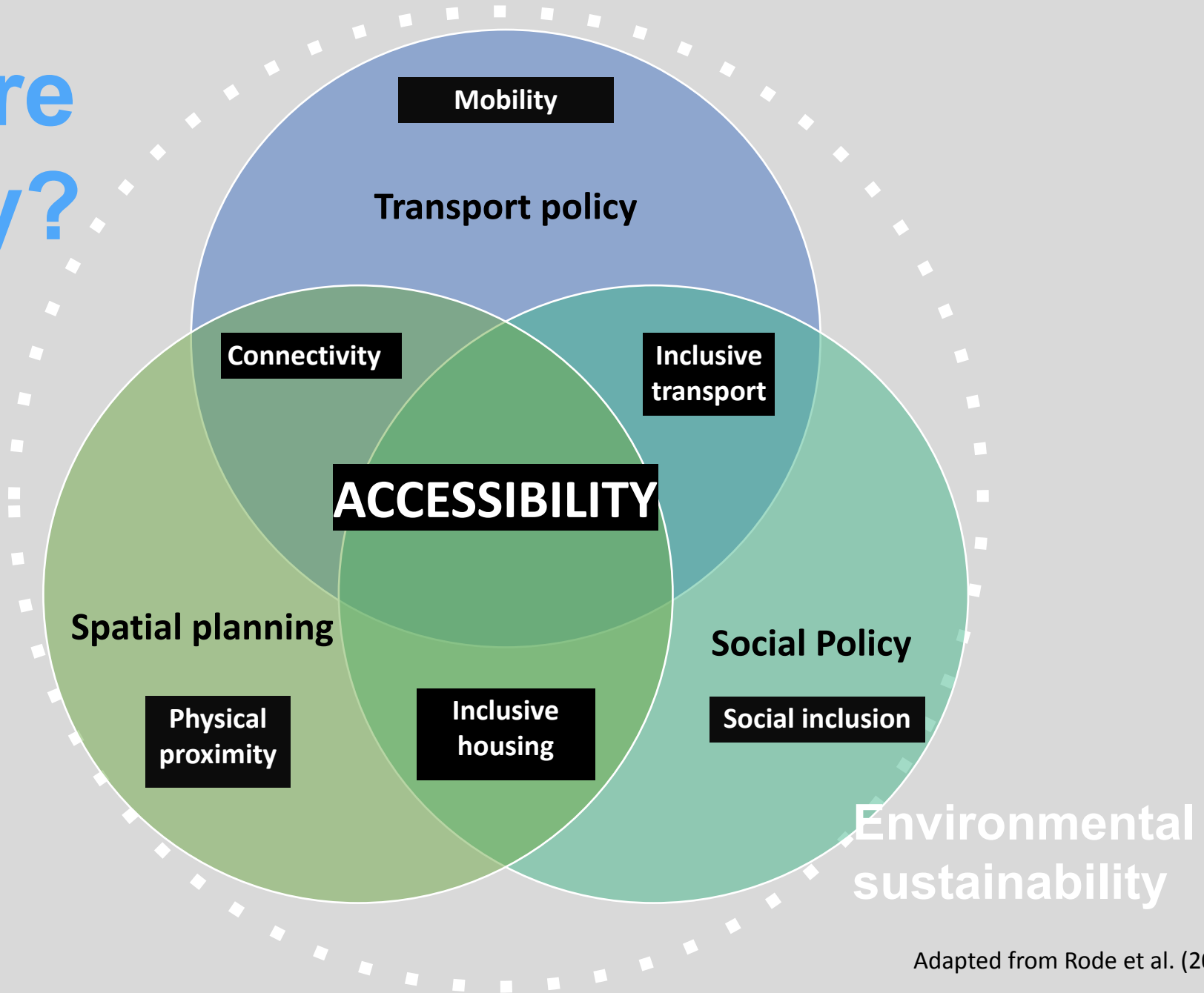
Measuring accessibility with open source tools

- Why measure access?
- How to translate access principles to policy?
- Measuring access
- Tools and data
- Applications for policy makers
- Overview of open source tools
- Next steps and challenges

Why measure accessibility?

Align multidimensional policy goals



Adapted from Rode et al. (2019)

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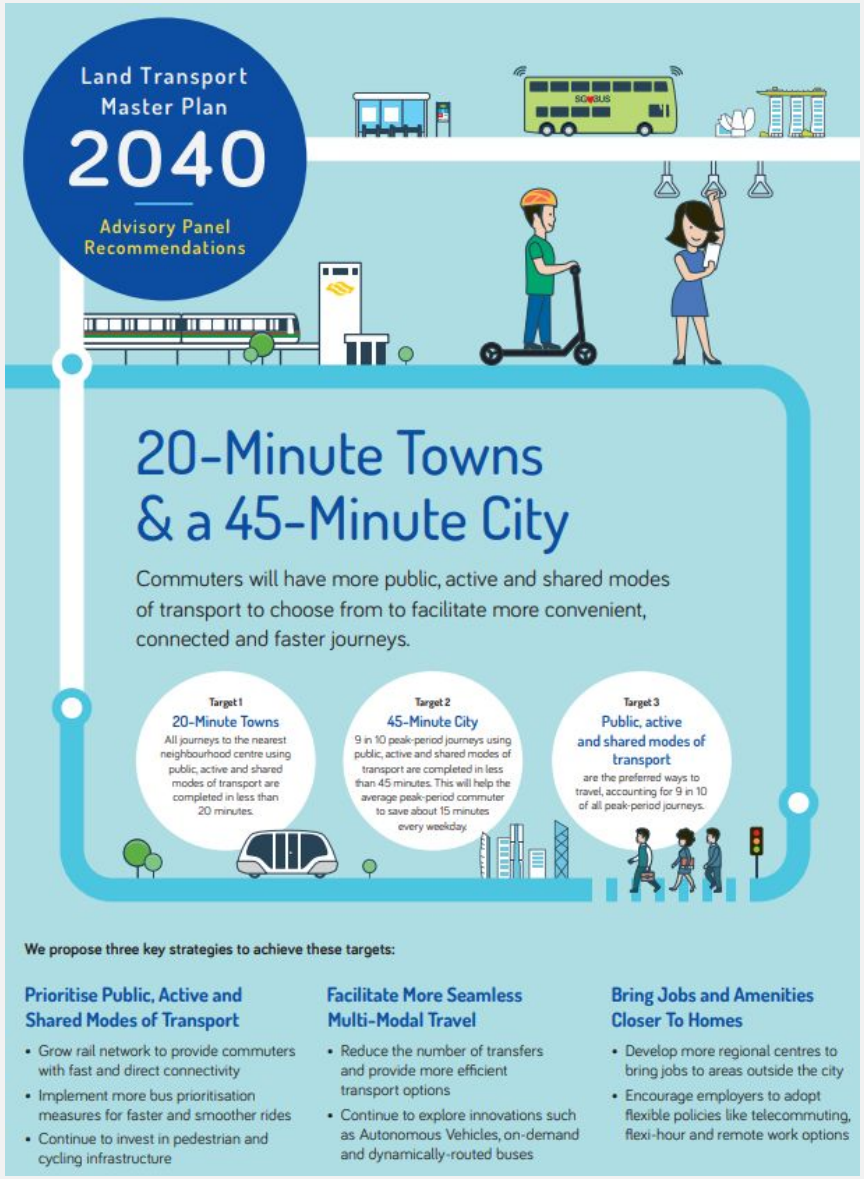
How to translate access principles into policy?

