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PROFECY – Processes, Features and Cycles of Inner Peripheries in Europe

(Inner Peripheries: National territories facing challenges of access to basic services of general interest)

Applied Research

Final Report

Annex 6. Delineations 1, 2 and 4 – Series of Maps illustrating the Delineation Process

Version 07/12/2017

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PROFECY – Processes, Features and Cycles of Inner Peripheries in Europe

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Abbreviations

Abbr.	Abbreviation
GIS	Geoinformation system(s)
IP	Inner Periphery, Inner Peripheries
km	kilometer
LAU	Local administrative units
min	Minute, minutes
NUTS	Nomenclature des unités territoriales statistiques
SGI	Service(s)-of-general-interest
UMZ	Urban morphological zone(s)

1 Introduction

This Annex Report complements and extends the results discussed in Chapter 4 of the main Final Report in relation to delineating inner peripheries for Delineations 1, 2 and 4. As the delineation process for all these delineations included various interim steps, who cannot be presented in the main report, this Annex Report presents series of maps illustrating all these steps.

A similar Annex Report 7 has also been produced illustrating all interim results for Delineation 3. As this delineation deals with ten different services-of-general-interest, with a large amount of maps, it was decided to move them to a separate document.

The map series represent a documentation of the entire delineation process for the the three delineations. The map layout of each map type is standardized, allowing an easy comparison of the (interim) delineation results between all SGIs.

Another Annex Report has been produced illustrating the input data used for these delineations (Annex Report 3 on visualization of input data).

2 Delineation 1 – Higher travel time to regional centre

The following maps have been generated, representing the entire delineation process for this delineation approach:

Map 2.1: Access to regional centres: Travel times by car. (Step 1 of the delineation process)

Map 2.2: Access to regional centres: Standardized travel times. (Step 2 of the delineation process)

Map 2.3: Access to regional centres: Initial delineation of inner peripheries. (Step 3 of the delineation process)

Map 2.4: Access to regional centres: Delineation of inner peripheries at grid level. (Step 4 of the delineation process)

Map 2.5: . Access to regional centres: Overlay of NUTS-3 regions with IP areas at grid level. (Step 5 of the delineation process)

Map 2.6: Access to regional centres: Identification of NUTS-3 regions as inner peripheries. (Step 6 of the delineation process)

Map 2.7: Access to regional centres: Overlay of LAU-2 units with IP areas at grid level. (Step 5 of the delineation process)

Map 2.8: Access to regional centres: Identification of LAU-2 units as inner peripheries. (Step 6 of the delineation process)

Map 2.9: Access to regional centres: Identification of grid cells as inner peripheries. (Step 6 of the delineation process)

Today, many areas in Europe experience car travel times to the next centre of 30 minutes or below (Map 2.1:). In Germany, the Benelux countries and in England many centres can be reached from most of the territory within 20 or even within 10 minutes driving times. Intermediate areas in countries with a less dense system of centres (like Spain, Romania, Bulgaria, Poland) have travel times up to 90 minutes. Areas with more than 100 minutes car travel times are mountain ranges (such as Alps, Carpathians, Pyrenees). The most disadvantaged areas are the Northernmost regions in Scandinavia, Scotland, Iceland, and the islands. Still, there are significant differences in the access to regional centres in all countries, representing the dichotomy of central areas (i.e. regional centres and their hinterland) and the rural areas.

Inner peripheries at grid level (Map 2.4), i.e. areas with in a regional context poor access to regional centres, can be found in all ESPON countries[a]. Often, these areas follow NUTS-3

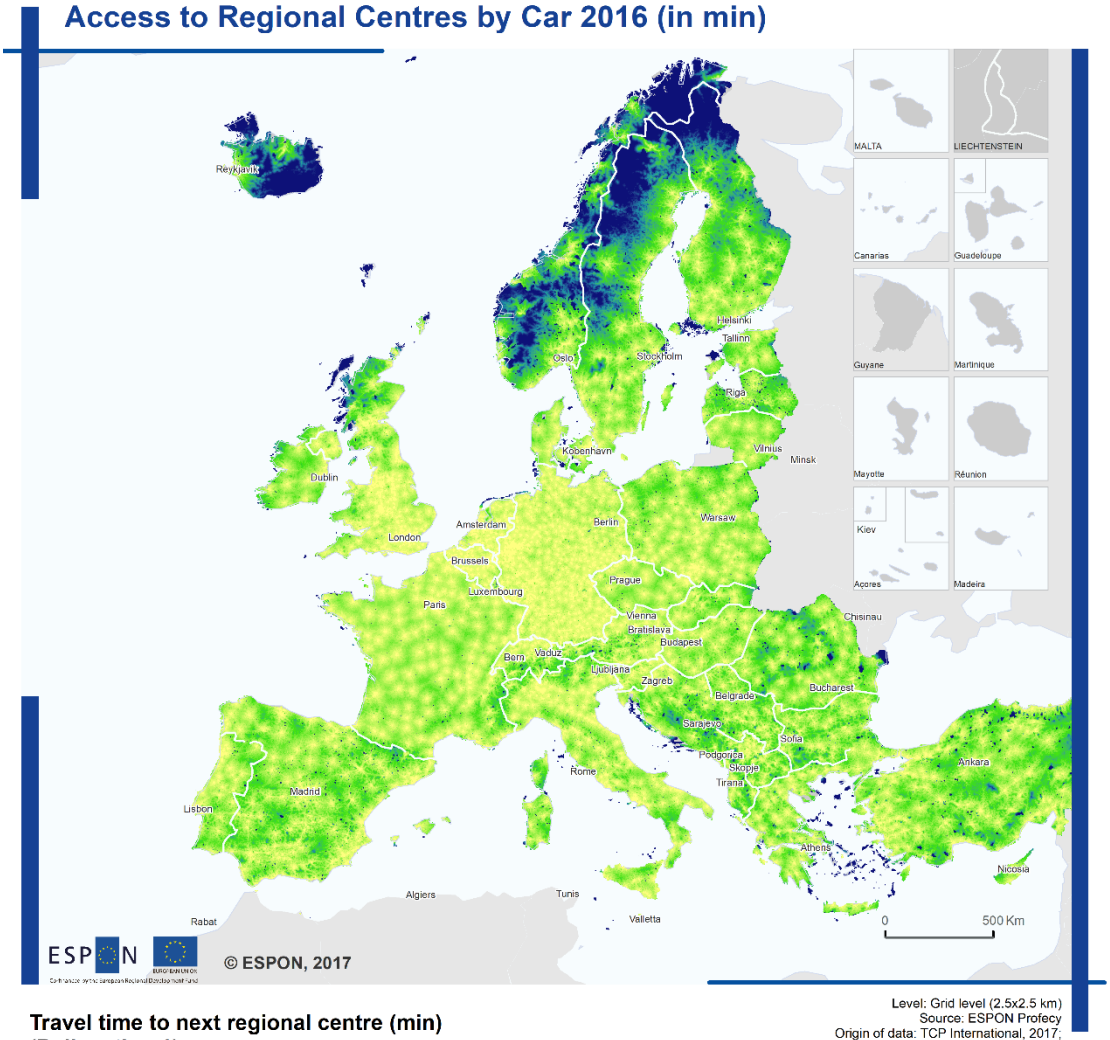
[a] Except for Cyprus and Malta, representing rather small island states.

region boundaries and span areas of low accessibility along region borders. Sometimes these areas are quite small (for instance, in Germany), sometimes they constitute large continuous areas covering several NUTS-3 regions (see for instance Norway and Sweden, Spain or Italy).

At NUTS-3 level (Map 2.6), one can identify 100 IP regions in Europe. The largest IP regions can be found in Norway and Sweden, followed by Spain and the Alpine regions, while the smallest ones are observed for Germany and the Benelux countries. Some of these IP regions represent traditionally disadvantaged regions such as mountain areas (Alps, Pyrenees, Carpathians, Apennines); others, though, cover central or rural areas (like IP regions in England or Germany). A complete list of these 100 regions is given in Annex Report 5.

However, the generally low shares of the overlay of inner peripheries at grid level with the NUTS-3 regions doubt the usefulness of the NUTS-3 level at all. Only very few NUTS-3 regions have shares of more than 50% of their territories, and there is only one region with more than 75%; for most regions, the share is far below 20%. Therefore, in a second attempt grid level IP areas where overlaid with LAU-2 units to get more precise results, and an explorative identification of LAU-2 units as inner peripheries has been developed (Map 2.8).

Map 2.1: Access to regional centres: Travel times by car. (Step 1 of the delineation process)



