



Brussels, 23.7.2014  
SWD(2014) 242 final

PART 12/23

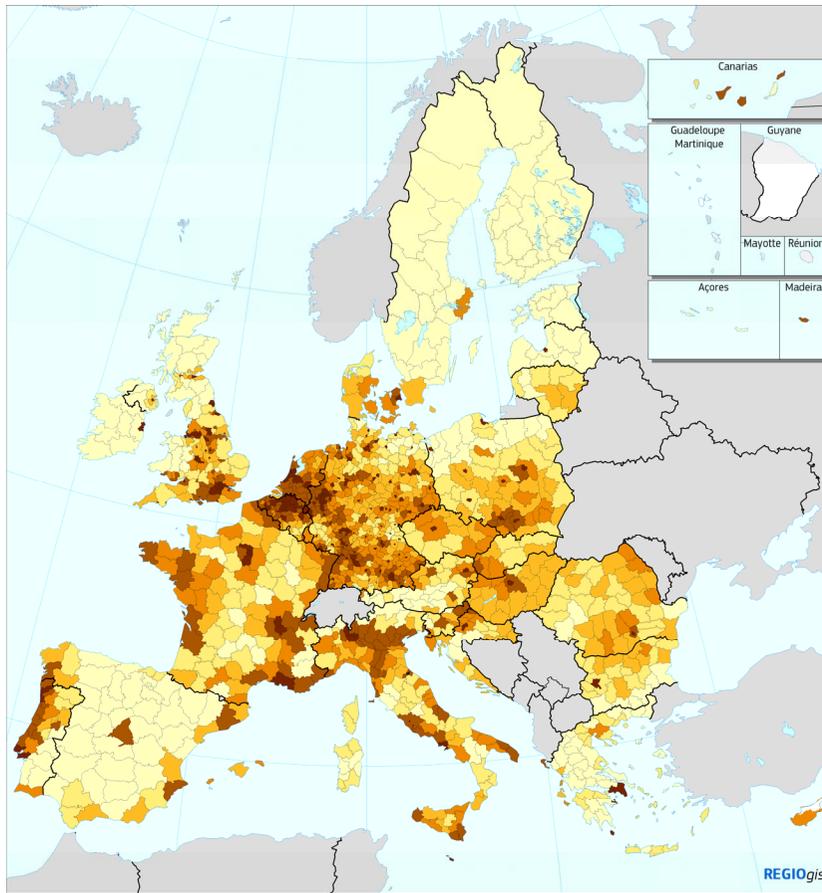
**COMMISSION STAFF WORKING DOCUMENT**  
*Accompanying the document*

**COMMUNICATION FROM THE COMMISSION**

**Sixth report on economic, social and territorial cohesion: Investing in Europe's Future**

{COM(2014) 473 final}

**Map 1 Share of Built-up area, 2012**



**Share of built up area in total area by region, 2012**

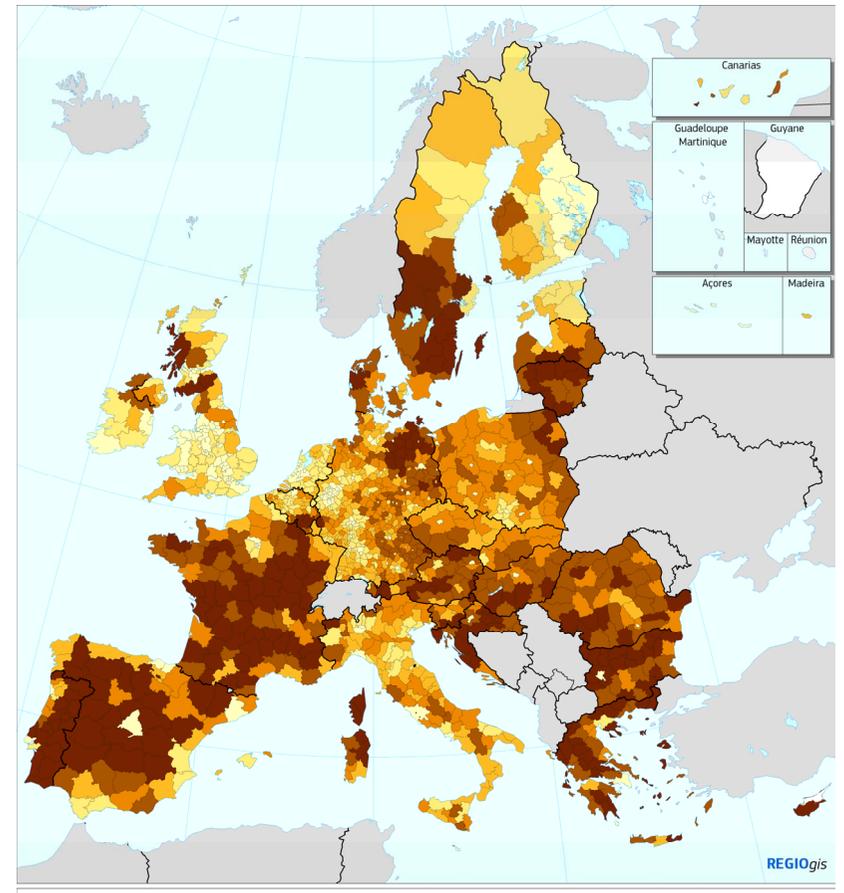


Source: JRC

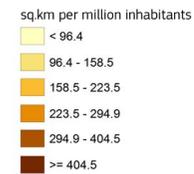


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**Map 2 Built-up area per head, 2012**