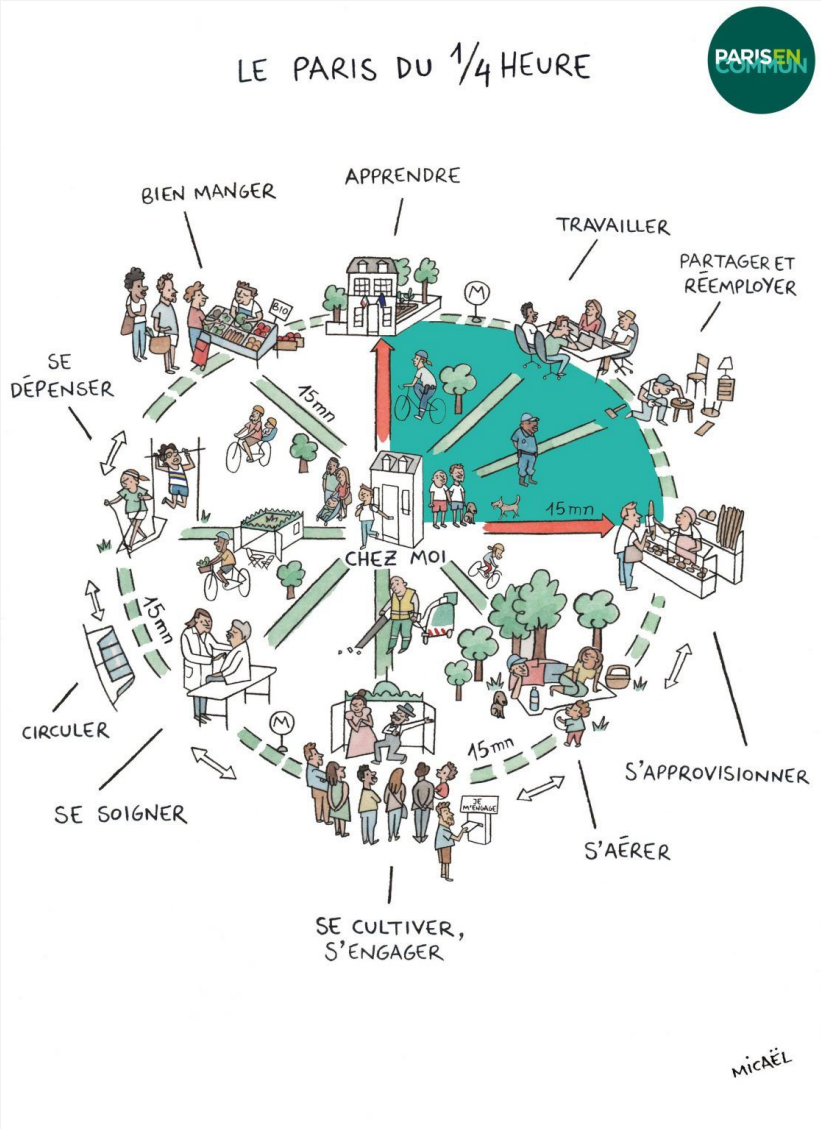
Some cities are setting accessibility goals.

Singapore, Paris, Sydney, Melbourne, …

How to keep track of progress?

How to align incentives?



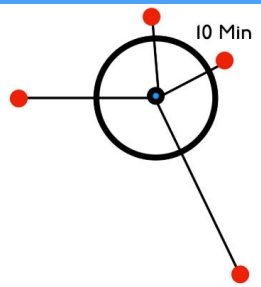


Measuring access

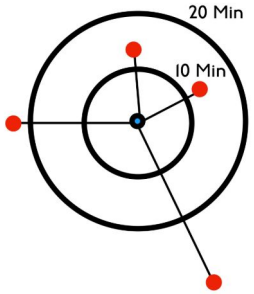
Cumulative opportunity indicators

Number of things you can reach in a given time threshold, under specific travel conditions.

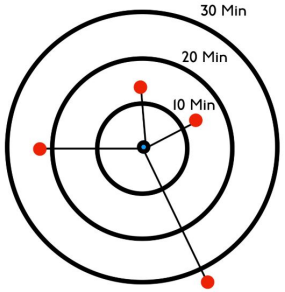
"Rings of opportunity" (Levinson, 2017)



