Method for determining functional areas in 2020

Following on from the 2010 zoning into urban areas, the 2020 zoning into functional areas defines cities as functionally consistent units. This zoning defines the extent of the commuting area of a centre of population and employment, on the surrounding municipalities. Functional areas are coherent economic entities: a public policy targeting a centre may have spillover effects on its entire functional area. The zoning into functional areas is also a research tool used for the analysis of the interacting networks of commuters, companies and individuals. More generally, this zoning allows to study territorial disparities from two perspectives: the size of the area and the differences between centre and outskirt.

The two principal objectives of the overhaul are:
- consistency with the European definitions of Cities and functional urban areas, in accordance with a request made by the National Council for Statistical Information (CNIS), researchers and organisations working on cross-border processes; this has led to modification of the definition of centres and commuting areas.
- simplification: in the 2010 zoning into urban areas, the notion of "multicentric municipality" was difficult to understand and use, so it has been removed in the 2020 zoning; the algorithm for determining commuting areas has also been simplified: the active population working in the centre, and no more the active population working in the centre and in the municipalities already aggregated with the centre (snowball effect), is taken into consideration.

1) Defining centres

Centres are defined primarily on the basis of criteria of density and total population, following a methodology consistent with that of the european degree of urbanisation (https://www.insee.fr/fr/information/2114627). This method enables a density level to be attributed to each municipality corresponding to the living standards of the majority of its population. Accordingly, if the majority of the population of the municipality lives in a densely populated area, the municipality will be deemed to be densely populated, even if this municipality has few inhabitants per km² on average.

Very large centres (level A) correspond to "cities", the highest level in the european degree of urbanisation used by Eurostat and the OECD to make international comparisons.
Levels B and C represent a subdivision of "municipalities of intermediate population density" in accordance with the current european degree of urbanisation.
Level D represents part of the "sparsely populated municipalities" in the european degree of urbanisation.
The thresholds were chosen with a view to harmonisation with a detailed european degree of urbanisation, the final version of which was published by Eurostat in december 2020, after the finalisation of the French zoning (https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-02-20-499).

To be included in a certain level, centres must contain a minimum number of jobs, failing which they will be moved down a level. The thresholds are: 10,000 jobs for A centres; 5,000 jobs for B centres; 1,500 jobs for C and D centres. This avoids essentially residential municipalities, where there are few jobs, being treated as centres.
Municipalities outside of functional areas having over 3,500 jobs are added ex-post as level D centres. These are Baugé-en-Anjou, Montrevault-sur-Evre, Segré-en-Anjou-Bleu, Chemillé-en Anjou and Le-Mené.

The thresholds used are summarised in figure 1.

	Thresholds		
	Density of the grid cells (inhabitants per km2)	Minimum population of the aggregated grid cells	Minimum number of jobs in all municipalities comprised in the centre
Level A	1,500	50,000	10,000
Level B	1,500	5,000	5,000
Level C	300	5,000	1,500
Level D	300	1,000	1,500

Reading note: a level A aggregation is a cluster of contiguous grid cells having over 1,500 inhabitants per km^2, such that over 50,000 inhabitants live in this cluster. In a level A municipality, over 50% of its inhabitants are included in a level A aggregation. A level A centre is a collection of contiguous level A municipalities, containing at least 10,000 jobs.

Figure 1: thresholds for the determination of centres for the zoning into functional areas

If two municipalities in a same level X are contiguous, and if an aggregation of grid cells of level X or more straddles these two municipalities, the two municipalities form part of a single centre. If the two aggregations are disjoint but one of the two municipalities sends 15% of its workers to work in the contiguous municipality, these two municipalities form part of a single centre. If not, they are two separate centres.

2) Determining commuting areas

Municipalities which send over 15% of their workers to work in the centre are treated as part of the functional area of the centre. This method has been harmonised with the "Functional Urban Areas" (FUA) method released by Eurostat and the OECD (these are municipalities which send over 15% of their workers to work in a city).
It can be hoped that this high degree of consistency between French and international zoning will lead to further international comparisons and works about cross-border zones.

