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MOBILITY
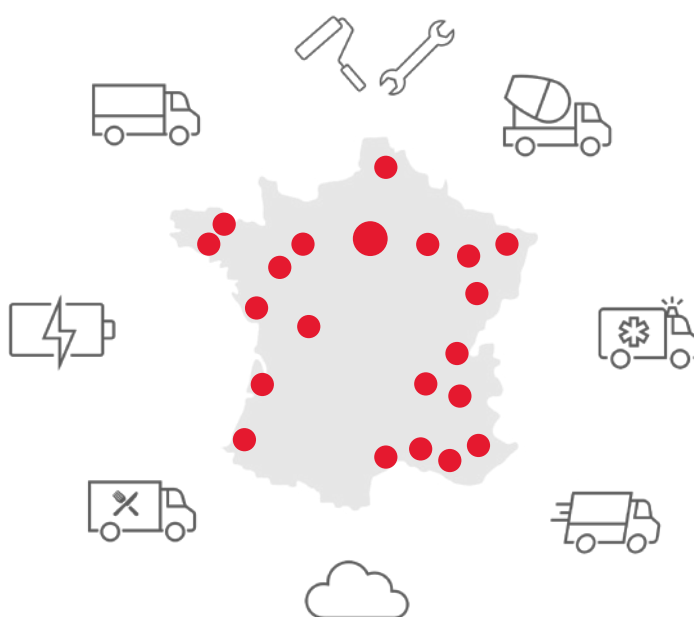
SUCCESSFULLY IMPLEMENTING LOW-EMISSION MOBILITY ZONES
WITH BUSINESSES, FOR BUSINESSES

A data science-based tool to help local authorities in their communication with stakeholders and in their decision-making processes

Prepare and better equip local authorities for a targeted and proportionate approach

The French Climate and Resilience Law has successfully enacted the introduction by 2025 of low emission transport zones (zones à faibles émissions mobilité, ZFE-m) in all urban areas with more than 150,000 inhabitants. This measure is undeniably a powerful lever for transforming the vehicle fleet, changing modes of transport and improving air quality. However, the schedules for implementing traffic restrictions envisaged by local authorities are often considered too ambitious in terms of the economic and social impact on the most vulnerable users, whether businesses or individuals. Their implementation requires preparation and support on an unprecedented scale, whether in terms of investment, infrastructure development, support systems or monitoring resources. Beyond these mainly technical issues, communication and consultation with all stakeholders are equally important aspects.

In the knowledge that the conditions of implementation, the alternative solutions and the proposed support systems are at the heart of the issue of public acceptability, local authorities concerned have undertaken the necessary investment programmes and the associated communication efforts. However, surveys have revealed a level of user anticipation that is far from satisfactory, to the point where there is a relatively high political risk of rejection.

In the opinion of the authors, the quality of consultation and the relevance of support systems depend on in-depth work to identify the issues at stake according to the user type, the sub-territory and to different social situations. Sharing this objective understanding of needs and options is a prerequisite for more constructive, dispassionate discussions and for the effectiveness of targeted, co-constructed solutions. This understanding will also enable public decision-makers to strengthen their decisions by accurately calculating their budgetary needs in terms of support or exemption schemes, or by specifying the eligibility conditions to increase their equity and thus their acceptance.

As part of the Mobility in Transition initiative, IDDRI, in collaboration with C-Ways, has developed a data science-based tool to support local authorities in their discussions and consultations with stakeholders to enable informed decision-making and greater certainty in terms of expected impact. This methodological approach has been tested in two cities, Strasbourg and Lyon, to demonstrate the tool's potential.

IDDRI

The Institute for Sustainable Development and International Relations (IDDRI) is a think tank that facilitates the transition towards sustainable development.
IDDRI is an independent research institute that examines sustainable development issues requiring international coordination, such as climate change and the depletion of natural resources. IDDRI has three objectives: informing policy decisions; identifying emerging policy issues; and providing a platform for dialogue between stakeholders with often divergent interests. The permanent team is made up of around forty people, including thirty or so multidisciplinary researchers. Within IDDRI, the Mobility in Transition initiative focuses on the conditions for successful transition in the mobility and transport sector in France.

Tool presentation

The methodology presented in this document was developed by IDDRI with the help of the local authorities involved in the study. The data obtained and the subsequent analyses are the sole responsibility of IDDRI and in no way constitute a commitment by local authorities.