**Built up area per head by region, 2012**



Source: JRC



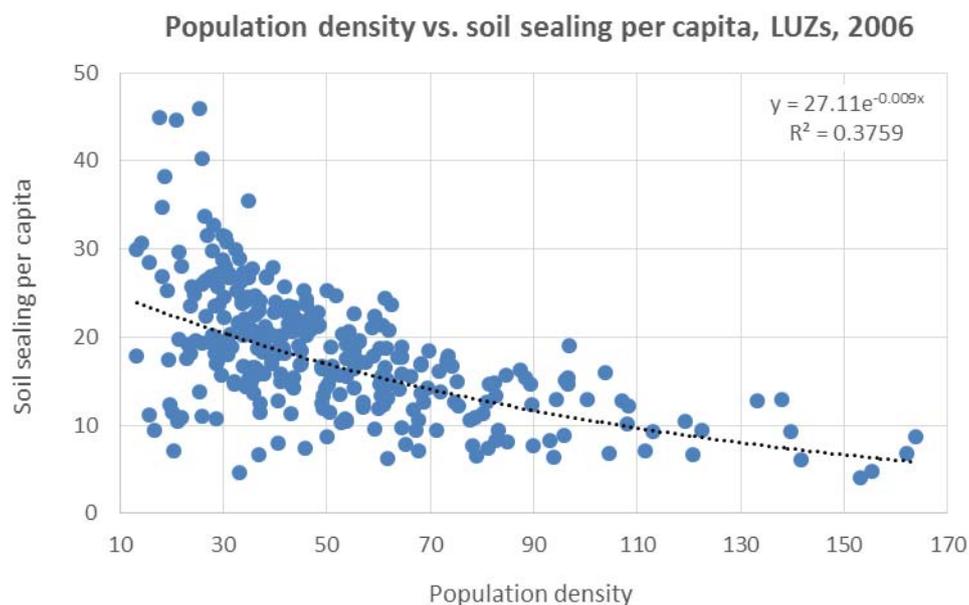
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The reasons are twofold: a more efficient use of land by people and businesses in urban areas and more industrial and agricultural buildings in other areas. Accordingly, the growth of population and economic activity in cities has a smaller impact on land use than the same growth elsewhere.

### Large cities use land more intensively than smaller cities

The same conclusion results from using a slightly different indicator, that of soil-sealing (imperviousness), which shows that where population densities are higher, the amount of soil sealed (i.e. concreted over) per head is smaller. Larger cities, which typically have higher concentrations of population, therefore, tend to be more efficient than smaller ones (Figure 42).

**Figure 1. Relationship between population density and sealed soil per head in larger urban zones, 2006.**



### Land in the centre of large cities is the most intensively used

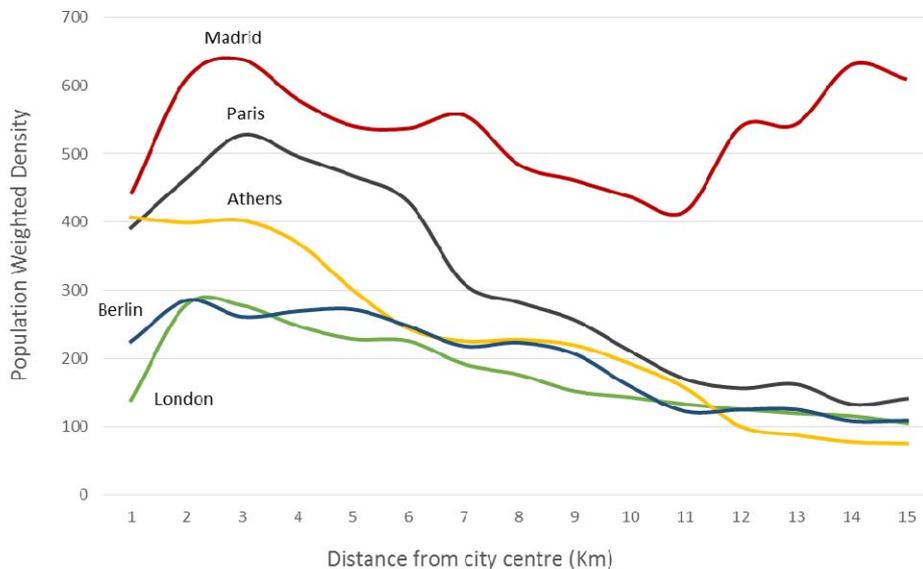
Average population densities per city, however, tend to mask a great deal of variation. Population density tends to decline the further away from the city centre an area is located. In the larger EU capitals, population densities tend to peak within a distance of 3-4 km from the centre (Figures 43 and 44)<sup>1</sup>.