The determination of functional areas is said to be "hierarchical". The highest level centres and their commuting areas are determined first (cities, A centres), followed by level B centres and their commuting areas, etc.

This means that the functional area of an A centre reflects all the municipalities which send over 15% of their workers to work in the A centre in question. The functional area of a B centre reflects all the municipalities which send over 15% of their workers to work in the B centre in question, and which are not already included in an A centre, etc. It is therefore the functional area of the highest level centre which takes precedence. A municipality which sends over 30% of its workers to work in a C centre, and 16% in an A centre, will be attached to the A centre.
A second aspect associated with the hierarchical aggregation algorithm is that municipalities are classified on the basis of whether they belong to the functional area of the principal centre in the zone. For example, a municipality which sends 15% of its workers to a B centre which has previously been incorporated into the commuting area of an A centre, will be considered to be "outside of functional areas" if it sends fewer than 15% of its workers to the A centre in question.

3) Areas in which the centre is located abroad

Using the european degree of urbanisation enables cross-border centres to be defined using a methodology which is consistent for the French and foreign parts. These comprise level A centres, contiguous with the border on both sides. The 2020 zoning includes two cross-border clusters: Basel - Saint-Louis and Geneva - Annemasse (figure 2). In determining the functional area of cross-border centres, all municipalities which send over 15% of their workers to work in the municipalities (French or foreign) forming part of the centre are taken into consideration.

Moreover, the extent of the functional area in France of level A centres (cities) located entirely abroad is also taken into consideration. They are Charleroi, Lausanne, Luxembourg, Monaco and Saarbrücken.

