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Inspire policy making by territorial evidence

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 7. Delineation 3 – Series of Maps illustrating the Delineation Process

Version 07/12/2017

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Authors
Carsten Schürmann, TCP International (Germany)

Advisory Group
Project Support Team: Barbara Acreman and Zaira Piazza (Italy), Eedi Sepp (Estonia), Zsolt Szokolai, European Commission.
ESPON EGTC: Marjan van Herwijnen (Project Expert), Laurent Frideres (HoU E&O), Ilona Raugze (Director), Piera Petruzzi (Outreach), Johannes Kiersch (Financial Expert).

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Contact: info@espon.eu

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 complements and extends the results discussed in Chapter 4 of the Final Report in relation to delineating inner peripheries for Delineation 3, i.e. identifying inner peripheries with poor access to services-of-general-interest (SGIs).

In the process of identifying such areas of poor access to services-of-general-interest, in a first setp, access to individual SGIs have been analysed, by preparing map series for each type of SGI. These map series will be presented in detail in Chapter 2 of this Annex. For all SGIs considered, the same set of standardized[1] maps will be presented. Each map corresponds to one important interim step in the delineation process. A detailed description of the individual steps is provided in Annex 4.

The following standard map have been produced:

- Access to the next facility (car travel times)
- Standardized car travel times
- Areas identified as inner peripheries at grid level
- Share of overlay of grid level IPs with NUTS-3 regions
- NUTS-3 regions identified as inner peripheries
- Share of overlay of grid level IPs with LAU-2 units
- LAU-2 units identified as inner peripheries
- Number of facilities that can be reached within a given time period

The map series thus represents a documentation of the entire delineation process for the Delineation 3 approach. The map layout of each map type is standardized, allowing an easy comparison of the (interim) delineation results between all SGIs.

The maps illustrating the number of facilities that can be reached have not been used for the delineation of inner peripheries in Delineation 3 itself, but have been explored as one option to identify areas-of-risk (see Chapter 4 of the Final Report), and they turned out as an important analytical variable for the case studies. Table 1 indicates for which SGI the grid-based indicator on numbers of facilities were calculated, and which travel time threshold was applied for this.

After the presentation of the results for the individual SGIs, the individual results will be combined to produce one single delineation of inner peripheries for Delineation 3. The options for this combination, and the final results, will be presented in Chapter 3 of this Annex.

[1] Standardization refers to the colors and symbols used, the class breaks implemented, and the terminologies.

2 Individual services-of-general-interest

As a result of the data overview given in the PROFECY Inception Report, a total of seven different types of services-of-general-interest have been selected (banks, cinemas, health care, education, train stations, retail, jobs), four of which are further subdivided into subtypes (health care, education, train stations, retail), resulting in twelve individual SGI types:

Table 2.1: Overview of the selected services-of-general-interest.

Type of service	**Indicator "Number of facilities"**	
	Generated (yes/no)	**Time threshold**
 Banks	yes	30 min
 Cinemas	yes	45 min
 Health care: Doctors	yes	30 min
 Health care: Hospitals	yes	60 min
 Health care: Pharmacies	yes	15 min
 Education: primary schools		
 Education: secondary schools	yes	60 min
 Train stations: all stations	yes	20 min
 Train stations: major stations	yes	30 min
 Retail sector: Supermarkets	yes	15 min
 Retail sector: Convenient stores		
 Jobs (places of work / urban morphological zones)	no	./.

The maps will be presented in Chapter 2 as a map gallery, without any further comments or descriptions. Each map will be presented as a full-page map, in order to enable detecting map details easily on all the grid maps.

2.1 Banks

The following maps have been generated as part of the delineation process:

Map 2.1: Access to banks: Travel times by car.

Map 2.2: Access to banks: Standardized travel times.

Map 2.3: Access to banks: Delineation of inner peripheries at grid level.

Map 2.4: Access to banks: Overlay of NUTS-3 regions with IP areas at grid level.

Map 2.5: Access to banks: Identification of NUTS-3 regions as inner peripheries.

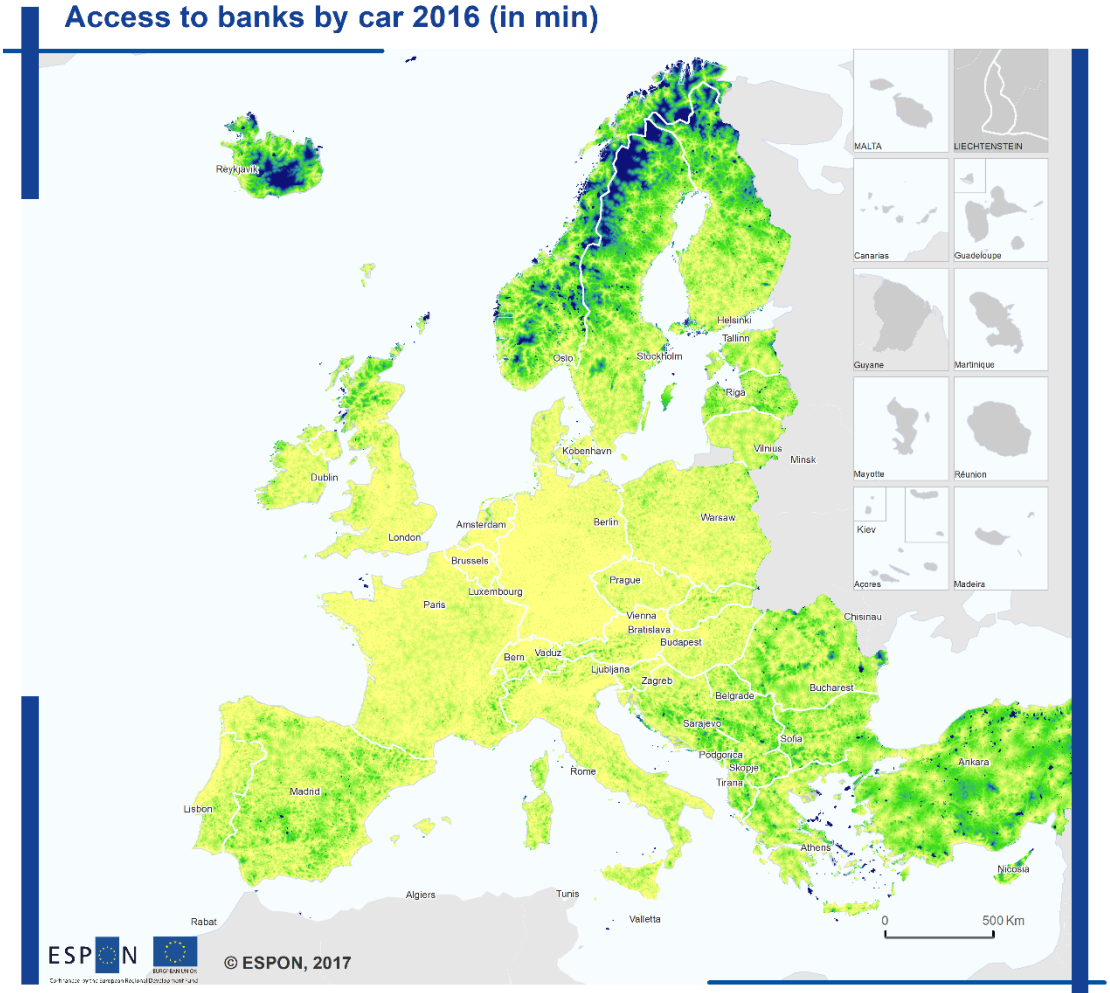
Map 2.6: Availability of banks within 30 min car travel times.

Map 2.7: Access to banks: Overlay of LAU-2 units with IP areas at grid level.

Map 2.8: Access to banks: Identification of LAU-2 units as inner peripheries.

Banking facilities:
Only bank *offices* were considered in the analyses, while locations of cash machines were excluded.

Map 2.1: Access to banks: Travel times by car.



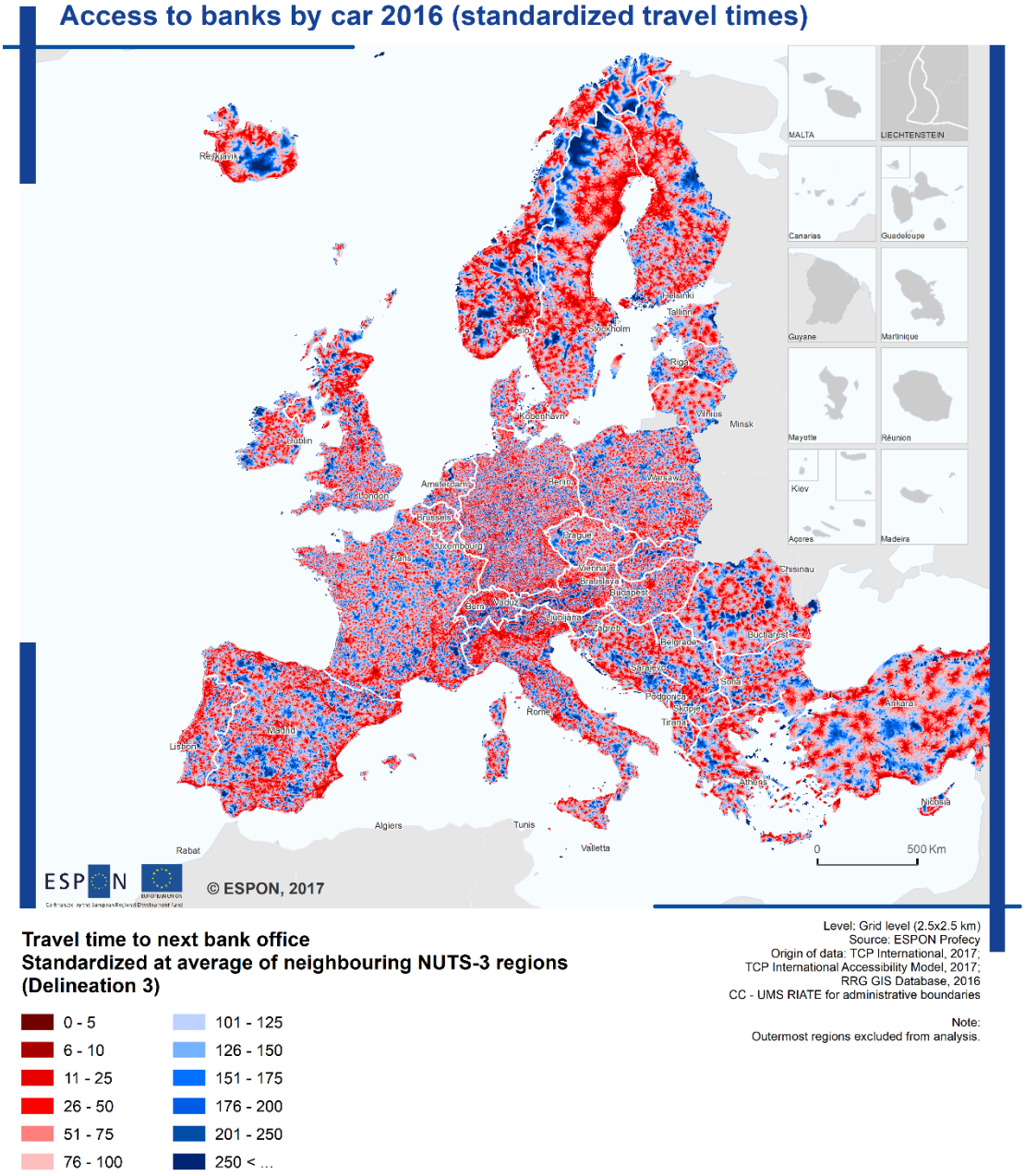
Travel time to next bank (min)
(Delineation 3)

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 banks: Standardized travel times.



Travel time to next bank office
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

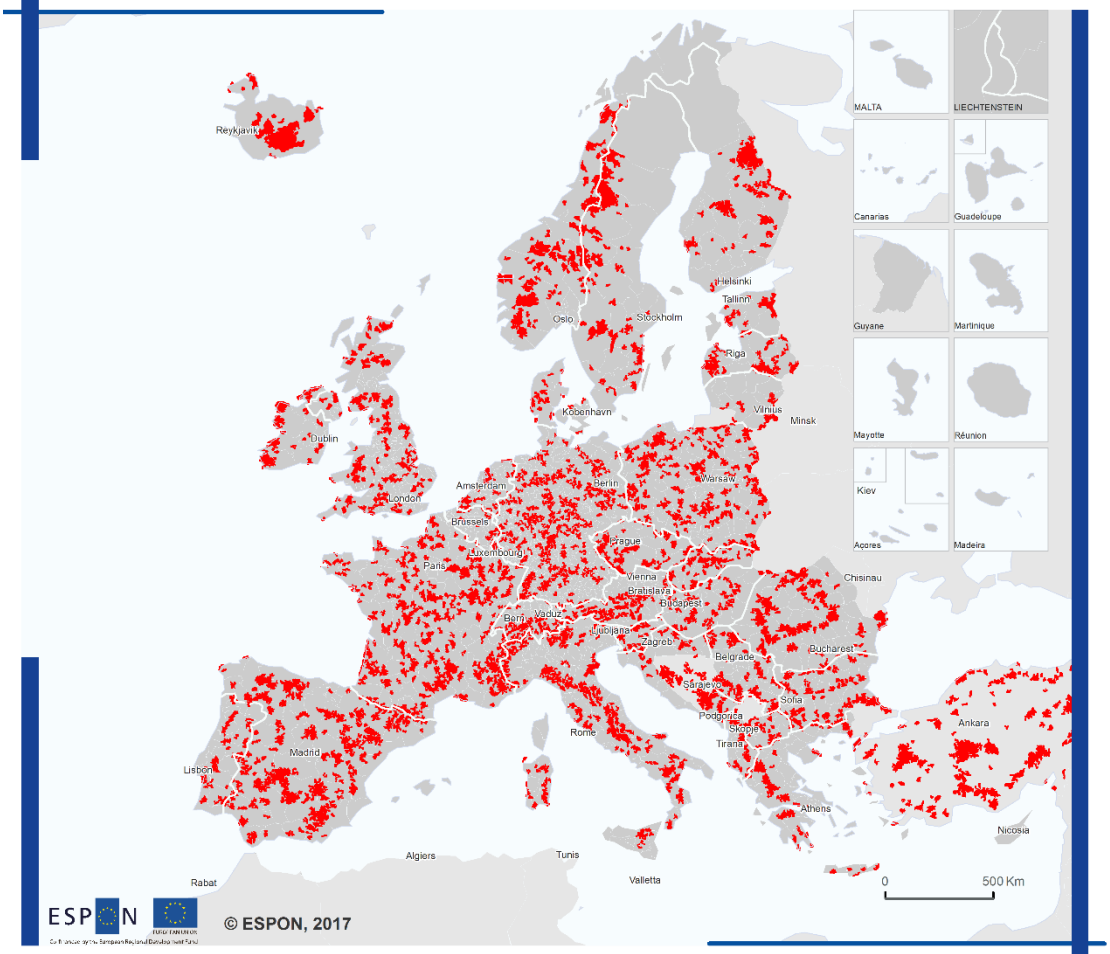
- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 250
- 250 < ...

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 2.3: Access to banks: Delineation of inner peripheries at grid level.

Delineation 3: Inner Peripheries in Europe, banks (grid level)



Delineation 3: Inner peripheries in Europe (grid areas) based upon poor access to banks by car

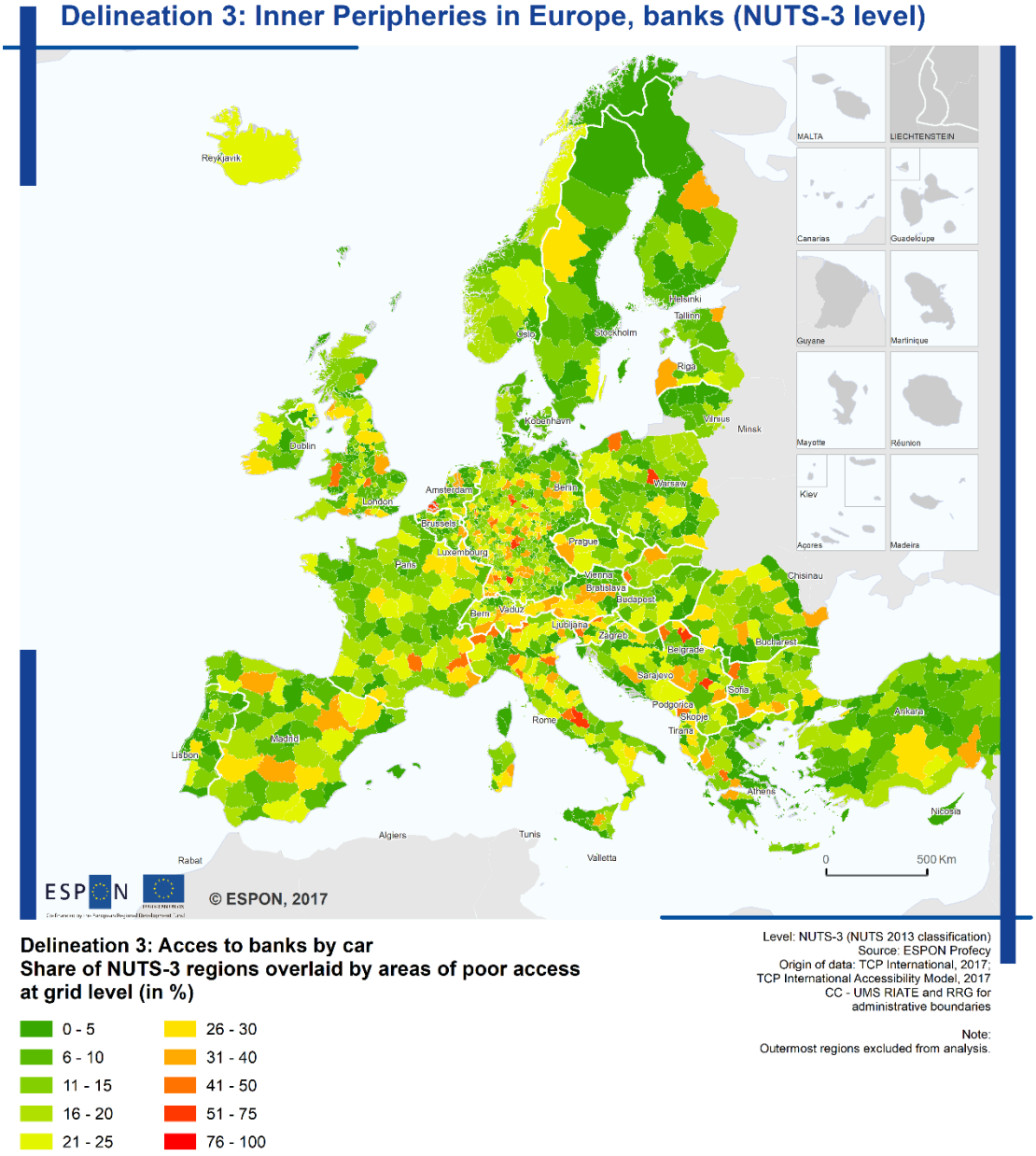
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 580 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 1,231

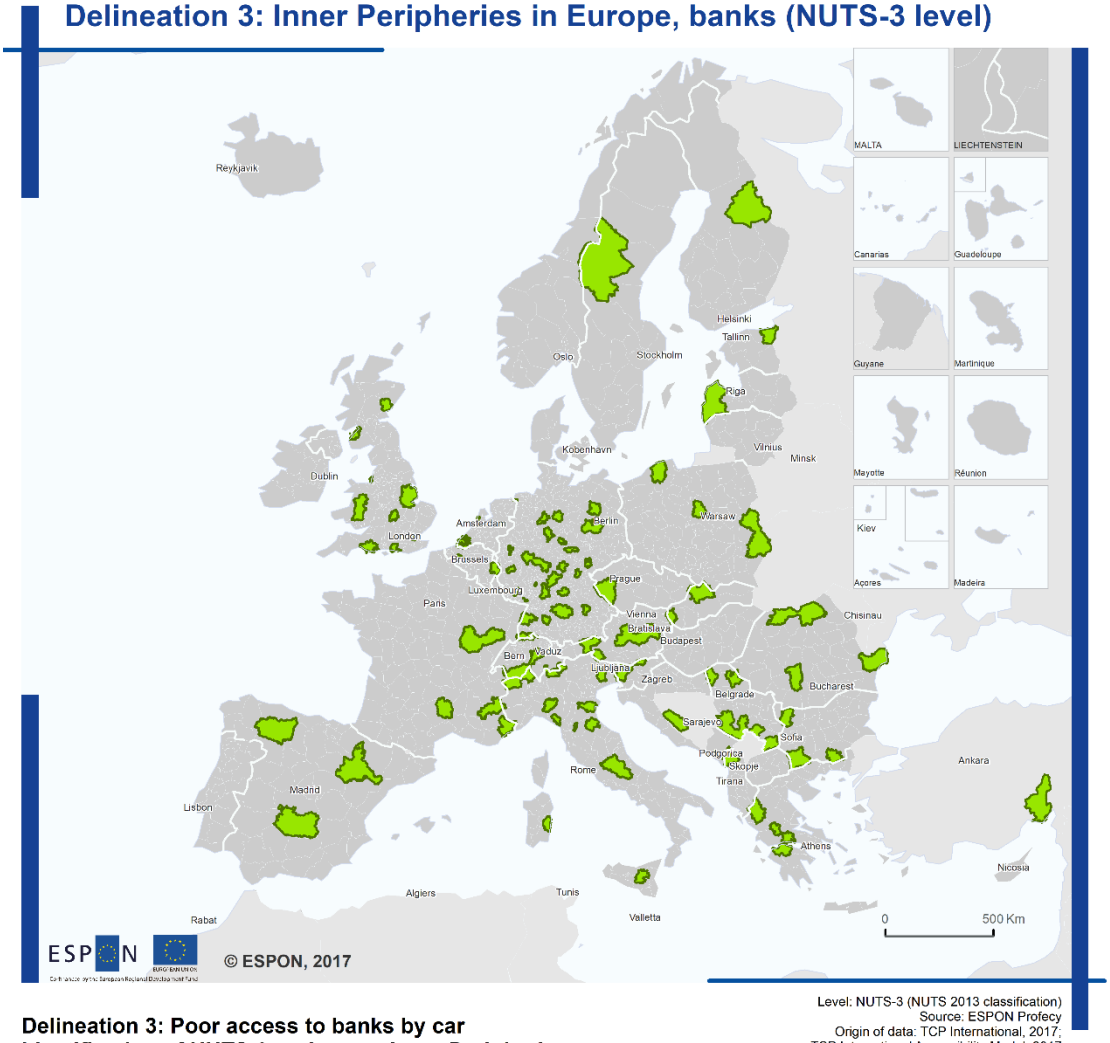
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.4: Access to banks: Overlay of NUTS-3 regions with IP areas at grid level.



Map 2.5: Access to banks: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to banks by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

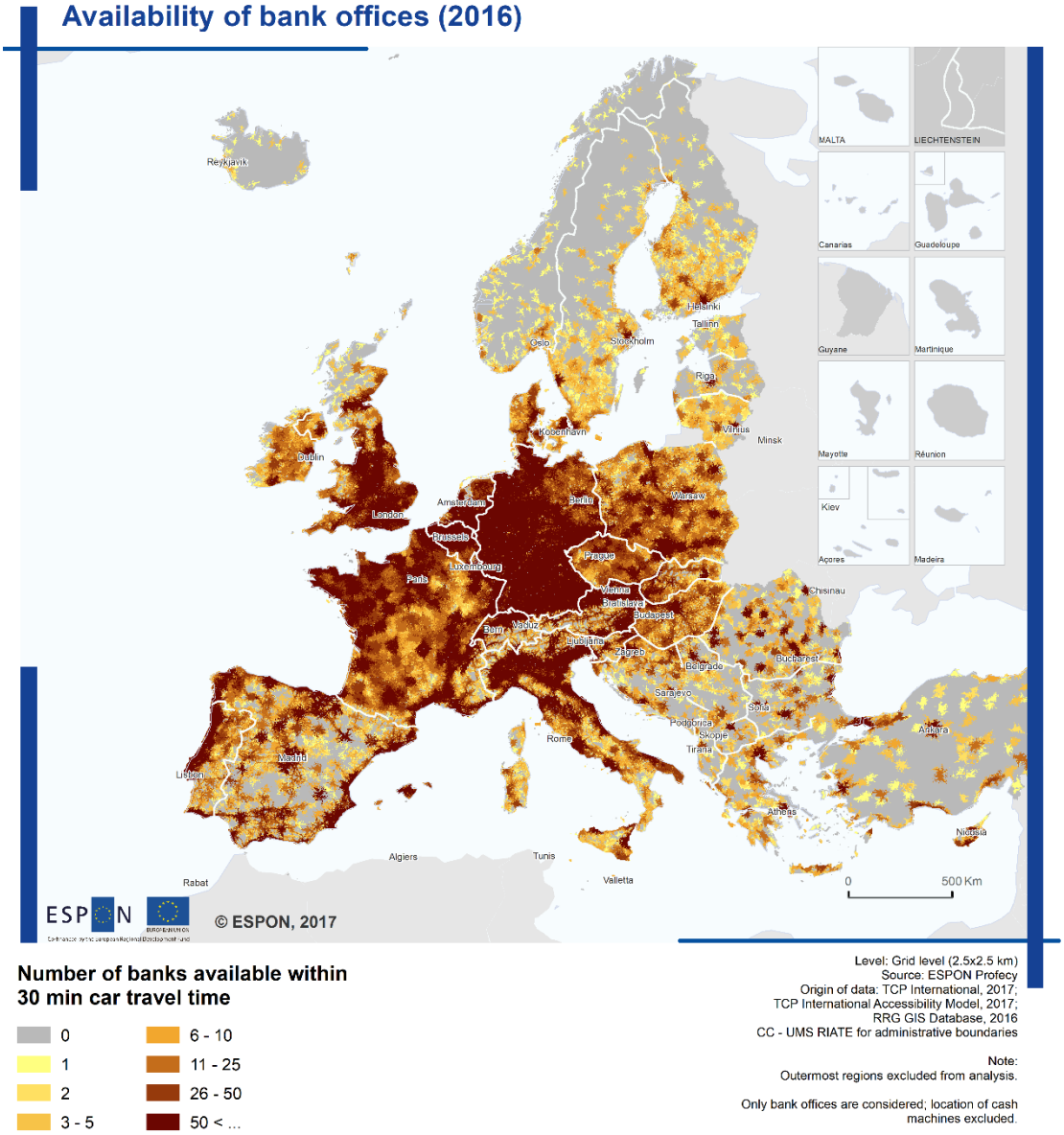
Remarks:

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 - UMS RIATE and RRG for
administrative boundaries

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

Map 2.6: Availability of banks within 30 min car travel times.