The tool developed by IDDRI in collaboration with C-Ways consultancy is principally based on the use of the SIV (*Système d'Immatriculation des Véhicules* – French Vehicle Registration System) database (of which C-Ways owns the operating licence), in addition to INSEE surveys and analyses by SDES (Statistical Data and Studies Department of the Ministry of Ecological Transition).

The proposed approach aims to:
- **facilitate dialogue and consultation** between local authorities and stakeholders by providing an objective description of requirements and limitations that are specific to different trades and types of businesses.
- **differentiate, target, scale or condition support proposals** (economic, technical, transformational...) according to business categories or fleet size.
- **evaluate the impact of measures** taken from an economic, social and environmental perspective, justifying temporary or definitive exemptions if necessary by estimating the anticipated effects on air quality.
- **monitor and compare the implementation** schedule with the fleet renewal rate.

The ultimate objective is to **inform and justify public authority decision-making**.

🚚 Businesses, users with specific needs

ZFE-m implementation will have a major impact on businesses that use light commercial vehicles (less than 3.5 tonnes) and heavy goods vehicles (less than 16 tonnes), particularly following the Crit'Air 2 exclusion stage that essentially bans diesel vehicles, which represent 97% of the fleet.

The diversity of activities carried out by this user category implies extremely varied requirements in terms of volume, load transported, mileage, all of which requires a specific approach according to user classification. For most businesses, modal shift is not an option, so they are forced to turn to technological alternatives, the first of which is electrification. In the same way, the nature of a company, its size and financial situation affect its capacity to make the transition. Thus, in the development and implementation of adapted support measures, a distinction must be drawn between an individual plumber and their van, and a large company with several hundred vehicles.

The tool presented here enables the consideration of the entire vehicle stock to classify and analyse the needs of users according to categories in order to propose adapted and proportional solutions.
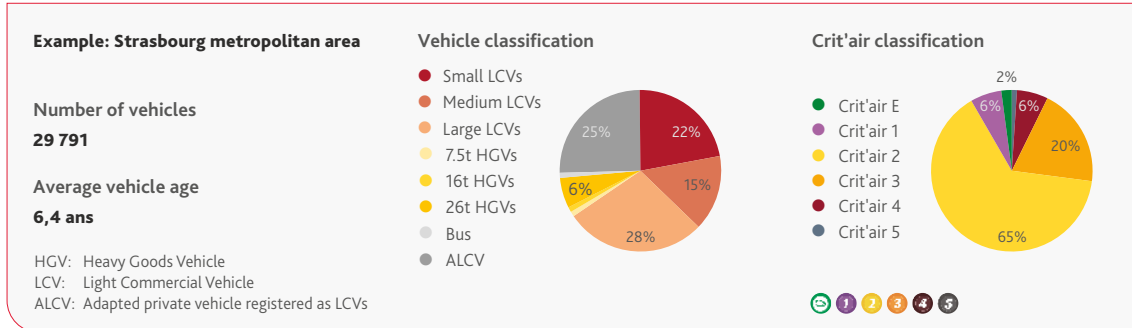
A tool with great potential

🚚 Analysing the vehicle fleet in circulation...

The starting point is to carry out a precise survey and analysis of the fleet in circulation within a defined geographical perimeter, based on SIV data.
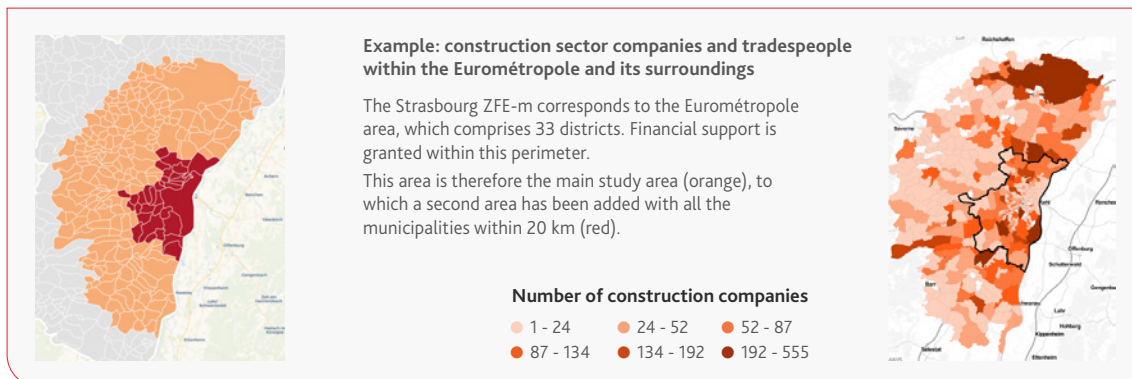Highly detailed analyses are possible, according to activity sectors and districts.