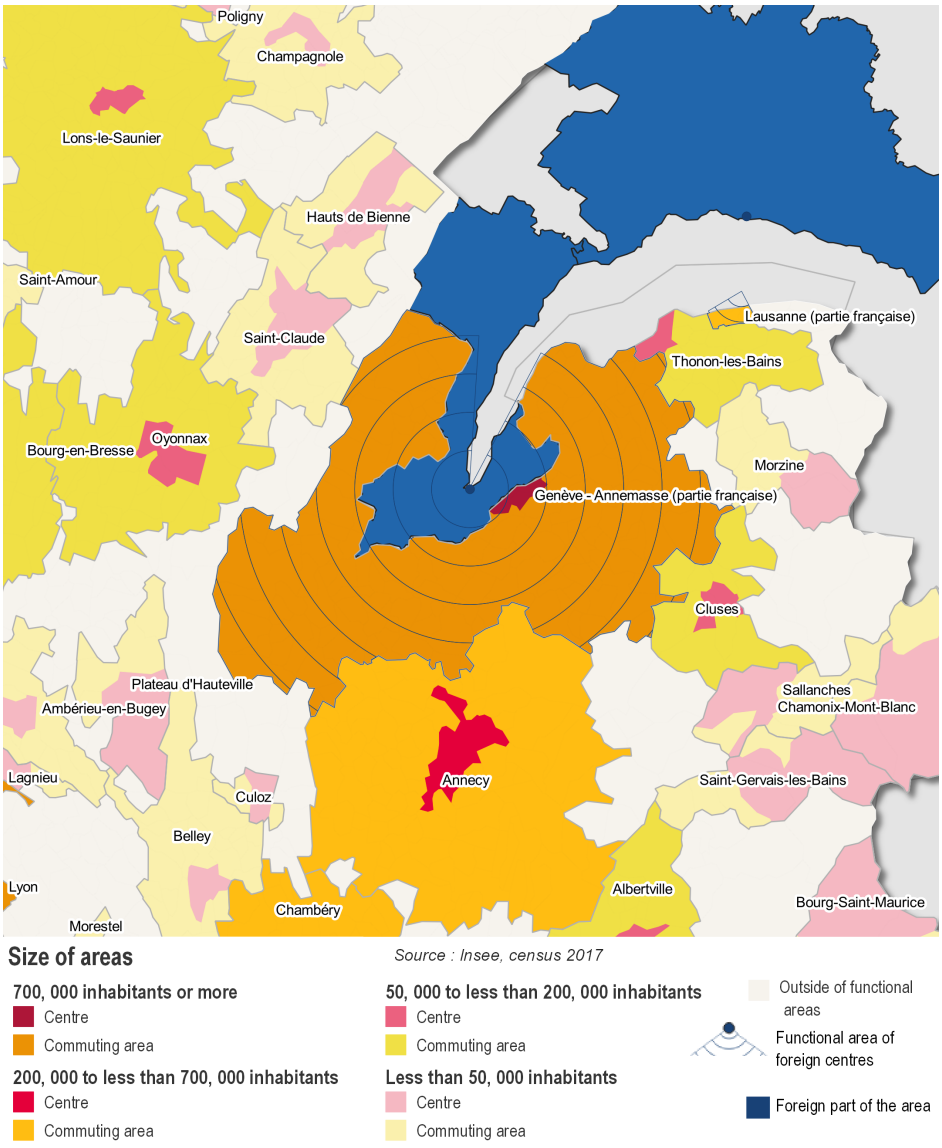

Figure 2: area of Geneva - Annemasse

4) Functional areas with multiple centres

This principle is borrowed from the OECD/Eurostat method for determining FUAs. If a centre sends at least 15% of its workers to work in another centre of the same level, it is merged with that centre, to form a zone with several centres which will be the core of the functional area. For example, the area of Paris includes not only a principal centre centred on the municipality of Paris, but also four secondary centres (Creil, Mantes-la-Jolie, Meaux and Melun, figure 3). In accordance with the European recommendations relating to the connection between cities and the level of political decision-making, to avoid dividing up an existing level with single local governance into several FUAs, a rule is applied to the effect that if several cities have their central municipality in the same public inter-municipal cooperation establishment (EPCI), they will be joined together in the same functional area with multiple centres (case of Marseille-Aix-en-Provence).

Six areas comprise several centres: Paris, Marseille-Aix-en-Provence, Luxembourg, Toulon, Narbonne and Biars-sur-Cère.