The general pattern can be explained by economic theory that goes back to von Thünen, who observed that the price of land, and its corresponding use, varies according to access to the market (the city centre). The highest return to land use, therefore, tends to be close to the city centre, where shops and services are concentrated, followed by high density residential use. Returns to land use decline with the distance from the centre.

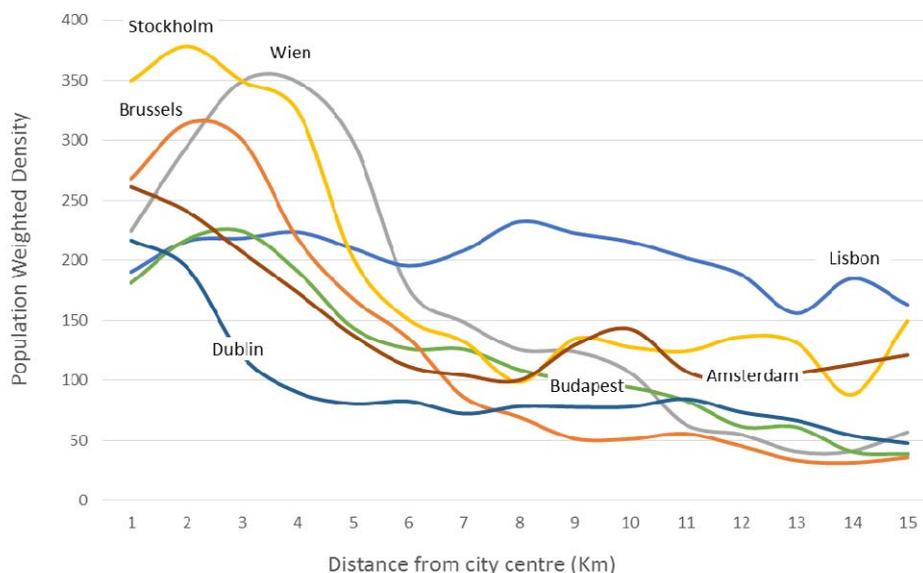
<sup>1</sup> In the majority of the cases, the city centres themselves are actually not as dense as the immediately surrounding areas. This is due to a high share of commerce and services, and in some cases as well, depopulated historical centres.

Despite this general tendency, population densities in practice differ between cities of similar size. For example, Paris peaks at a density of 520 inhabitants per square km, while London peaks at just under 300. Madrid, Athens and Berlin peak at 650, 400 and 290, respectively.

**Figure 2 Population density profile of a selection of large European capital cities, 2006**



**Figure 3 Population density profile of a selection of mid-sized European capital cities, 2006.**



In the medium-sized capital cities, the peaks tend to be lower. Stockholm, Vienna and Brussels have a peak of between 300 and 400 inhabitants per square km, Lisbon, Dublin, Amsterdam and Budapest, between 200 and 300.

After peaking, population density falls, more or less abruptly, towards the periphery. This is clearly the case for Paris, Athens, Vienna, Budapest, Stockholm, Brussels and Dublin. Secondary peaks are also evident in some places, such as in Madrid, Lisbon and Amsterdam, which could be related to the existence of ‘satellite’ urban centres in the vicinity of the main agglomeration.

## **Urban population growth and changing land use intensities**

A new analysis shows how a number of cities have changed in terms of land use and population between the 1950s and 2006. The most rapid changes occurred in the 1960s and 1970s which saw high population growth and an even faster expansion of built-up areas. For example, in Palermo, the built-up area tripled between 1955 and 1984, while its population increased by only 26%. In the following two decades, the pattern of change was different: built-up areas increased by 9% and population shrank by 3%.

In Helsinki, the built-up area almost doubled between 1950 and 1984, while its population grew by 25%. In the following two decades, population and built-up area increased by 12% in both cases, leaving land-use intensity unchanged.

In contrast, in Vienna, the built-up area increased by only 15% between 1955 and 1997, while population shrank by 5%. In the following decade population grew by 7%, while the built-up area increased by only 4% leading to higher land use intensity.

Comparing the land use intensity of Palermo, Vienna, Helsinki and Bratislava between the 1950s and 2000s, shows a rapid convergence of built-up areas relative to population to about 9000 inhabitants per square km by the 1980s and very little change since.

The revival of many EU urban centres during the 1990s and 2000s has allowed cities to reclaim brownfield sites and reuse abandoned buildings, increasing the vitality of city centres without expanding the built-up area.