Example: Strasbourg metropolitan area

Number of vehicles
29 791

Average vehicle age
6,4 ans

HGV: Heavy Goods Vehicle
LCV: Light Commercial Vehicle
ALCV: Adapted private vehicle registered as LCVs

Vehicle classification

- Small LCVs — 22%
- Medium LCVs — 15%
- Large LCVs — 28%
- 7.5t HGVs
- 16t HGVs — 6%
- 26t HGVs
- Bus
- ALCV — 25%

Crit'air classification

- Crit'air E — 2%
- Crit'air 1 — 6%
- Crit'air 2 — 65%
- Crit'air 3 — 20%
- Crit'air 4 — 6%
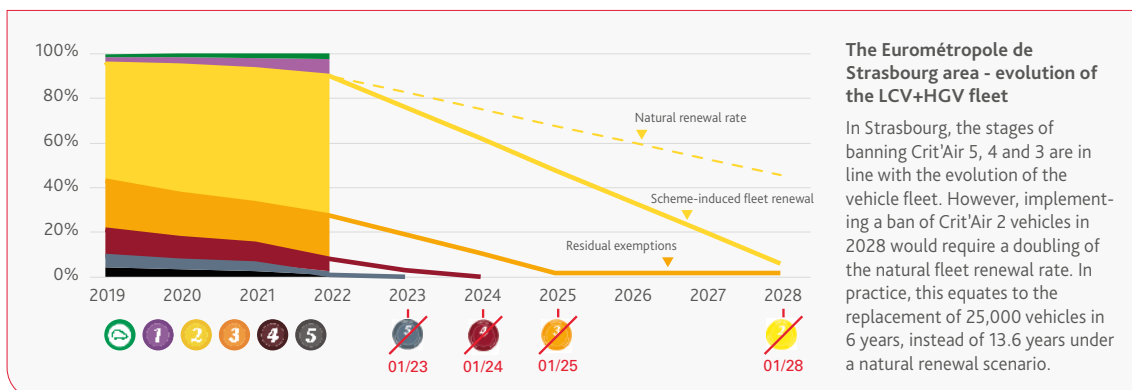- Crit'air 5

🗺️ ... in a geographical area

Through the use of geolocation tools, it is possible to describe the vehicle fleet at the IRIS level (i.e. at the district level), but also to conduct analyses on different geographic scales by targeting comprehensive study perimeters of different sizes. In this way, comparisons can be made between territories and adapted to local contexts. The limitations linked to ZFE-m implementation will have an impact on companies located outside the perimeter but which travel within it on a daily basis to conduct their activities.

Example: construction sector companies and tradespeople within the Eurométropole and its surroundings

The Strasbourg ZFE-m corresponds to the Eurométropole area, which comprises 33 districts. Financial support is granted within this perimeter.

This area is therefore the main study area (orange), to which a second area has been added with all the municipalities within 20 km (red).

Number of construction companies
- 1 - 24
- 24 - 52
- 52 - 87
- 87 - 134
- 134 - 192
- 192 - 555

📅 Analysing the coherence between fleet evolution and ZFE-m planning

The data obtained enables the ZFE-m timetable to be considered alongside the fleet renewal rate. The comparison of the renewal rate required to achieve the objectives and the natural renewal rate of new and used vehicles enables the measurement of the effort required by users and the adaption of necessary support measures.

Natural renewal rate

Scheme-induced fleet renewal

Residual exemptions

01/23   01/24   01/25   01/28

The Eurométropole de Strasbourg area - evolution of the LCV+HGV fleet

In Strasbourg, the stages of banning Crit'Air 5, 4 and 3 are in line with the evolution of the vehicle fleet. However, implementing a ban of Crit'Air 2 vehicles in 2028 would require a doubling of the natural fleet renewal rate. In practice, this equates to the replacement of 25,000 vehicles in 6 years, instead of 13.6 years under a natural renewal scenario.