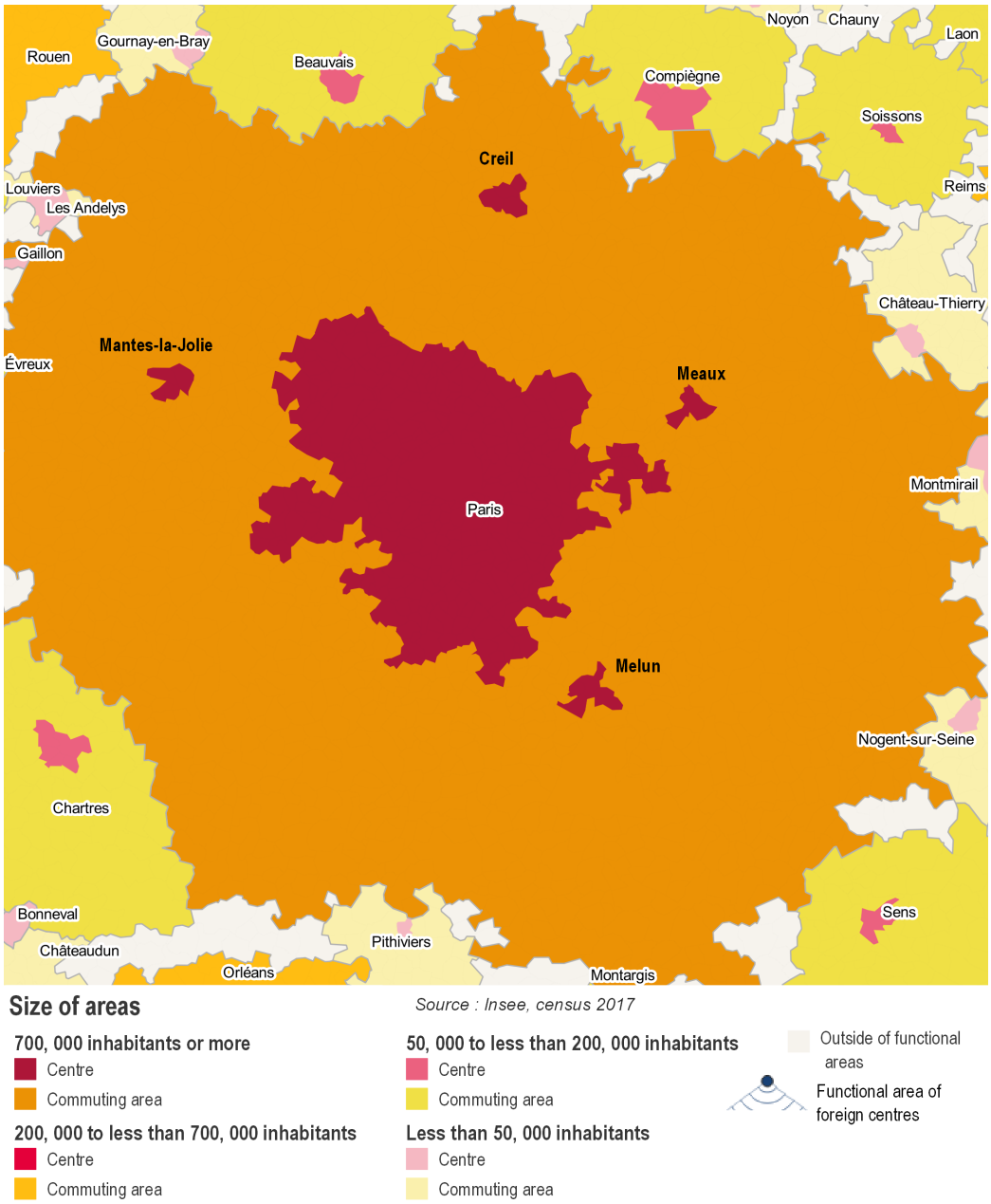

Figure 3 : functional area of Paris with multiple centres

5) Geometric treatment

Functional areas are contiguous sets of municipalities without enclaves. Accordingly:

- Municipalities outside of functional areas, which are completely enclaved within a centre or commuting area, are linked to the centre or commuting area in question.
- Municipalities outside of functional areas which are located between a commuting area and the sea, or between a commuting area and a border zone, remain outside of functional areas, as is the case for those enclaved between two commuting areas.
- Municipalities outside of functional areas, which are partially enclaved within a commuting area, are linked to the commuting area in question if a certain enclave ratio is exceeded (the enclave ratio is the portion of the boundary of the municipality which is in contact with municipalities in the commuting area). Similarly, an exclave ratio is applied to determine which municipalities should be excluded from the commuting areas (figure 4).

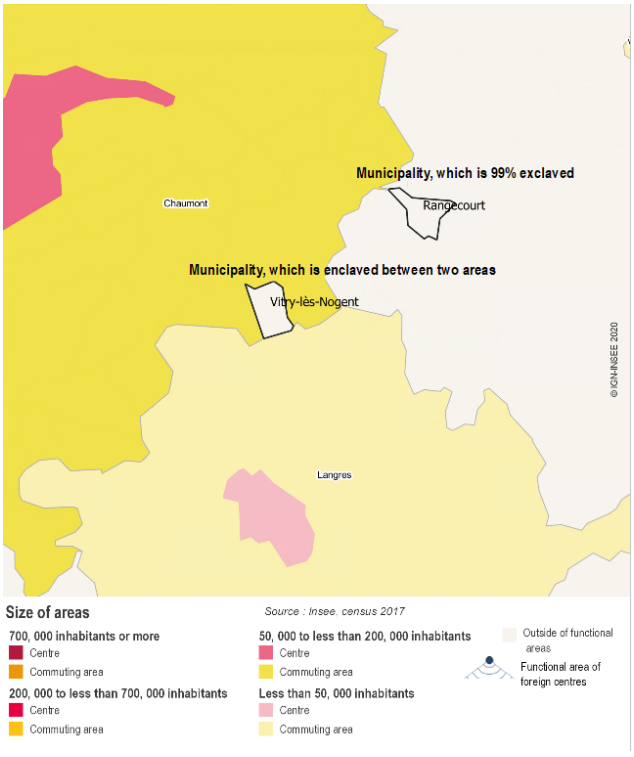

Figure 4: exclaved municipality: the municipality of Rangecourt sends 22 % of its workers (5 out of 23) to the area of Chaumont but 99% of its boundary is not in contact with the area of Chaumont; it is therefore excluded from the commuting area of Chaumont. The municipality of Vitry-lès-Nogent sends 14% of its workers to Chaumont and 7% to Langres; although enclaved between the two areas, it remains outside of functional areas.