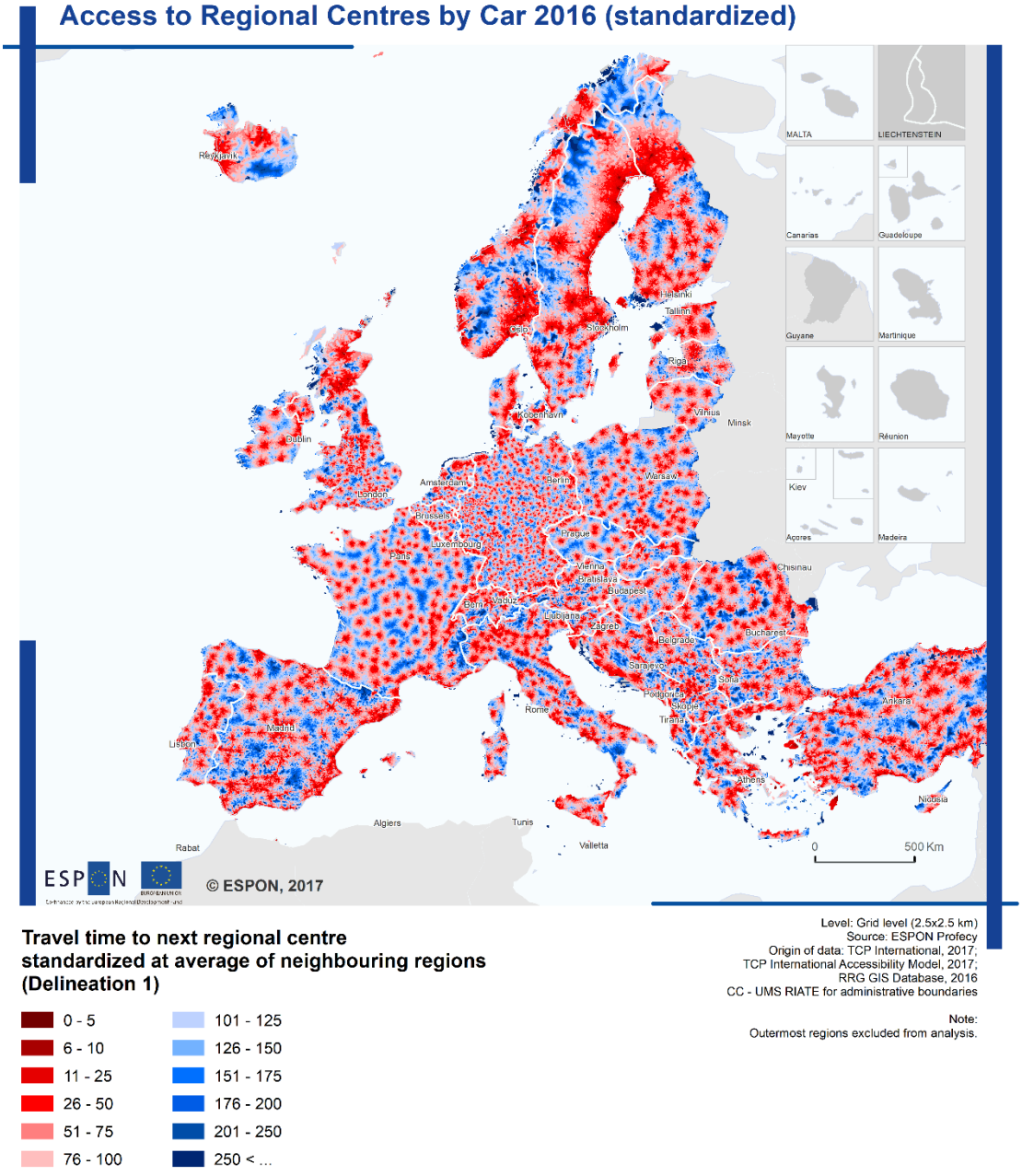
Travel time to next regional centre (min) (Delineation 1)

0 - 10	101 - 110
11 - 20	111 - 120
21 - 30	121 - 130
31 - 40	131 - 140
41 - 50	141 - 150
51 - 60	151 - 160
61 - 70	161 - 170
71 - 80	171 - 180
81 - 90	181 - 200
91 - 100	200 < ...

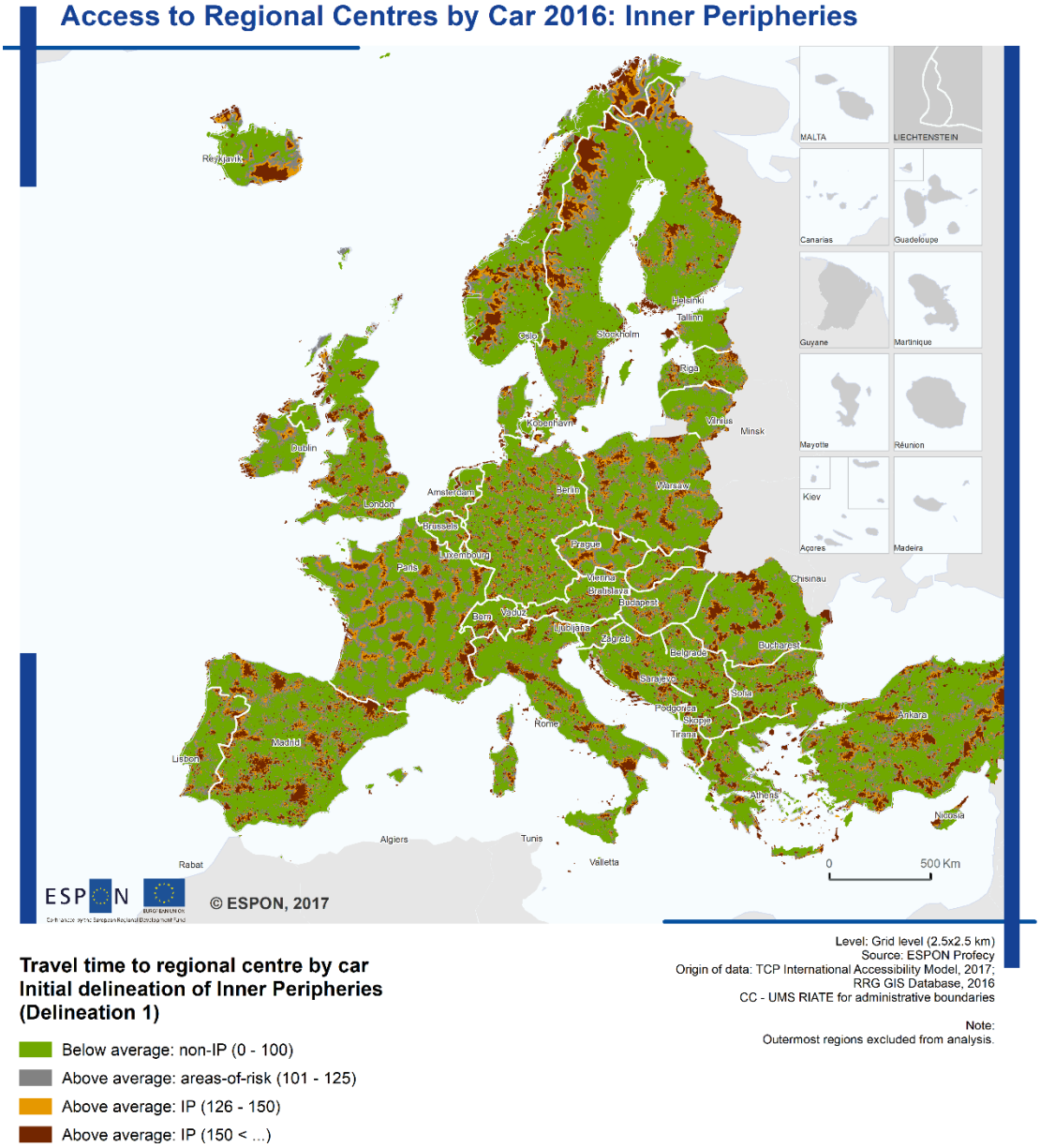
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017;
RRG GIS Database, 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

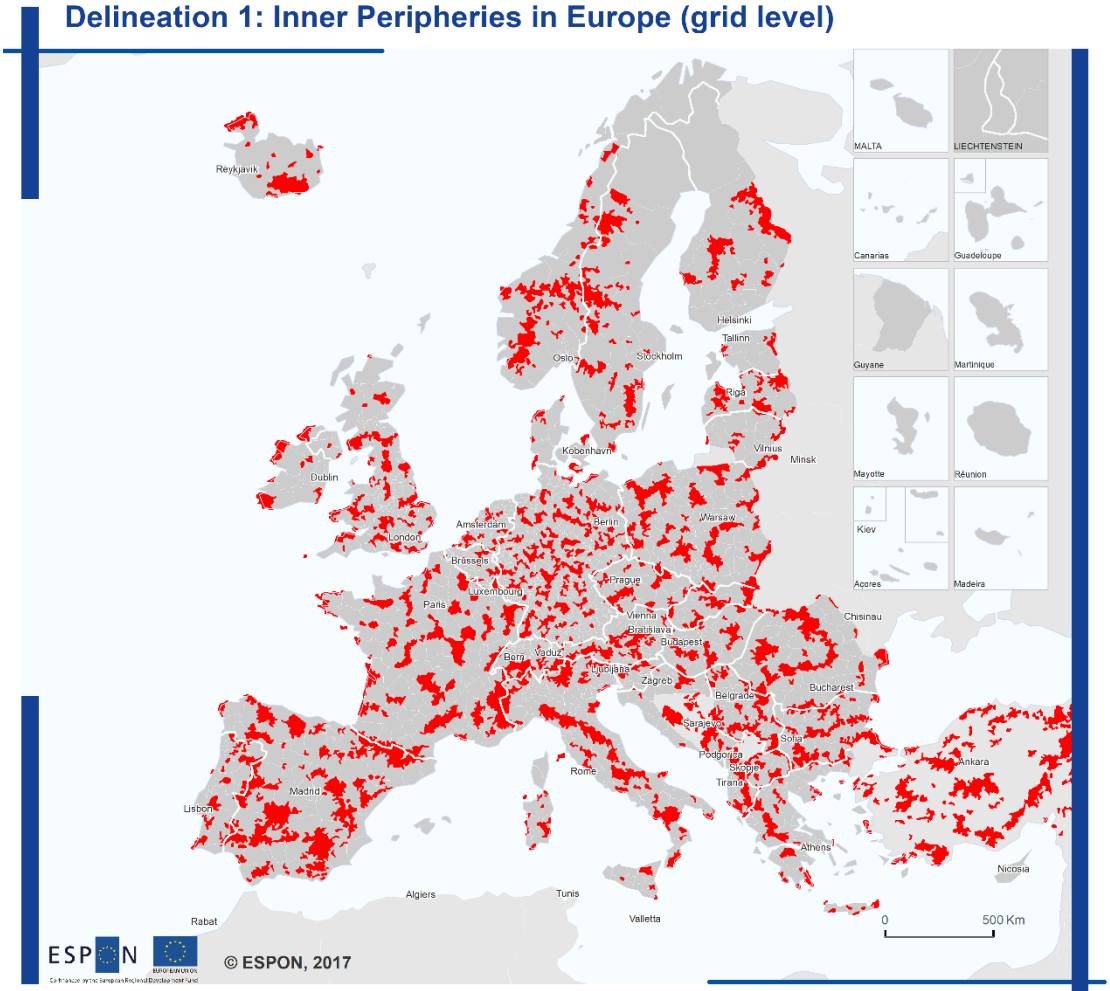
Map 2.2: Access to regional centres: Standardized travel times. (Step 2 of the delineation process)



Map 2.3: Access to regional centres: Initial delineation of inner peripheries. (Step 3 of the delineation process)



Map 2.4: Access to regional centres: Delineation of inner peripheries at grid level. (Step 4 of the delineation process)



Delineation 1: Inner peripheries in Europe (grid areas) (based upon access to regional centres by car)