Number of banks available within 30 min car travel time

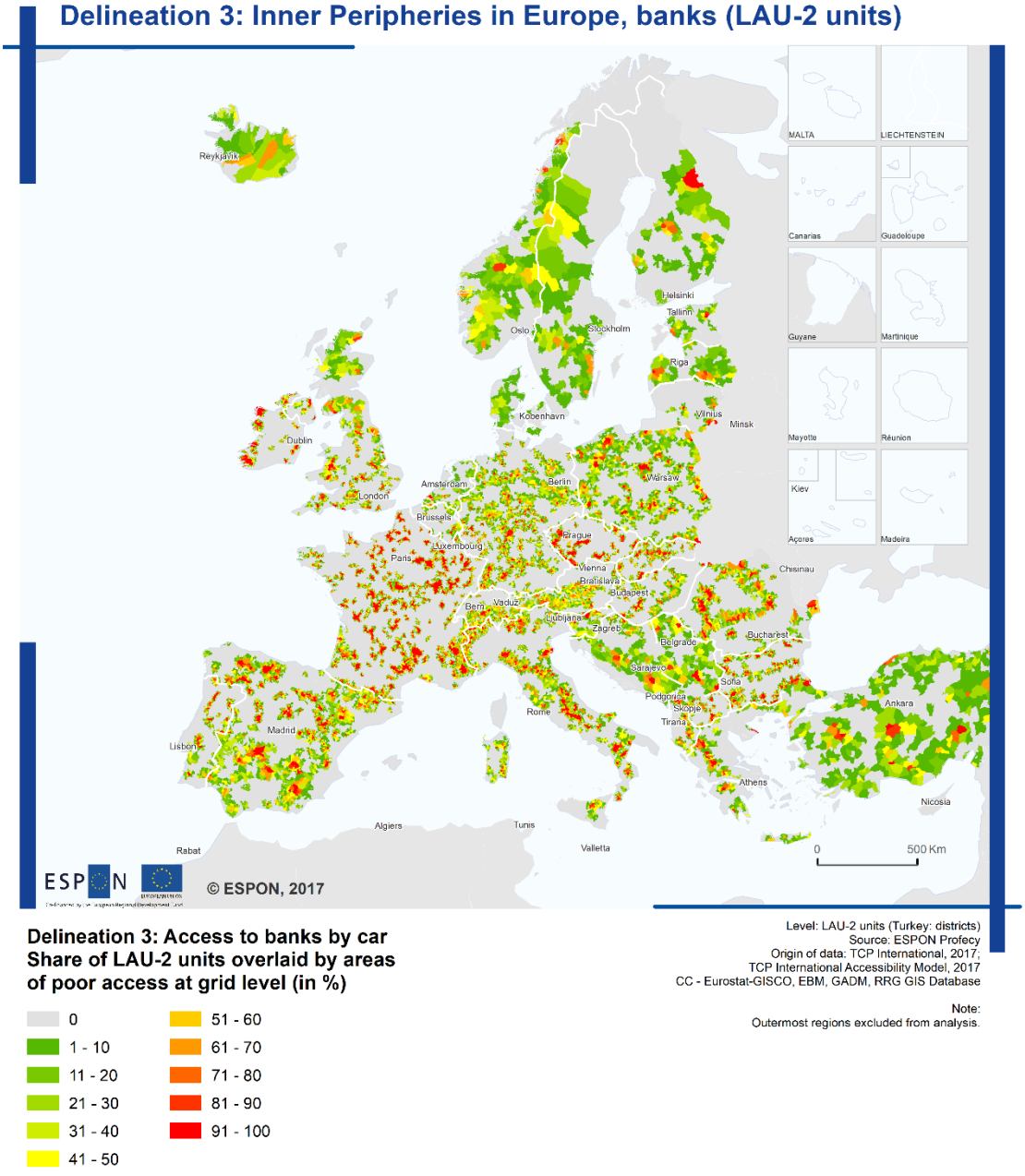
0	6 - 10
1	11 - 25
2	26 - 50
3 - 5	50 < ...

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

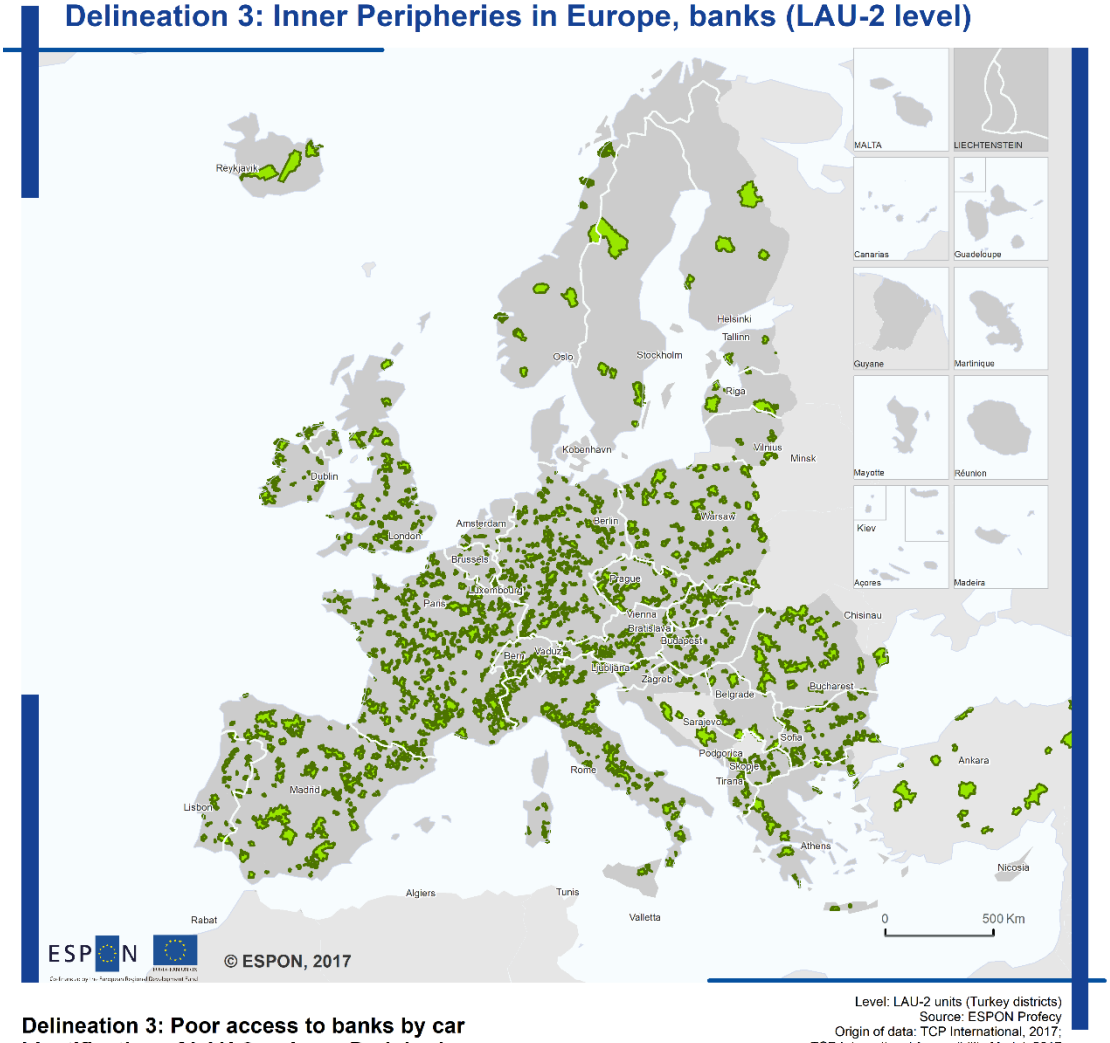
Note:
Outermost regions excluded from analysis.

Only bank offices are considered; location of cash machines excluded.

Map 2.7: Access to banks: Overlay of LAU-2 units with IP areas at grid level.



Map 2.8: Access to banks: Identification of LAU-2 units as inner peripheries.



Remarks:

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

2.2 Cinemas

The following maps have been generated as part of the delineation process:

Map 2.9: Access to cinemas: Travel time by car.

Map 2.10: Access to cinemas: Standardized travel times.

Map 2.11: Access to cinemas: Delineation of inner peripheries at grid level.

Map 2.12: Access to cinemas: Overlay of NUTS-3 regions with IP areas at grid level.

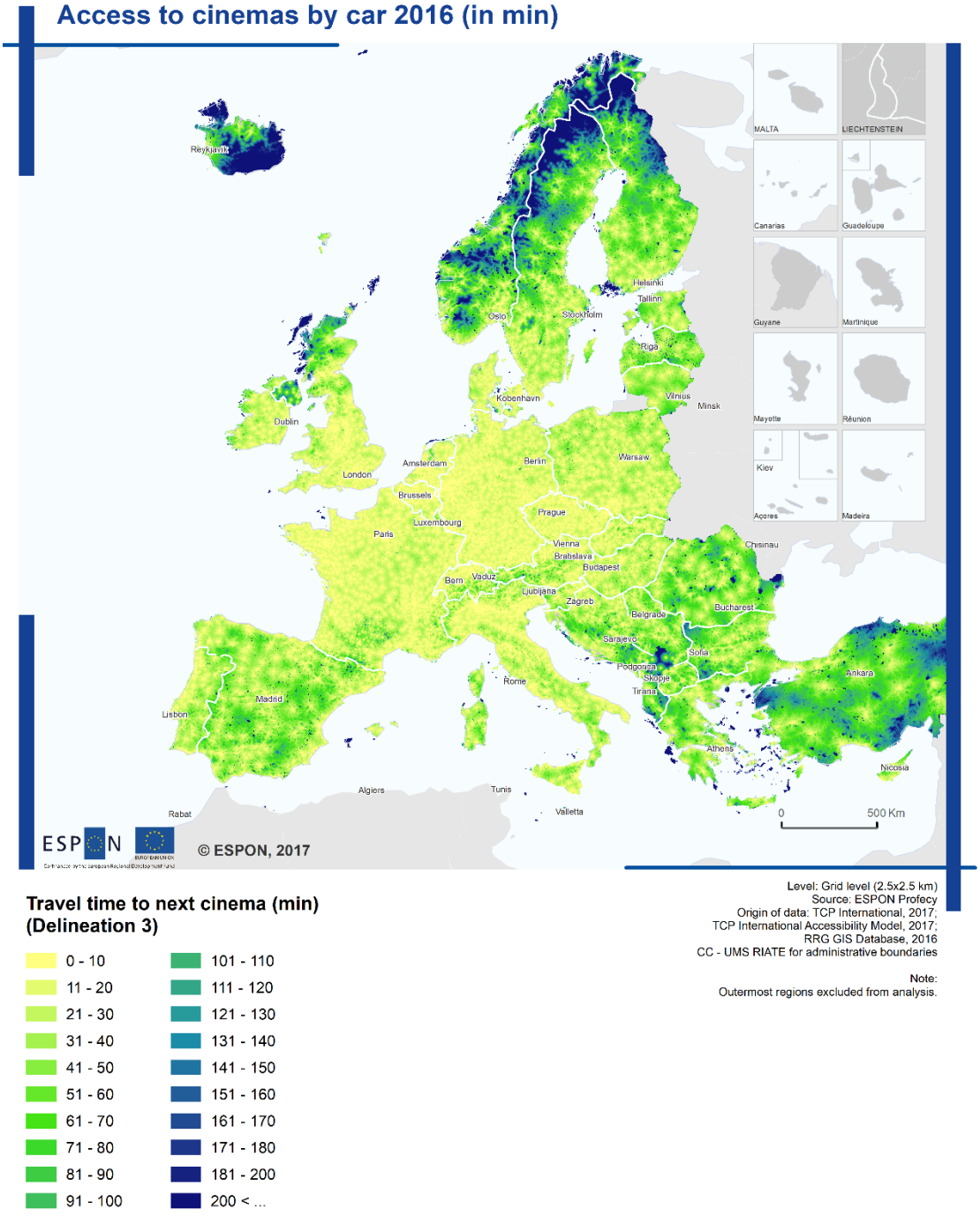
Map 2.13: Access to cinemas: Identification of NUTS-3 regions as inner peripheries.

Map 2.14: Availability of cinemas within 45 min car travel time.

Map 2.15: Access to cinemas: Overlay of LAU-2 units with IP areas at grid level.

Map 2.16: Access to cinemas: Identification of LAU-2 units as inner peripheries.

Map 2.9: Access to cinemas: Travel time by car.



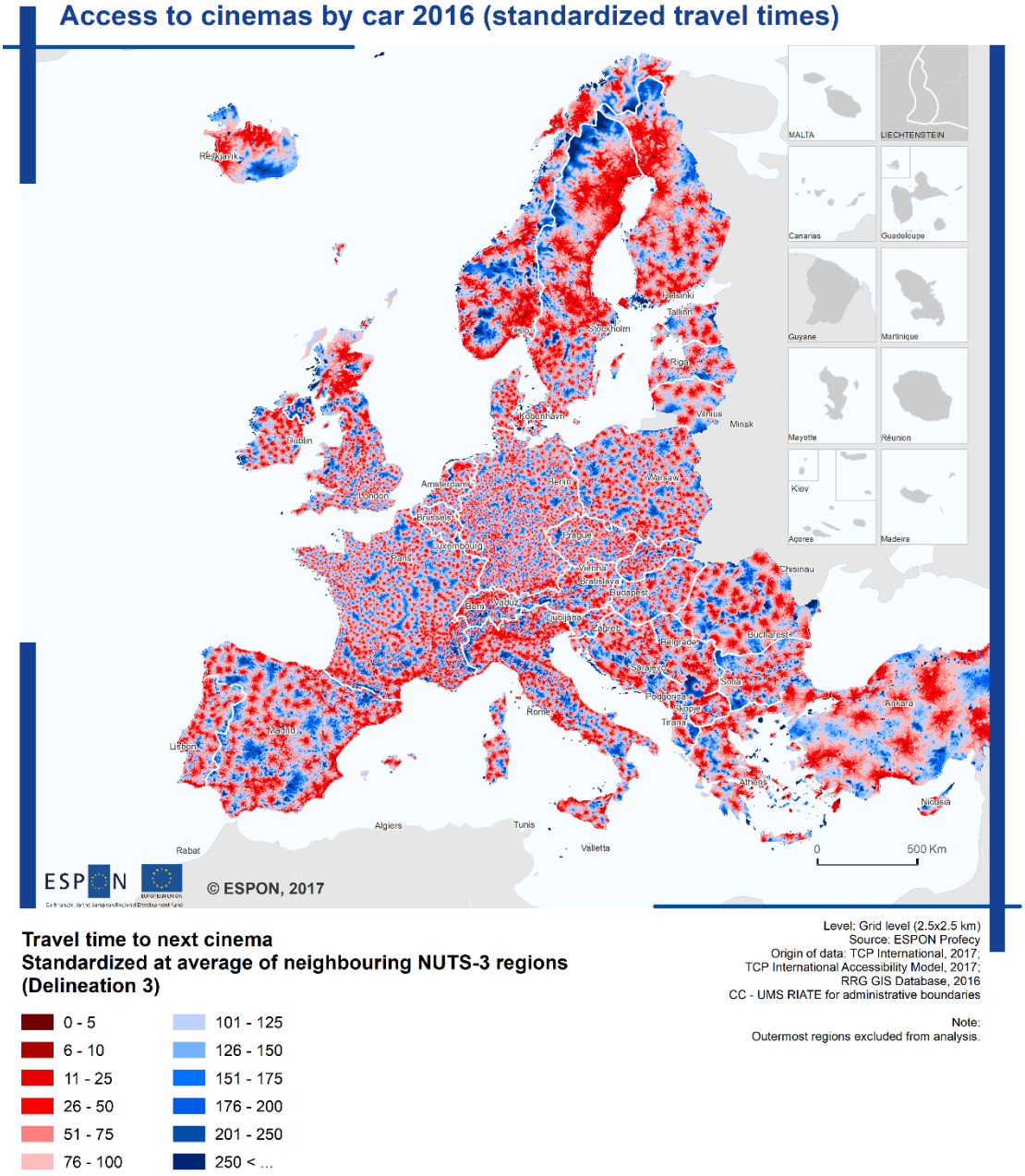
Travel time to next cinema (min) (Delineation 3)

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 2.10: Access to cinemas: Standardized travel times.



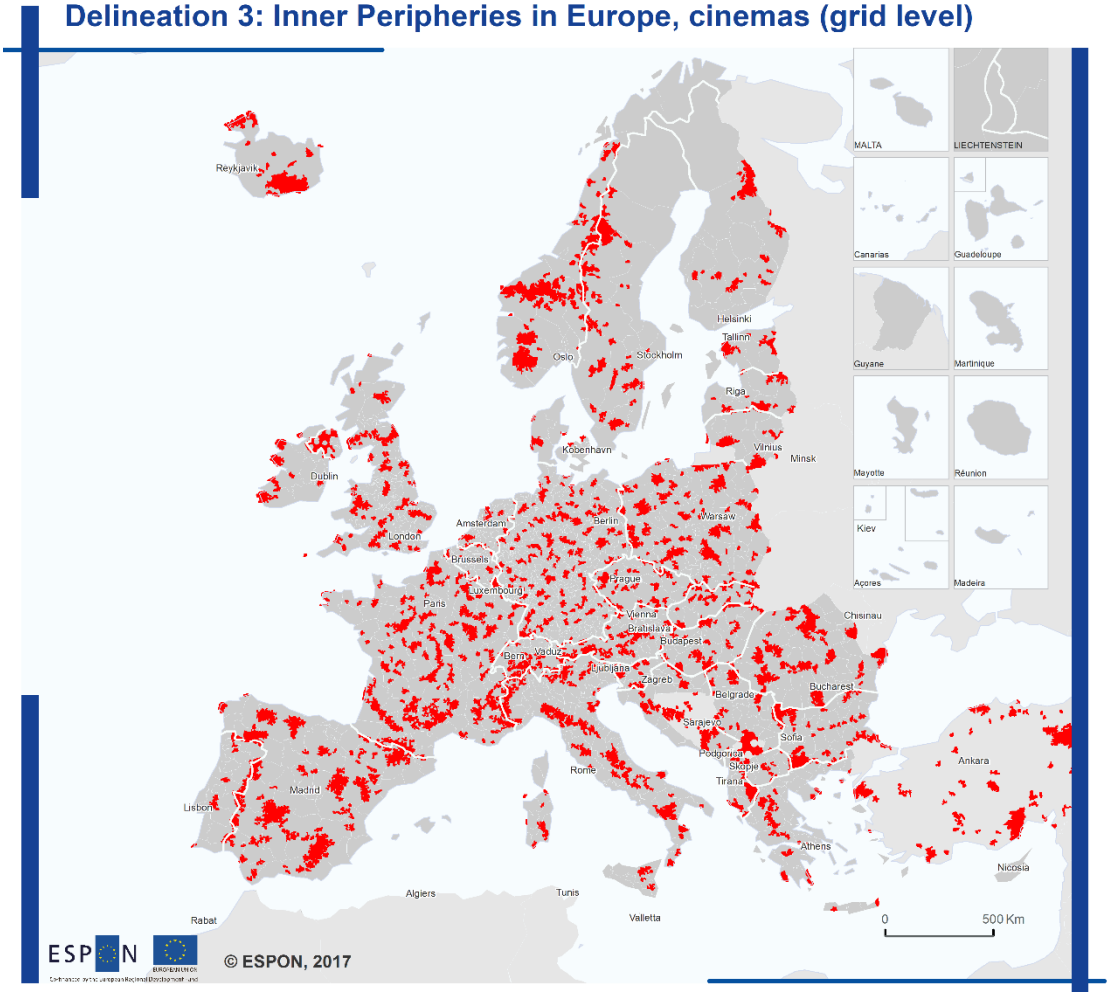
Travel time to next cinema
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 250
- 250 < ...

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 2.11: Access to cinemas: Delineation of inner peripheries at grid level



Delineation 3: Inner peripheries in Europe (grid areas) based upon poor access to cinemas by car

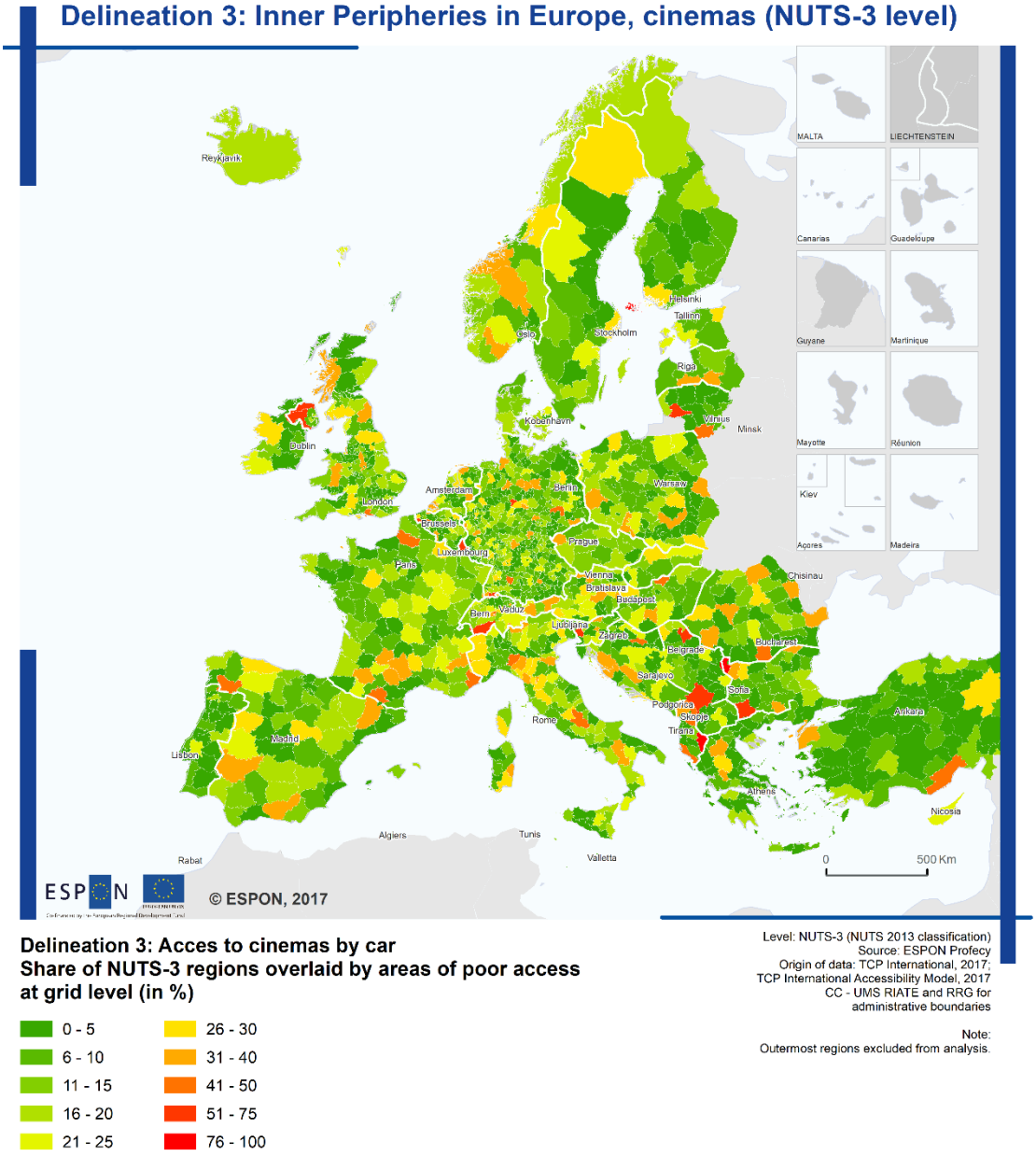
Areas identified as inner peripheries at grid level

Notes:
- *areas identified as inner peripheries represent areas with poor access to doctors and poor access to hospitals*
- *minimum patch size: 100 sqkm*
- *average patch size: 730 sqkm*
- *neighboring grid cells merged, cell boundaries smoothed*
- *patches on small lislands and in outermost regions removed*
- *total number of patches for ESPON space: 810*

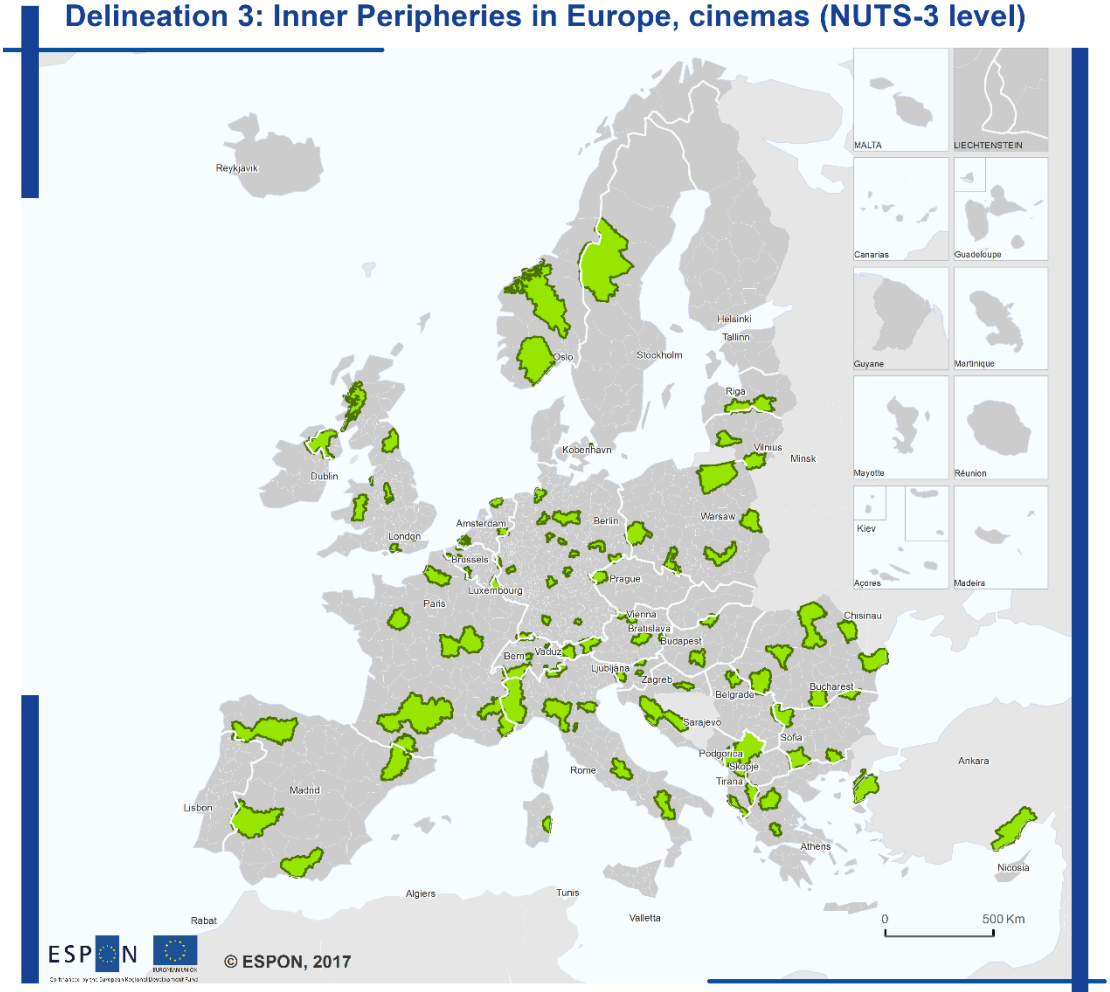
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017; TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.12: Access to cinemas: Overlay of NUTS-3 regions with IP areas at grid level.