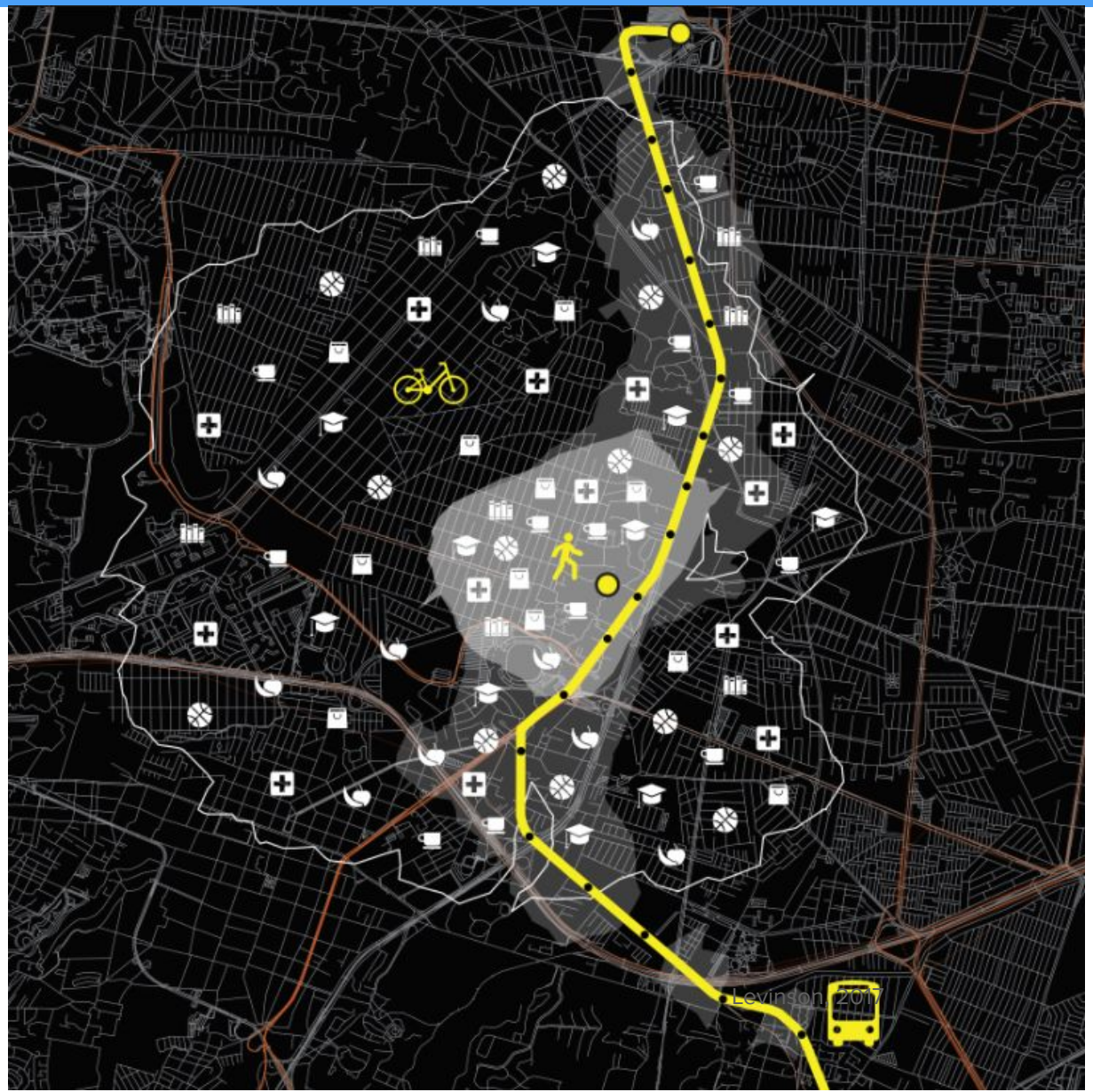
10-minute accessibility: 0



20-minute accessibility: 2



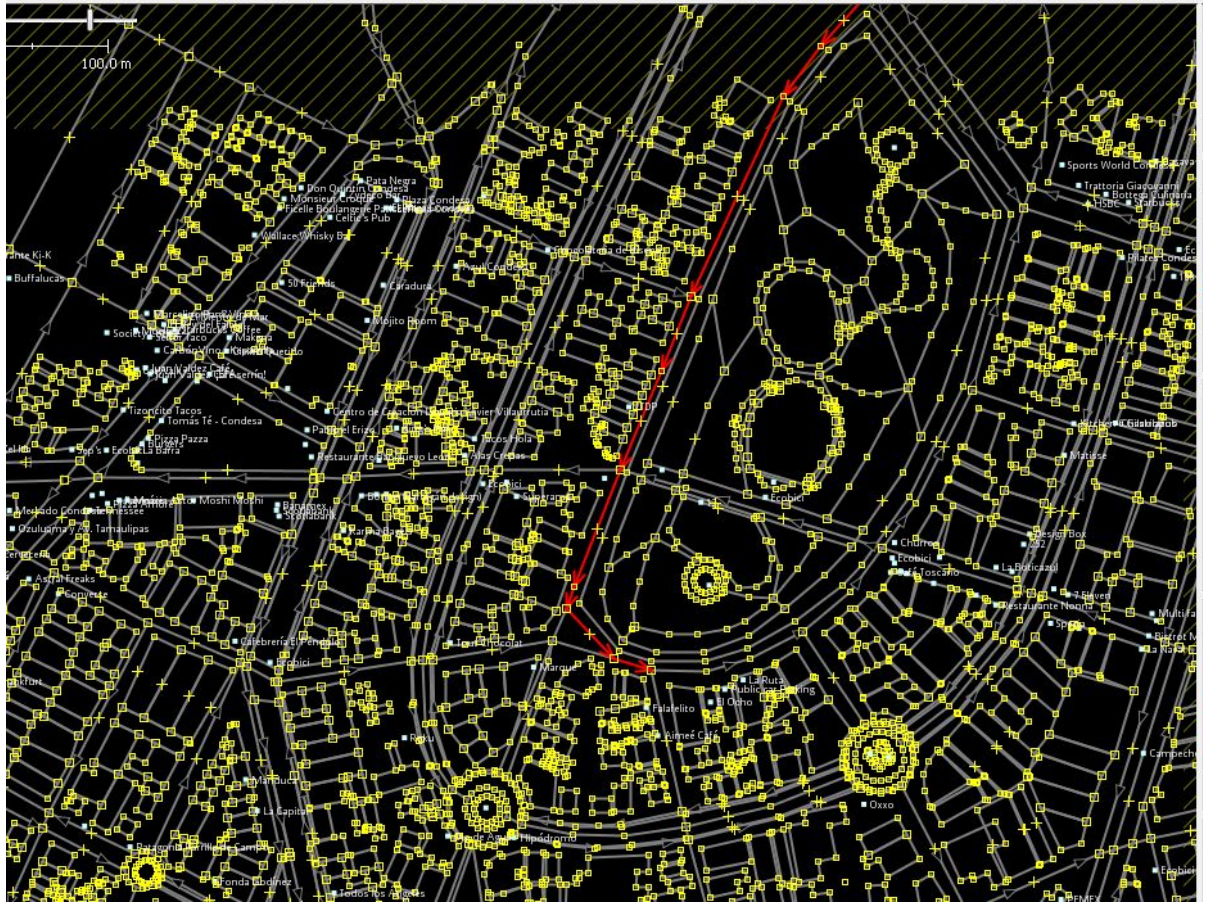
30-minute accessibility: 3



Tools for policy makers

Open data and open-source software:

- **Transit system data**: GTFS
- **Street network data:** OpenStreetMap
- **Traffic data:** Waze CCP
- **Spatial data:** Open, high-resolution global population maps (Worldpop)
- **Open-source software**: Python, R, OpenTripPlanner, URMO (DLR),
- **Software add-ons:** QGIS, Network Analyst (ArcMap), Urban Network Analytics Toolbox (Rhino)



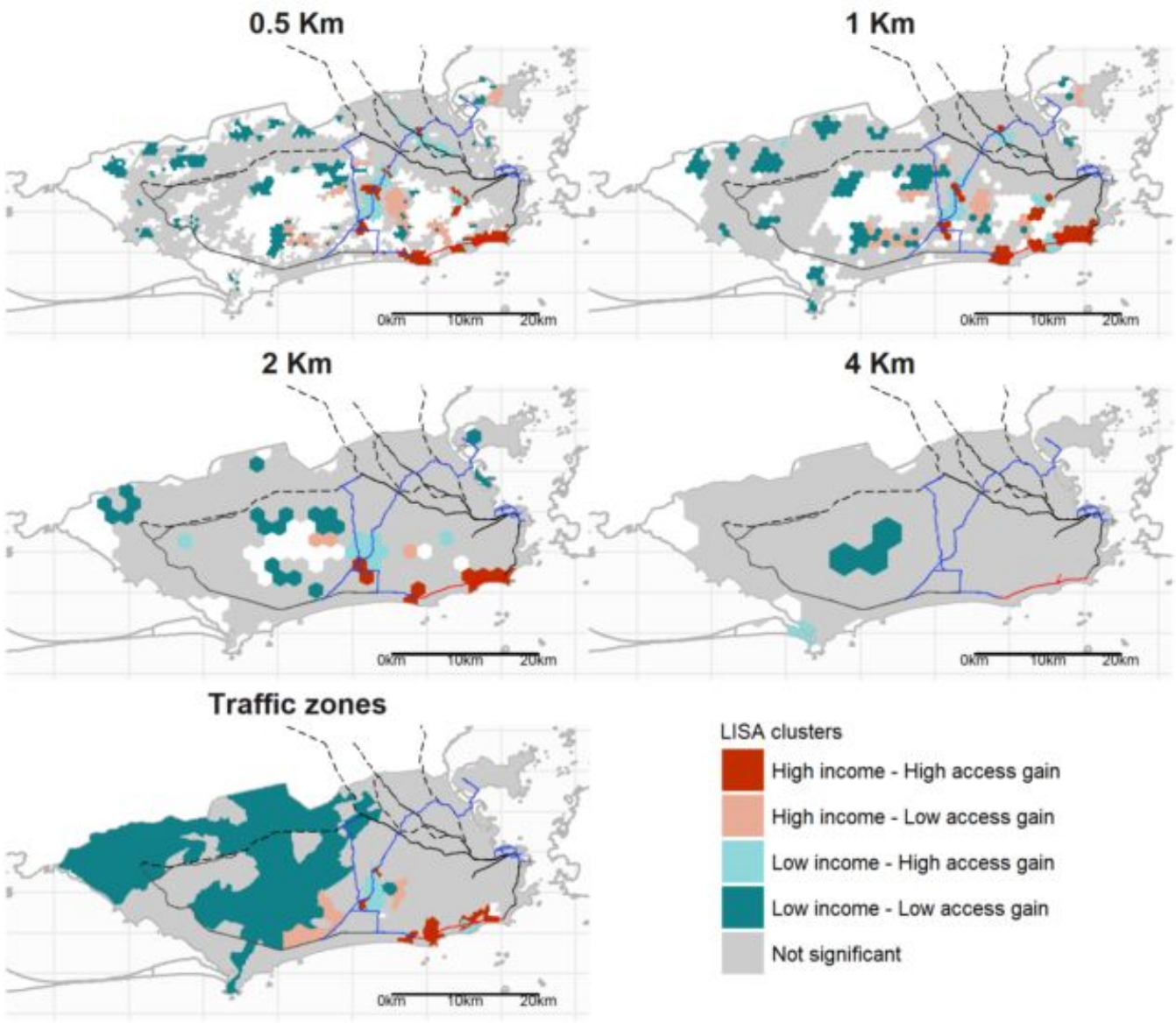
https://josm.openstreetmap.de/

Applications for policy makers

Evaluating transport impacts:

Did new BRT corridors increase or decrease access to lower-income people in Rio?

Infrastructure investments related to the 2014 World Cup and the 2016 Olympic Games, combined with cuts in service levels could have reduced average accessibility levels in Rio. (Pereira, 2018)