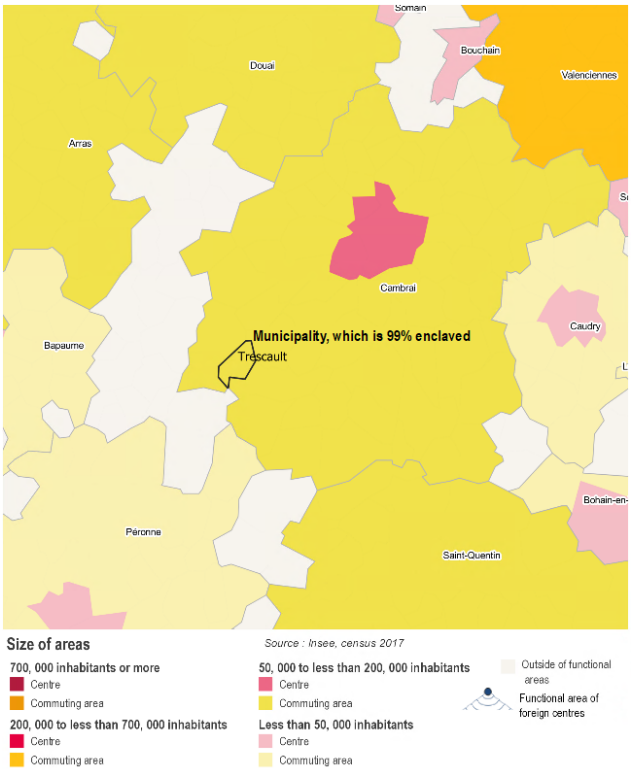

Figure 5: enclaved municipality: the municipality of Trescault sends only 7 % of its workers to work in the area of Cambrai, but 99% of its boundary is in contact with the area, so it is included in the commuting area of Cambrai.

6) Bases used

The cartographic basis used to determine contiguity between two municipalities is BD TOPO (IGN). The principal bridges and water-based transport links have been added to this basis.
Calculation of flows between municipalities is based on the main processing of the 2016 census survey. All flows have been taken into consideration, except those where the municipality of destination is unknown.

7) Categories of broadcasting

The levels of centres are used only to construct the zoning. Areas are subsequently classified according to the total number of inhabitants in the area on the basis of the 2017 population census. The population categories used are:
- Paris;
- area with 700,000 inhabitants or more (excluding Paris);
- area with 200,000 to less than 700,000 inhabitants;
- area with 50,000 to less than 200,000 inhabitants;
- area with less than 50,000 inhabitants.

Each municipality is also classified on the basis of whether it falls into the following categories:
- 11 Central municipality;
- 12 Other municipality in the principal centre;
- 13 Municipality in a secondary centre;
- 20 Municipality in the commuting area;
- 30 Municipality outside of functional areas.

The central municipality is the most highly populated in the centre on the basis of the 2017 population census.

Areas in which the centre is located abroad are placed in a category representing their total population (foreign and French).
- Basel - Saint-Louis (French part): 620,379 inhabitants (510,000 abroad, 110,379 in France)
- Charleroi (French part): 500,402 inhabitants (500,000 abroad, 402 in France);
- Geneva - Annemasse (French part): 991,855 inhabitants (570,000 abroad, 421,855 in France);
- Lausanne (French part): 413,560 inhabitants (400,000 abroad, 13,560 in France);
- Luxembourg (French part): 902,104 inhabitants (600,000 abroad, 302,104 in France);
- Monaco - Menton (French part): 113,548 inhabitants (40,000 abroad, 73,548 in France);
- Saarbrücken (French part): 824,833 inhabitants (790,000 abroad, 34,833 in France)

The geographical code for the area corresponds to the classification by decreasing area size (001 for the most highly populated). Areas in which the centre is located abroad are inserted into the numbering system (006, GEN, 008), and overseas departments (DOM) are numbered separately.