Map 2.13: Access to cinemas: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to cinemas by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe (100 regions)

non-IP NUTS-3 regions

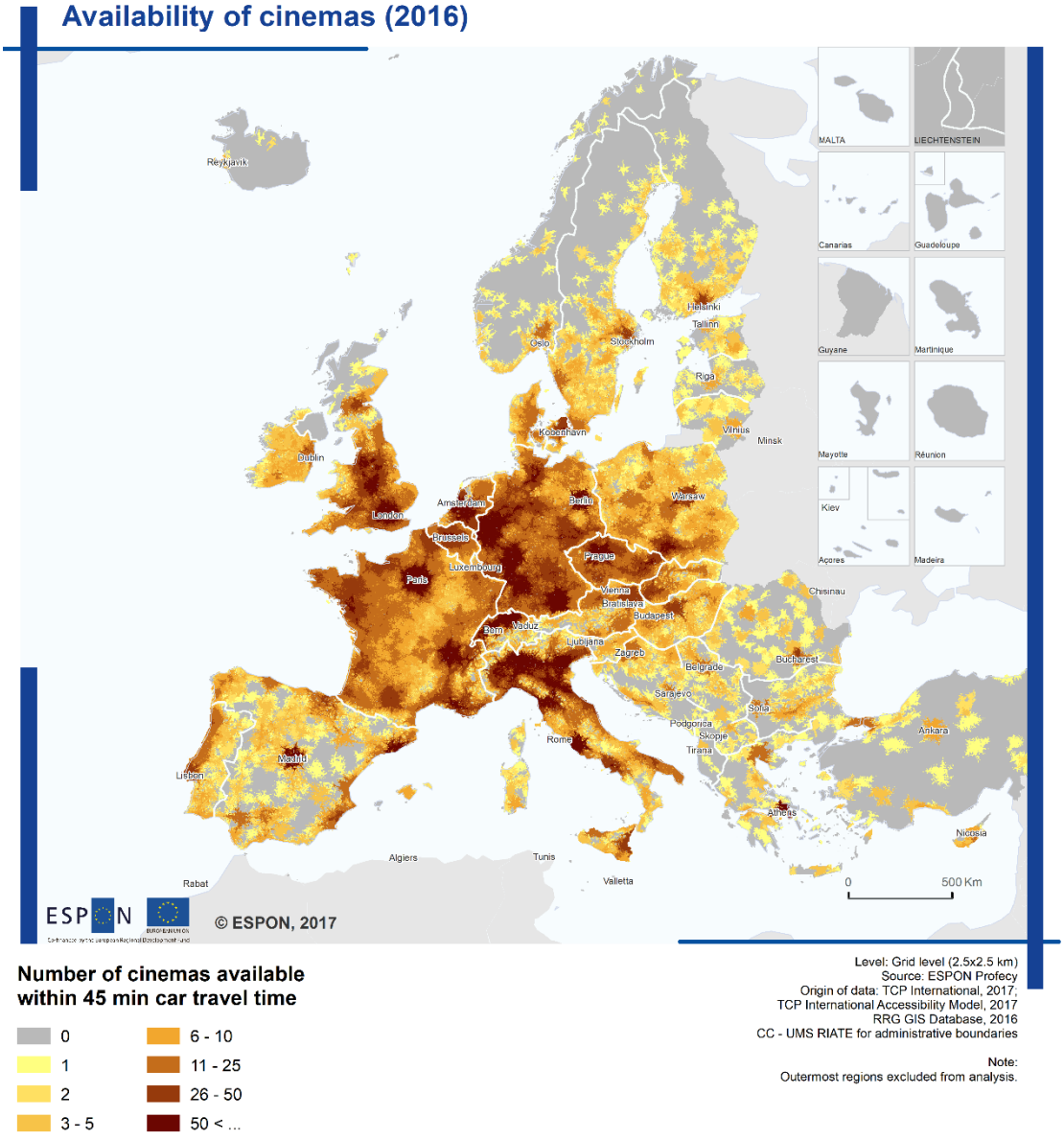
Remarks:

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 - UMS RIATE and RRG for administrative boundaries

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

Map 2.14: Availability of cinemas within 45 min car travel time.



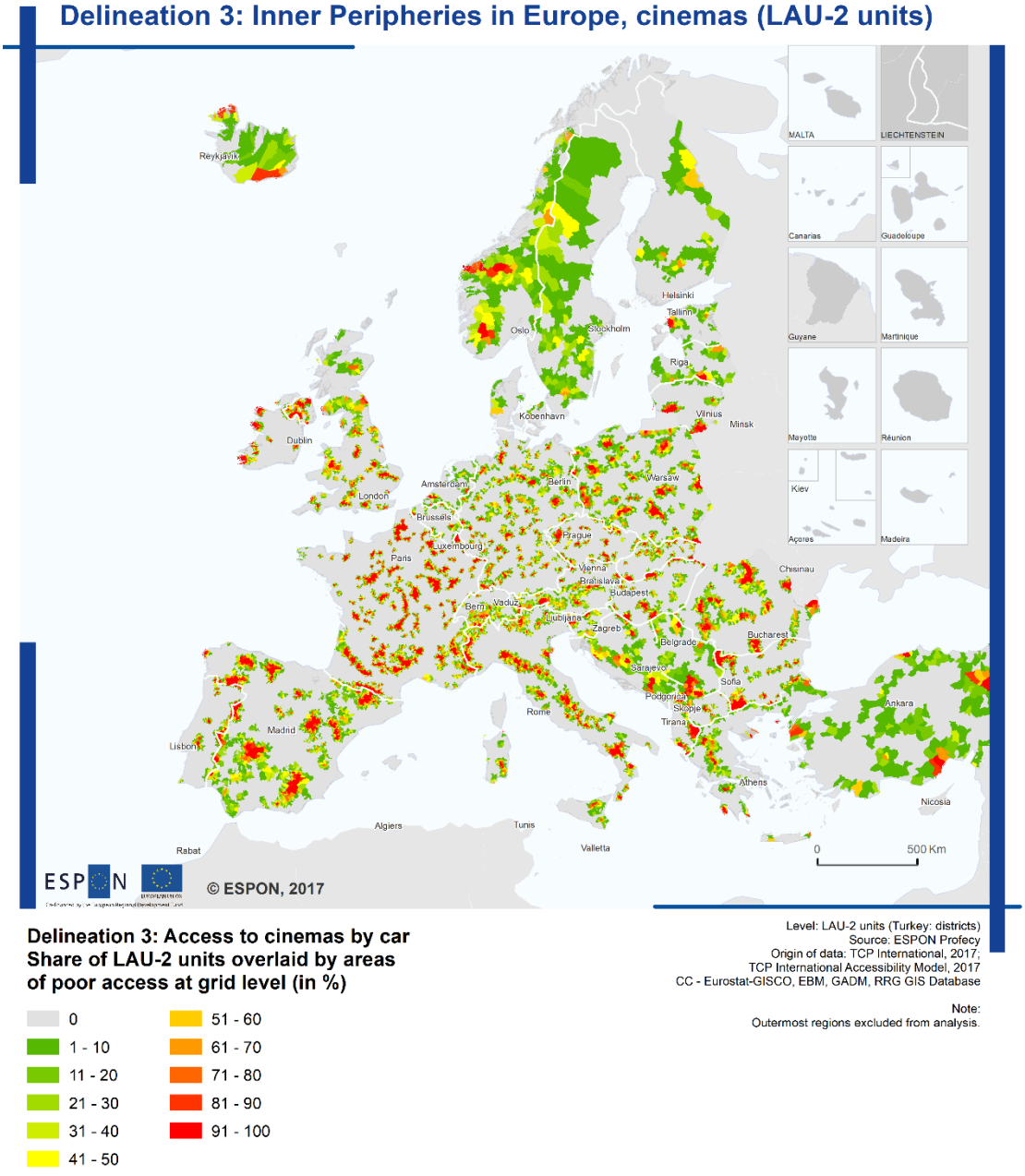
Number of cinemas available within 45 min car travel time

0	6 - 10
1	11 - 25
2	26 - 50
3 - 5	50 < ...

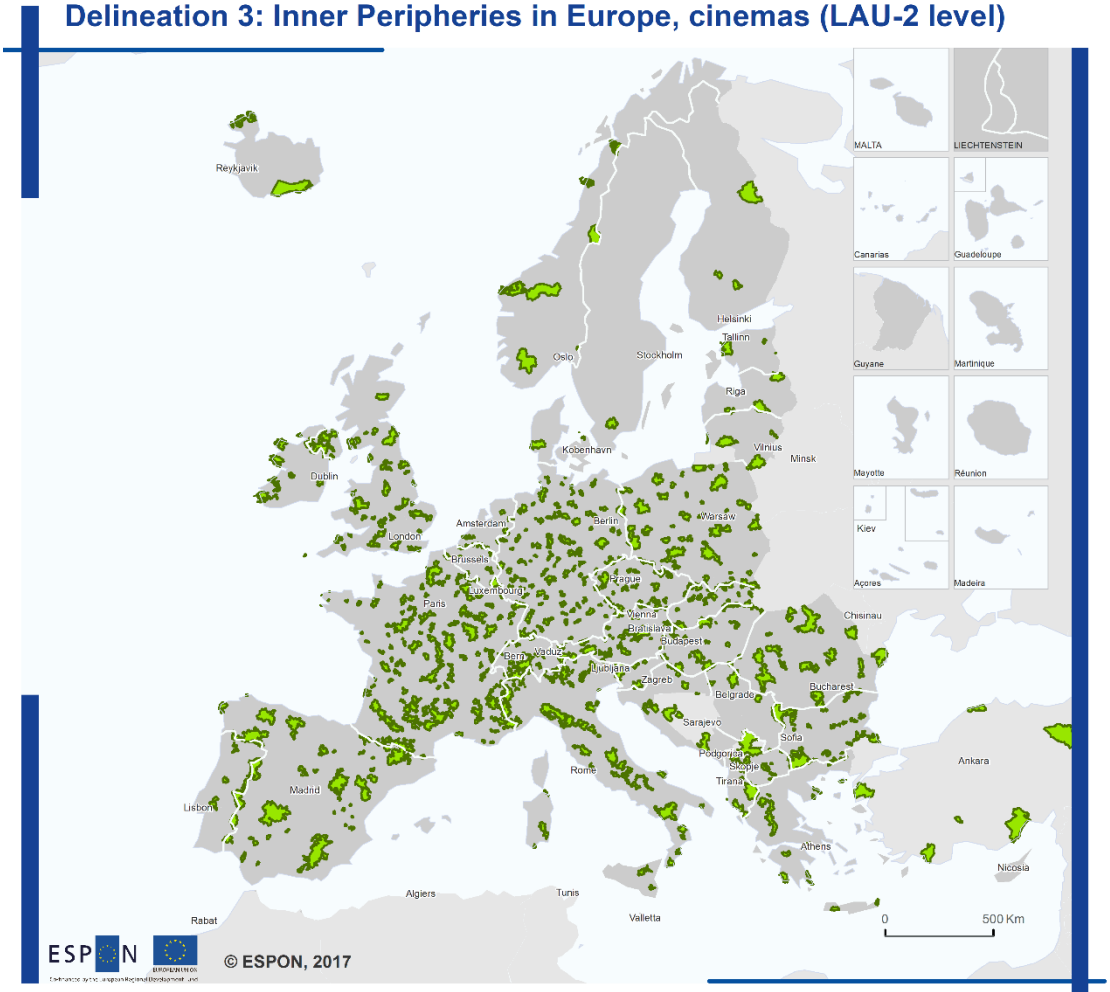
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
RRG GIS Database, 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.15: Access to cinemas: Overlay of LAU-2 units with IP areas at grid level.



Map 2.16: Access to cinemas: Identification of LAU-2 units as inner peripheries.



Delineation 3: Poor access to cinemas 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 - Eurostat-GISCO, EBM, GADM, RRG GIS Database

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

2.3 Health care (doctors, hospitals, and pharmacies)

First, maps on doctors, then maps on hospitals and finally maps on pharmacies are compiled. Altogether, The following maps have been generated as part of the delineation process:

Map 2.17: Access to doctors: Travel time by car.

Map 2.18: Access to doctors: Standardized travel times.

Map 2.19: Access to doctors: Delineation of inner peripheries at grid level.

Map 2.20: Access to doctors: Overlay of NUTS-3 regions with IP areas at grid level.

Map 2.21: Access to doctors: Identification of NUTS-3 regions as inner peripheries.

Map 2.22: Availability of doctors within 30 min car travel time.

Map 2.23: Access to doctors: Overlay of LAU-2 units with IP areas at grid level.

Map 2.24: Access to doctors Identification of LAU-2 units as inner peripheries.

Map 2.25: Access to hospitals: Travel time by car.

Map 2.26: Access to hospitals: Standardized travel times.

Map 2.27: Access to hospitals: Delineation of inner peripheries at grid level.

Map 2.28: Access to hospitals: Overlay of NUTS-3 regions with IP areas at grid level.

Map 2.29: Access to hospitals: Identification of NUTS-3 regions as inner peripheries.

Map 2.30: Availability of hospitals within 60 min car travel times.

Map 2.31: Access to hospitals: Overlay of LAU-2 units with IP areas at grid level.

Map 2.32: Access to hospitals: Identification of LAU-2 units as inner peripheries.

Map 2.33: Access to pharmacies: Travel time by car.

Map 2.34: Access to pharmacies: Standardized travel times.

Map 2.35: Access to pharmacies: Delineation of inner peripheries at grid level.

Map 2.36: Access to pharmacies: Overlay of MUTS-3 regions with IP areas at grid level.

Map 2.37: Access to pharmacies: Identification of NUTS-3 regions as inner peripheries.

Map 2.38: Availability of pharmacies within 15 min car travel time.

Map 2.39: Access to pharmacies: Overlay of LAU-2 units with IP areas at grid level.

Map 2.40: Access to pharmacies: Identification of LAU-2 units as inner peripheries.

Doctors:

Only general practitioners (GPs) and general surgeries have been considered. Specialized doctors were excluded. Surgeries (with several GPs) have been assigned to doctors rather than to hospitals. Note that other studies may treat surgeries differently, by assigning them to hospitals. As in PROFECY we do not have any further information about the services offered in surgeries (such as only day-care services, or services including overnight stays) for entire ESPON space, it was decided to assign them to doctors rather than to hospitals.

The following countries have been excluded from the analysis, as the OpenStreetMap (OSM) database appeared to be too incomplete and no alternative data sources providing complete address information for doctors have been found so far: Albania, Bulgaria, Greece, Finland, Kosovo, Liechtenstein, Lithuania, Latvia, Montenegro, Macedonia, Malta, Norway, Portugal, Romania, Republic of Serbia, Slovenia, and Turkey.

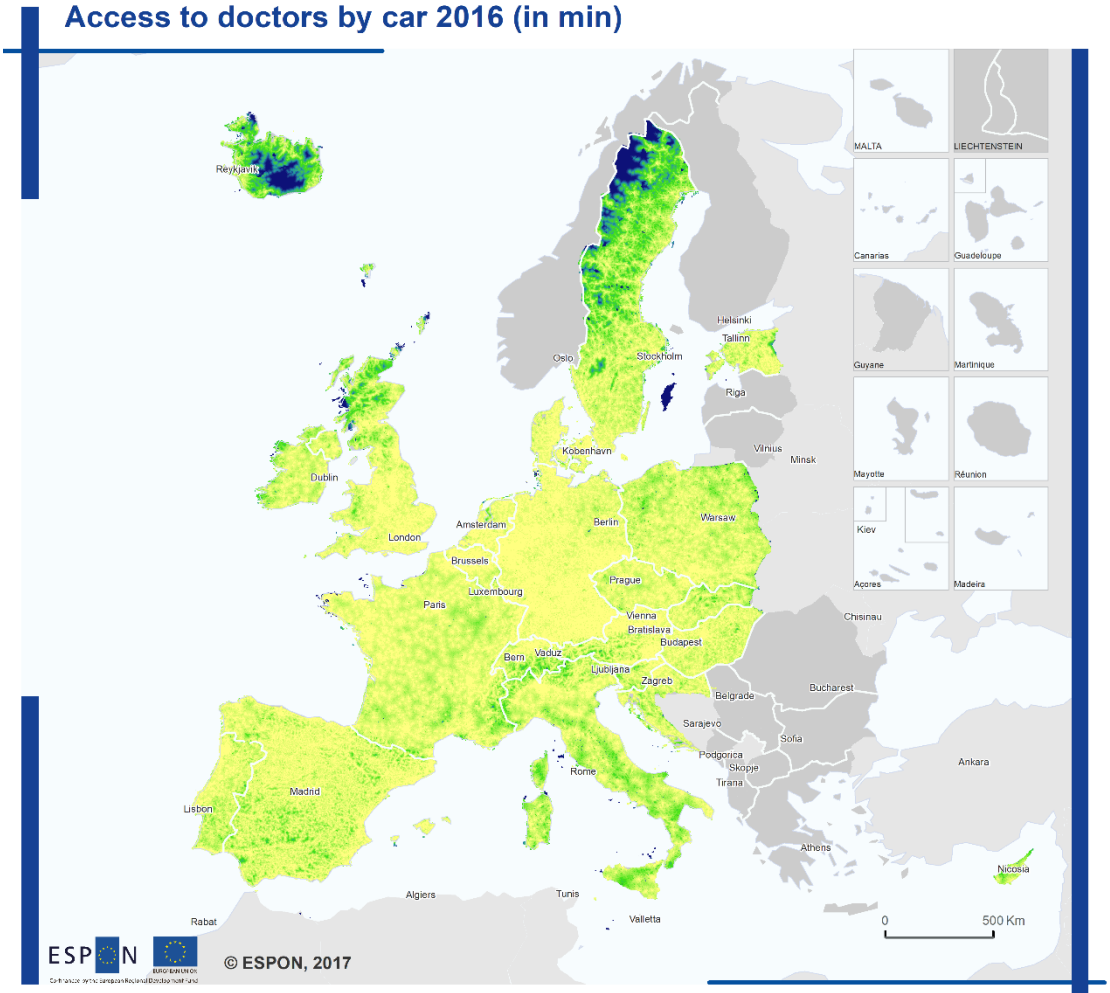
Hospitals:

Similar to doctors, only general hospitals have been considered. Specialized hospitals (such as rehabilitation centres, wellness clinics, sanatoriums, hospices etc.) have been excluded.

Pharmacies:

Turkey has been excluded from the analysis of pharmacies, as the OpenStreetMap (OSM) database appeared to be too incomplete and no alternative data sources providing complete address information for pharmacies has been found so far.

Map 2.17: Access to doctors: Travel time by car.



Travel time to next doctor (general practitioner) (min) (Delineation 3)

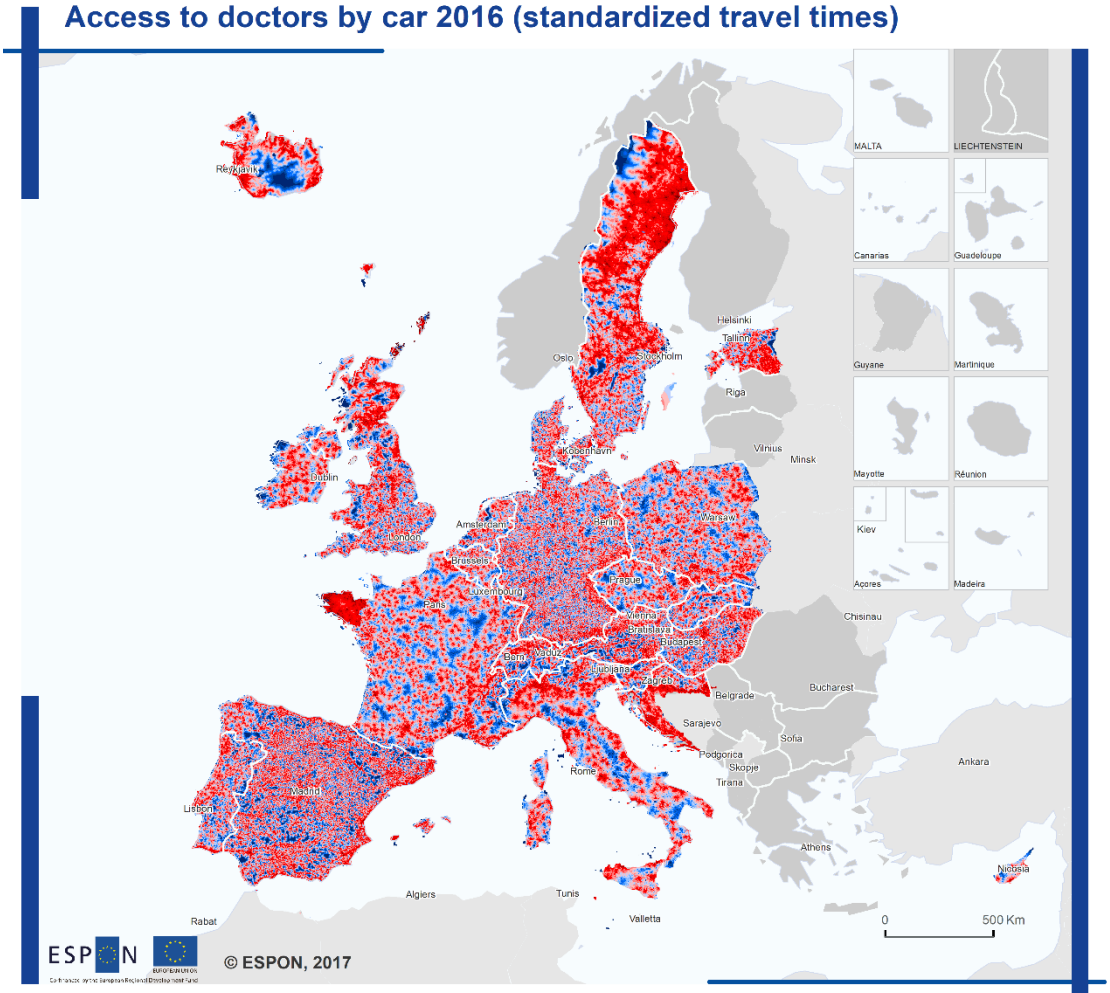
0 - 10	101 - 110	data n.a. (country excluded)
11 - 20	111 - 120	
21 - 30	121 - 130	
31 - 40	131 - 140	
41 - 50	141 - 150	
51 - 60	151 - 160	
61 - 70	161 - 170	
71 - 80	171 - 180	
81 - 90	181 - 200	
91 - 100	200 < ...	

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.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far: AL, BA, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR.

Map 2.18: Access to doctors: Standardized travel times.



Travel time to next doctor (general practitioner) / surgery
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

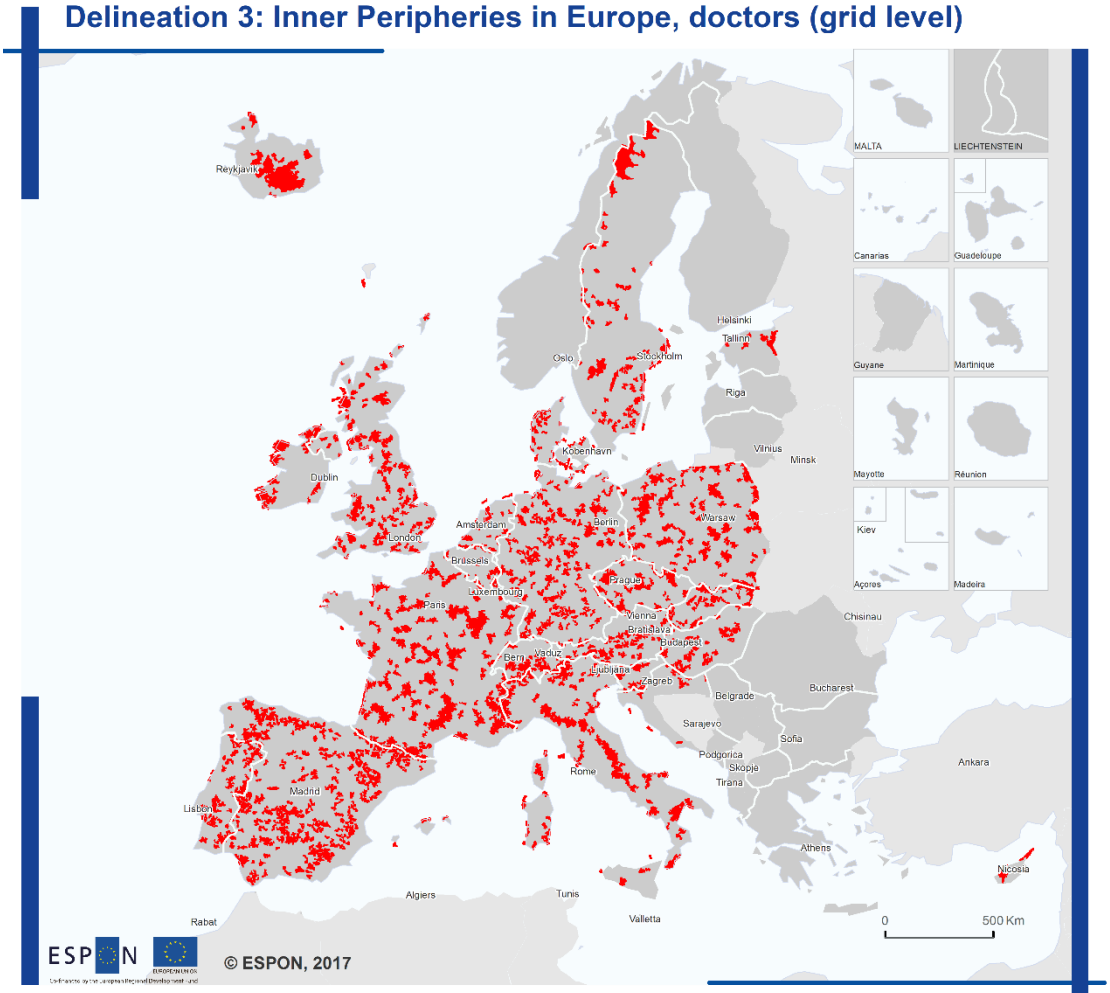
- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 250
- 250 < ...
- data n.a. (country excluded)

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.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far:
AL, BA, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR.