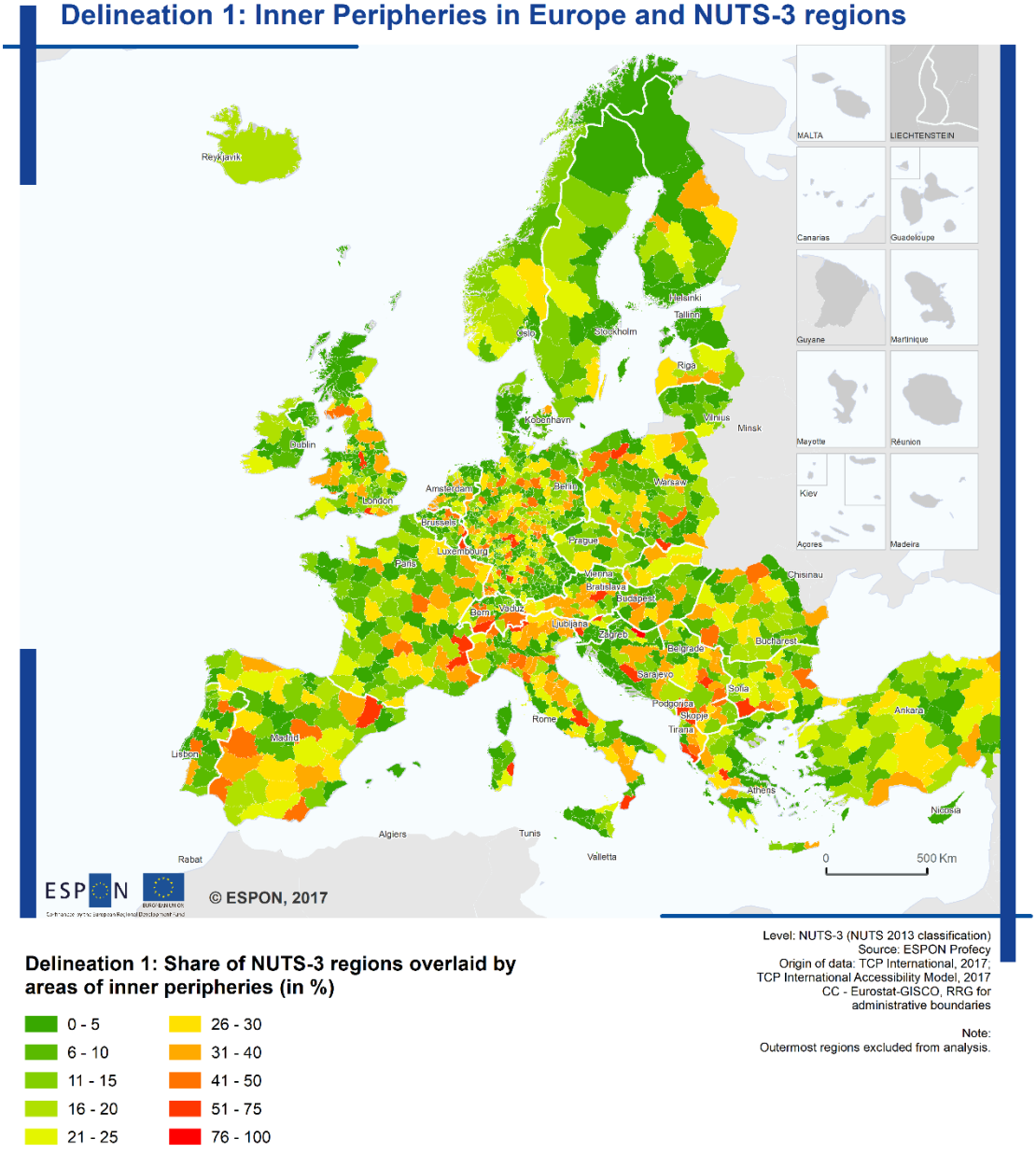
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 1,720 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 582

Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE for administrative boundaries

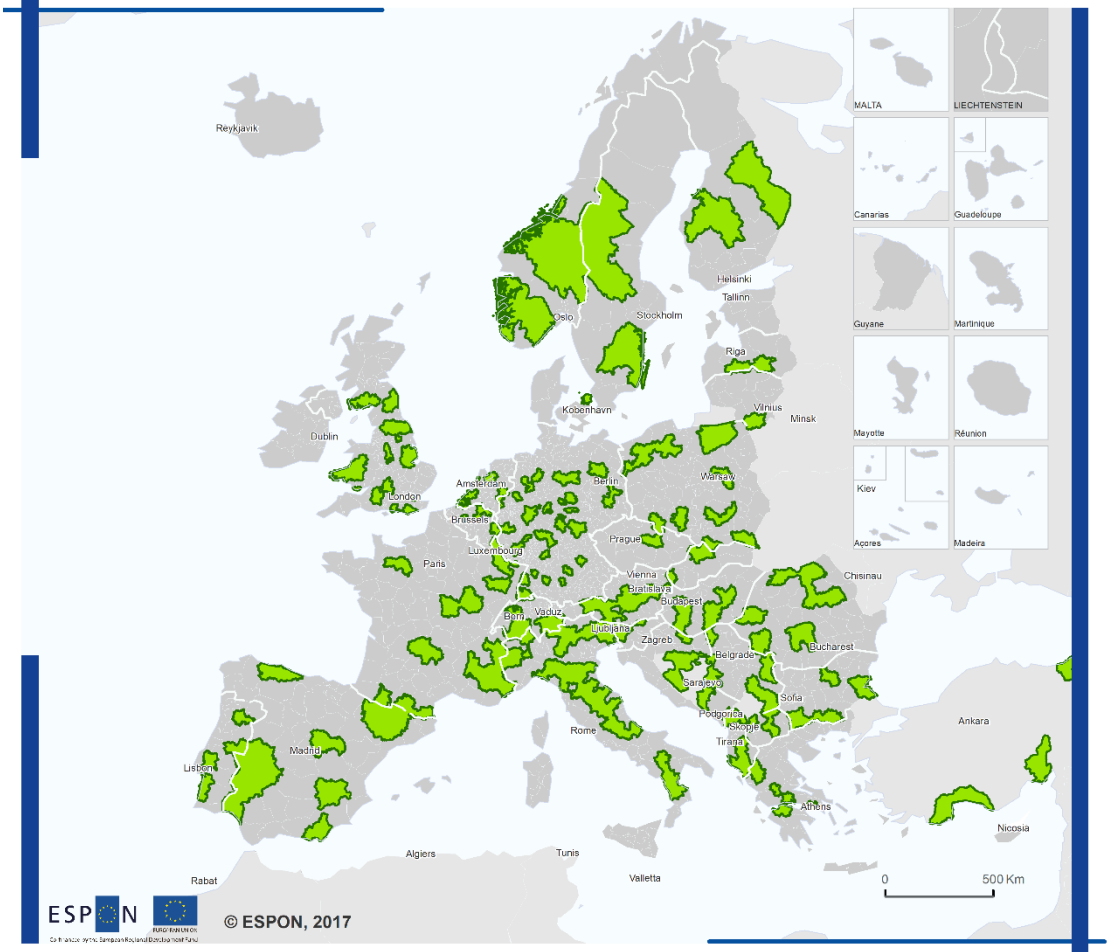
Note:
Outermost regions excluded from analysis.

Map 2.5: Access to regional centres: Overlay of NUTS-3 regions with IP areas at grid level. (Step 5 of the delineation process)



Map 2.6: Access to regional centres: Identification of NUTS-3 regions as inner peripheries. (Step 6 of the delineation process)

Delineation 1: Inner Peripheries in Europe and NUTS-3 regions



NUTS-3 regions identified as inner peripheries based on poor access to regional centres by car

IP regions in Europe (altogether 101 IP regions)

non-IP NUTS-3 regions

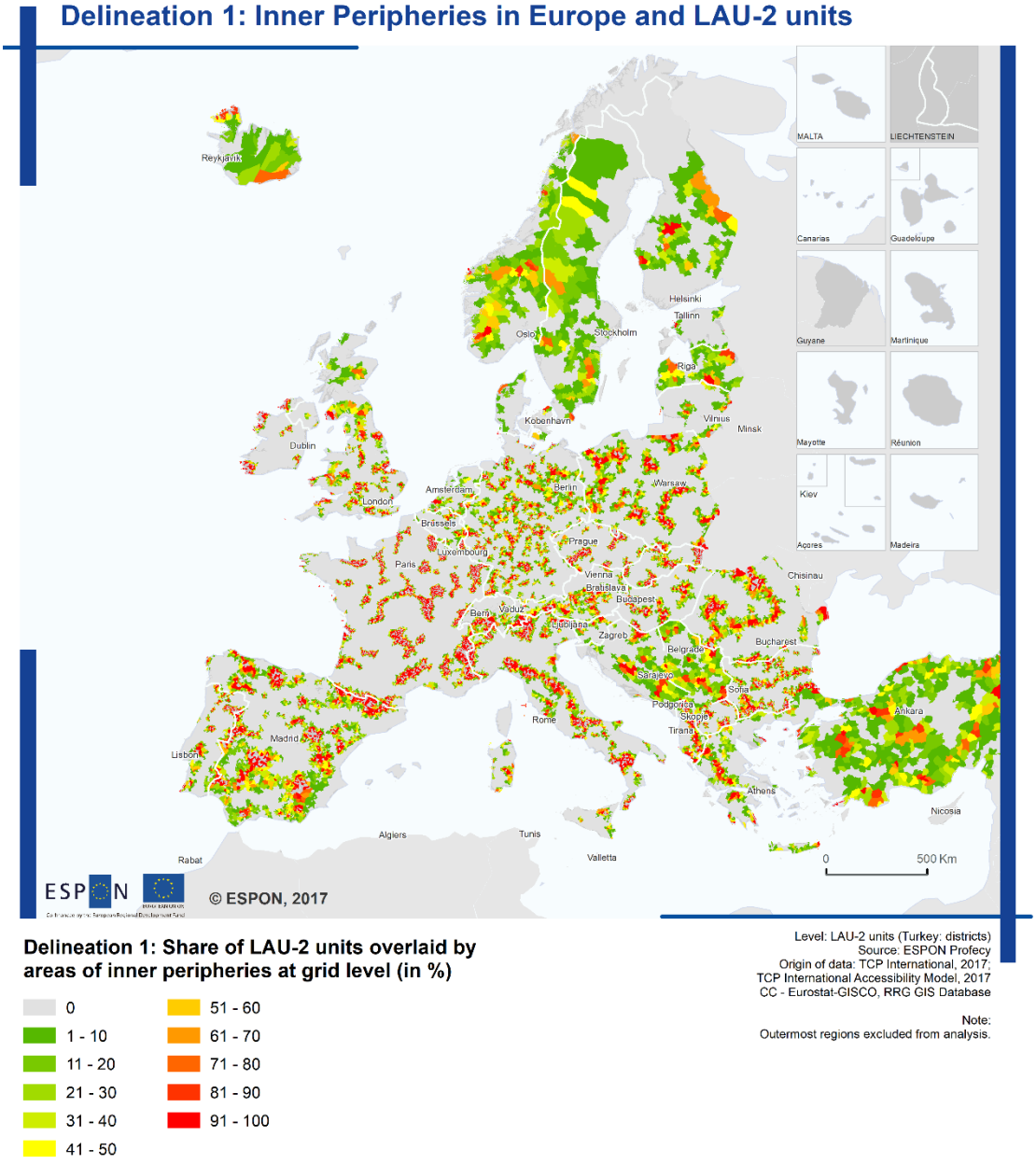
Remarks:

IP regions include all NUTS-3 regions
(i) whose territory is at least overlaid by 30% by grid IP patches
(ii) who are covered with a significant portion by the 75 largest IP patches
(iii) as far as possible all ESPON countries should have at least one IP region

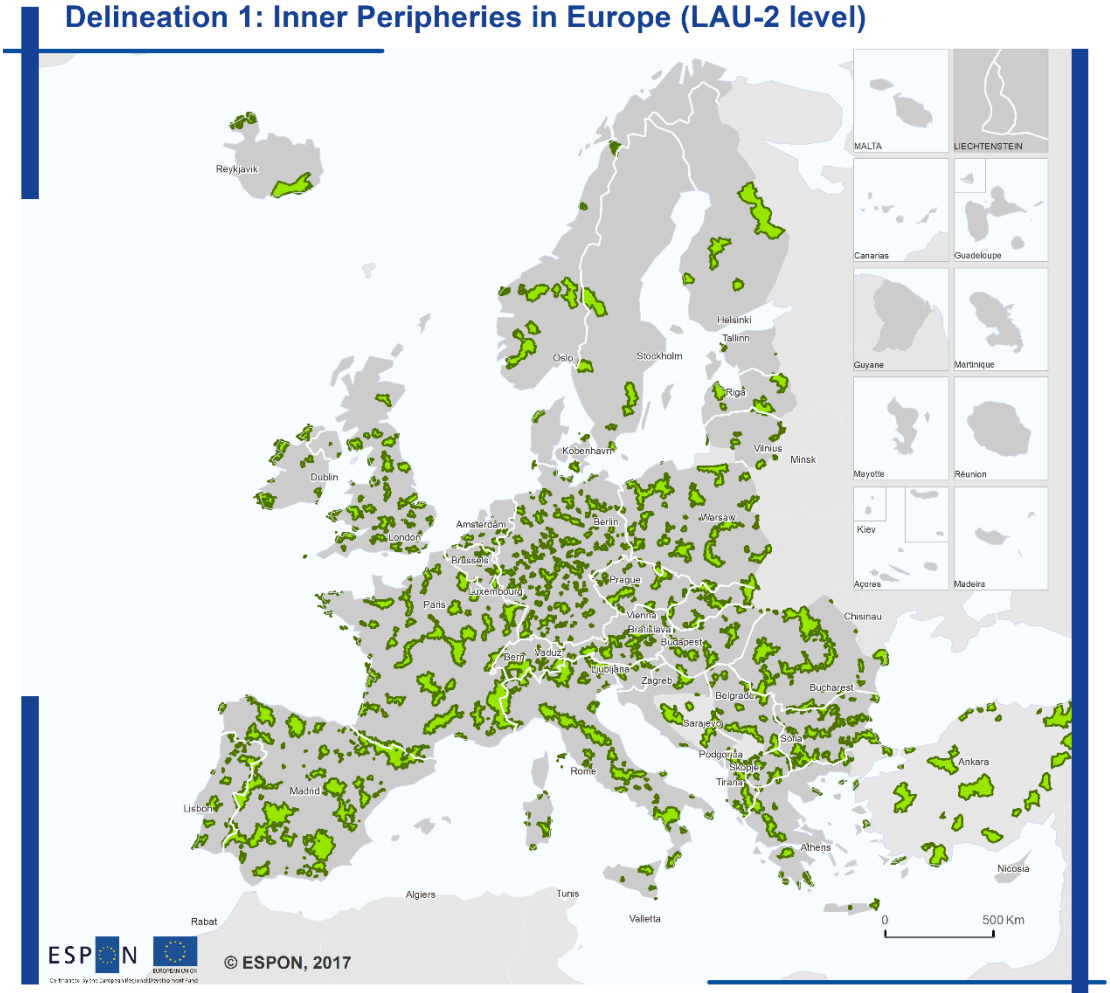
Level: NUTS-3 (NUTS 2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; TCP International Accessibility Model, 2017
CC - Eurostat-GISCO and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.7: Access to regional centres: Overlay of LAU-2 units with IP areas at grid level. (Step 5 of the delineation process)



Map 2.8: Access to regional centres: Identification of LAU-2 units as inner peripheries. (Step 6 of the delineation process)



Delineation 1: Access to regional centres by car Identification of LAU-2 as Inner Peripheries

IP regions in Europe

non-IP regions

Level: LAU-2 units (Turkey districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE for administrative boundaries, EBM, GADM

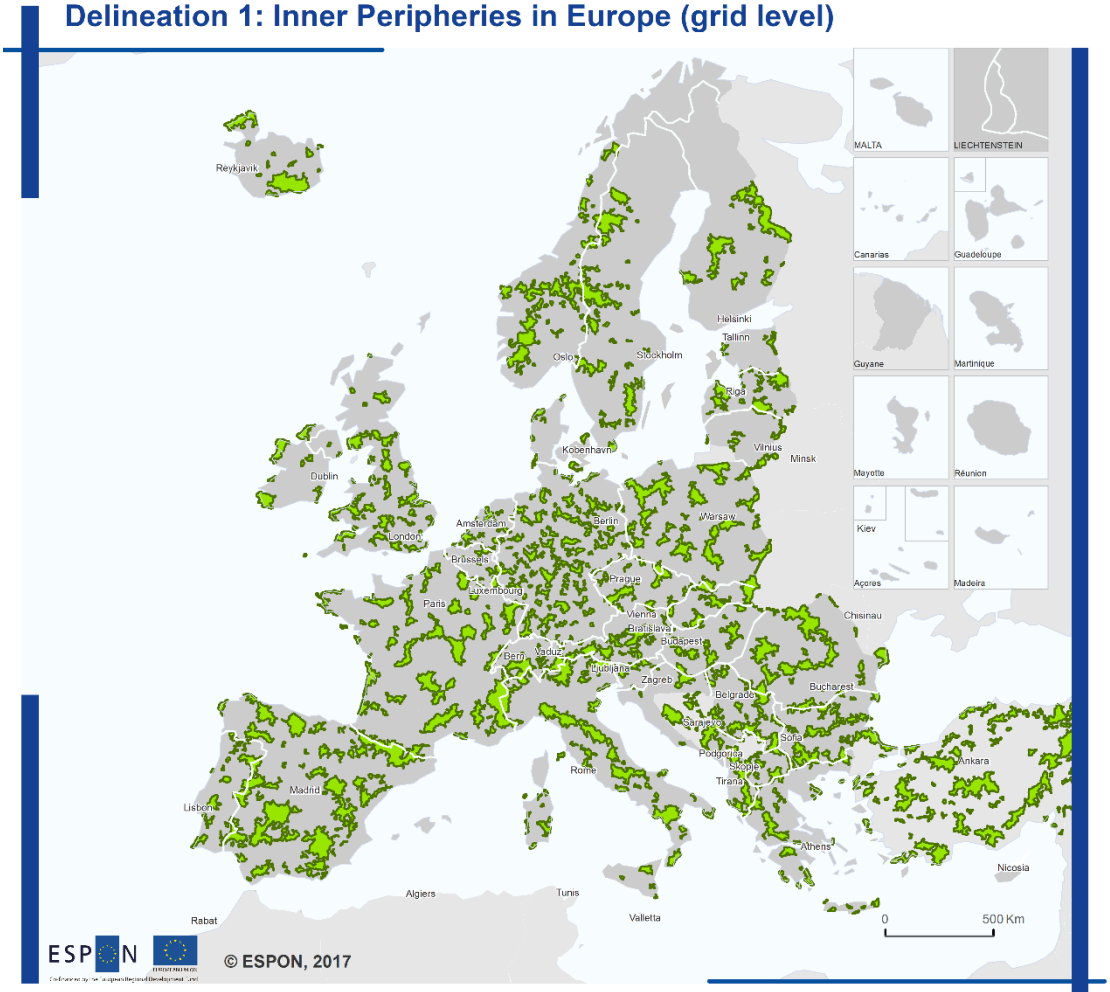
Note:
Outermost regions excluded from analysis.
Cyprus and Malta excluded because they represent rather small island states.

Remarks:

IP regions include all LAU-2 units whose territory is at least overlaid by 50% by grid IP patches

IP regions not include
- small and medium islands and island states like Cyprus and Malta
- outermost regions (French overseas territories, Iceland, Acores and Madeira, Canarias)

Map 2.9: Access to regional centres: Identification of grid cells as inner peripheries. (Step 6 of the delineation process)



Delineation 1: Poor access to regional centres
Identification of grid areas as Inner Peripheries

IP regions in Europe

non-IP regions

Remarks:

IP regions include all areas who have poor access to regional centres in Europe, in comparison to the neighbouring areas.

Level: grid cells (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE for administrative boundaries, EBM, GADM

3 Delineation 2 – Economic potential interstitual areas

Inner peripheries can also be identified as interstitial areas of poor economic potential in relation to their neighbouring regions. The economic potential of a region is measured as potential accessibility by road and by rail[b].

All NUTS-3 regions currently having an economic potential below the regional average[c] for road and rail and which have experienced a poorer development of the accessibilities for road and rail in the period 2001 to 2014 compared to their neighbouring regions are regarded as disadvantaged, and thus are regarded as inner peripheries according to this delineation.