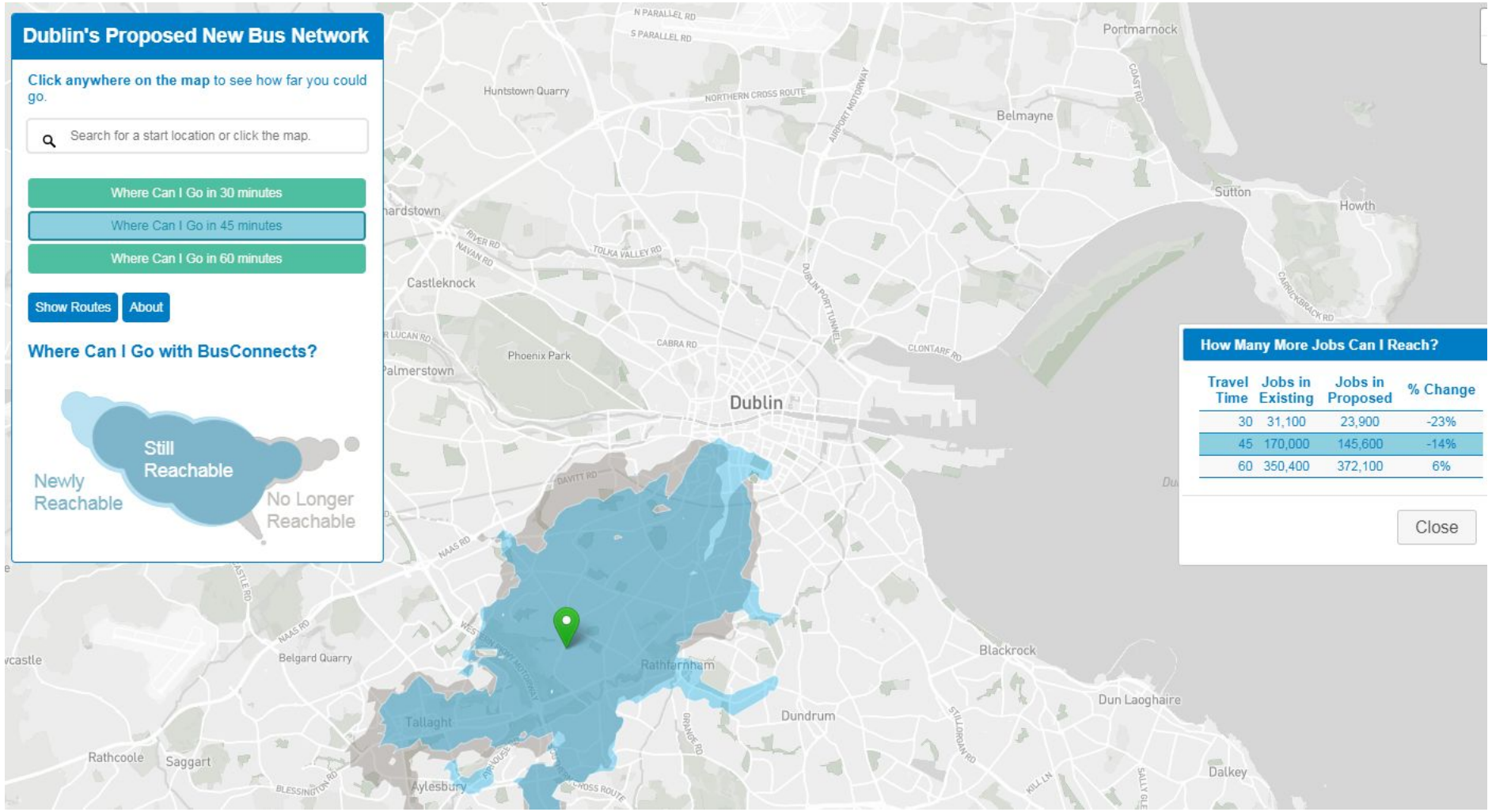


Applications for policy makers

Communicate impacts in transport policy to the public

Visualizing changes in service.

Busconnect, Irish National Transport Agency (2018)



https://busconnects.ie/initiatives/dublin-area-bus-network-redesign/

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Applications for policy makers

Accessibility standards for social housing

INFONAVIT, Mexico´s largest housing lender and introduced accessibility and mobility considerations for new housing developments.

Lack of accessibility had brought problems. In some areas, up to 70% of INFONAVIT financed housing was abandoned

These new rules, which will come into effect in May 2022, set criteria for credit lending for homes. To be eligible for credit, a house needs to be at least 30 minutes from:

- schools,
- clinics,
- grocery stores,
- recreation, and
- employment.

INFONAVIT

Open-source tools

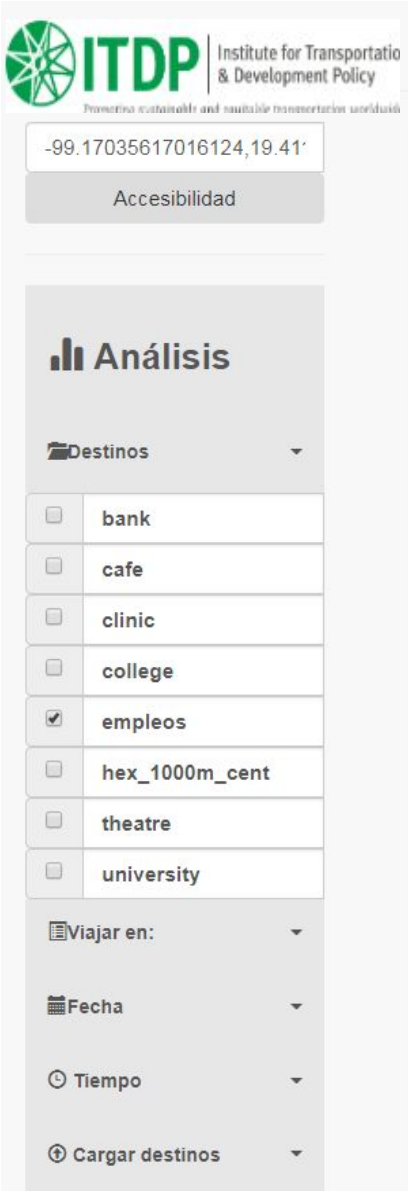
Open-source accessibility calculator ITDP Mexico (2017)

Data sources:

- OpenStreetMap
- GTFS
- Location data

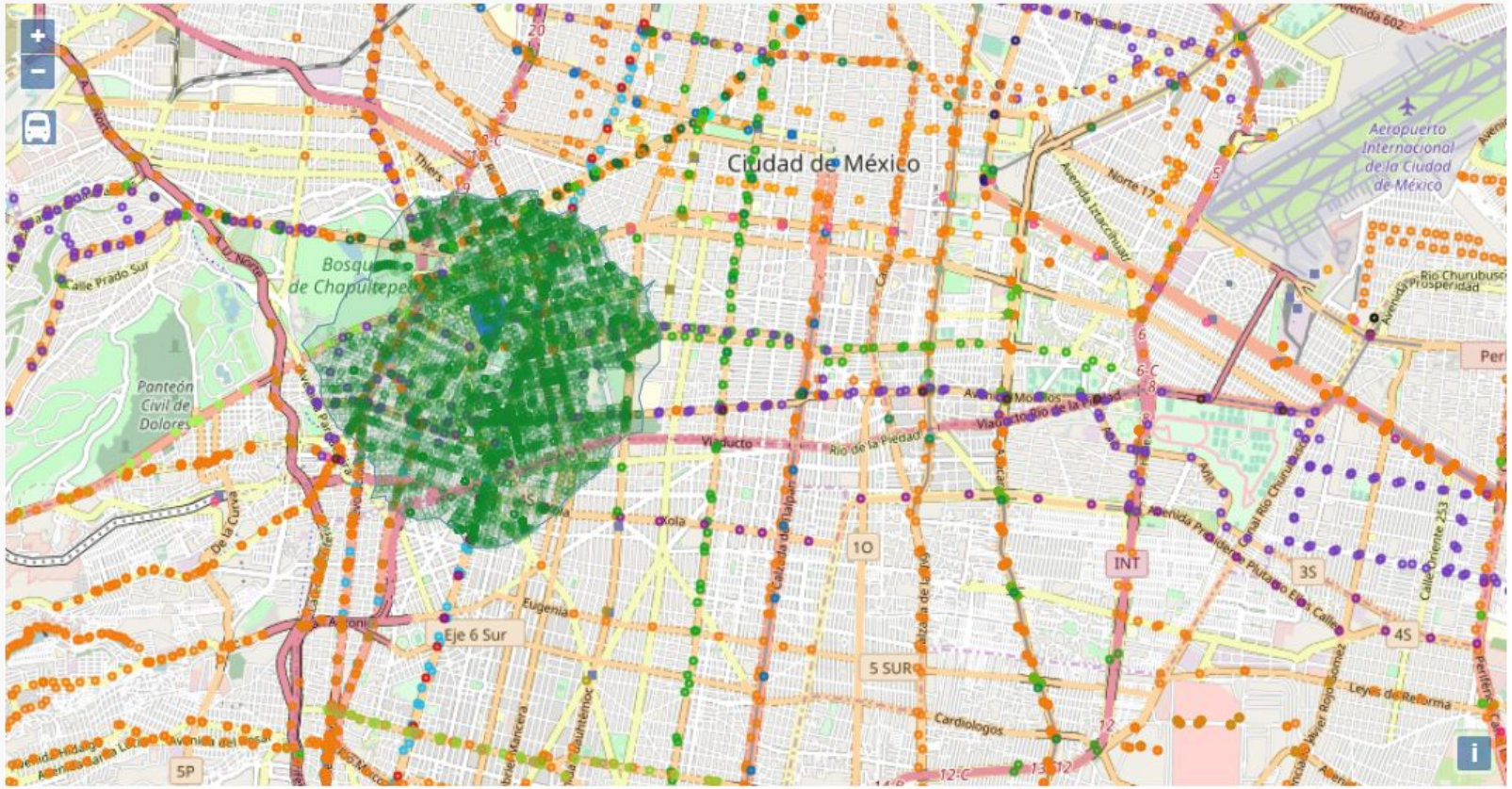
Open software tools:

- OpenTripPlanner
- Python app
- R



-99.17035617016124,19.41

☐ bank
☐ cafe
☐ clinic
☐ college
☑ empleos
☐ hex_1000m_cent
☐ theatre
☐ university