Map 2.19: Access to doctors: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon poor access to doctors (GPs) by car

Areas identified as inner perpiheries at grid level

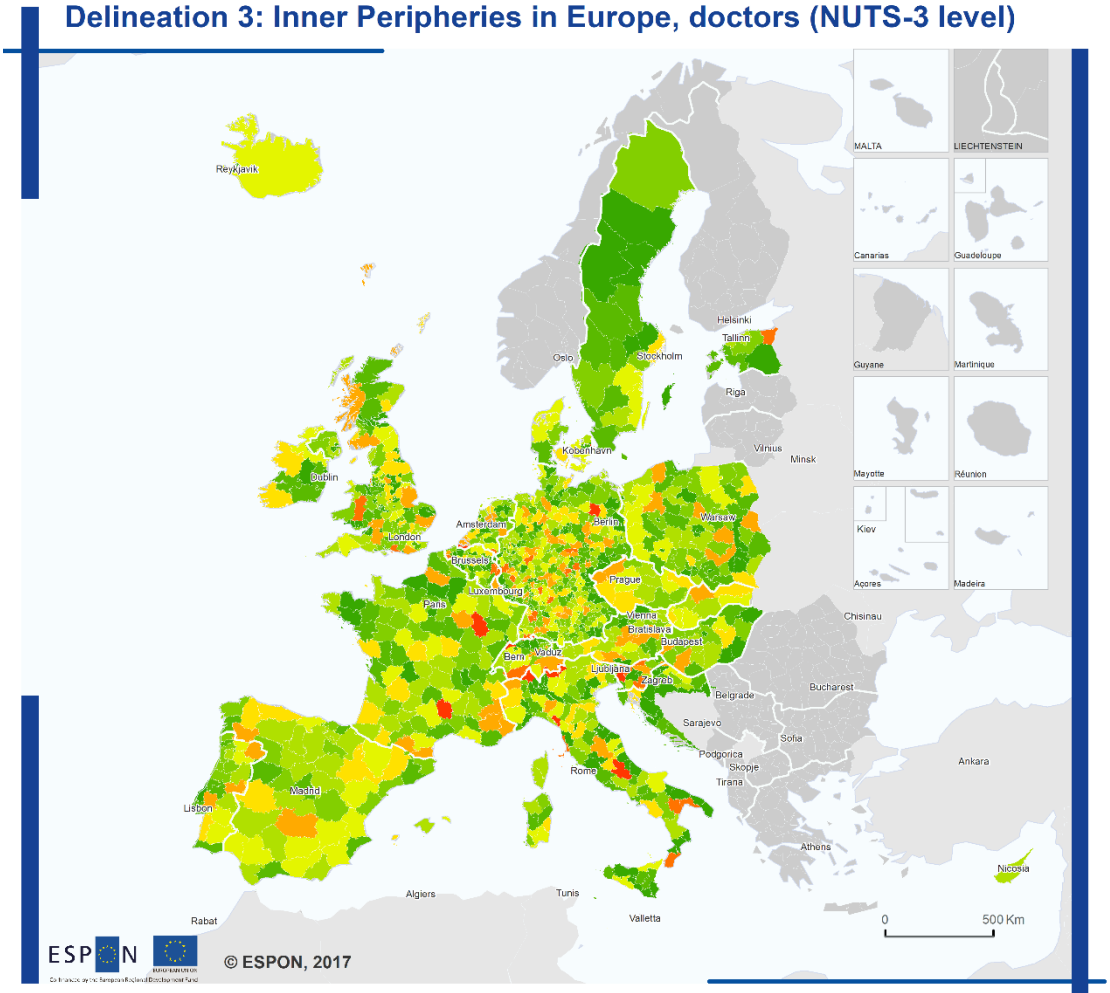
Notes:
- minimum patch size: 100 sqkm
- average patch size: 600 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 774

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.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far:
AL, BG, EL, FI, KS, LI, LT, LV, ME, MK, MT, NO, PT, RO, RS, SI, TR.

Map 2.20: Access to doctors: Overlay of NUTS-3 regions with IP areas at grid level.



Delineation 3: Acces to doctors (general practitioners) by car
Share of NUTS-3 regions overlaid by areas of poor access at grid level (in %)

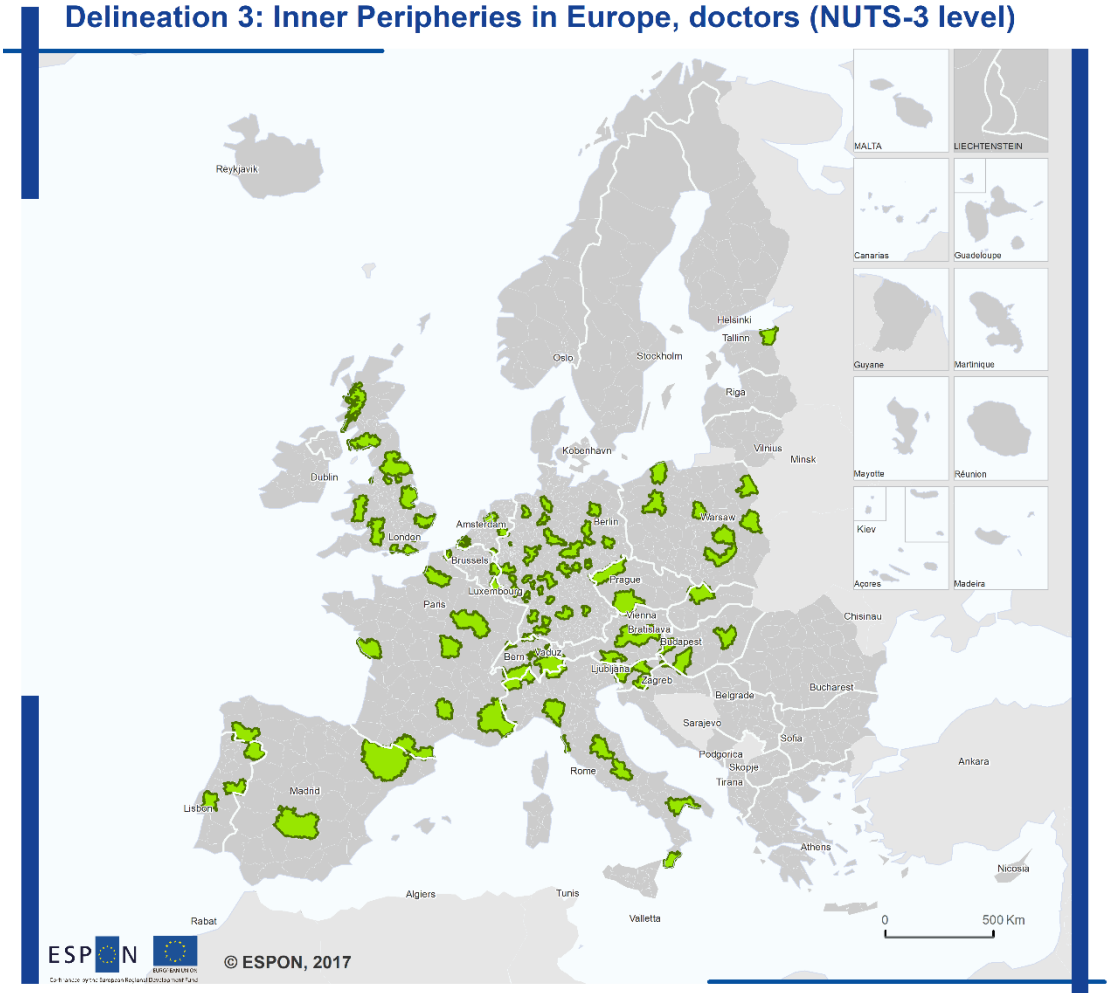
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 100
- data n.a. (region excluded)

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

Note:
Outermost regions excluded from analysis.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far: AL, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR.

Map 2.21: Access to doctors: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to doctors by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

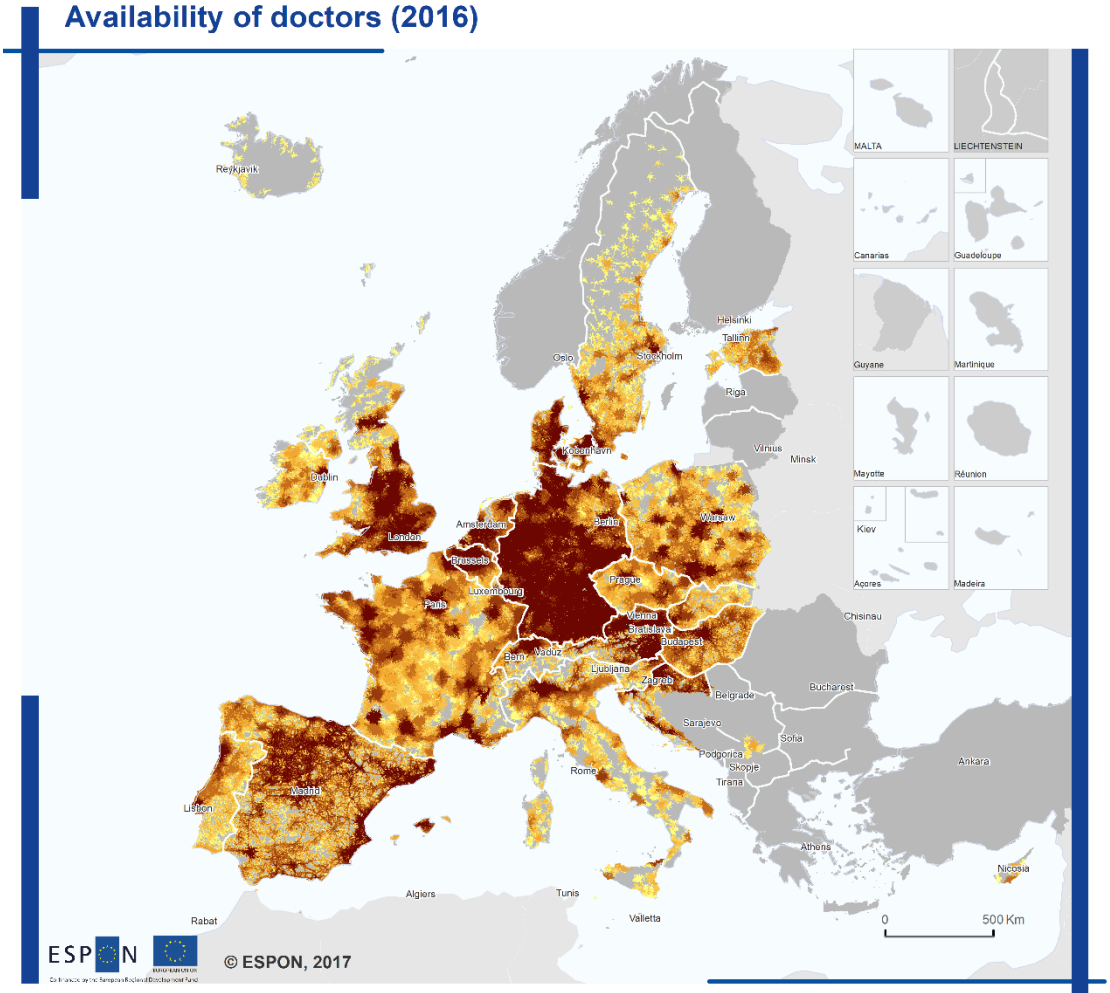
Remarks:

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 - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.
Cyprus and Malta excluded because they represent rather small island states.
The following countries have been excluded from analysis because the OSM database is too incomplete and alternative data soures providing complete address information for all doctors have not been found so far:
AL, BA, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR

Map 2.22: Availability of doctors within 30 min car travel time.



Number of doctors (general practitioners) available within 30 min car travel time

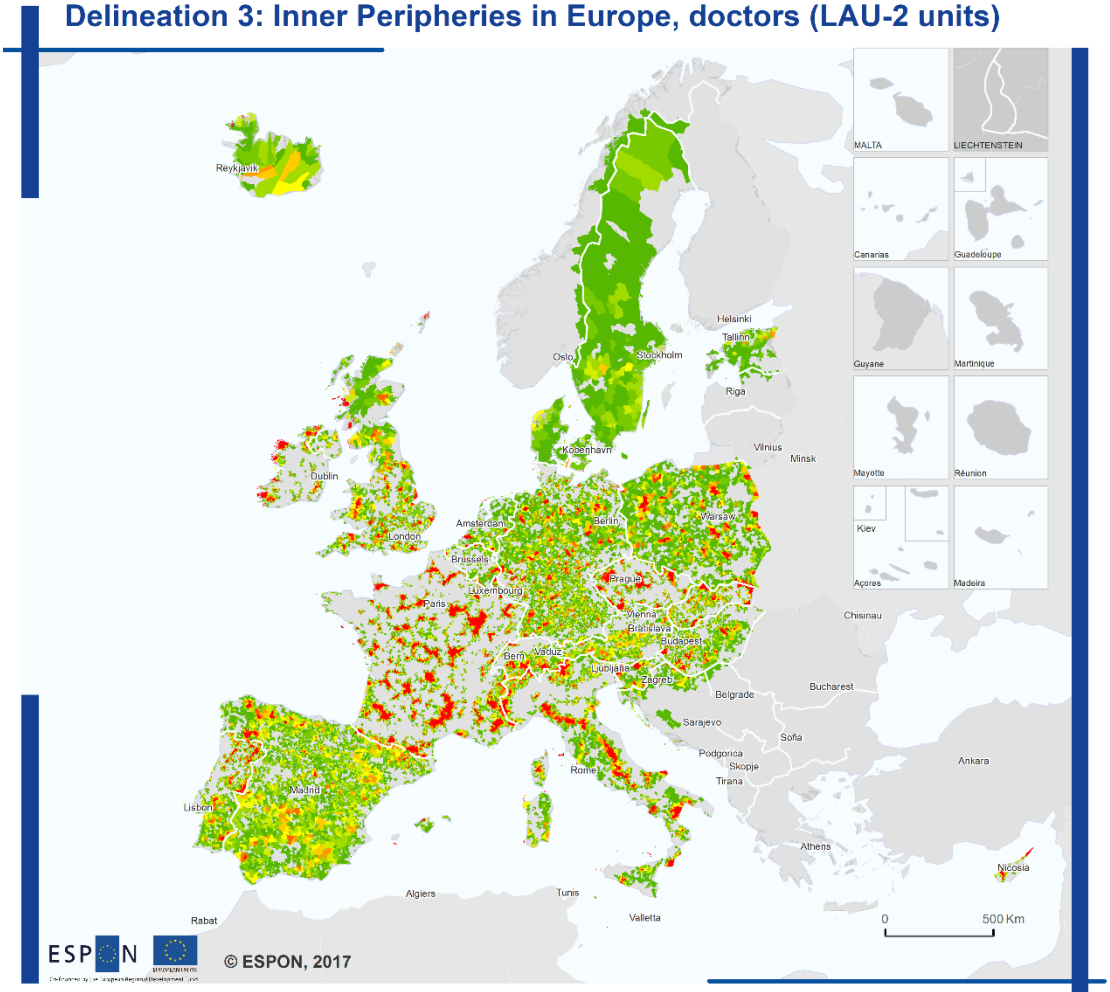
0	6 - 10
1	11 - 25
2	26 - 50
3 - 5	50 < ...

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.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far:
AL, BA, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR.

Map 2.23: Access to doctors: Overlay of LAU-2 units with IP areas at grid level.



Delineation 3: Access to doctors (general practitioners) by car
Share of LAU-2 units overlaid by areas
of poor access at grid level (in %)

- 0
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

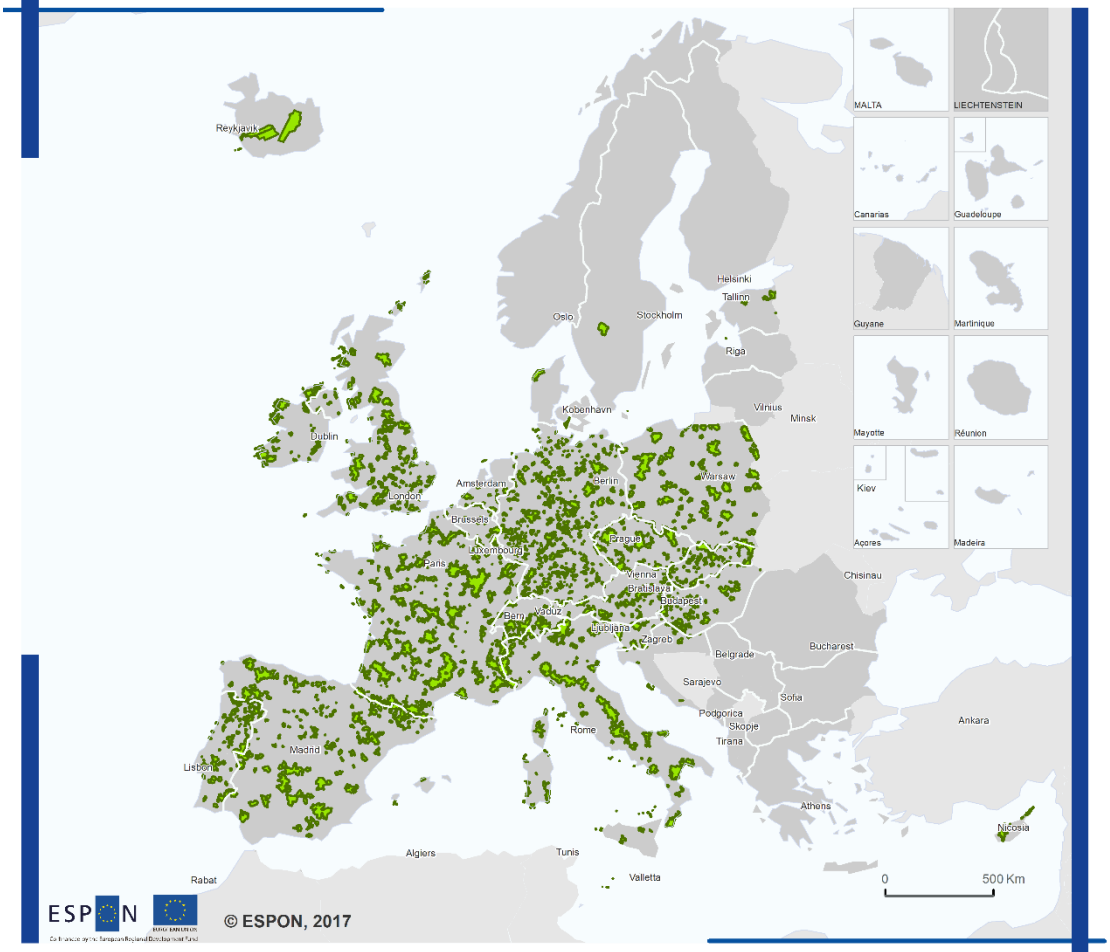
Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.

The following countries have been excluded from analysis, since the OSM database is too incomplete and alternative data sources providing complete address information for all doctors have not been found so far:
AL, BA, BG, EL, FI, LT, LV, ME, MK, MT, NO, RO, RS, TR

Map 2.24: Access to doctors Identification of LAU-2 units as inner peripheries.

Delineation 3: Inner Peripheries in Europe, doctors (LAU-2 level)



Delineation 3: Poor access to doctors by car
Identification of LAU-2 as Inner Peripheries

IP regions in Euroipe

non-IP regions

Remarks:

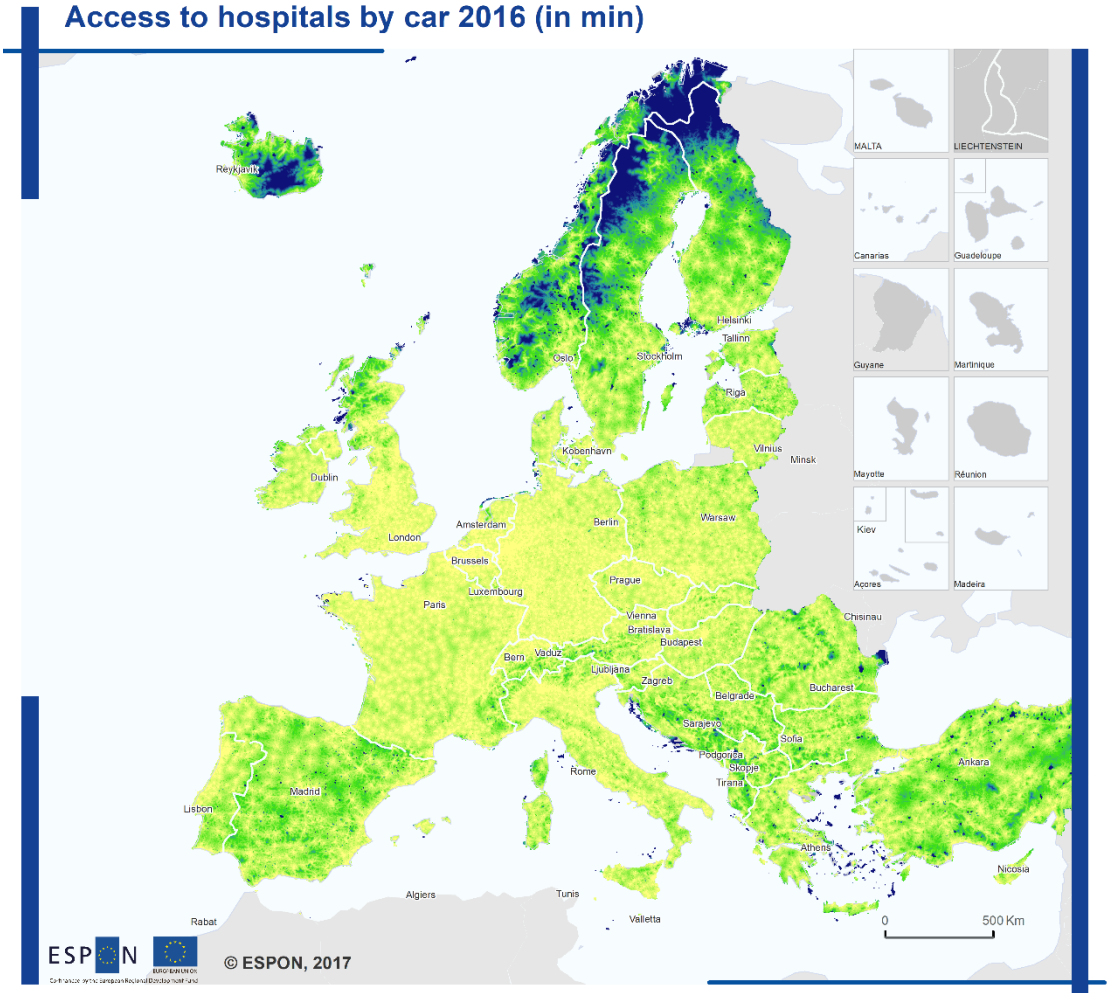
IP regions include all LAU-2 units whose territory is at least overlaid by 50% by grid IP patches

Level: LAU-2 units (Turkey districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

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

The following countries have been excluded from analysis, since the OSM database is too incomplete and alternative data sources providing complete address information for all doctors have not been found so far:
AL, BA, BG, EL, FI, LT, LV, ME, MK, MT, NO, RO, RS, TR

Map 2.25: Access to hospitals: Travel time by car.