The following maps have been produced as part of this delineation approach:

Map 3.1: Standardized potential accessibility by car 2014. (Criterion 1 of this delineation approach)

Map 3.2: Standardized potential accessibility by rail 2014. (Criterion 2 of this delineation approach)

Map 3.3: . Standardized potential accessibility by car, change rate of index values 2001-2014. (Criterion 3 of this delineation approach)

Map 3.4: Standardized potential accessibility by rail, change rate of index values 2001-2014. (Criterion 4 of this delineation approach)

Map 3.5: Economic potential interstitial areas: Identification of NUTS-3 regions as inner peripheries

[b] Most recent potential accessibility indicators for entire ESPON space were calculated in the ESPON Matrices project. Spiekermann, K., Wegener, M. (2014): *Integrated Spatial Scenarios until 2050*. ET2050 Scientific Report Volume 6. Dortmund: Spiekermann & Wegener Stadt- und Regionalforschung.

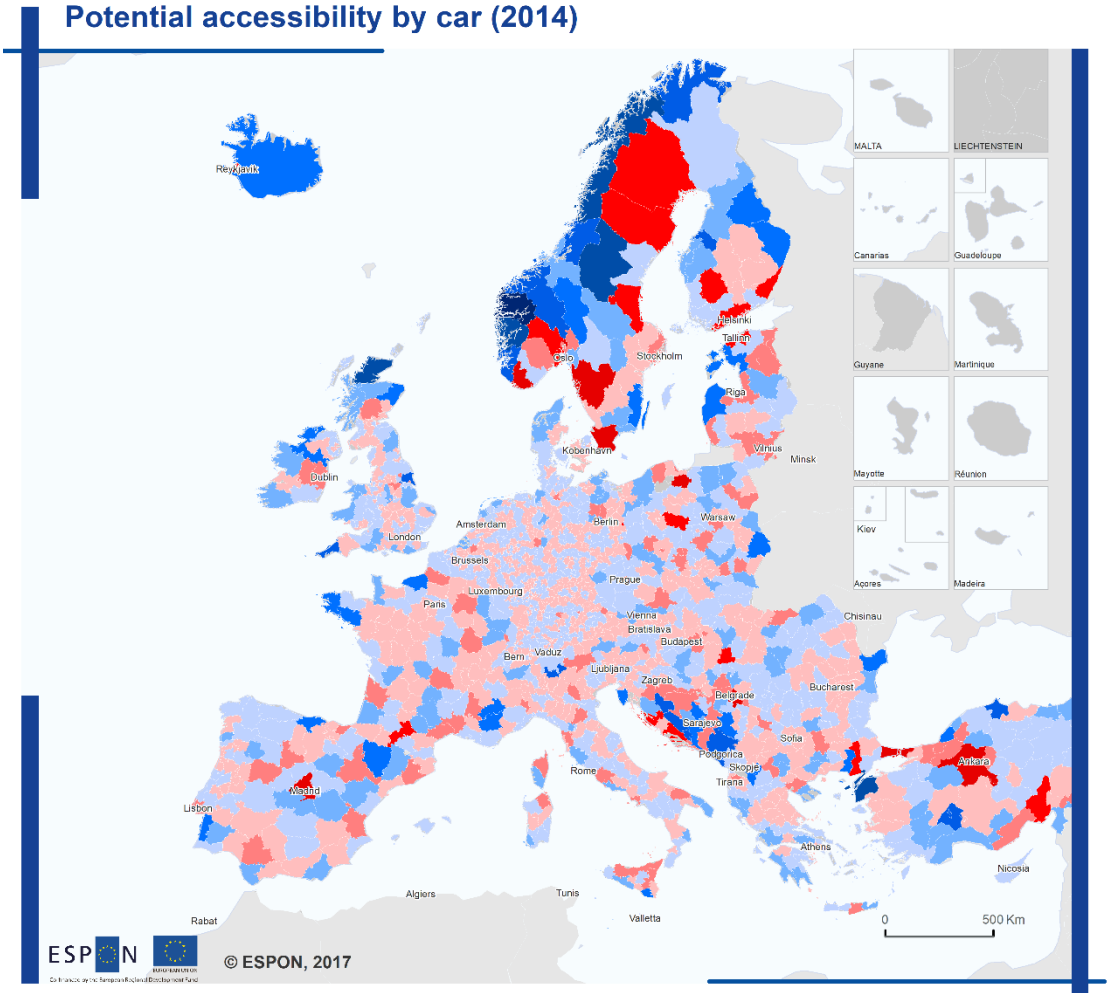
[c] In ESPON Matrices project, the accessibility values were standardized at the ESPON average resulting in the well-known large scale European core-periphery divide. For PROFECY, however, we are looking into regional accessibility patterns. Therefore, the raw accessibility numbers were re-standardized at the average of the neighbouring regions, following the approach implemented in the other delineations.

Methodological remarks regarding calculation of potential accessibility:

Potential accessibility measures the attractiveness of a region as a function of the opportunities or activities to be reached (here: represented by population size), and the effort, time, distance or costs needed to reach them. The attraction of a distant region (or location) is proportional to its size, weighted by a decreasing function if its distance.

In ESPON Matrices, potential accessibility indicators for road, rail and air and multimodal were calculated for NUTS-3 regions, where each NUTS-3 region was represented by its centroids, i.e. the main regional centre. Calculation results were assigned to the entire NUTS-3 region, even if the region consist of islands as well as mainland parts. By way of consequence, the island parts of a NUTS-3 region obtained the same indicator value as the mainland part. This of course is a simplification of reality, as in most cases the accessibility of the island part should be lower than those of the mainland part.

Map 3.1: Standardized potential accessibility by car 2014. (Criterion 1 of this delineation approach)



Potential accessibility by car 2014 (standardized at average of neighbouring regions) (Delineation 2)

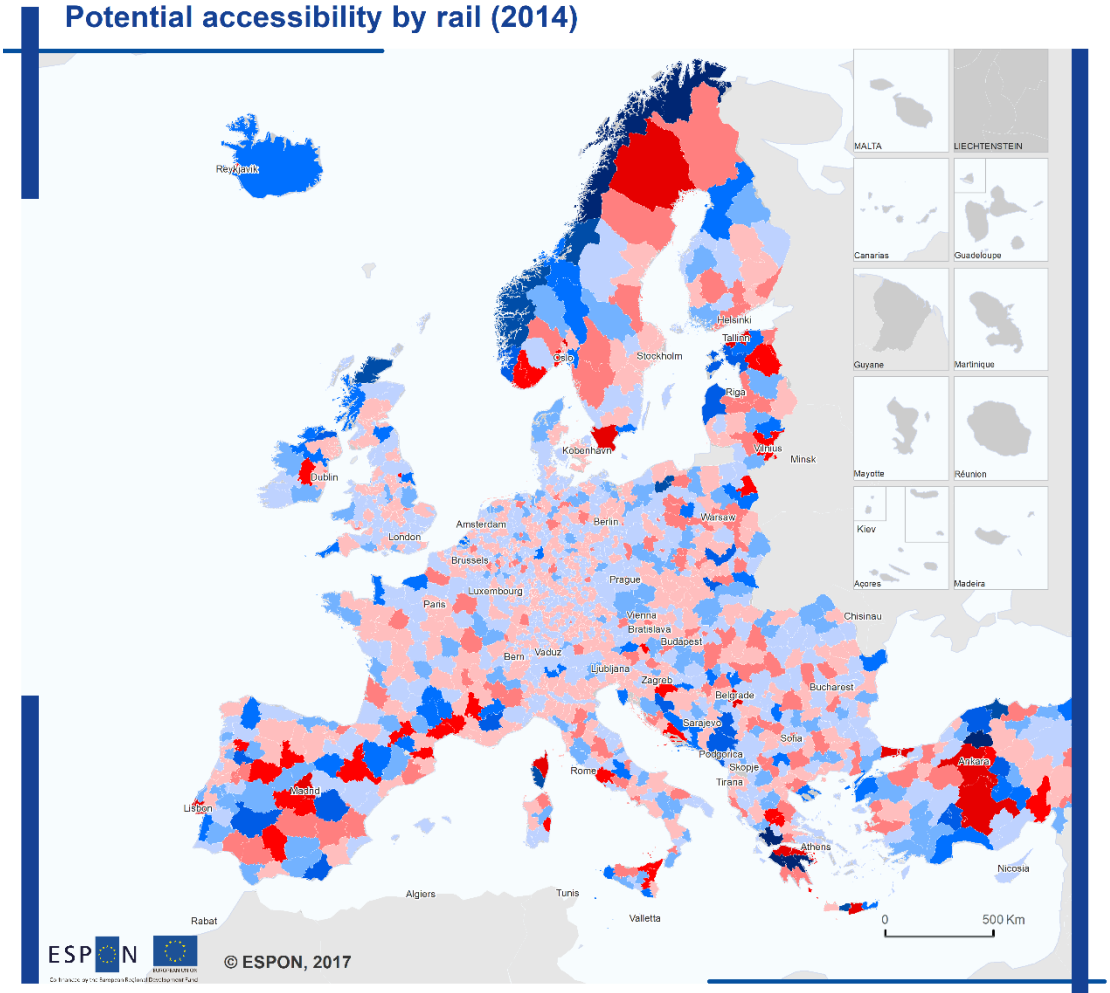
0 - 50	91 - 100
51 - 60	101 - 110
61 - 70	111 - 120
71 - 80	121 - 130
81 - 90	130 < ...

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; ESPON Matrices, Spiekermann&Wegener Urban and Regional Research, (2014; 2017); S&W Accessibility Model, 2014 own re-standardization, 2017; RRG GIS Database, 2014 CC - UMS RIATE and RRG for administrative boundaries

Notes:
Outermost regions excluded from analysis.

Average calculated as the average potential accessibility of the neighbouring NUTS-3 regions and the region itself.