Jobs reachable walking 30 minutes: **248,592**

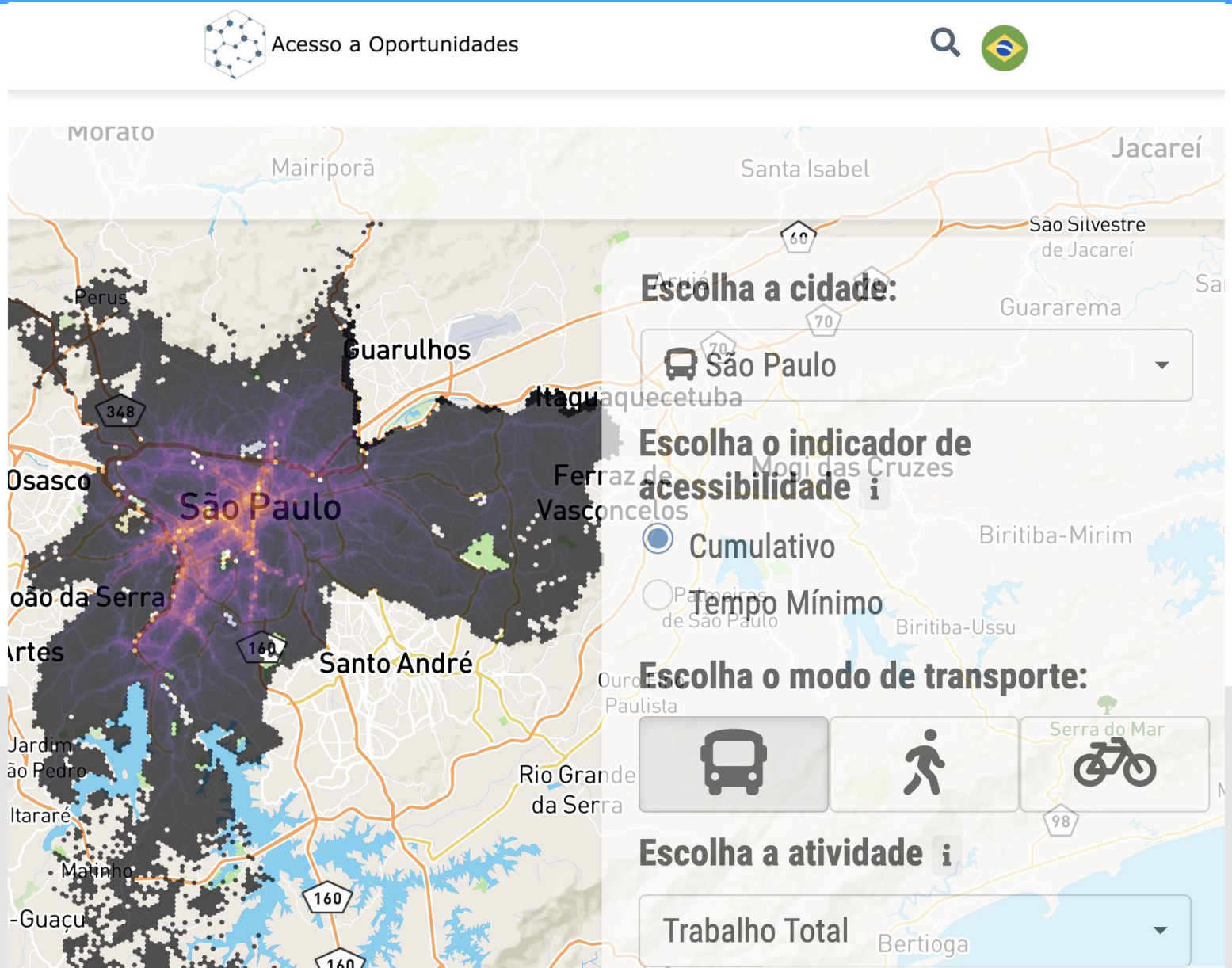
Open-source tools

Acesso a Oportunidades

Access visualization for Brazilian cities

IPEA & ITDP Brasil (2019)

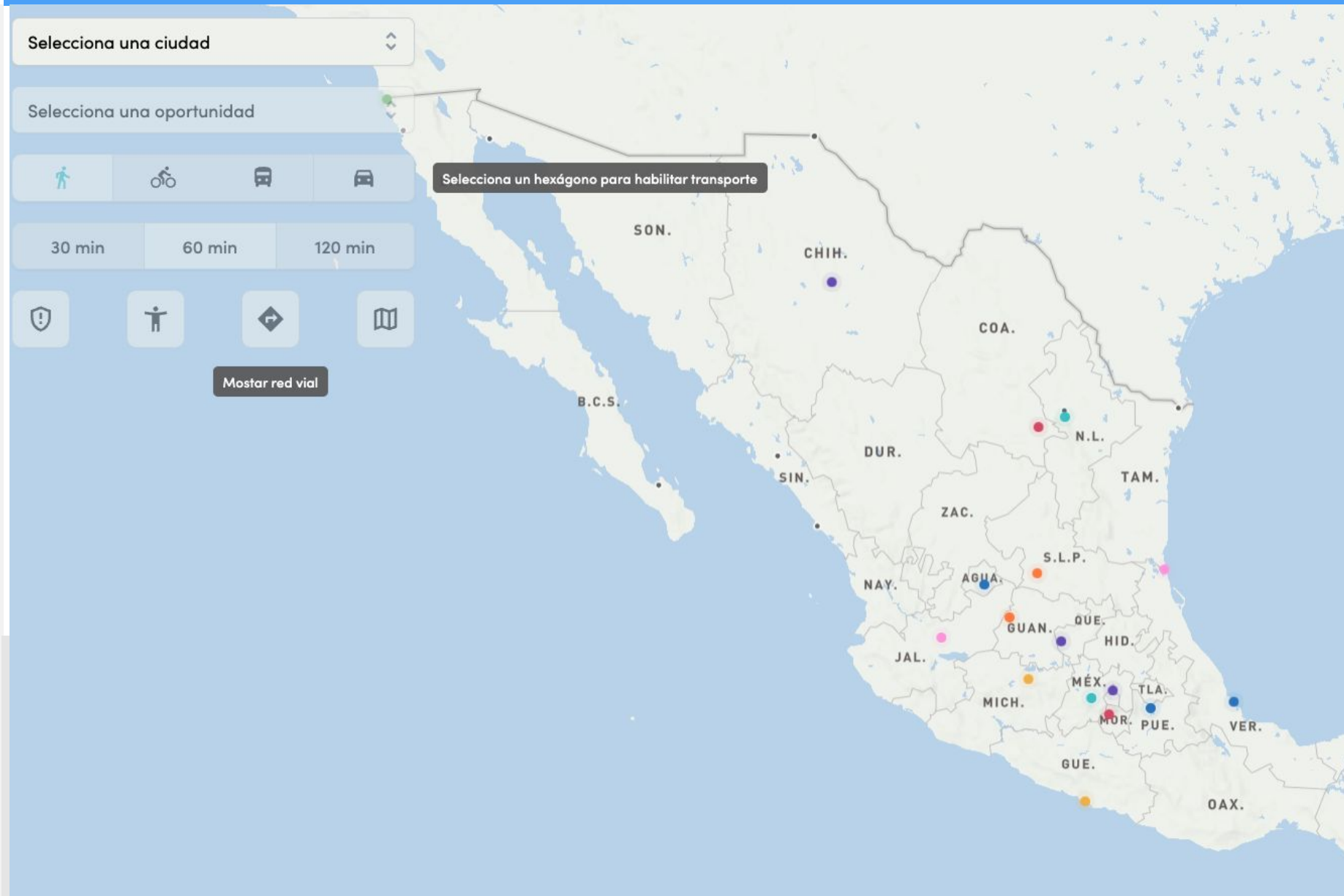
https://www.ipea.gov.br/acessooportunidades/en/



Open-source tools

ITDP Mexico (2022, upcoming)

- Visualization tool for 20 largest cities in Mexico
- Open source data and software.