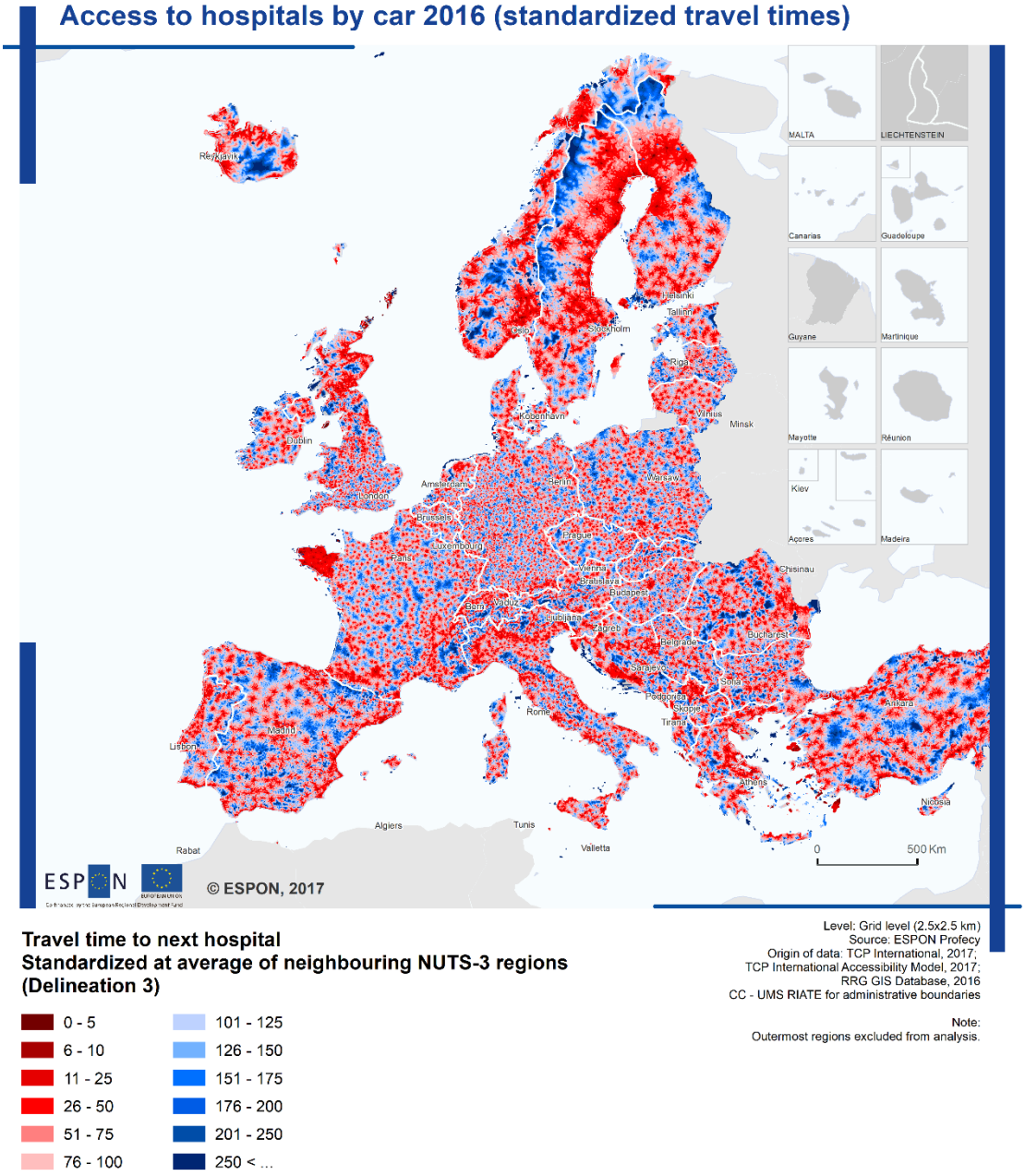
Travel time to next hospital (min) (Delineation 3)

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 2.26: Access to hospitals: Standardized travel times.



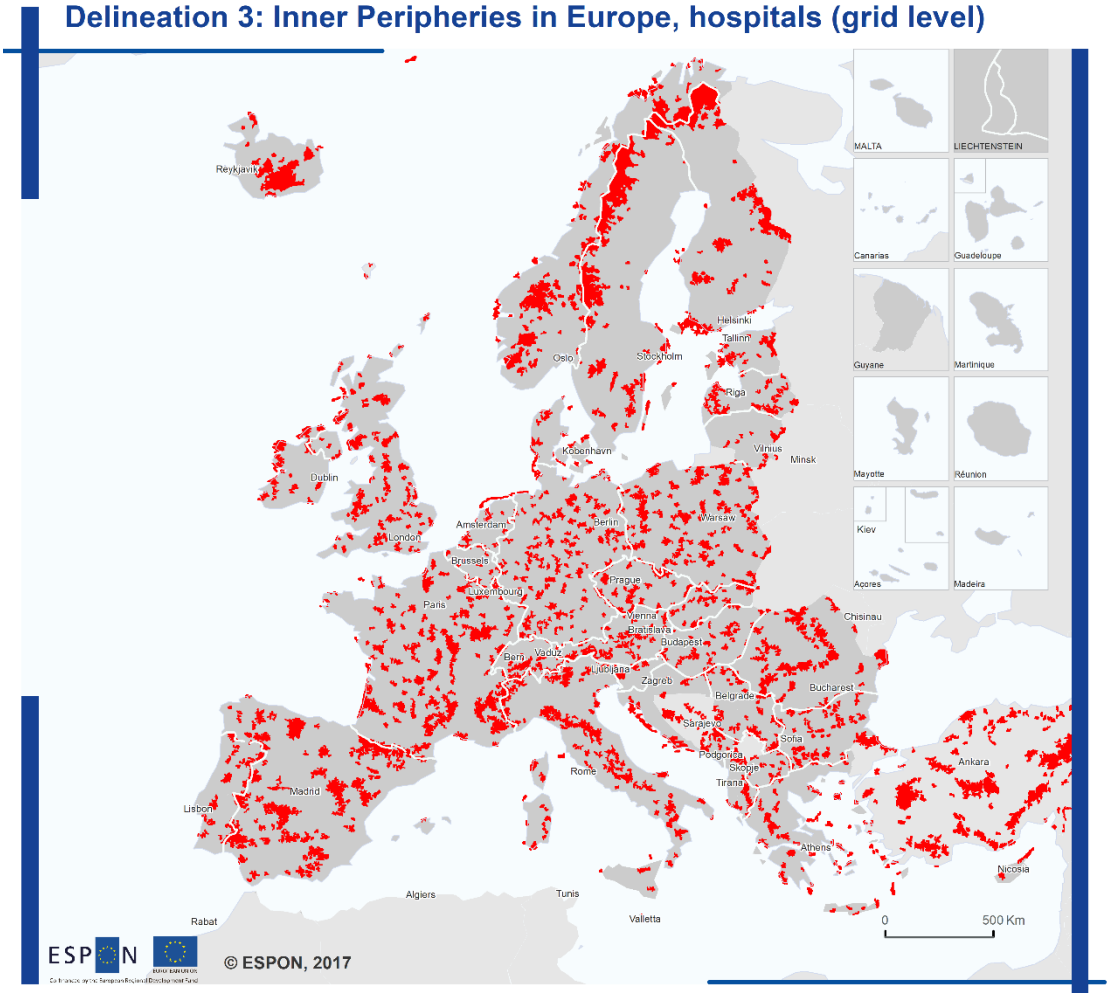
Travel time to next hospital
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

0 - 5	101 - 125
6 - 10	126 - 150
11 - 25	151 - 175
26 - 50	176 - 200
51 - 75	201 - 250
76 - 100	250 < ...

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 2.27: Access to hospitals: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon poor access to hospitals by car

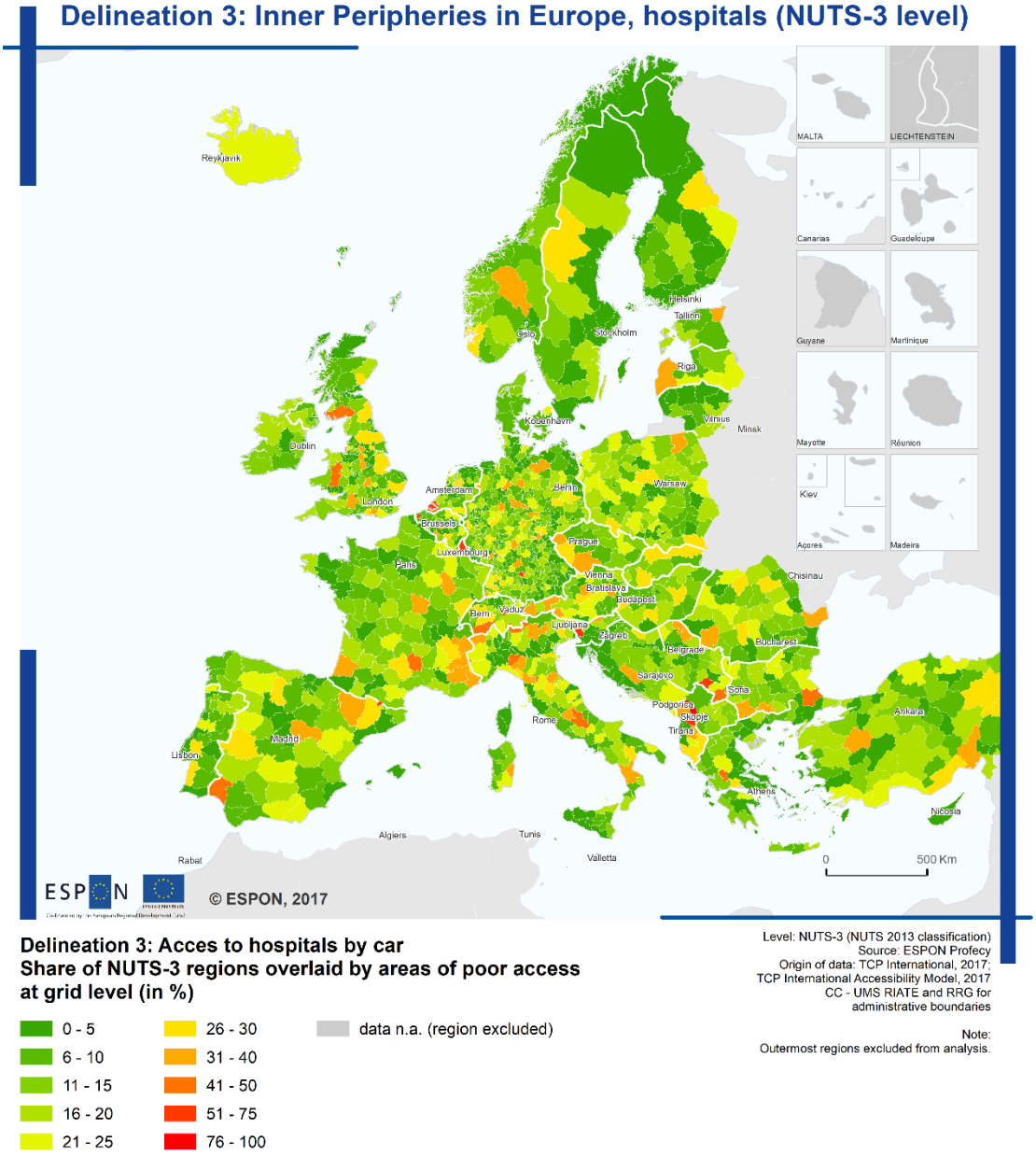
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 695 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 1102

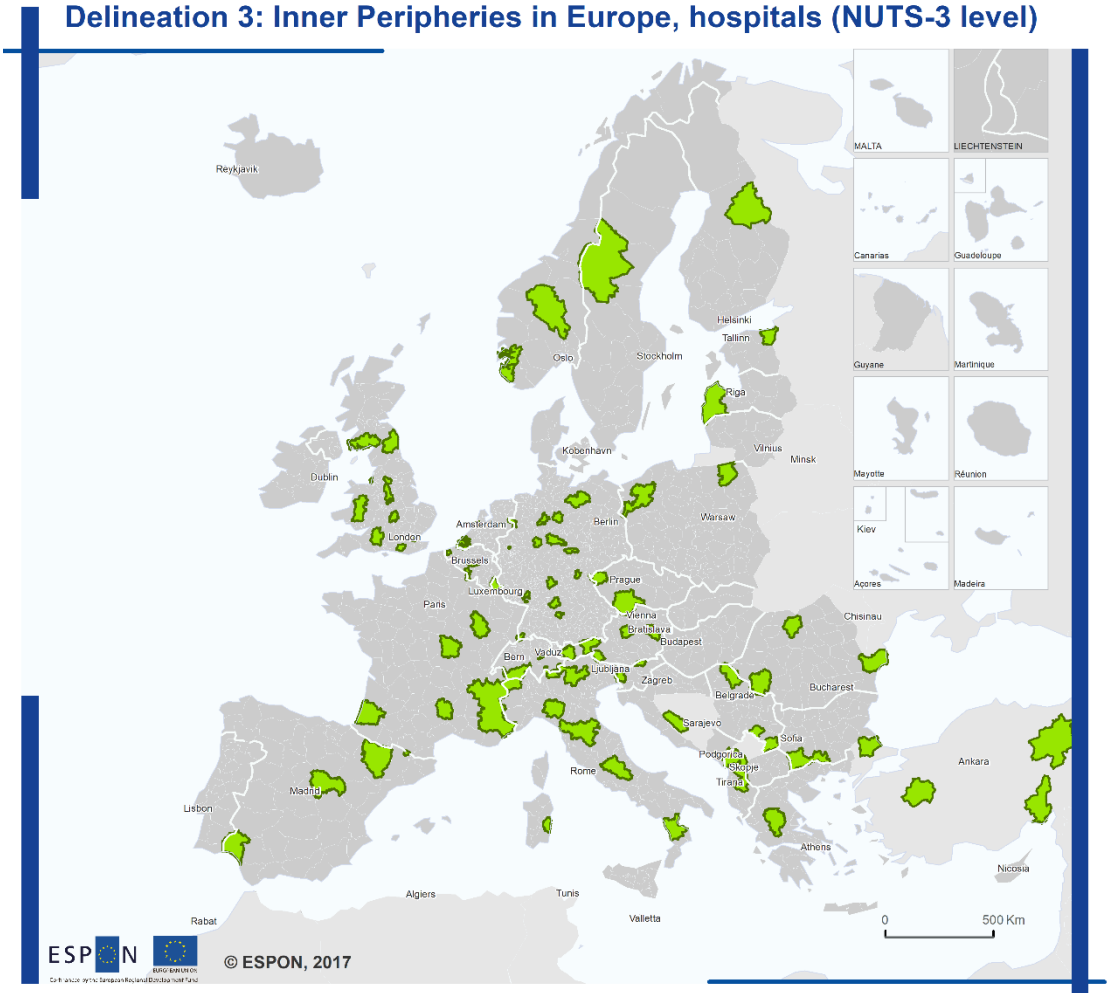
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.28: Access to hospitals: Overlay of NUTS-3 regions with IP areas at grid level.



Map 2.29: Access to hospitals: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to hospitals by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

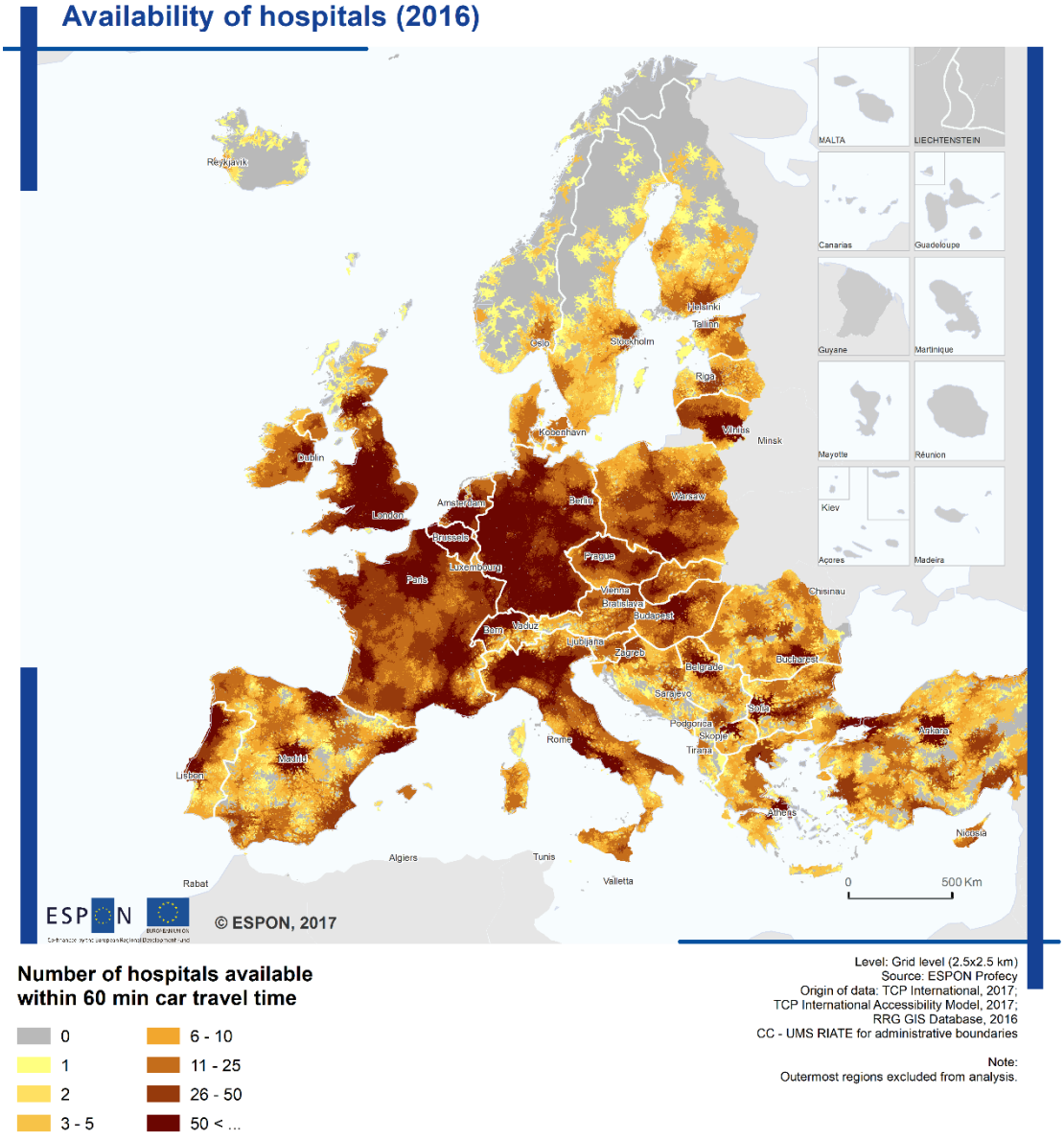
Remarks:

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 - UMS RIATE and RRG for
administrative boundaries

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

Map 2.30: Availability of hospitals within 60 min car travel times.



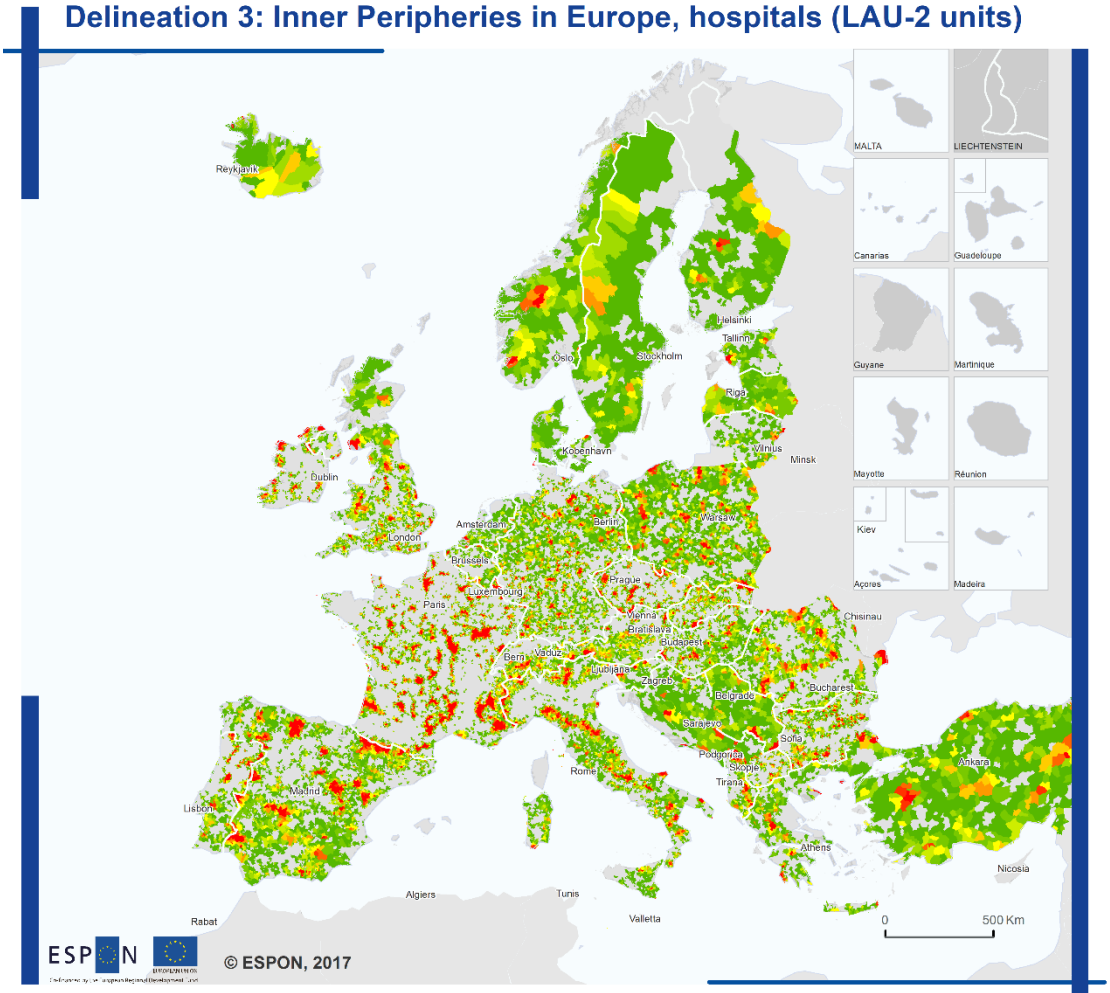
Number of hospitals available within 60 min car travel time

0	6 - 10
1	11 - 25
2	26 - 50
3 - 5	50 < ...

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 2.31: Access to hospitals: Overlay of LAU-2 units with IP areas at grid level.



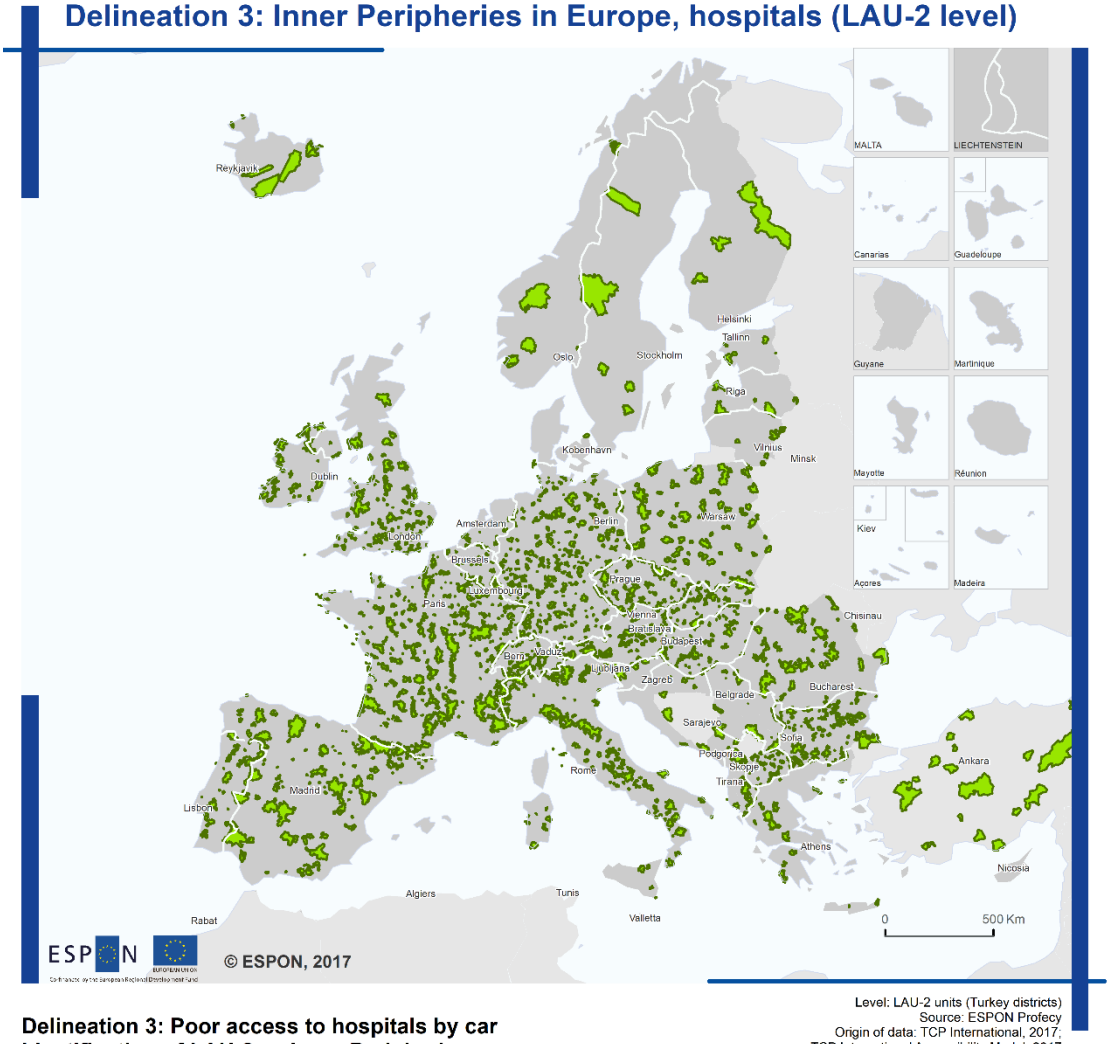
Delineation 3: Access to hospitals by car
Share of LAU-2 units overlaid by areas of poor access at grid level (in %)

- 0
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.

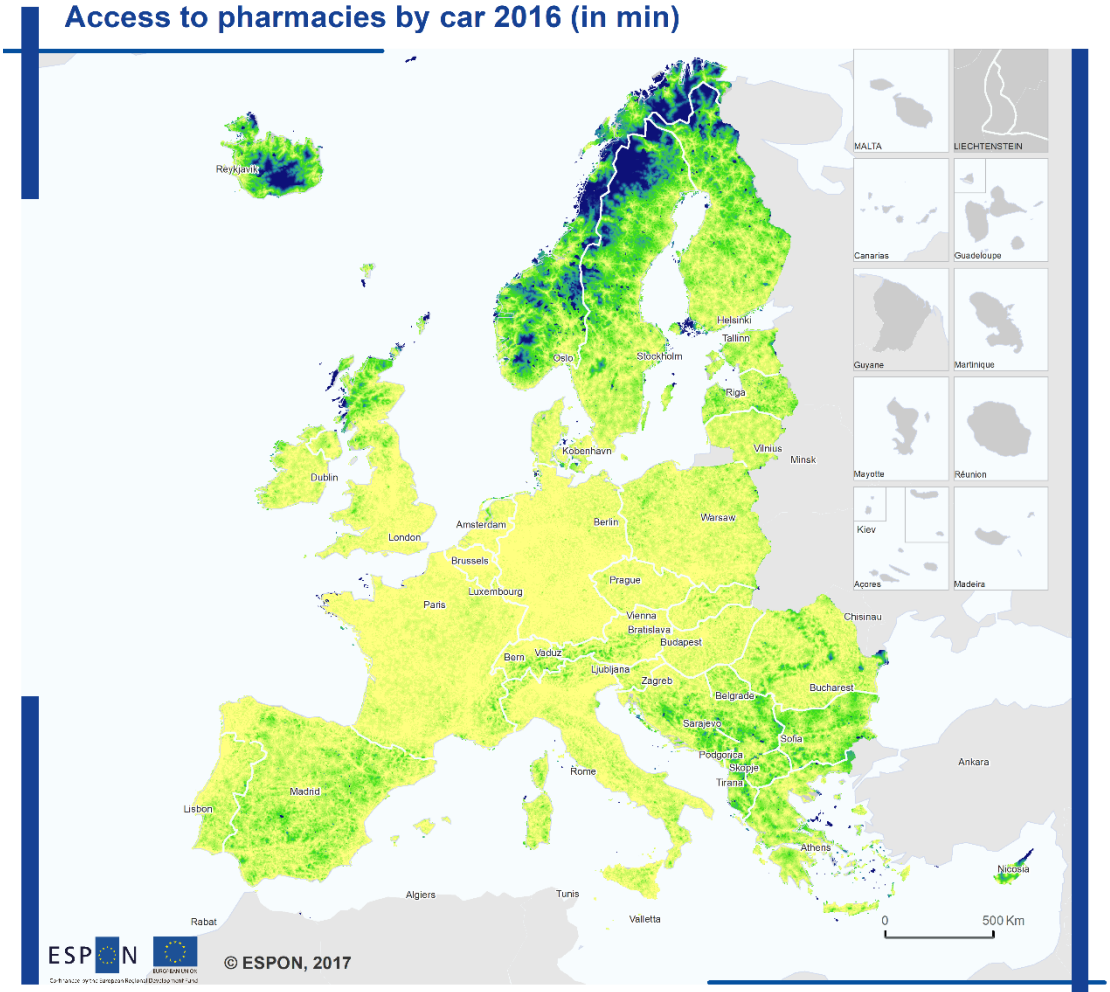
Map 2.32: Access to hospitals: Identification of LAU-2 units as inner peripheries.