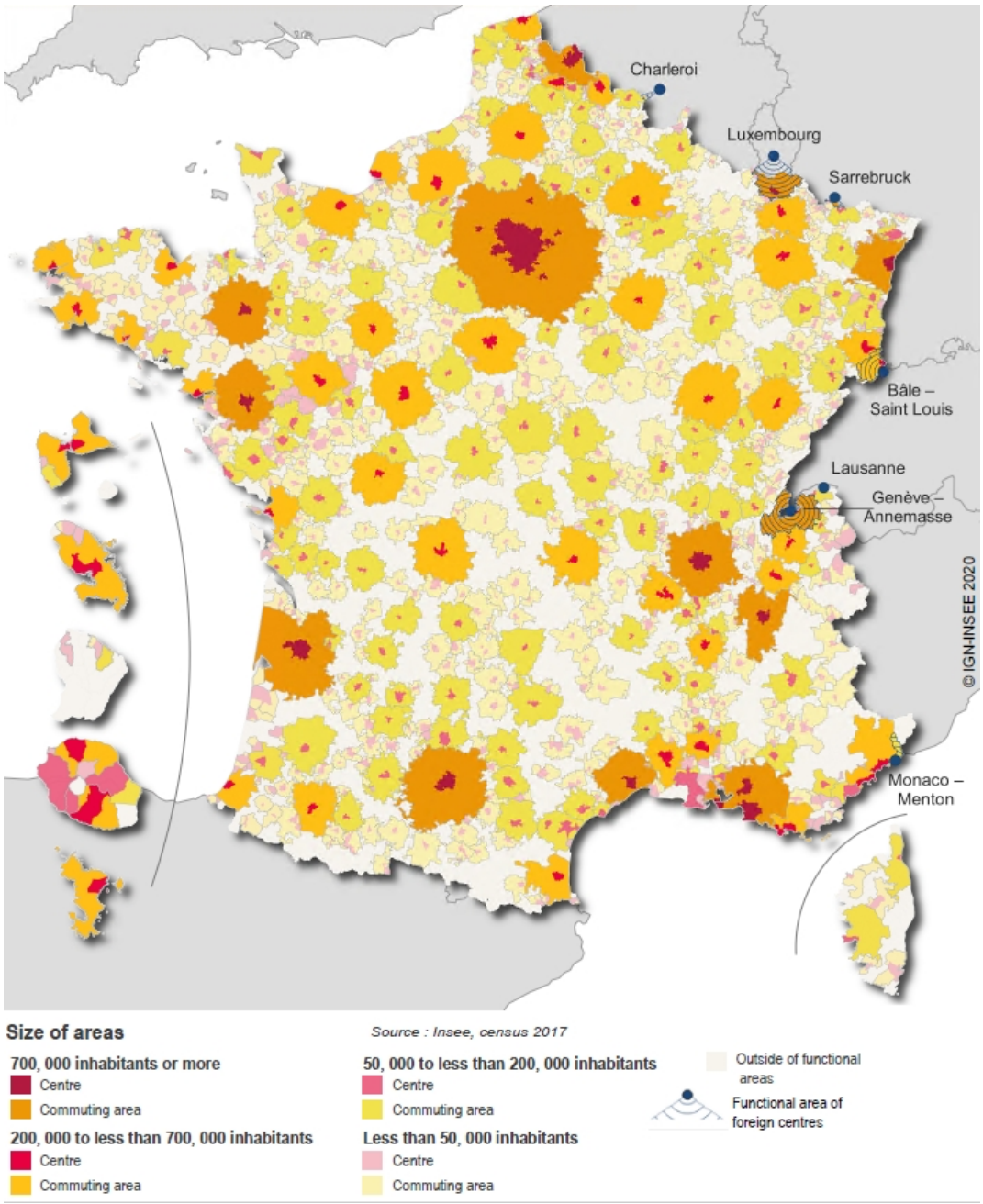

Figure 6: functional areas 2020