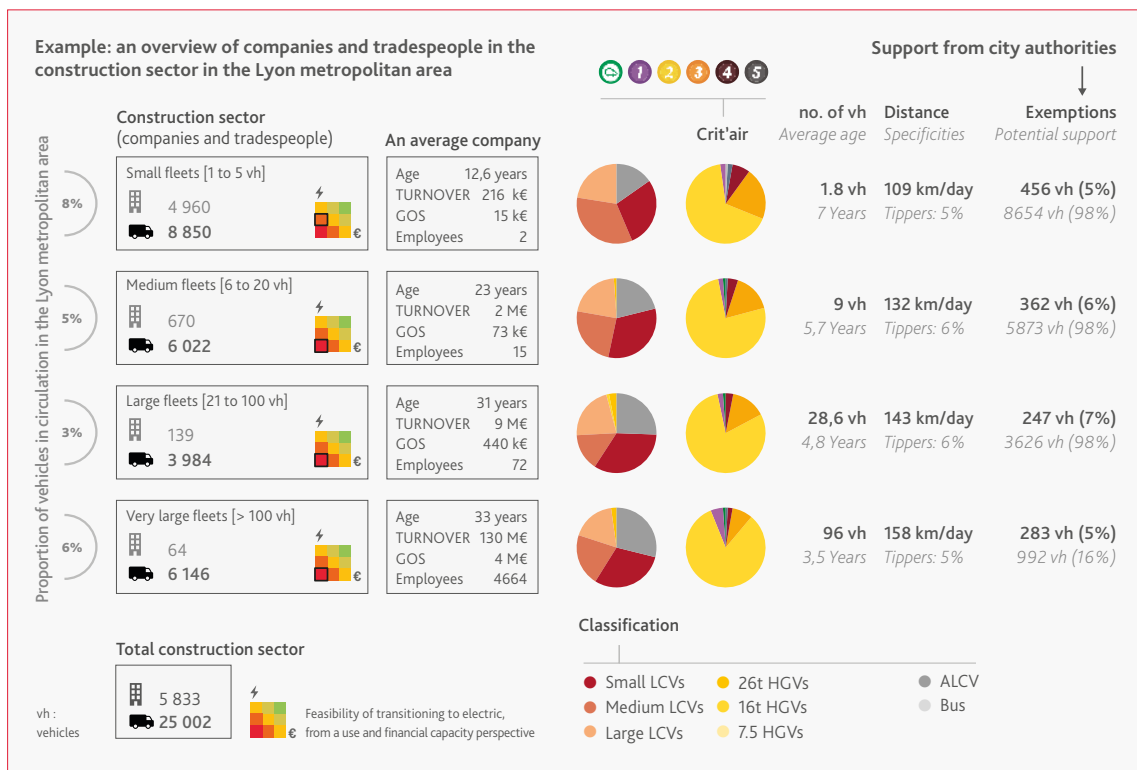## Evaluating financial support for the purchase of low-emission vehicles

On the basis of fleet data, the tool should enable cities to accurately assess the sums of financial support required and, above all, to quantify the number of beneficiaries per vehicle category. Depending on the amount of financial support provided, it is possible to define a provisional budget.

Example in the Lyon metropolitan area

Vehicle category	Quantity	Support per unit	Total amount for 80% of vehicles
LCV < 3.5t	40,100	€5,000	€160 m
HGV > 3.5 t	7,900	€10,000	€13 m
TOTAL	48,000		€223 m

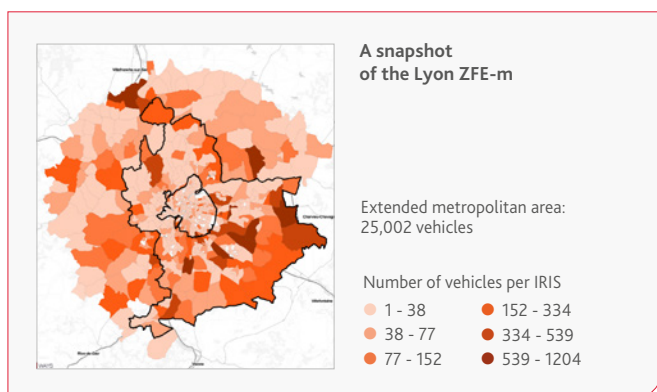## Analysing the impacts on activity sectors and proposing solutions

The database created allows for a detailed analysis of activity sectors: companies, vehicles, uses, location map. This detailed analysis according to user type enables solutions to be designed and adapted to the specific needs of each category.