Remarks:

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

Map 2.33: Access to pharmacies: Travel time by car.



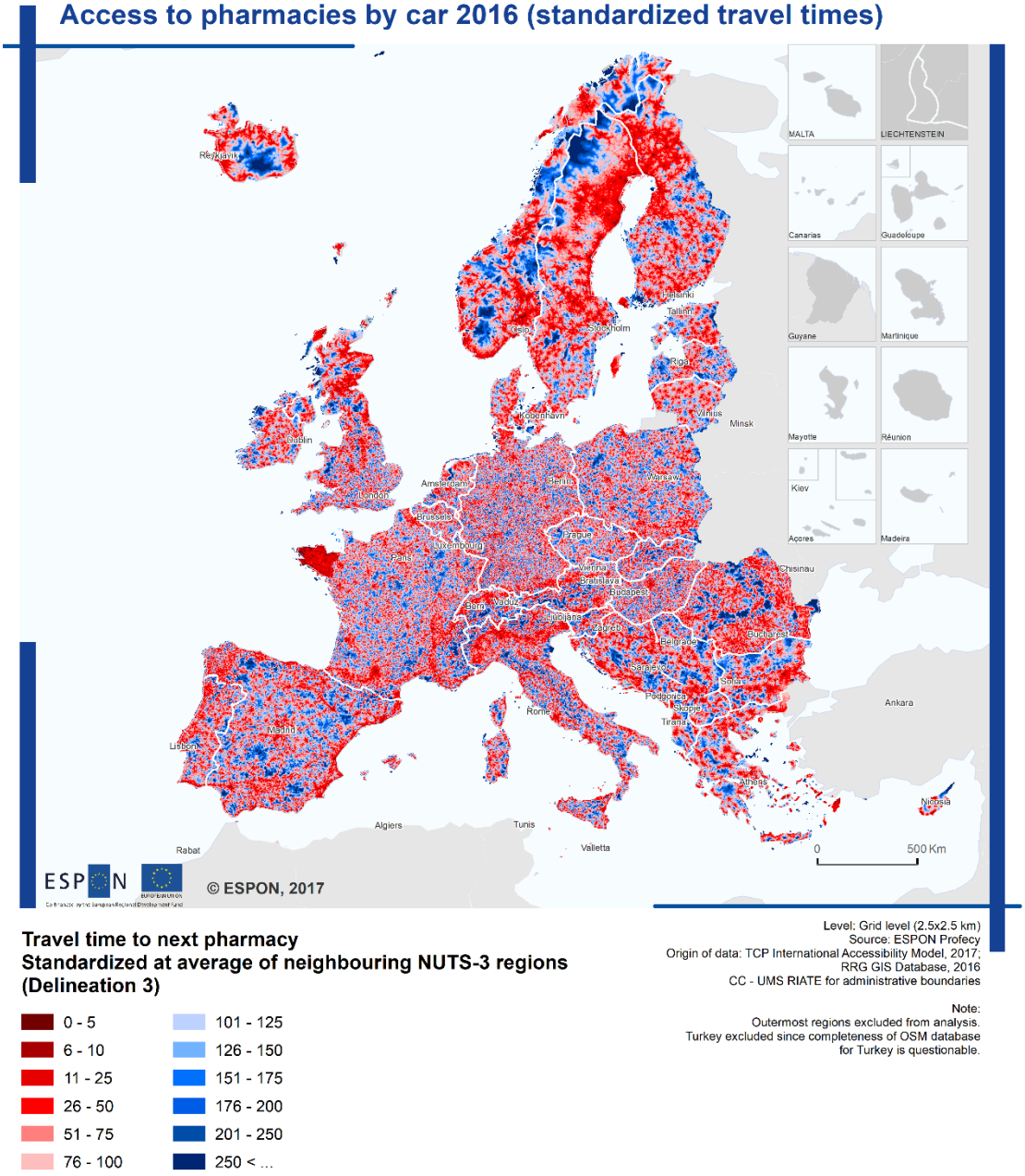
Travel time to next pharmacy (min) (Delineation 3)

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 < ...

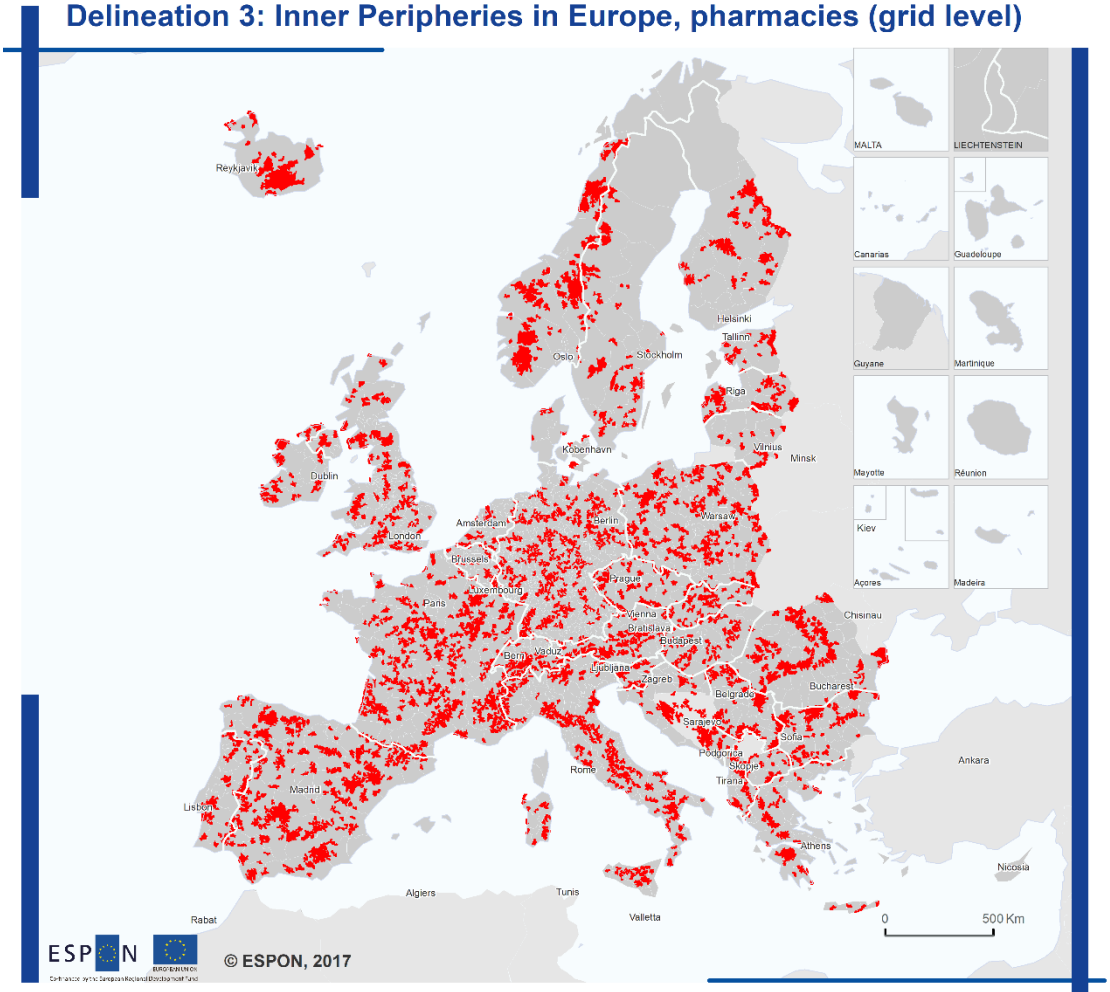
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International Accessibility Model, 2017; RRG GIS Database, 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.
Turkey excluded since completeness of OSM database for Turkey is questionable.

Map 2.34: Access to pharmacies: Standardized travel times.



Map 2.35: Access to pharmacies: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon access to pharmacies by car

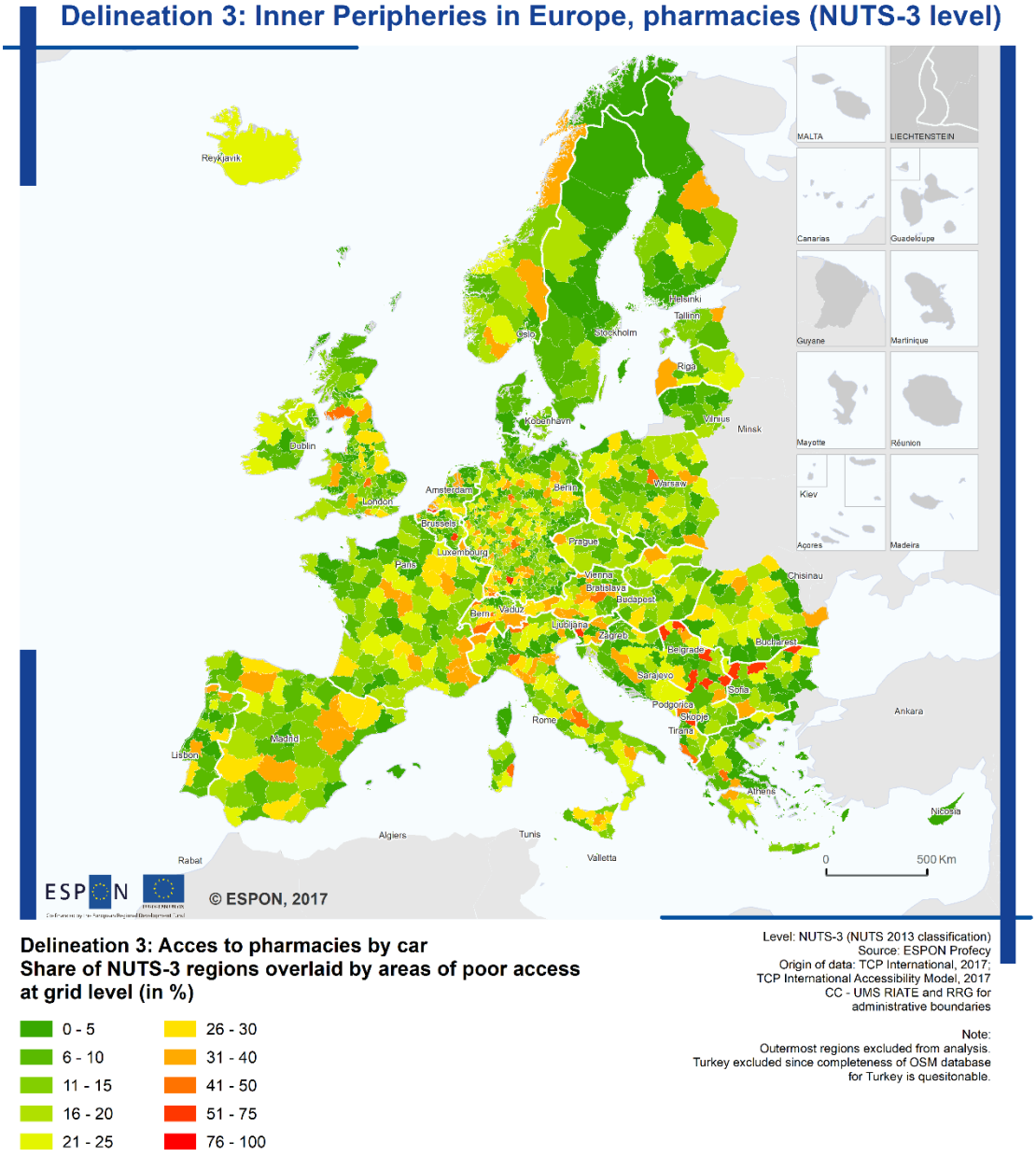
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 600 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 1,069

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.
Turkey excluded because of incompletef OSM database.

Map 2.36: Access to pharmacies: Overlay of MUTS-3 regions with IP areas at grid level.



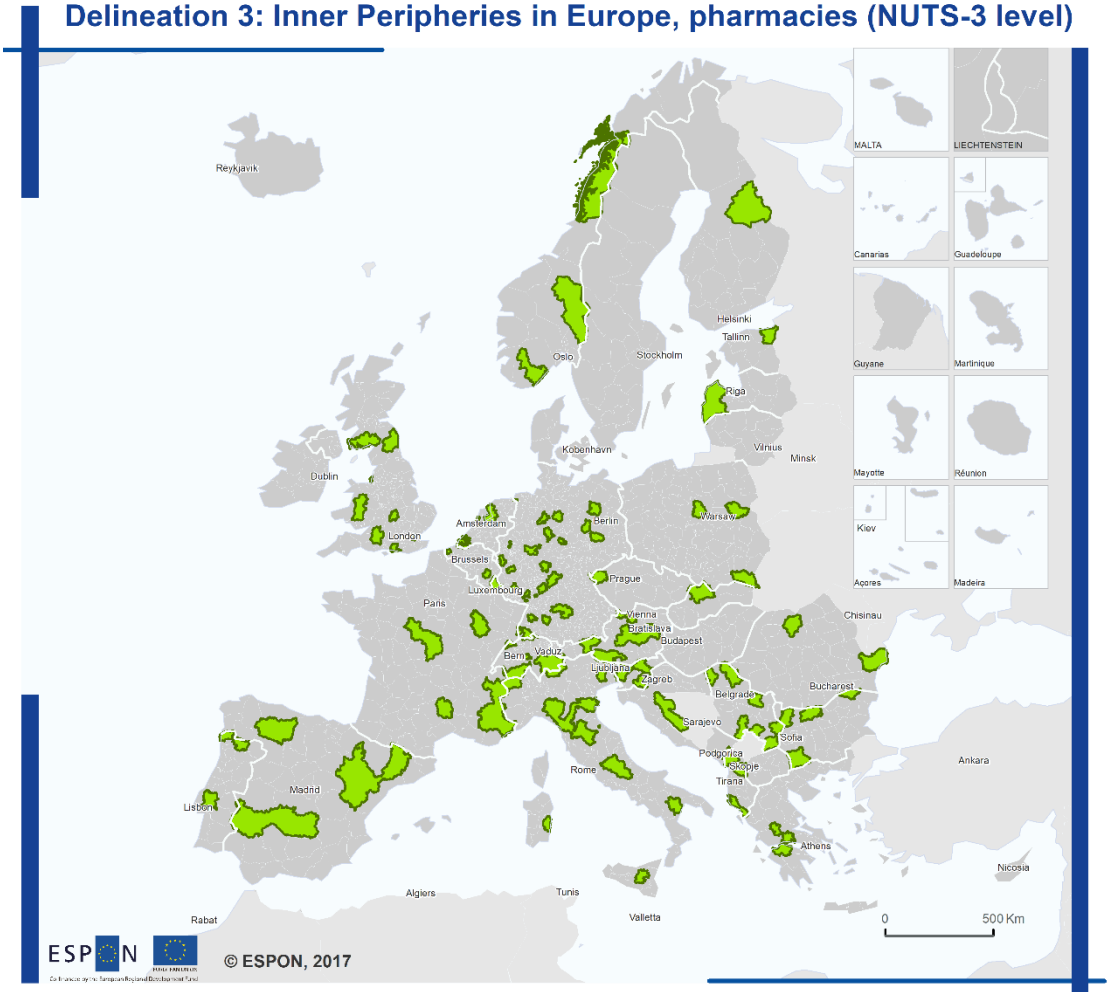
Delineation 3: Acces to pharmacies by car
Share of NUTS-3 regions overlaid by areas of poor access at grid level (in %)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 100

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

Note:
Outermost regions excluded from analysis.
Turkey excluded since completeness of OSM database for Turkey is quesitonable.

Map 2.37: Access to pharmacies: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to pharmacies by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

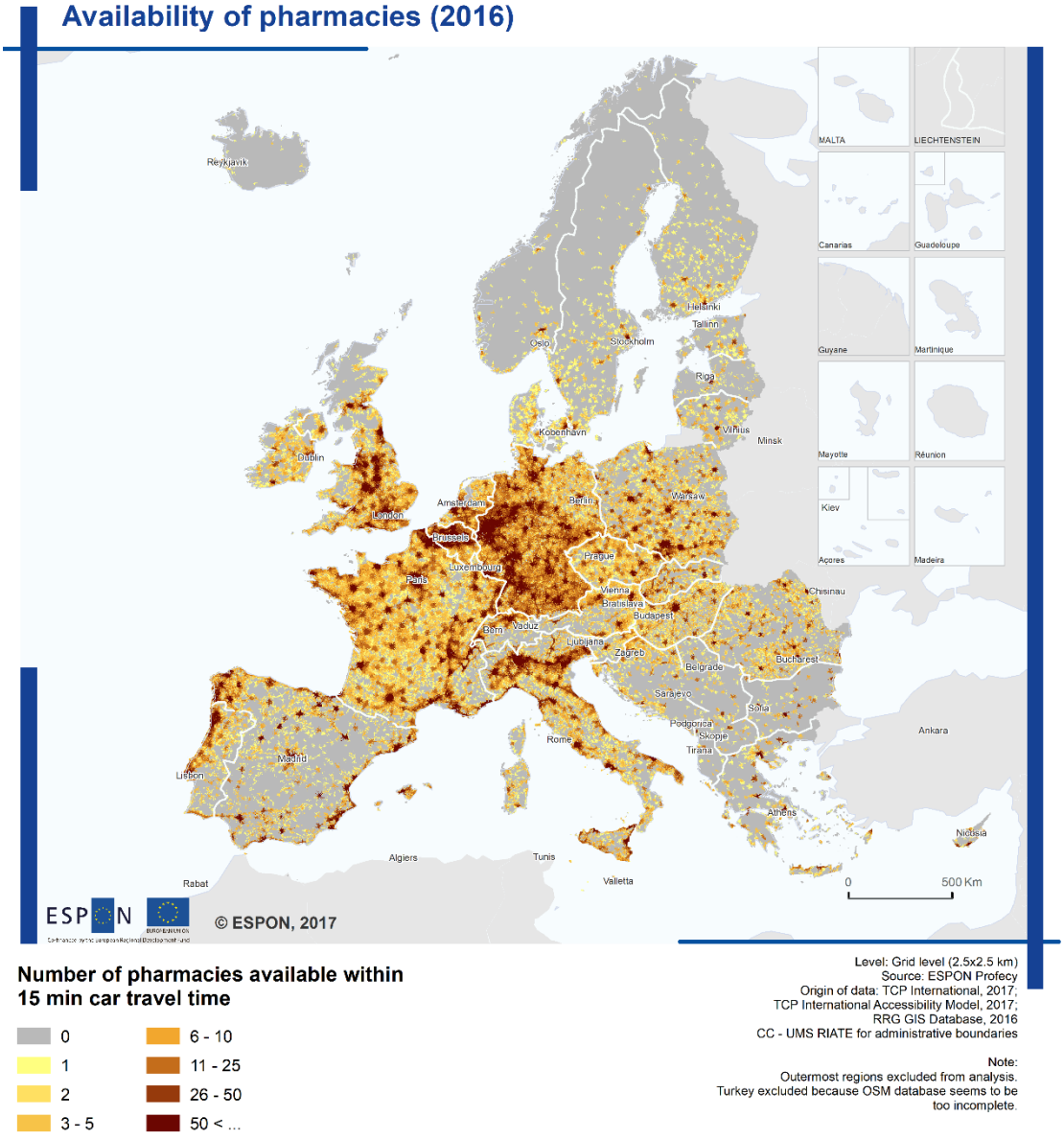
Remarks:

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

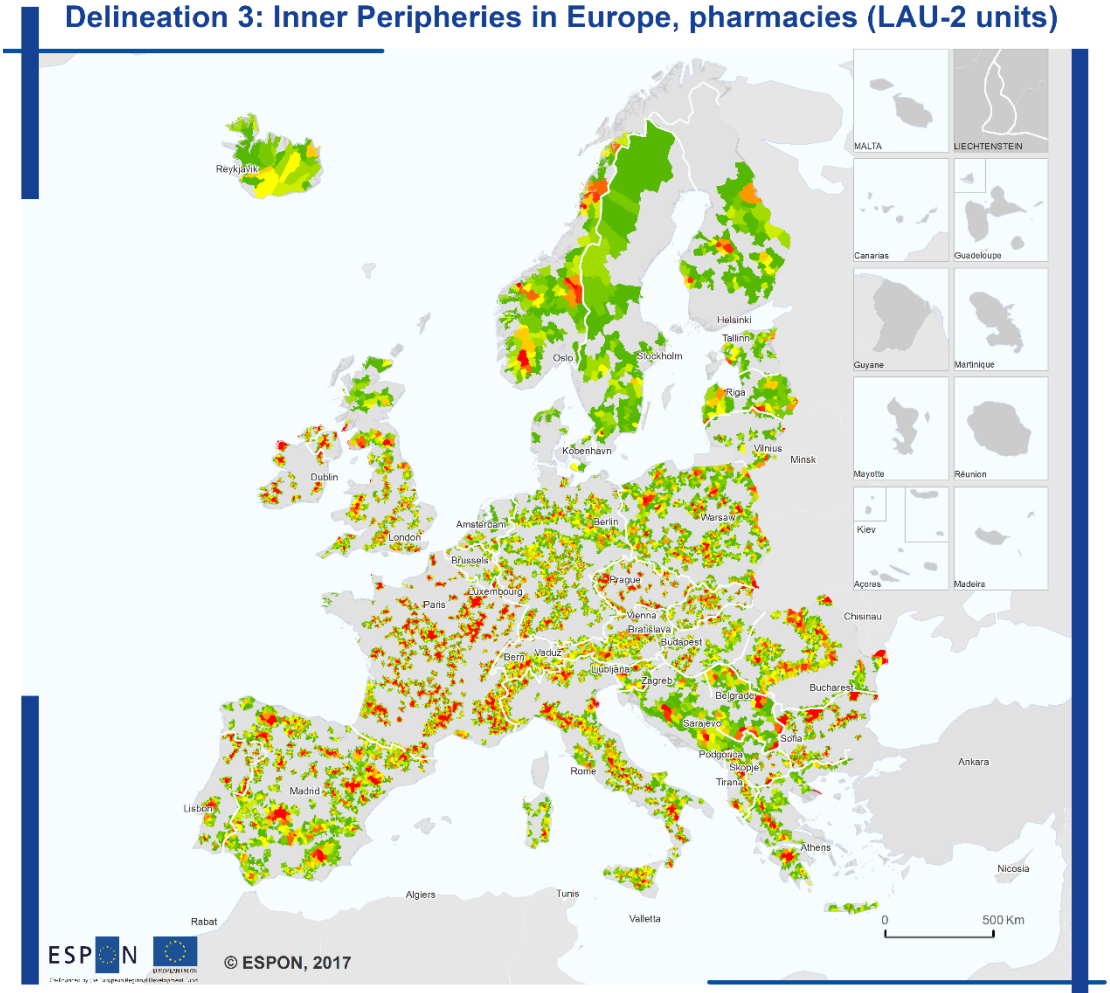
Level: NUTS-3 (NUTS 2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.
Turkey excluded because completeness of OSM database on pharmacies is questionable.
Cyprus and Malta excluded because they represent rather small island states.

Map 2.38: Availability of pharmacies within 15 min car travel time.



Map 2.39: Access to pharmacies: Overlay of LAU-2 units with IP areas at grid level.