Map 3.2: Standardized potential accessibility by rail 2014. (Criterion 2 of this delineation approach)



Potential accessibility by rail 2014 (standardized at average of neighbouring regions) (Delineation 2)

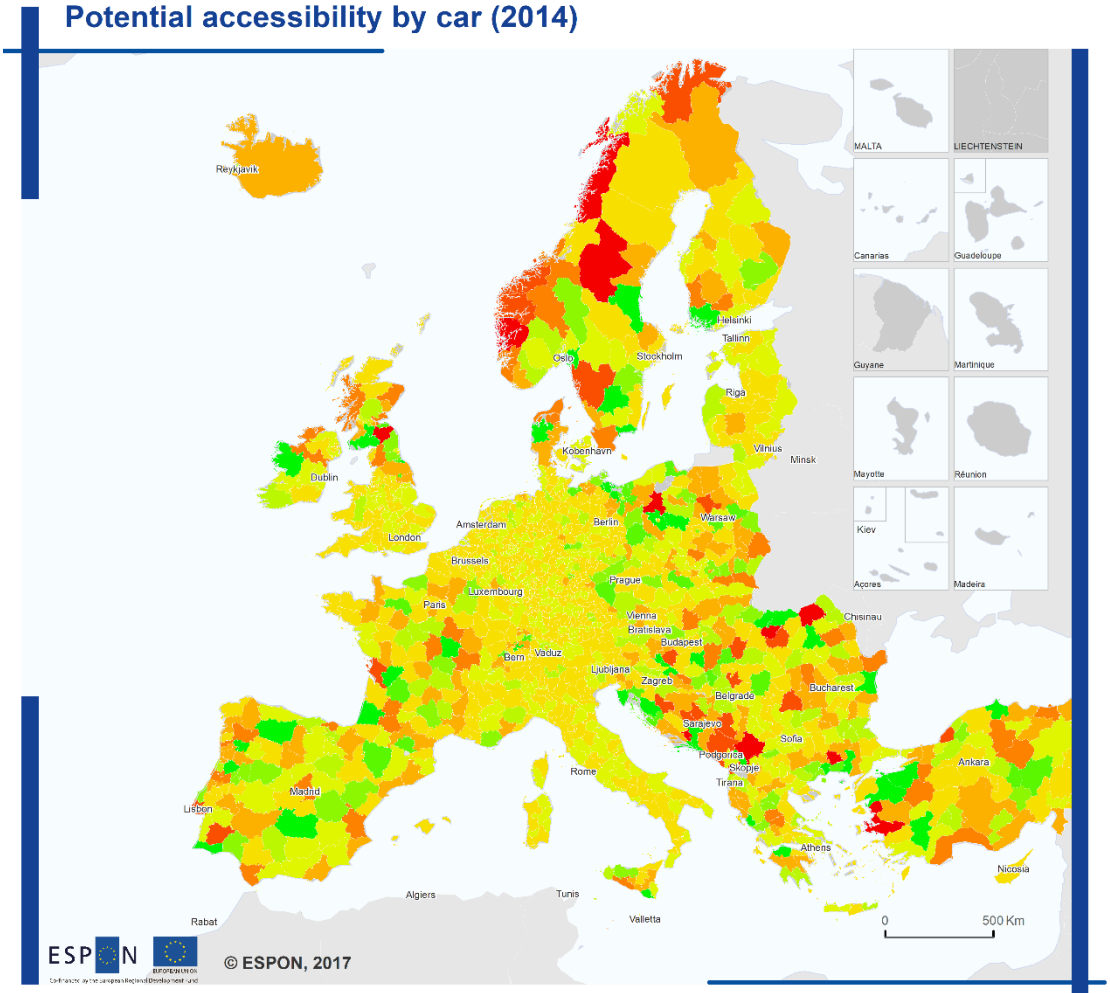
- 5 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100
- 101 - 110
- 111 - 120
- 121 - 130
- 130 < ...

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; ESPON Matrices, Spiekermann&Wegener Urban and Regional Research, (2014; 2017); S&W Accessibility Model, 2014 own re-standardization, 2017; RRG GIS Database, 2014 CC - UMS RIATE and RRG for administrative boundaries

Notes:
Outermost regions excluded from analysis.

Average calculated as the average potential accessibility of the neighbouring NUTS-3 regions and the region itself.

Map 3.3: Standardized potential accessibility by car, change rate of index values 2001-2014. (Criterion 3 of this delineation approach)



Potential accessibility by car
change rate 2001-2014 of standardized index values (in %)
(Delineation 2)

Decrease	*Increase*
-15,0 - -10,0	0,1 - 2,5
-9,9 - -7,5	2,6 - 5,0
-7,4 - -5,0	5,1 - 7,5
-4,9 - -2,5	7,6 - 10,0
-2,4 - 0,0	10,1 - 65,0

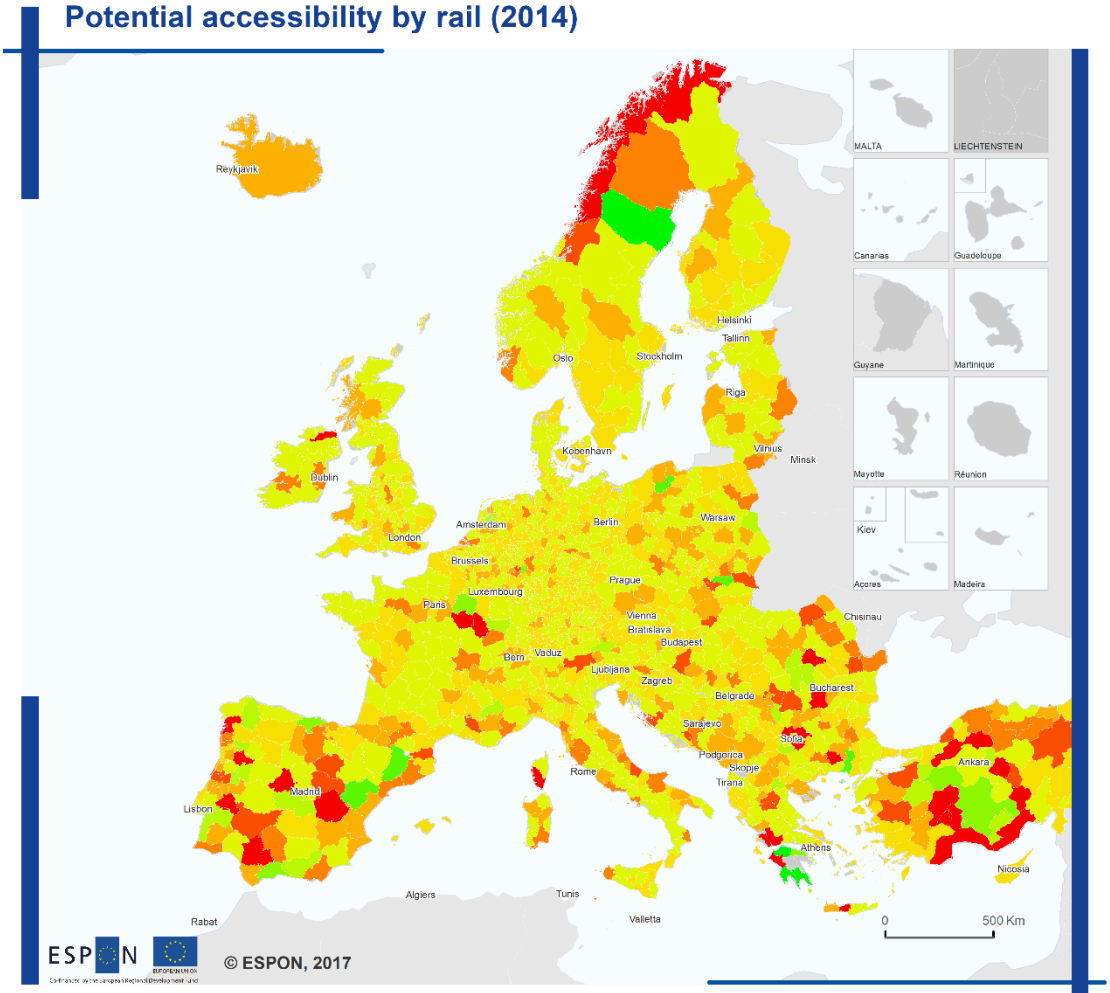
Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; ESPON Matrices, Spiekermann&Wegener Urban and Regional Research, (2014; 2017); S&W Accessibility Model, 2014 own re-standardization, 2017 RRG GIS Database, 2014 CC - UMS RIATE and RRG for administrative boundaries

Notes:
Outermost regions excluded from analysis.

Potential accessibility of a region standardized at the average of neighbouring regions and the region itself. Change rate of these standardized indices calculated for 2001-2014. The change rate now indicates how the potential accessibility of a region developed in relation to the development of the neighbouring regions.

Decrease - Development of potential accessibility in the region was worse than in neighbouring regions.
Increase - Development of potential accessibility in the region was better than in neighbouring regions.

Map 3.4: Standardized potential accessibility by rail, change rate of index values 2001-2014. (Criterion 4 of this delineation approach)



Potential accessibility by rail
change rate 2001-2014 of standaridzed index values (in %)
(Delineation 2)

Decrease		*Increase*	
	... < -10.0		0.0 - 10.0
	-9.9 - -7.5		10.1 - 20.0
	-7.4 - -5.0		20.1 - 30.0
	-4.9 - -2.5		30.1 - 40.0
	-2.4 - 0.0		40.1 - 55.0

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; S&W Accessibility Model, 2014
ESPON Matrices, Spiekermann&Wegener Urban and Regional Research, (2014; 2017); own re-standardization, 2017
RRG GIS Database, 2014
CC - UMS RIATE and RRG for administrative boundaries