Example: an overview of companies and tradespeople in the construction sector in the Lyon metropolitan area

Example: Construction companies and tradespeople are particularly vulnerable to electrification. The average mileage is moderate, but uncertain, and the transport of heavy equipment and materials limits the range. Vehicles operated by small companies are often old (7 years on average) and pollute more (33% Crit'Air 3 and above, compared to an average of 22%), while such companies have limited financial capacity.

Therefore, recommendations could be to:

- Install fast charging points with priority or reserved access for businesses and/or a preferential rate.
- Offer financial assistance for the installation of fast charging points.
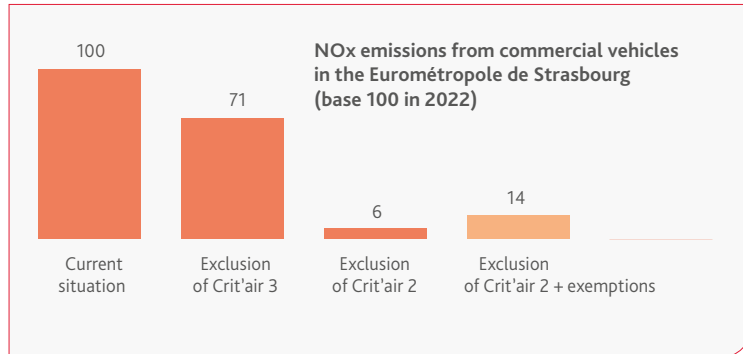

A snapshot of the Lyon ZFE-m

Extended metropolitan area: 25,002 vehicles

Number of vehicles per IRIS
- 1 - 38
- 38 - 77
- 77 - 152
- 152 - 334
- 334 - 539
- 539 - 1204

☁ Estimating the impact of different scenarios on pollutant emissions

The primary objective of the ZFE-m is to improve air quality. The tool estimates the reduction in emissions for commercial vehicles, based on the current vehicle fleet, mileage, and unit emissions, projected over time. These data are essential to justify and determine the scale of the measures implemented.

Example

In Strasbourg, the assessment of NOx emissions from commercial vehicles (LCVs and HGVs) shows a sevenfold reduction by 2028. .

NOx emissions from commercial vehicles in the Eurométropole de Strasbourg (base 100 in 2022)

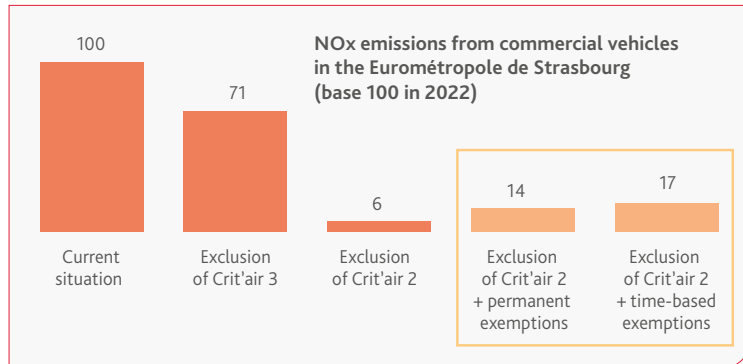|	
100	Current situation
71	Exclusion of Crit'air 3
6	Exclusion of Crit'air 2
14	Exclusion of Crit'air 2 + exemptions

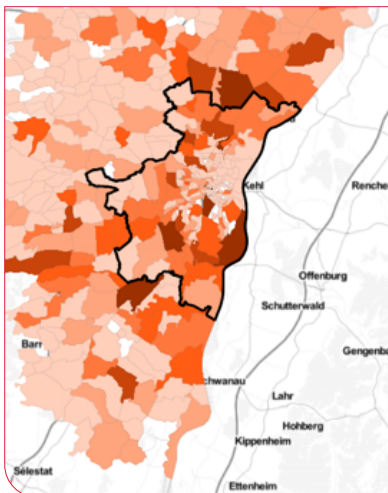## ⚖ Estimating the impact of pollutant emission exemptions

Permanent or temporary exemptions enable the management of certain problematic situations, for example regarding high-energy use vehicles (tippers, etc.) where no electric alternatives are available. The tool enables the quantification of the impact of such exemptions on pollutant emissions, which can be used for their justification.