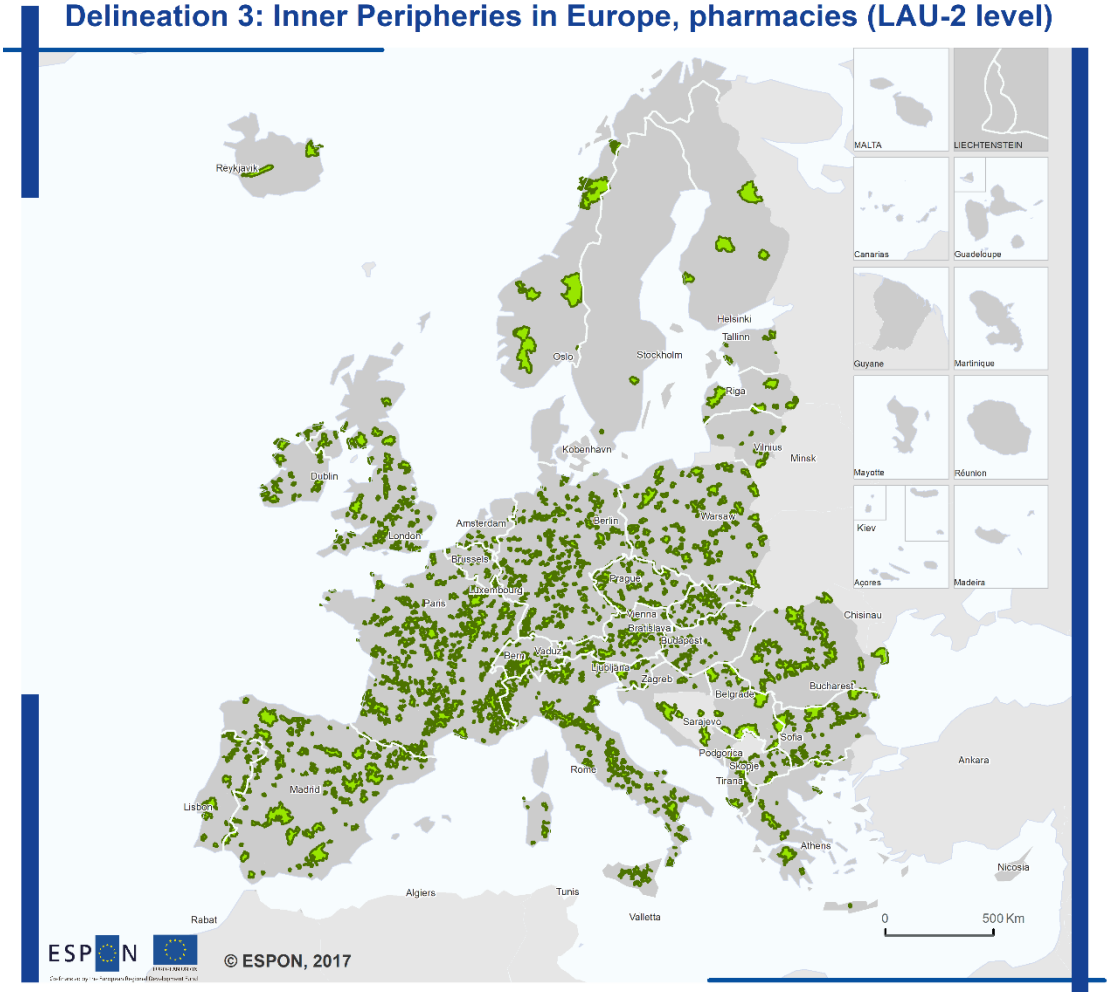
Delineation 3: Access to pharmacies by car
Share of LAU-2 units overlaid by areas of poor access at grid level (in %)

- 0
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.
Turkey excluded since completeness of OSM database for Turky is questionable.

Map 2.40: Access to pharmacies: Identification of LAU-2 units as inner peripheries.



Delineation 3: Poor access to pharmacies 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 - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.
Cyprus and Malta excluded because they represent rather small island states.
Turkey excluded as OSM database incomplete

Remarks:

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

2.4 Education (primary and secondary schools)

Primary and secondary schools have been treated as individual SGIs in PROFECY. The following maps have been generated as part of the delineation process:

Map 2.41: Access to primary schools: Travel time by car.

Map 2.42: Access to primary schools: Standardized travel times.

Map 2.43: Access to primary schools: Delineation of inner peripheries at grid level.

Map 2.44: Access to primary schools: Overlay of NUTS-3 regions with IP areas at grid level.

Map 2.45: Access to primary schools: Identification of NUTS-3 regions as inner peripheries.

Map 2.46: Availability of primary schools within 15 min car travel time.

Map 2.47: Access to primary schools: Overlay of LAU-2 units with IP areas at grid level.

Map 2.48: Access to primary schools: Identification of LAU-2 units as inner peripheries.

Map 2.49: Access to secondary schools: Travel time by car.

Map 2.50: Access to secondary schools: Standardized travel times.

Map 2.51: Access to secondary schools: Delineation of inner peripheries at grid level.

Map 2.52: Access to secondary schools: Overlay of NUTS-3 regions with IP areas at grid level.

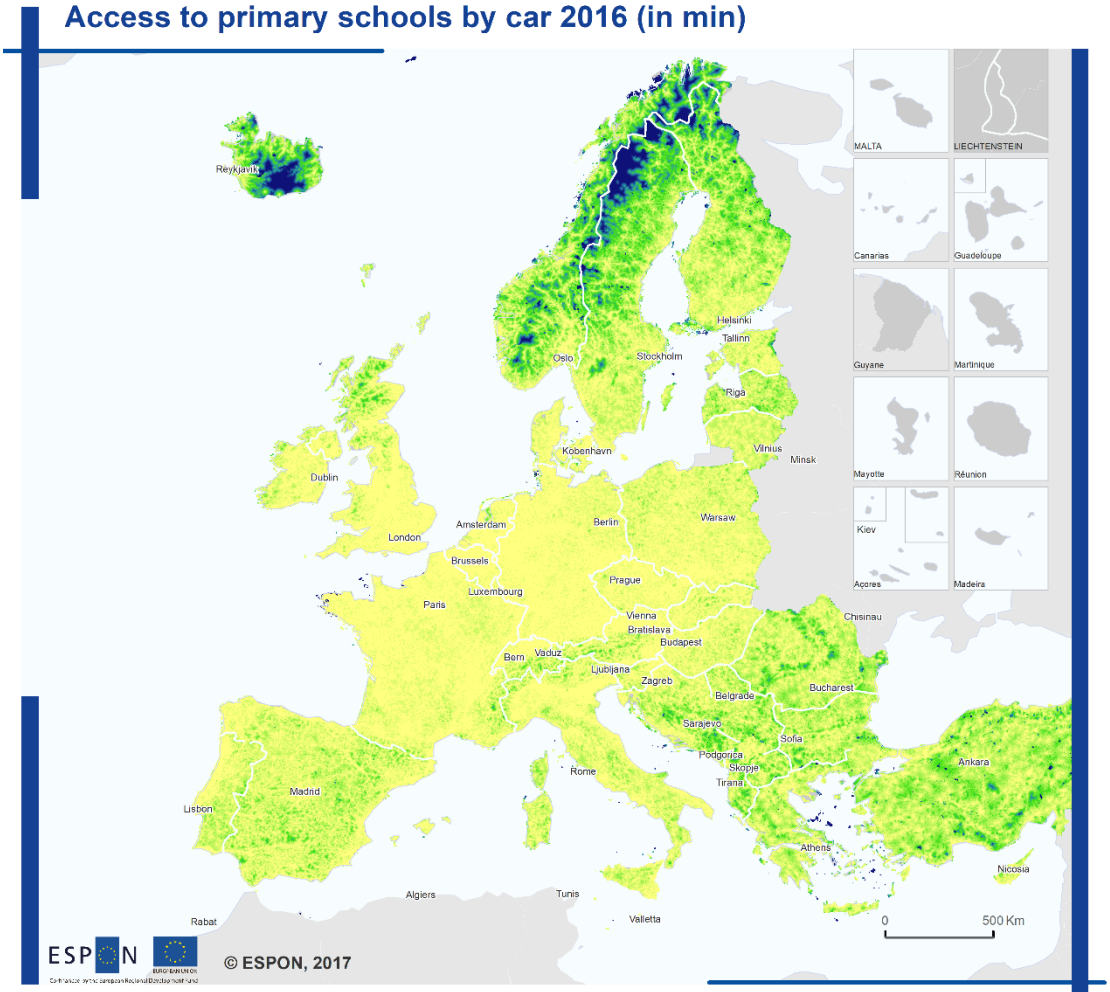
Map 2.53: Access to secondary schools: Identification of NUTS-3 regions as inner peripheries.

Map 2.54: Availability of secondary schools within 60 min car travel time.

Map 2.55: Access to secondary schools: Overlay of LAU-2 units with IP areas at grid level.

Map 2.56: Access to secondary schools: Identification of LAU-2 units as inner peripheries.

Map 2.41: Access to primary schools: Travel time by car.



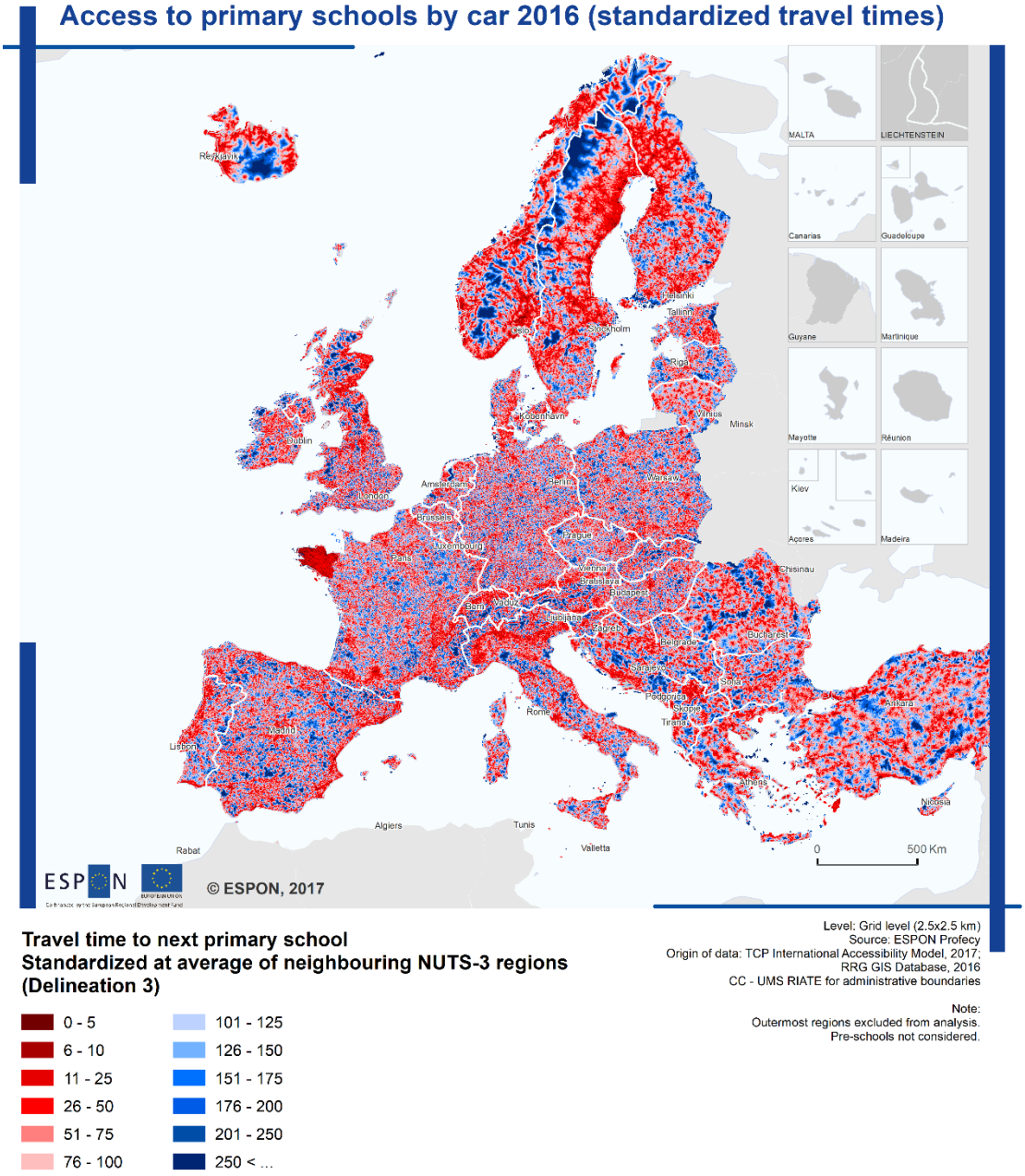
Travel time to next primary school (min) (Delineation 3)

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 Accessibility Model, 2017; RRG GIS Database, 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.
Pre-schools not considered.

Map 2.42: Access to primary schools: Standardized travel times.



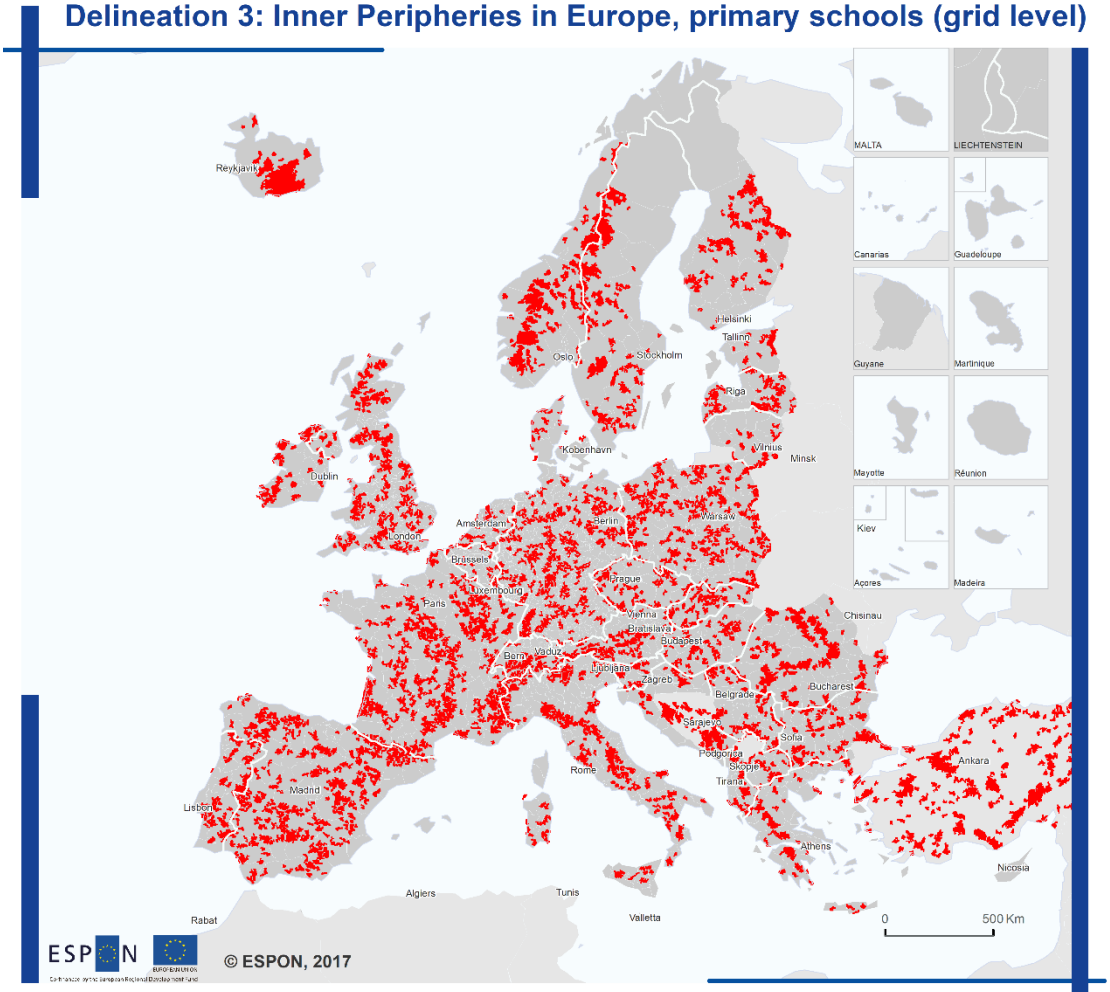
Travel time to next primary school
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 250
- 250 < ...

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

Note:
Outermost regions excluded from analysis.
Pre-schools not considered.

Map 2.43: Access to primary schools: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon access to primary schools by car

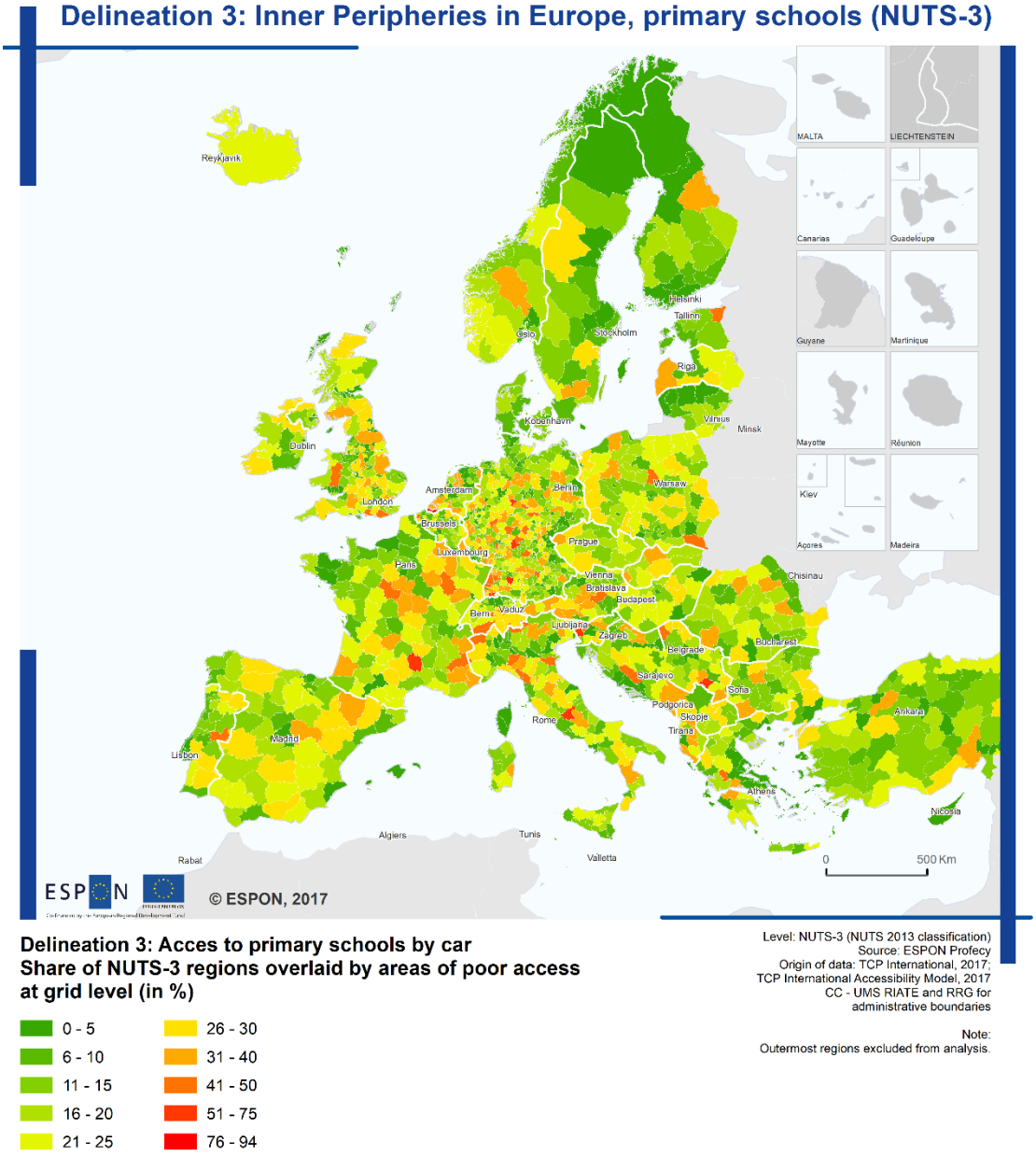
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 600 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 1,309

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 2.44: Access to primary schools: Overlay of NUTS-3 regions with IP areas at grid level.



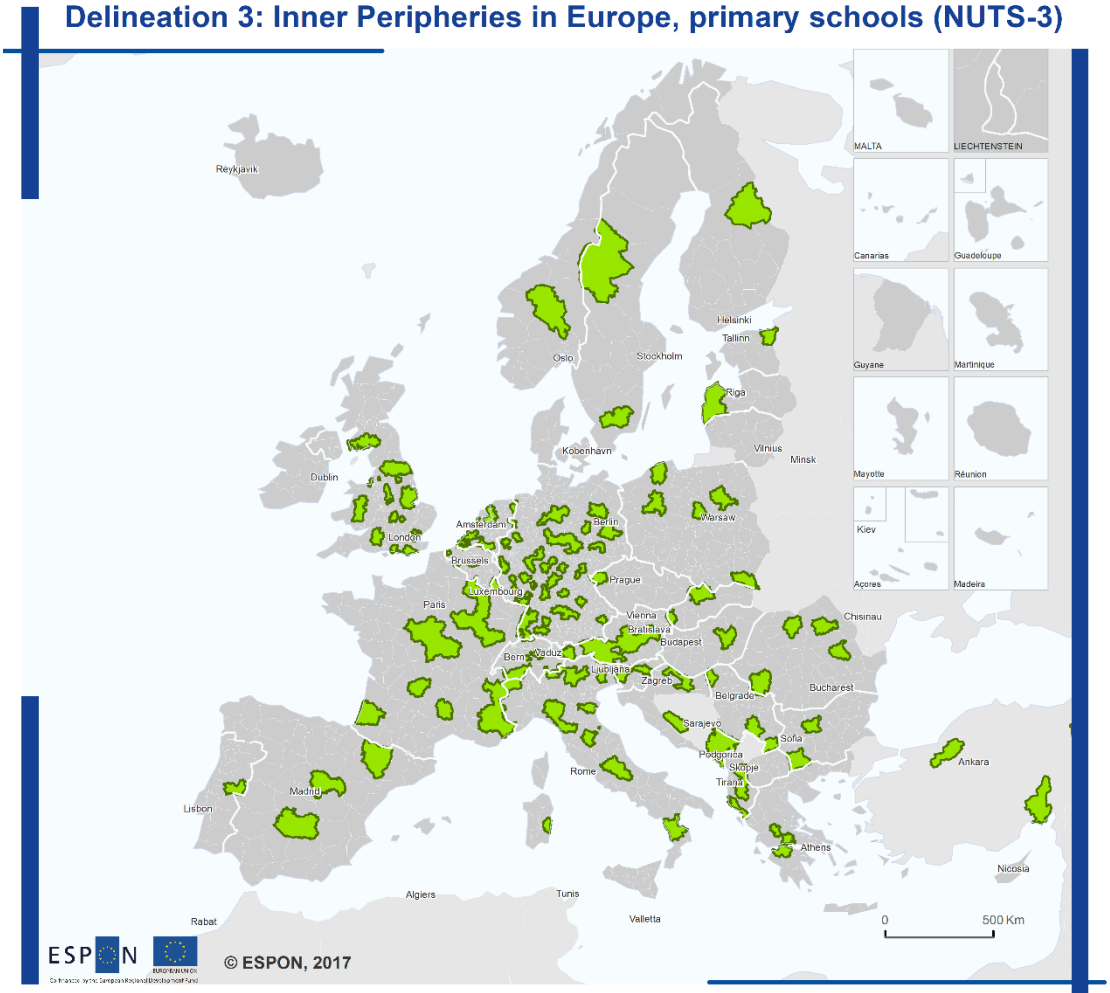
Delineation 3: Acces to primary schools by car
Share of NUTS-3 regions overlaid by areas of poor access at grid level (in %)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 94

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

Note:
Outermost regions excluded from analysis.

Map 2.45: Access to primary schools: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to primary schools by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

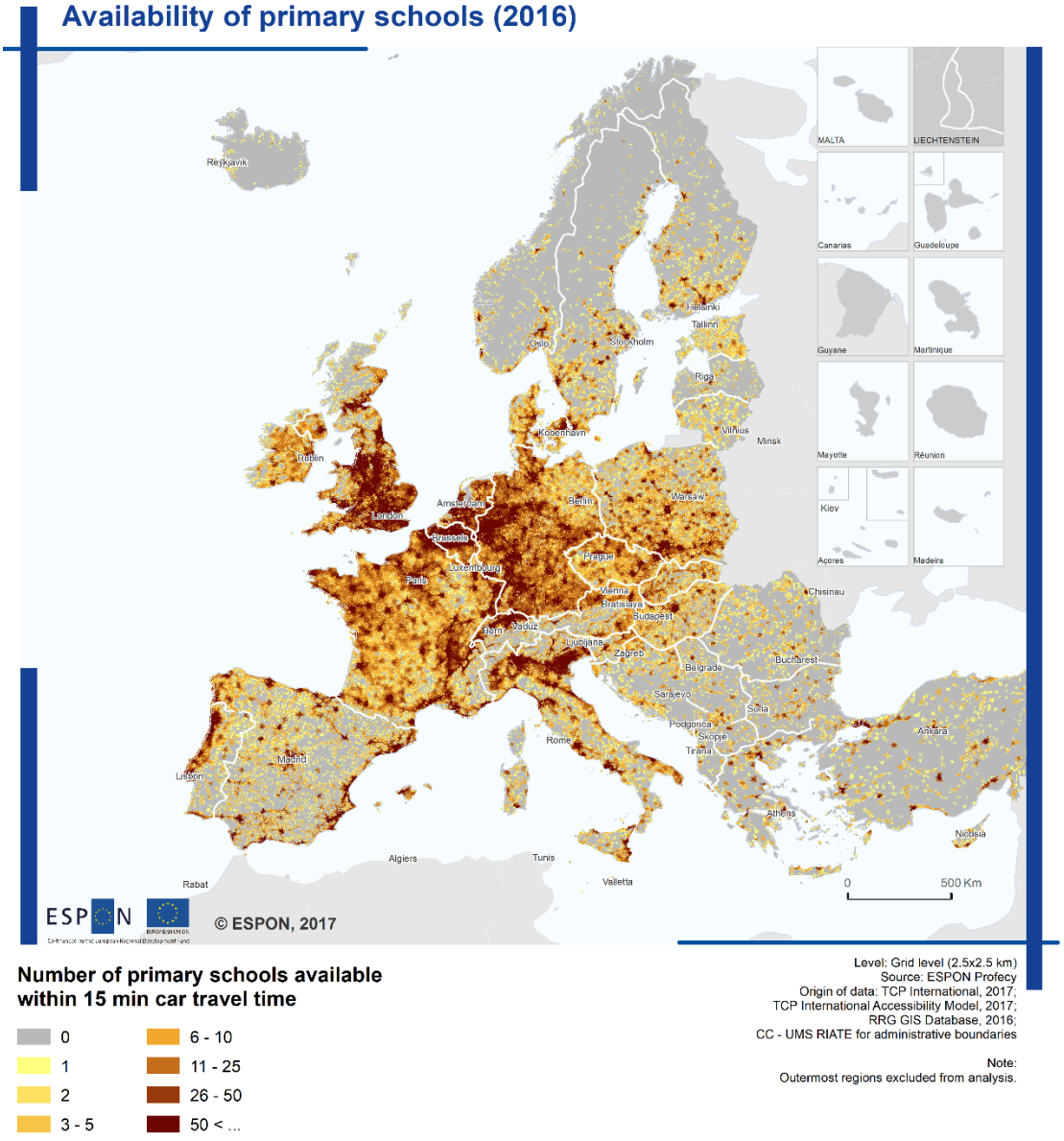
Remarks:

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

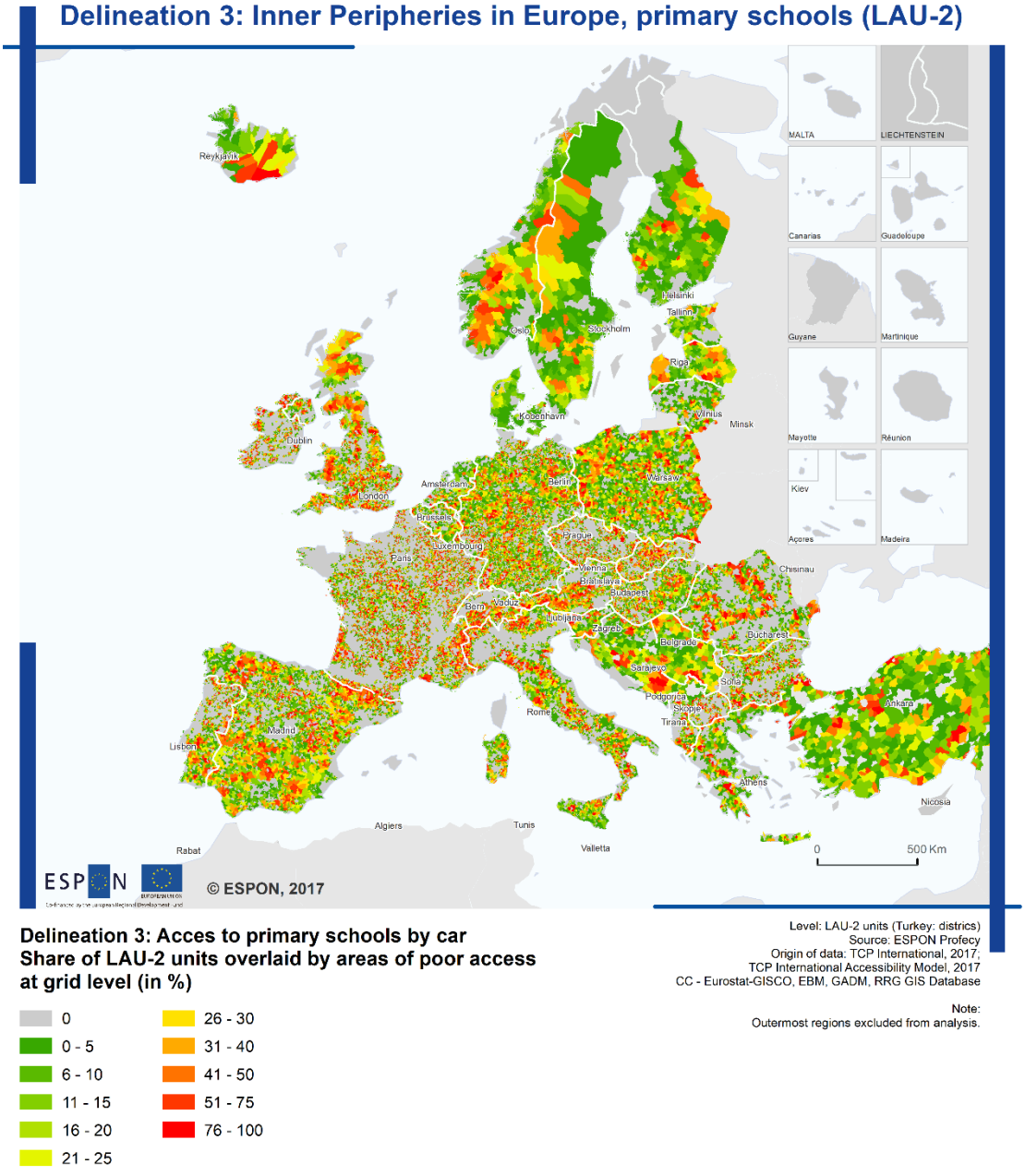
Level: NUTS-3 (NUTS 2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for
administrative boundaries

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

Map 2.46: Availability of primary schools within 15 min car travel time.