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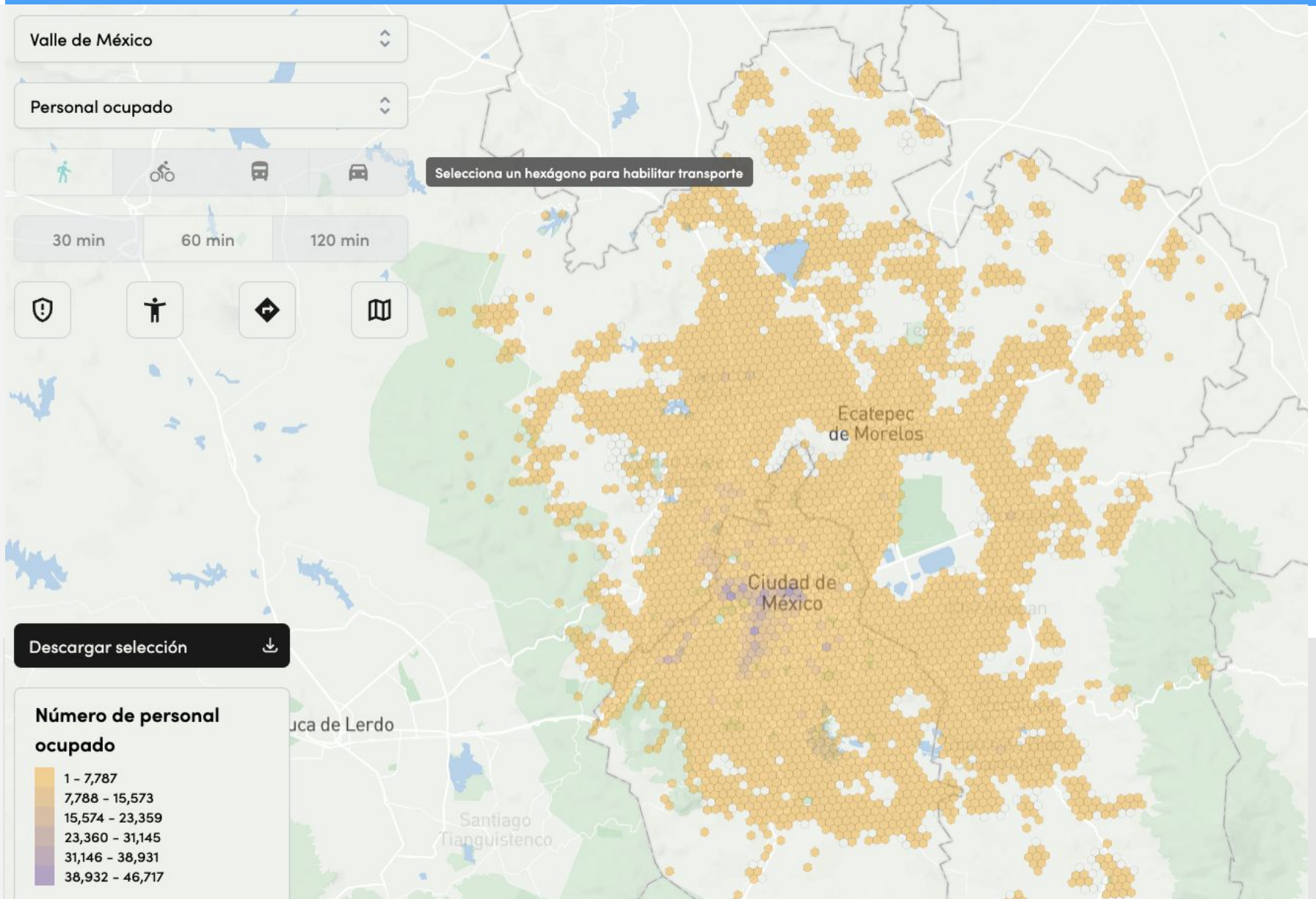
Open-source tools

- Multimodal: walking, cycling, transit, car (congested)
- Different time thresholds
- Different destinations (jobs, clinics, schools, ...)



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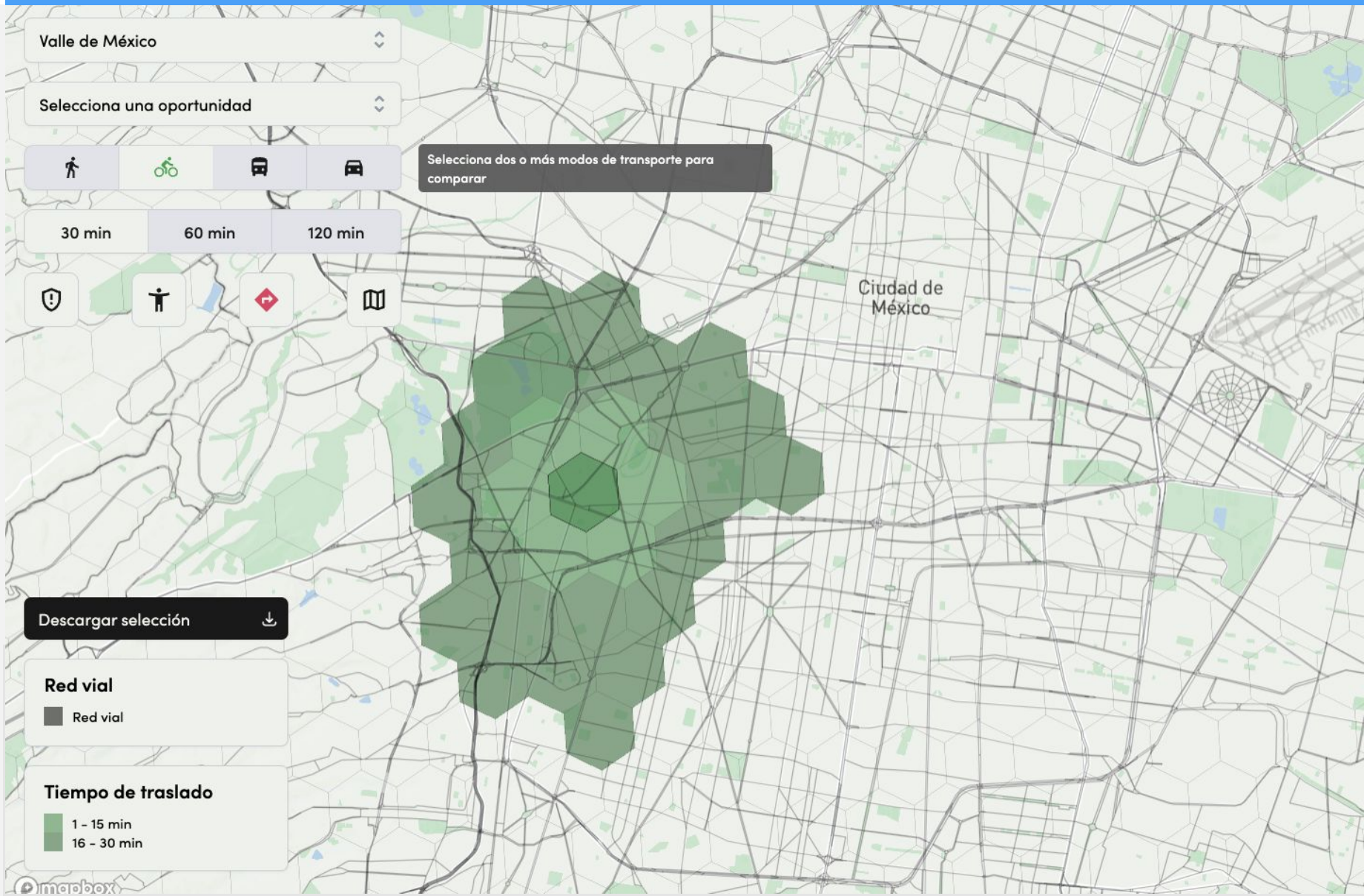
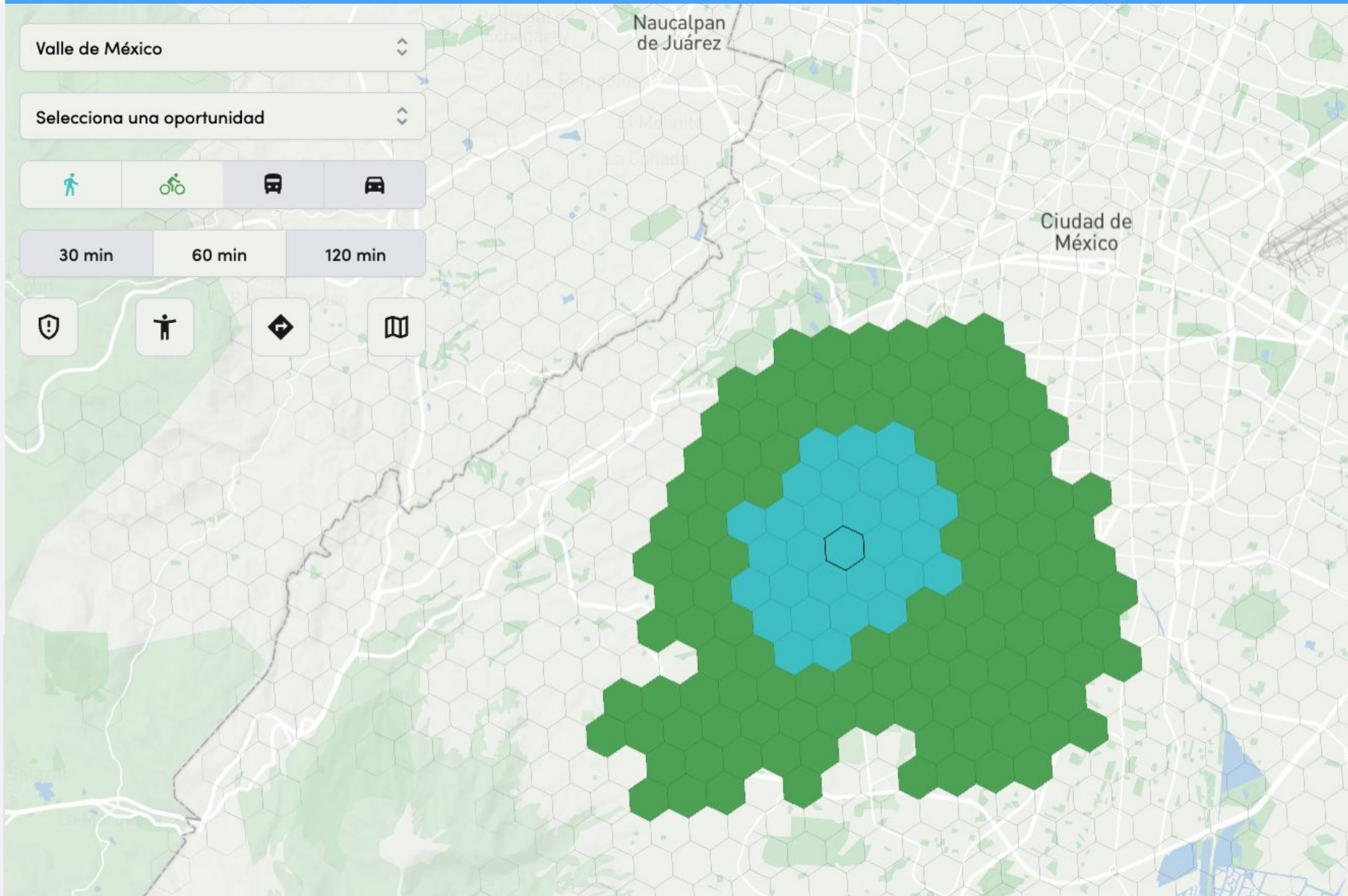
Open-source tools