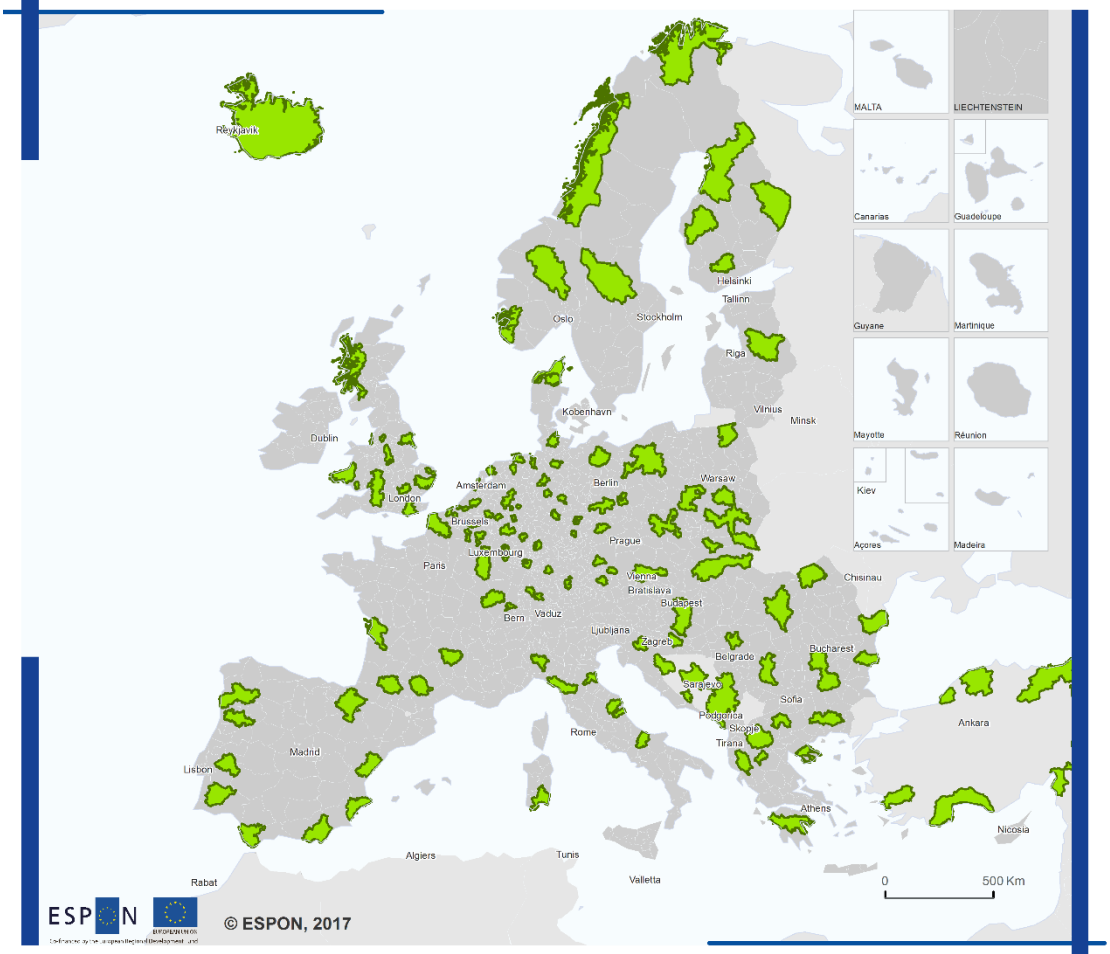
Notes:
Outermost regions excluded from analysis.

Potential accessibility of a region standardized at the average of neighbouring regions and the region itself. Change rate of these standardized indices calculated for 2001-2014.
The change rate now indicates how the potential accessibility of a region developed in relation to the development of the neighbouring regions.

Decrease - Development of potential accessibility in the region was worse than in neighbouring regions.
Increase - Development of potential accessibility in the region was better than in neighbouring regions.

Map 3.5: Economic potential interstitial areas: Identification of NUTS-3 regions as inner peripheries

Delineation 2: Inner peripheries in Europe (NUTS-3 level)



Delineation 2: Potential accessibility - low performing regions
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 region

Remarks:

IP regions include all NUTS-3 regions
(i) whose standardized potential accessibility indices in 2014 for road and rail are below average of neighbouring regions, and
(ii) whose development of the standardized potential accessibility indices between 2001 and 2014 for road and rail is negative (i.e. whose accessibilty development was worse compared to its neighbours - negative change rates).

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; ESPON Matrices Final, 2017
Spiekermann&Wegener Urban and Regional Research, 2017; S&W Accessibility Model, 2017; own classification
RRG GIS Database, 2017
CC - UMS RIATE and RRG for administrative boundaries

Notes:
Outermost regions excluded from analysis.

4 Delineation 4 – Depleting areas

The following maps have been generated, representing the entire delineation process for this delineation approach:

Map 4.1: NUTS-3 regions identified as IP according to poor demographic development.

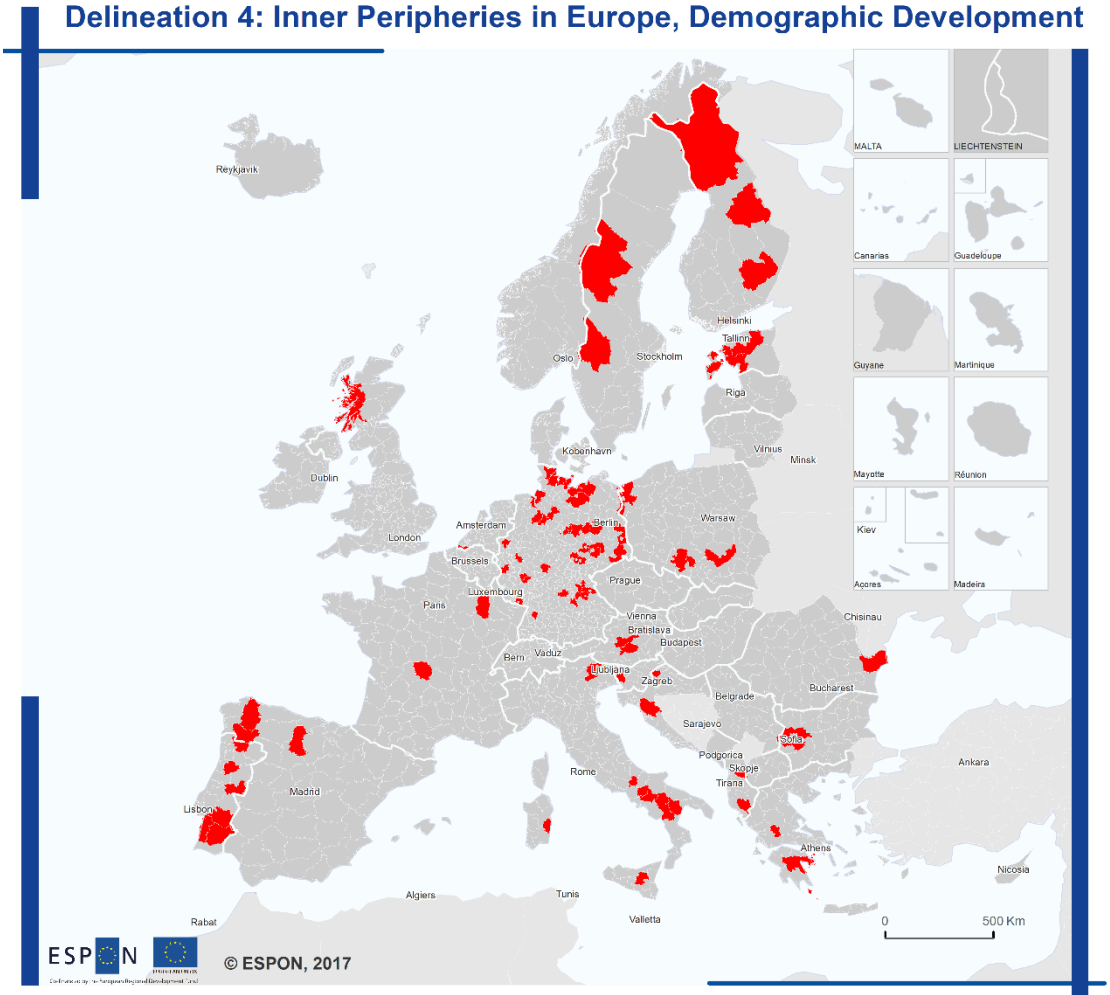
Map 4.2: NUTS-3 regions identified as IP according to poor economic development.

Map 4.3: NUTS-3 regions identified as IP according to poor social inclusion.

Map 4.4: Delineation 4: NUTS-3 regions identified as inner peripheries (depleting areas).

Map 4.4 shows that most of the depleting areas are located in the Mediterranean space, but also in Western Europe (Benelux, France, Germany, UK) and even in Scandinavia, while only very few regions in East European countries are concerned. This should not be misunderstood as a sign that East European regions are generally more prosperous compared to the old EU Member States; instead, it should be rather seen as a proof that the disparities between neighbouring regions are much larger in old EU Member States compared to the new ones. In the former countries, there are extremely prosperous regions located adjacent to regions facing large development problems (i.e. “peaks” and “lowland” regions are more accentuated), while in the latter countries disparities among adjacent regions are much smaller due to the generally lower performance of socio-economic indicators.

Map 4.1: NUTS-3 regions identified as IP according to poor demographic development.



Delineation 4: Inner peripheries in Europe (NUTS-3 level) based upon poor demographic situation

Areas identified as inner peripheries at NUTS-3 level

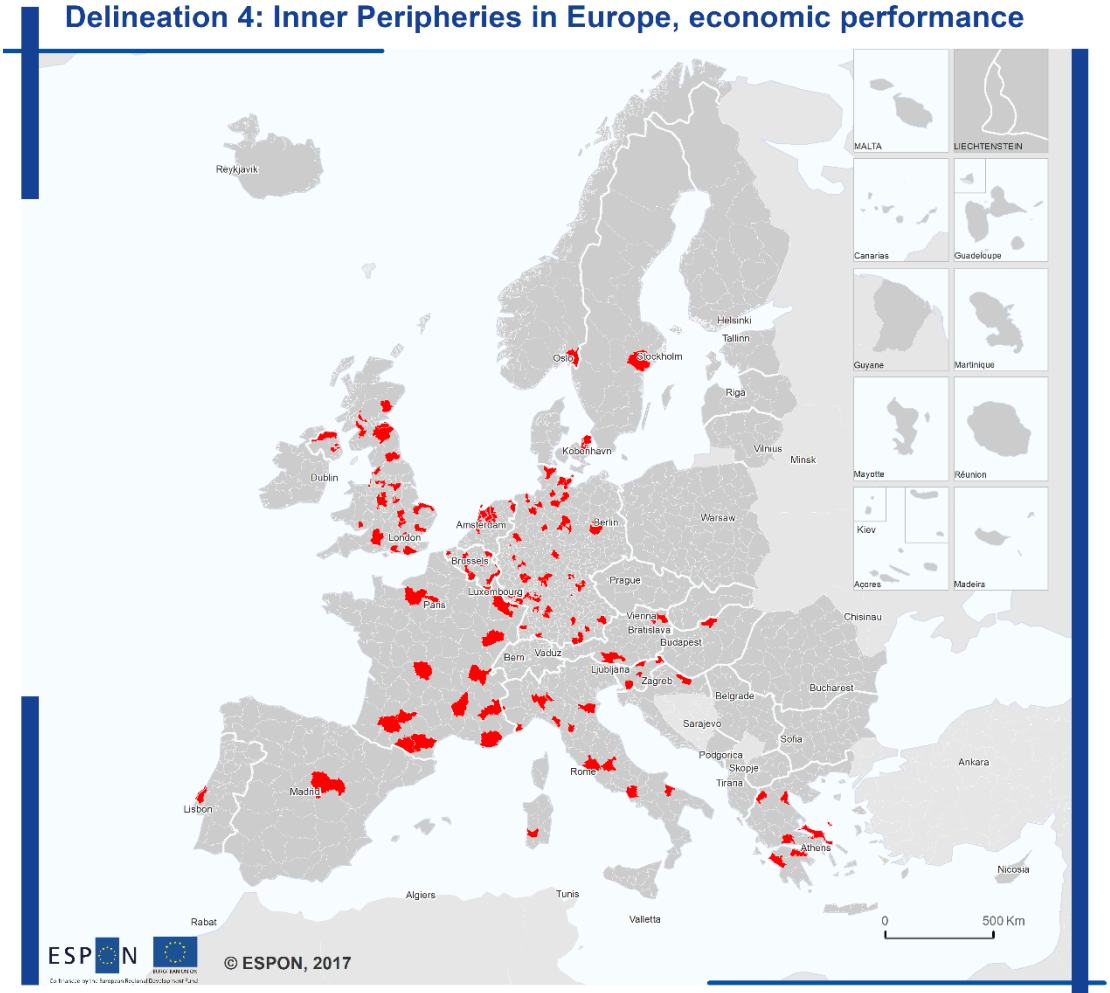
Notes:
All NUTS-3 regions considered as inner periphery,
(i) whose standardized population density in 2015 is < 50% of the average of neighbouring regions, and
(ii) who experienced negative mean annual change rates in the time period 2000-2015

non-IP region

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based on Eurostat, 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 4.2: NUTS-3 regions identified as IP according to poor economic development.