Example

In Strasbourg, a temporary exemption of 23 days per year for businesses located outside of the ZFE-m would enable them to continue working occasionally in the metropolitan area.

NOx emissions from commercial vehicles in the Eurométropole de Strasbourg (base 100 in 2022)

100	Current situation
71	Exclusion of Crit'air 3
6	Exclusion of Crit'air 2
14	Exclusion of Crit'air 2 + permanent exemptions
17	Exclusion of Crit'air 2 + time-based exemptions

⚡ Assessing the number of fast charging points to be installed and their location

Eurométropole of Strasbourg

The targeted sectors are mainly construction, services and short-distance logistics, which are largely local activities, i.e. 17,168 vehicles.

Small and medium-sized fleets are the main ones concerned (large companies generally have the capacity to install private charging points). This would affect 9,631 vehicles.

Recharging is likely to be concentrated into certain time slots, for a total of about five hours. Based on a recharging time of about 15 minutes, the number of charging points needed can be estimated at 50 to 100. A geographical approach to vehicles can help optimize the location of these charging points.

Methodology

Data collection

Sources | **The data**

Sources:
- The SIV
- SIRENE database
- Société.com
- VUL CGDD survey
- Platform interviews

The data:

Vehicle fleet
- Classification / type
- Crit'air / age
- Daily distance

Companies
- Size (turnover, employees)
- Financial health (GOS)
- Age

Location in the metropolitan area
- In or out of the ZFE-m

Creation of a qualified classification

We propose a classification according to two criteria, which are clear and can be used for any urban area: activity sector and company fleet size.

All sectors	Construction sector (companies and tradespeople)	Short distance logistics	Services	Administration & associations	Passenger transport	Industry	Long distance logistics
	1 804 / 6 492	197 / 3 049	1 941 / 7 627	120 / 1 894	30 / 394	595 / 4 724	1 240 / 5 610
Small fleets [1 to 5 vh]							
5 196 / 8 246	9% — 1 524 / 2 759	1% — 113 / 258	8% — 1 640 / 2 498	0,5% — 92 / 163	0,1% — 20 / 26	3% — 518 / 821	6% — 1 024 / 1 721
Medium fleets [6 to 20 vh]							
845 / 6 118	7% — 217 / 1 924	2% — 50 / 485	6% — 11 / (—)	0,3% — 11 / 91	0,2% — 6 / 68	2% — 51 / 516	5% — 150 / 1 327
Large fleets [21 to 100 vh]							
95 / 4 712	4% — 44 / 1 168	4% — 32 / 1 295	4% — 53 / 1 237	0,5% — 6 / 142	0,1% — 1 / 28	1% — 15 / 346	5% — 46 / 1 506
Very large fleets [> 100 vh]							
95 / 5 722	2% — 19 / 641	3% — 2 / 1 011	7% — 11 / (—)	5% — 11 / 1 498	1% — 3 / 272	10% — 11 / 3 041	3% — 20 / 1 056

% : Share of vehicles in circulation

Note: The French mobility act (*Loi d'orientation des mobilités*) requires fleets of more than 100 vehicles to include a proportion of electric vehicles at renewal, but these rates (10% in 2022, 20% in 2024, 40% in 2027, 70% in 2030) are insufficient to adhere to the timetable imposed by the metropolitan areas of Strasbourg or Lyon - the two examples studied here.

The ability of companies to transition to electric

Each business sector studied is assessed according to two criteria:
- a technical aspect, corresponding to the feasibility of transitioning uses to electric
- a financial aspect, corresponding to a company's ability to finance the transition of its fleet to electric vehicles.

The feasibility of transitioning uses to electric depends mainly on mileage. In addition to mileage, certain uses require high power demands, which may be incompatible with electrification, for example, vehicles with refrigeration, cranes, tippers, or cattle trucks. Tonnage transported will also limit the range; which will often be the case in the construction industry, where tilers are an extreme example.

Feasibility of transitioning uses to electric = daily km x severity factor
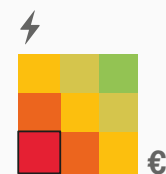
Ability to finance the transition = GOS/ fleet cost x age / (age + 1)