- Visualizing reachable areas, and opportunities within it.

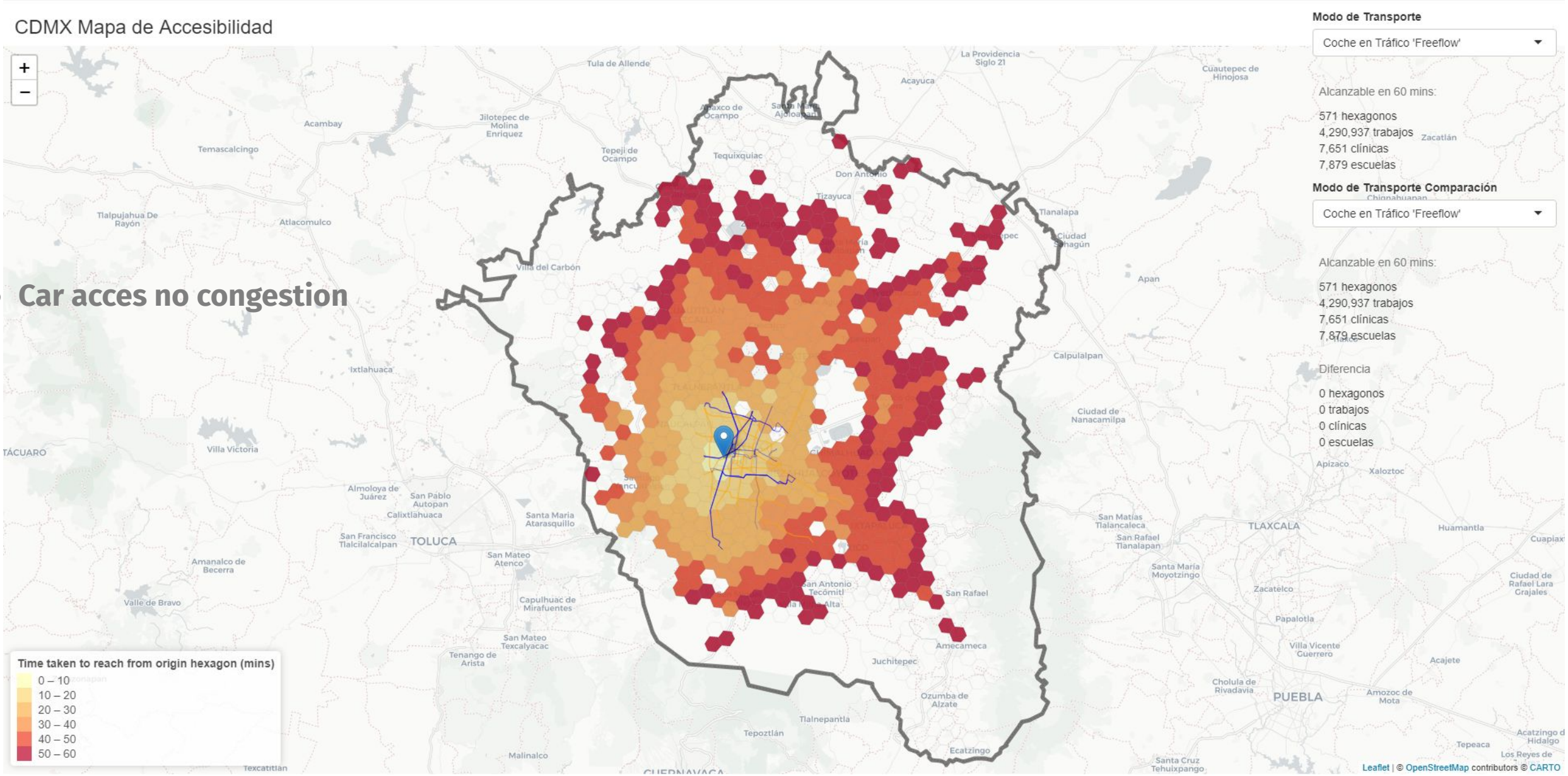


Open-source tools

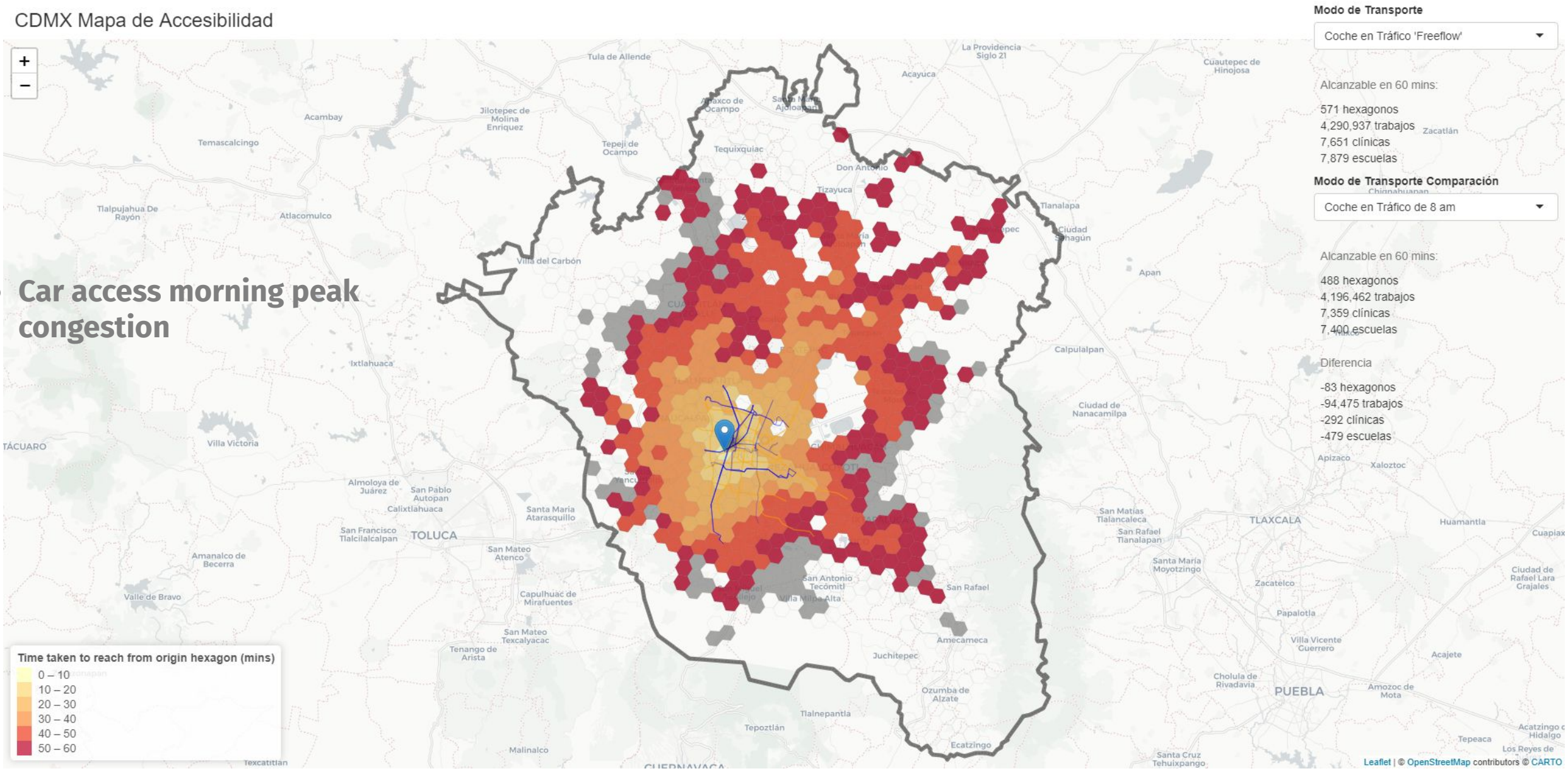
- Comparison of different scenarios



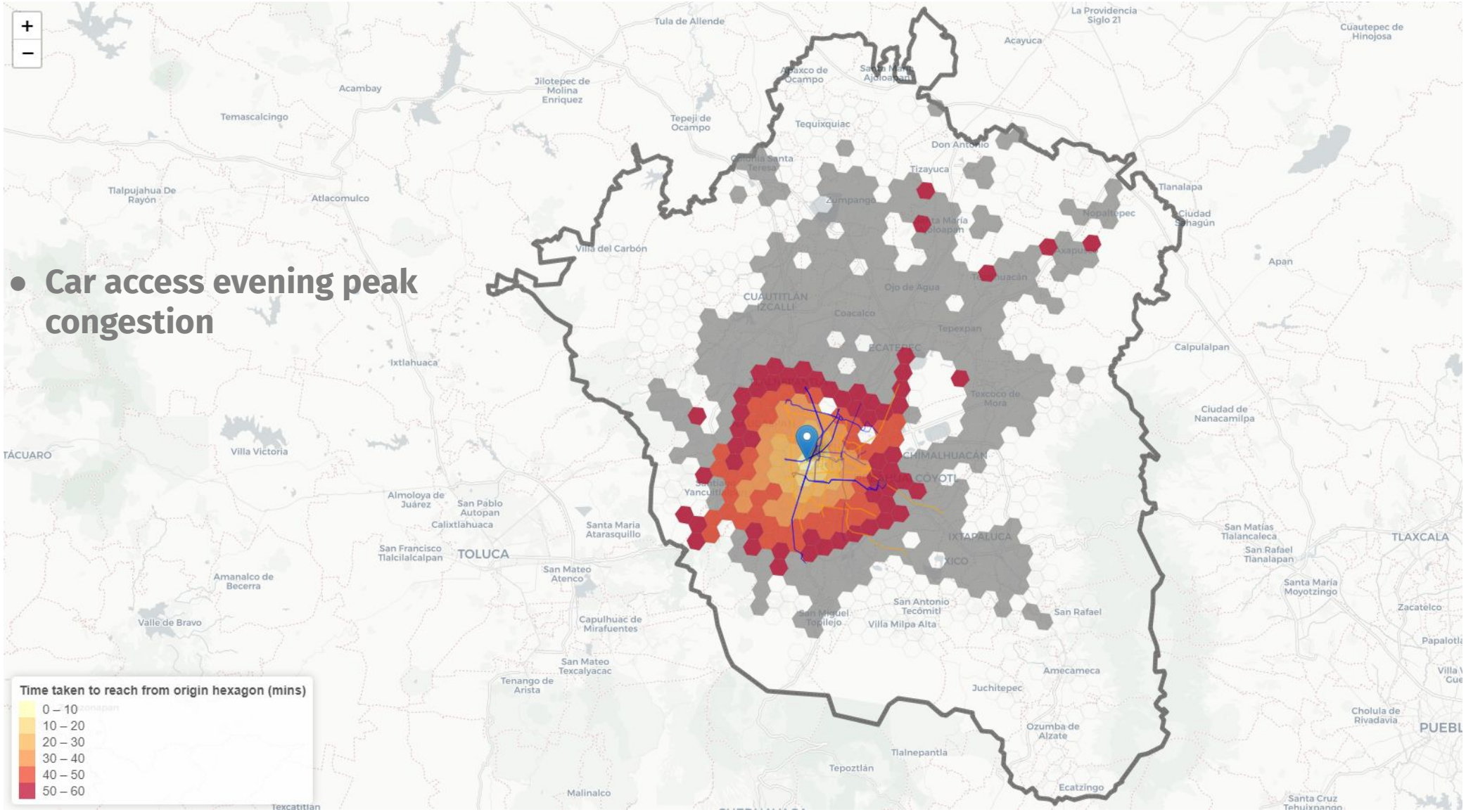
- **Car acces no congestion**



- **Car access morning peak congestion**



CDMX Mapa de Accesibilidad



- **Car access evening peak congestion**

Next steps and challenges

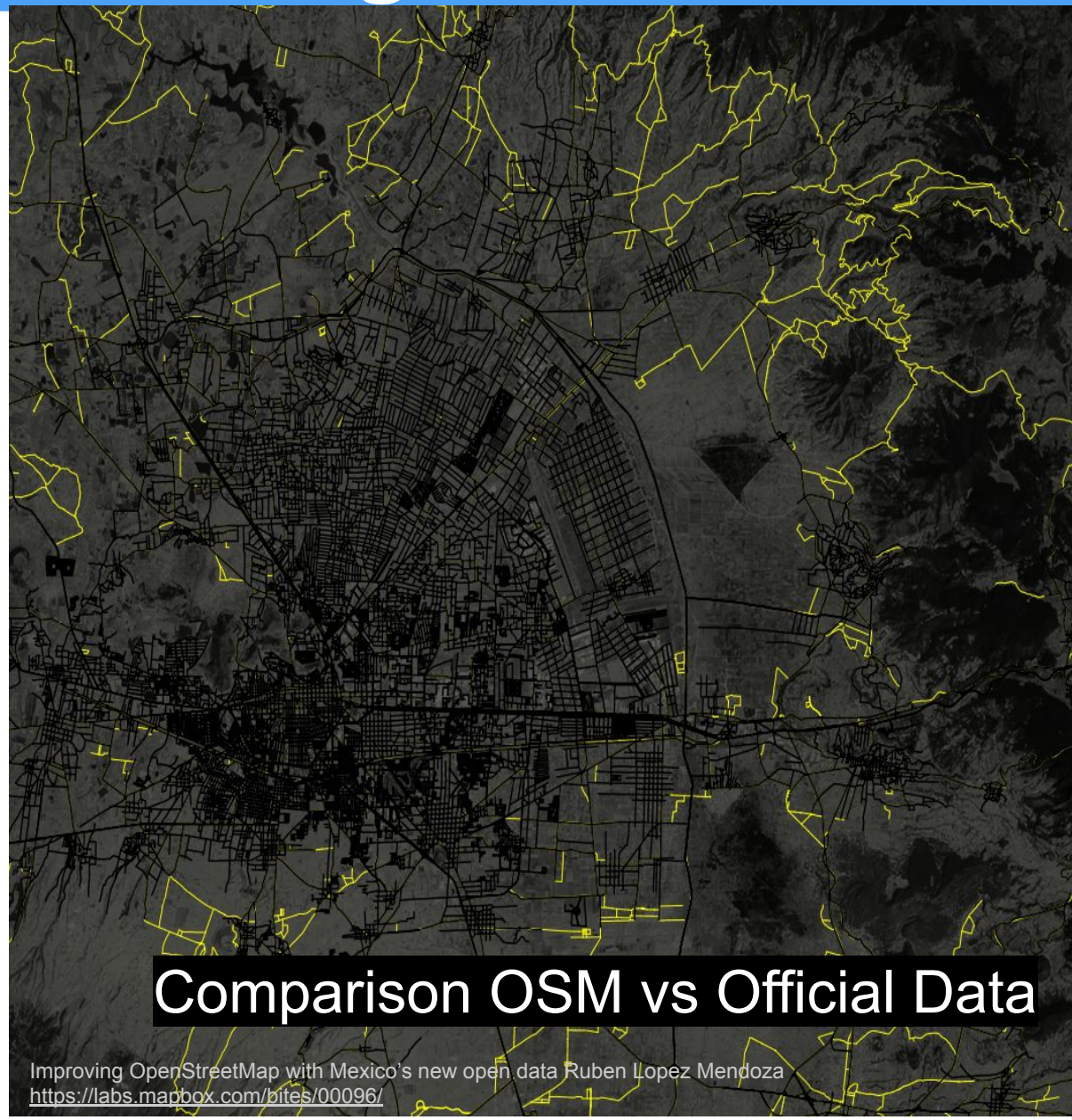
Developing indicators for babies and toddlers

Data availability:

- **GTFS is still lacking in many cities**
- Quality of OSM is uncertain, but it can be evaluated and improved
- Data sources need to be parsed with official sources and audited by authorities to be useful in policy

Technical capabilities of authorities

- Ecosystem of NGOs, international organizations, startups and companies, consultants and academics.



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Thank you!

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Ecosystem

Open source tools

Static GTFS Manager. WRI India

https://github.com/WRI-Cities/static-GTFS-manager

GTFS source editors

Paid subscription with technical support for GTFS feeds

https://trilliumtransit.com/

Startups and companies

NGOs and international organizations