Delineation 4: Inner peripheries in Europe (NUTS-3 level) based upon poor economic performance

Areas identified as inner peripheries at NUTS-3 level

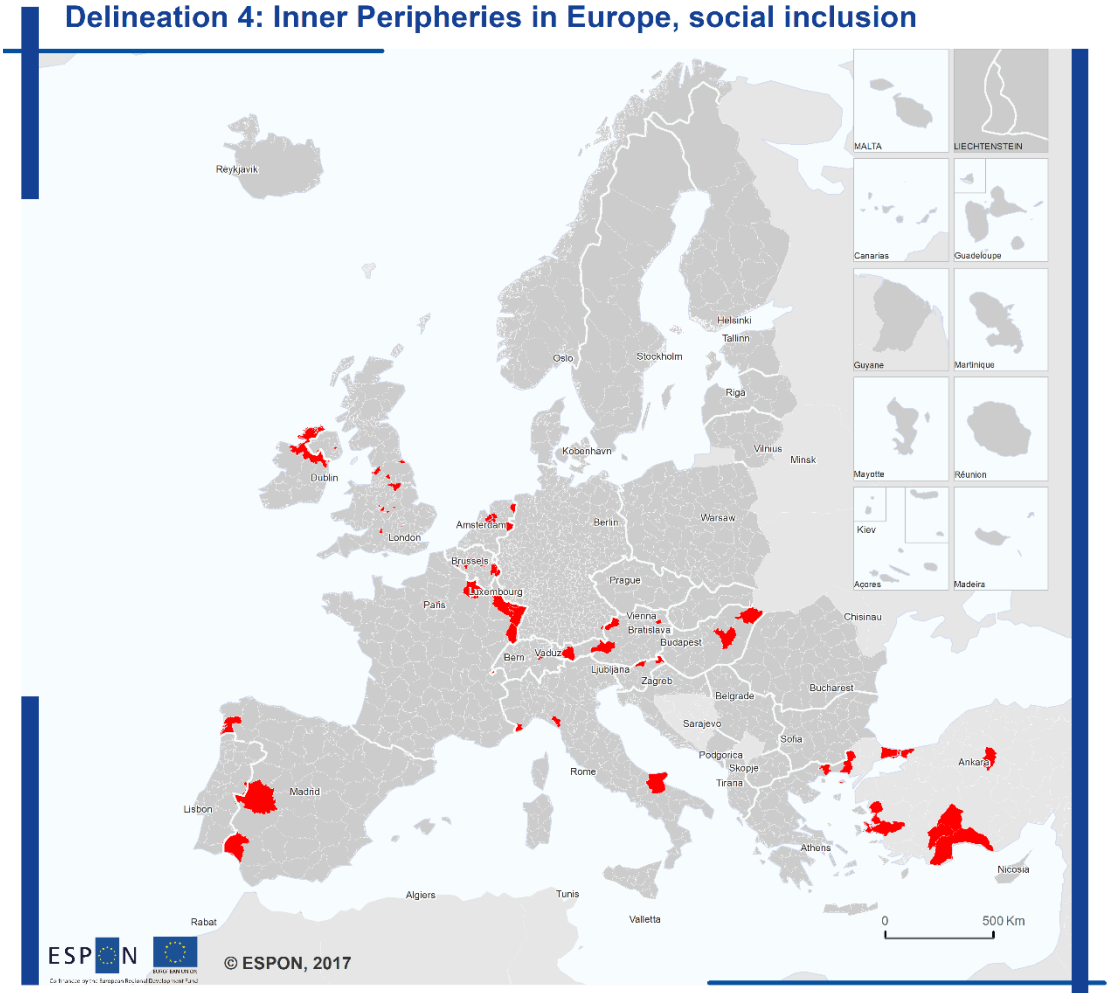
Notes:
All NUTS-3 regions considered as inner periphery,
(i) whose standardized GDP per capita in 2015 is < 85% of the average of neighbouring regions, and
(ii) who experienced GDP development in 2000-2015 below EU average

non-IP region

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based on Eurostat, 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 4.3: NUTS-3 regions identified as IP according to poor social inclusion.



Delineation 4: Inner peripheries in Europe (NUTS-3 level) based upon poor social inclusion (unemployment)

Areas identified as inner peripheries at NUTS-3 level

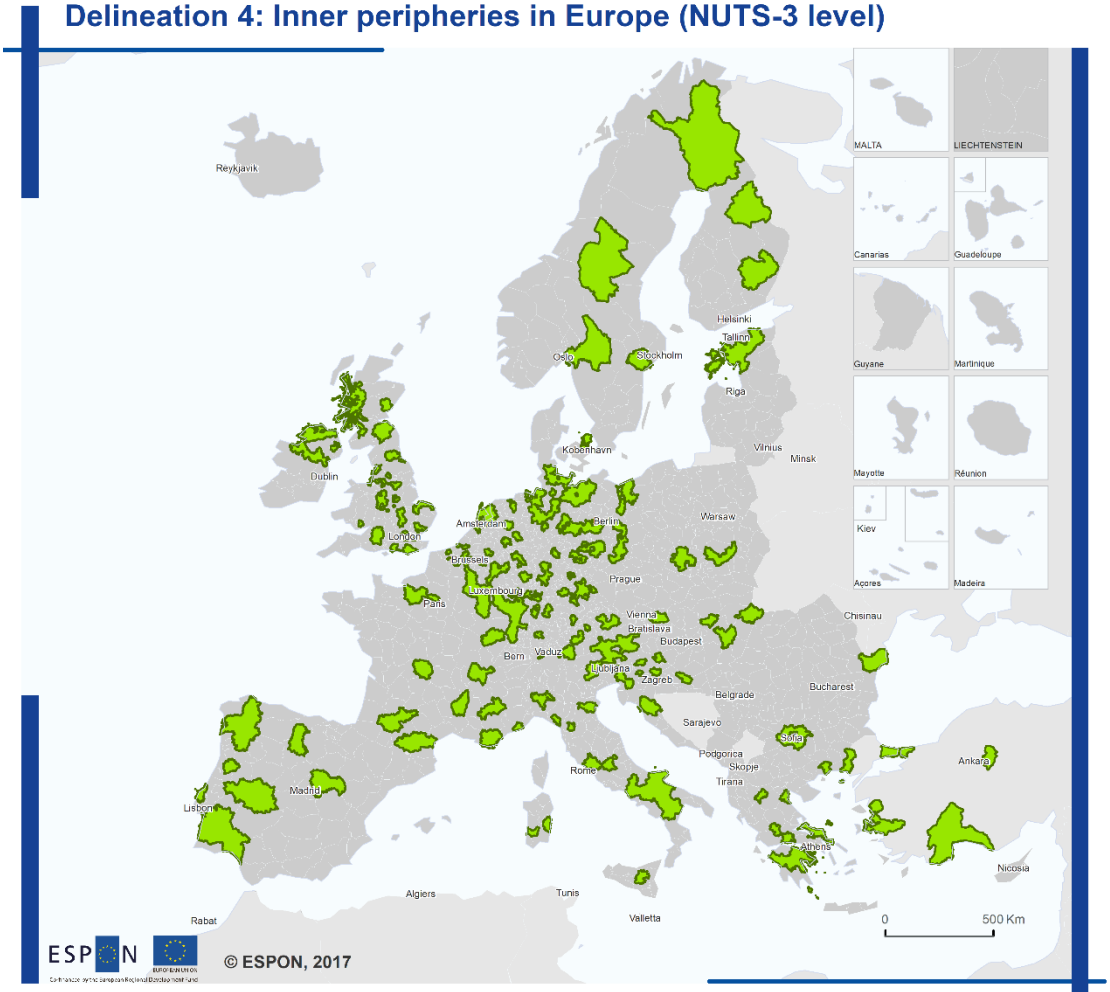
Notes:
All NUTS-3 regions considered as inner periphery,
(i) whose standardized unemployment rate in 2016 is > 125% of the average of neighbouring regions, and
(ii) who experienced increasing unemployment rates in the time period 2002-2016.

non-IP region

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based on Eurostat, 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 4.4: Delineation 4: NUTS-3 regions identified as inner peripheries (depleting areas).



Delineation 4: Demographic and economic performance
Regions with poor performance as regards population, GDP and unemployment (depleting areas)
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 region

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculations based on Eurostat, 2017
CC - UMS RIATE and RRG for administrative boundaries

Notes:
Outermost regions excluded from analysis.

Remarks:

IP regions include all NUTS-3 regions
(i) whose standardized population density in 2015 is < 50% of the average of neighbouring regions and who experienced negative mean annual change rates in the time period 2000-2015,
or
(ii) whose standardized GDP per capita in 2015 is < 85% of the average of neighbouring regions and who experienced GDP development in the time period 2000-2015 below the average of ESPON space,
or
(iii) whose standardized unemployment rate in 2016 is >125% of the average of neighbouring regions and who experienced increasing unemployment rates in the time period 2002-2016.

ESPON 2020 – More information

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