Map 2.47: Access to primary schools: Overlay of LAU-2 units with IP areas at grid level.



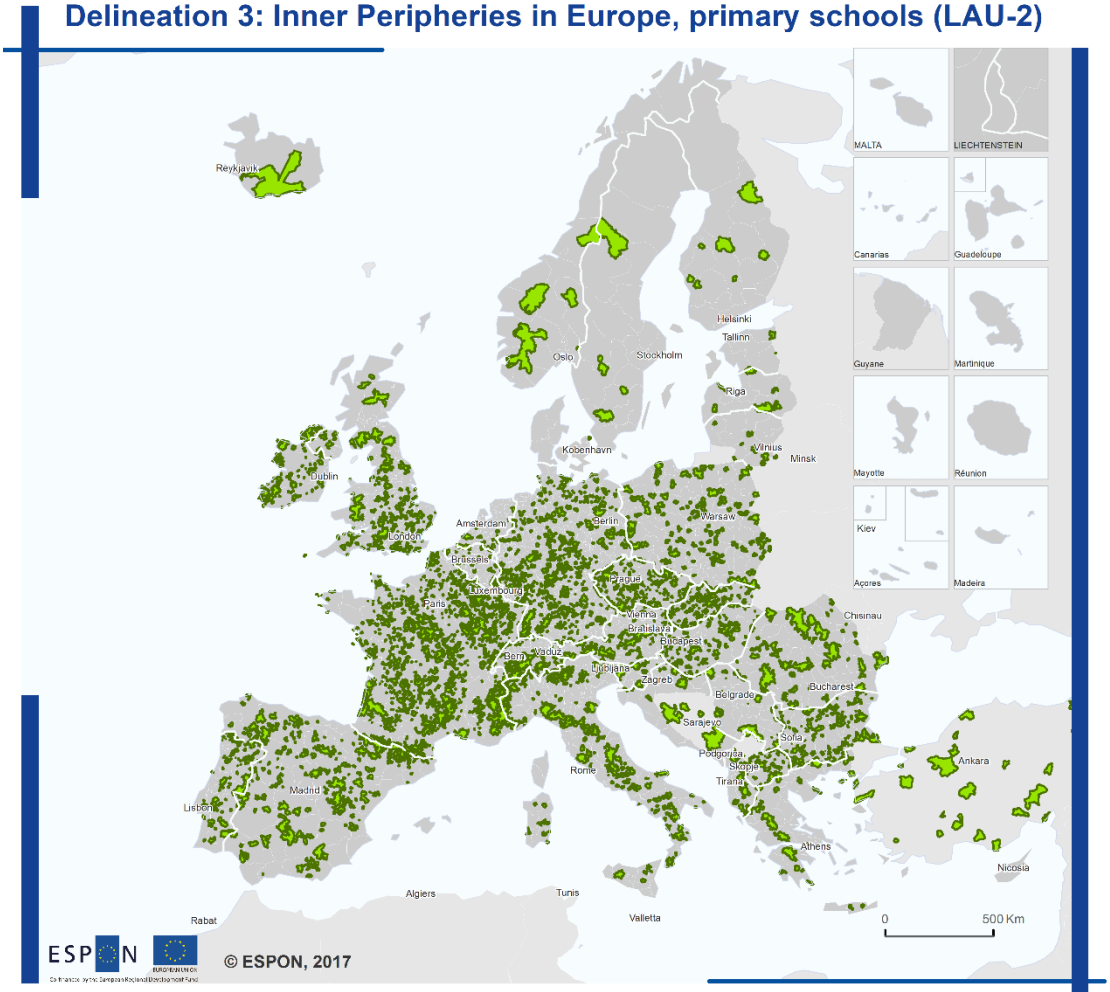
Delineation 3: Acces to primary schools by car
Share of LAU-2 units overlaid by areas of poor access at grid level (in %)

- 0
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 100

Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.

Map 2.48: Access to primary schools: Identification of LAU-2 units as inner peripheries.



Delineation 3: Poor access to primary schools by car
Identification of LAU-2 units as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

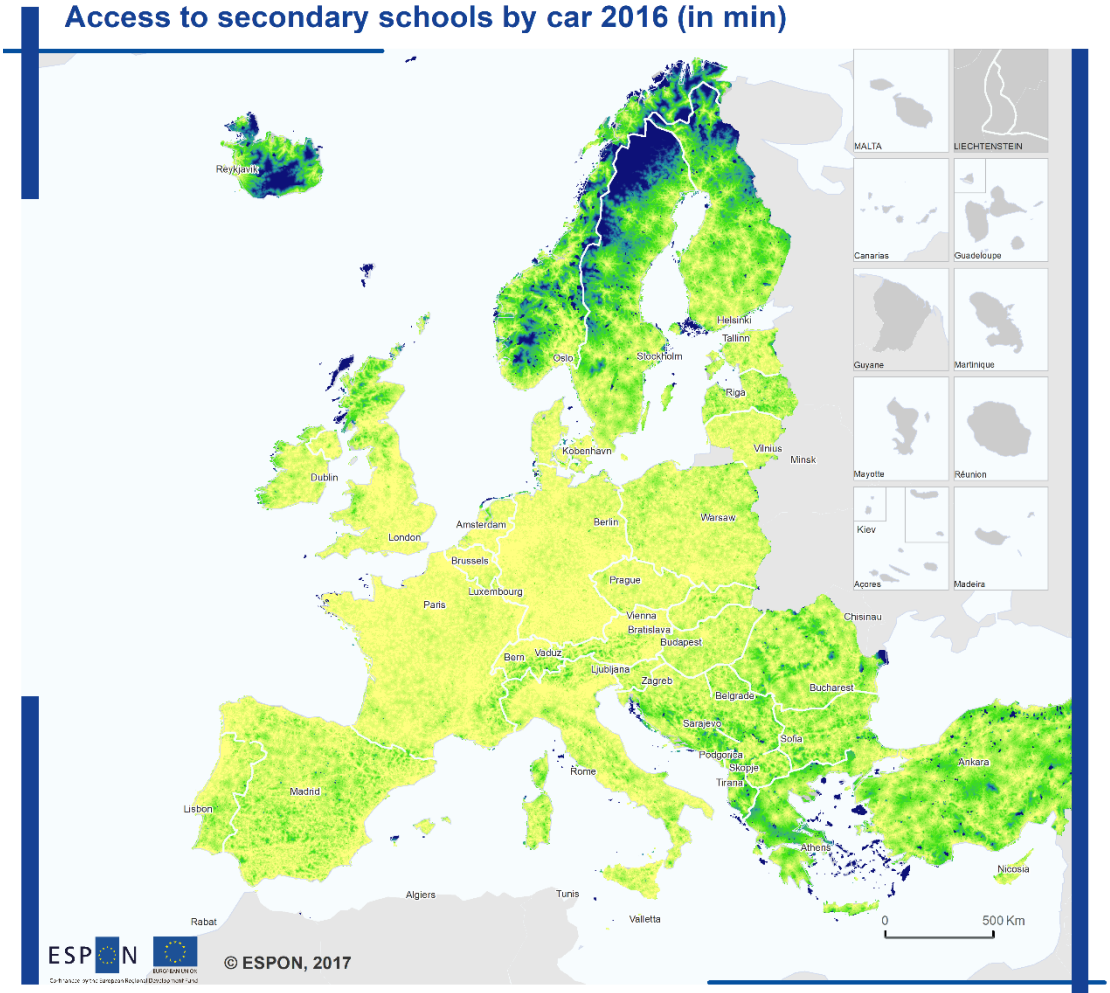
Remarks:

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: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

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

Map 2.49: Access to secondary schools: Travel time by car.



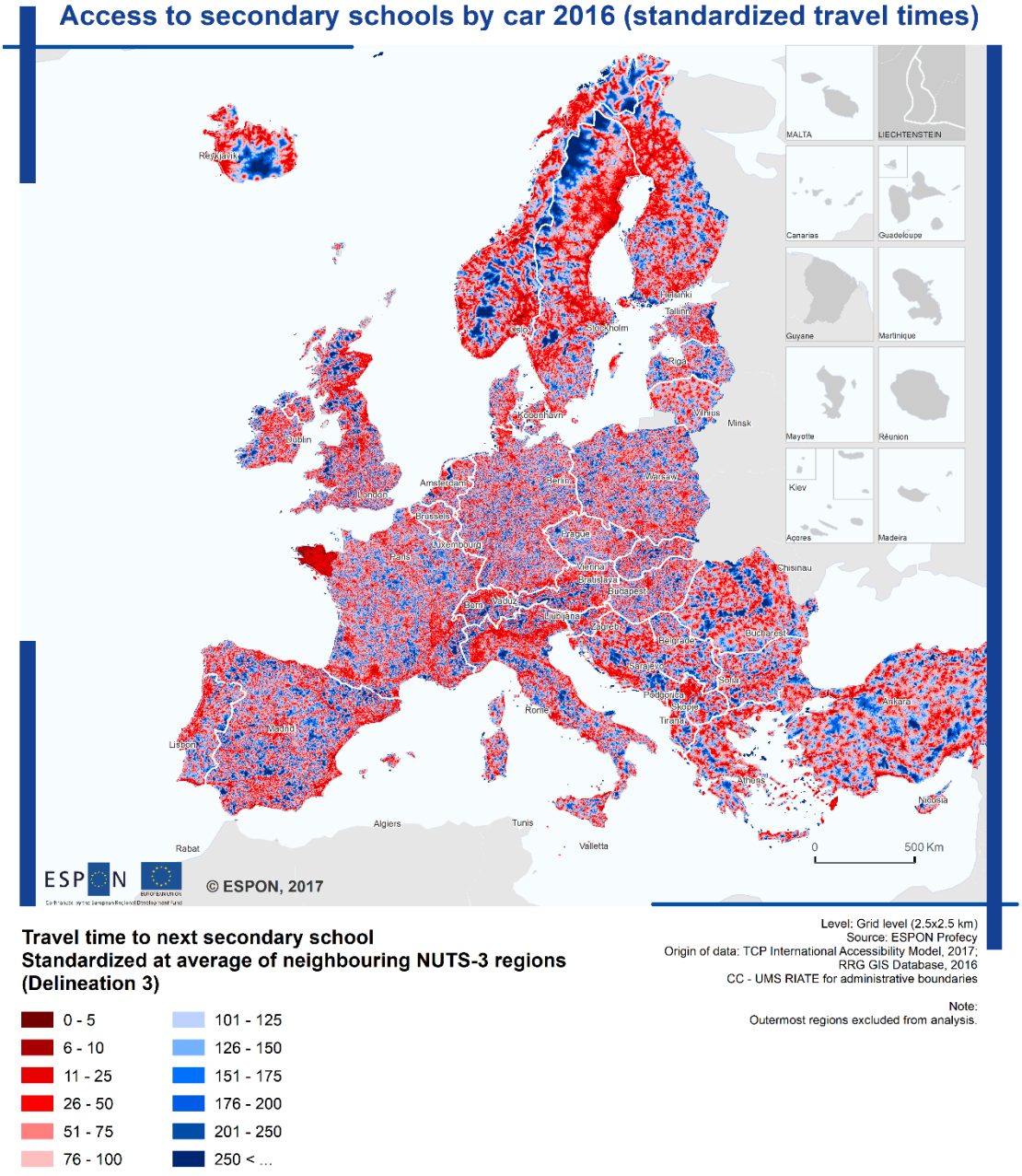
Travel time to next secondary school (min) (Delineation 3)

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 < ...

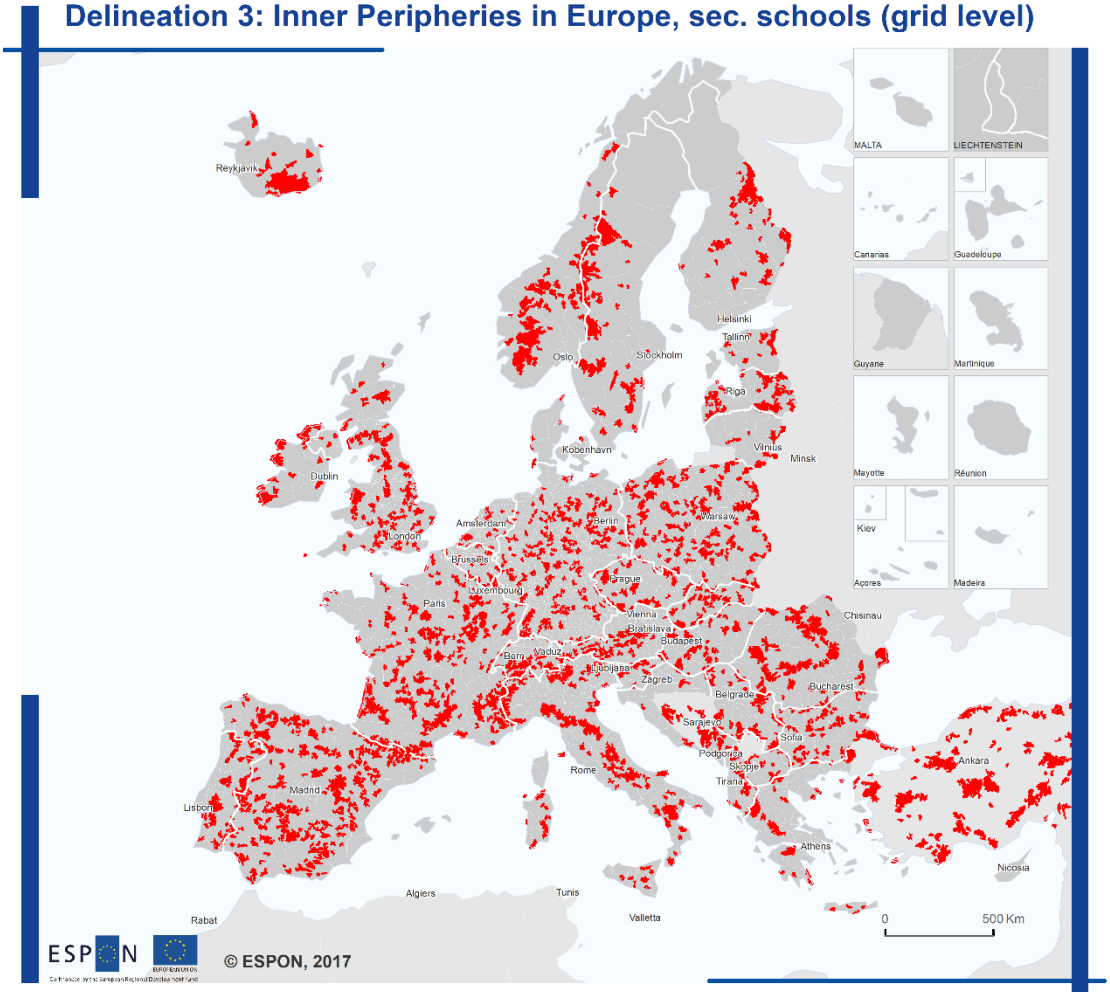
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International Accessibility Model, 2017; RRG GIS Database, 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.50: Access to secondary schools: Standardized travel times.



Map 2.51: Access to secondary schools: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon access to secondary schools by car

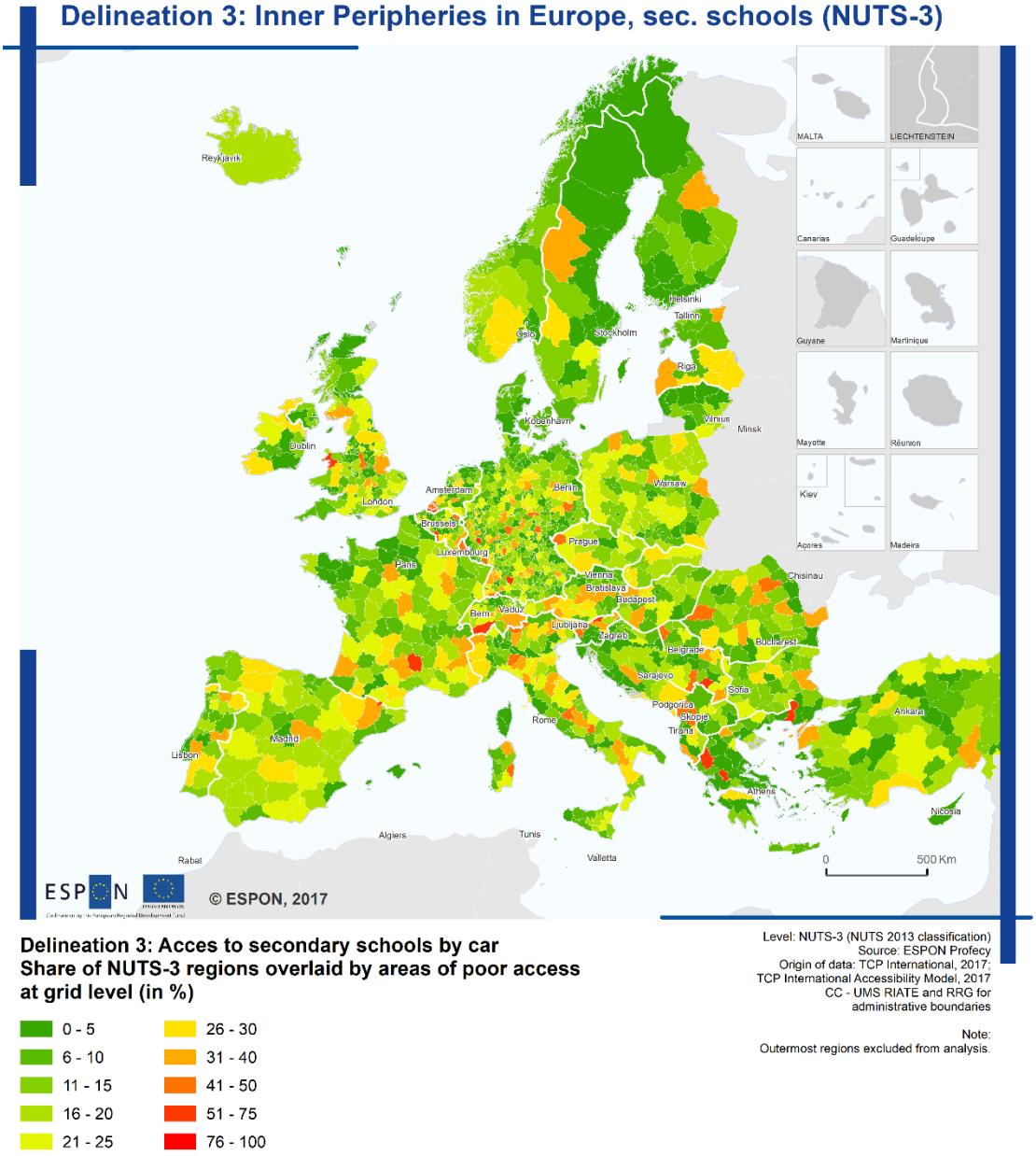
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 650 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 1,046

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 2.52: Access to secondary schools: Overlay of NUTS-3 regions with IP areas at grid level.



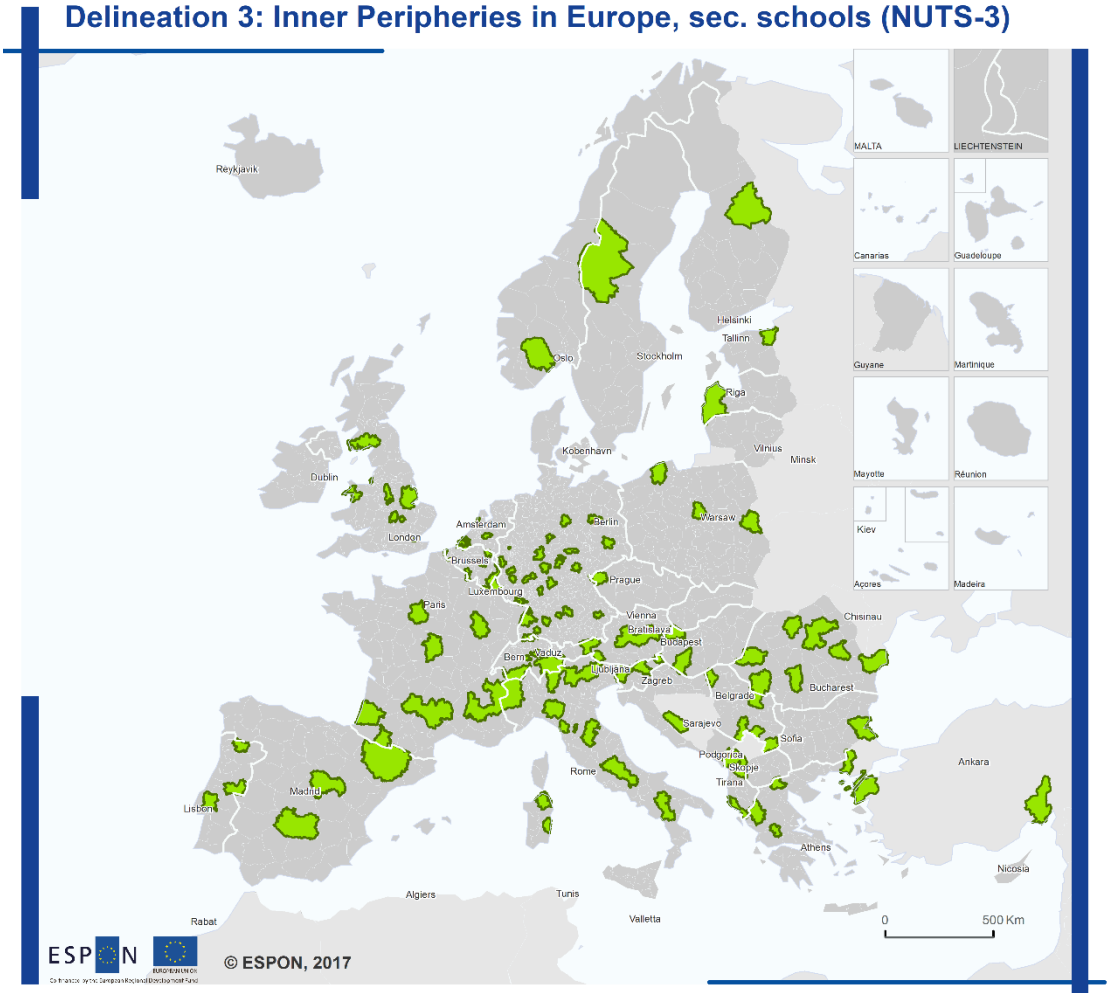
Delineation 3: Acces to secondary schools by car
Share of NUTS-3 regions overlaid by areas of poor access at grid level (in %)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 100

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

Note:
Outermost regions excluded from analysis.

Map 2.53: Access to secondary schools: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to secondary schools by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

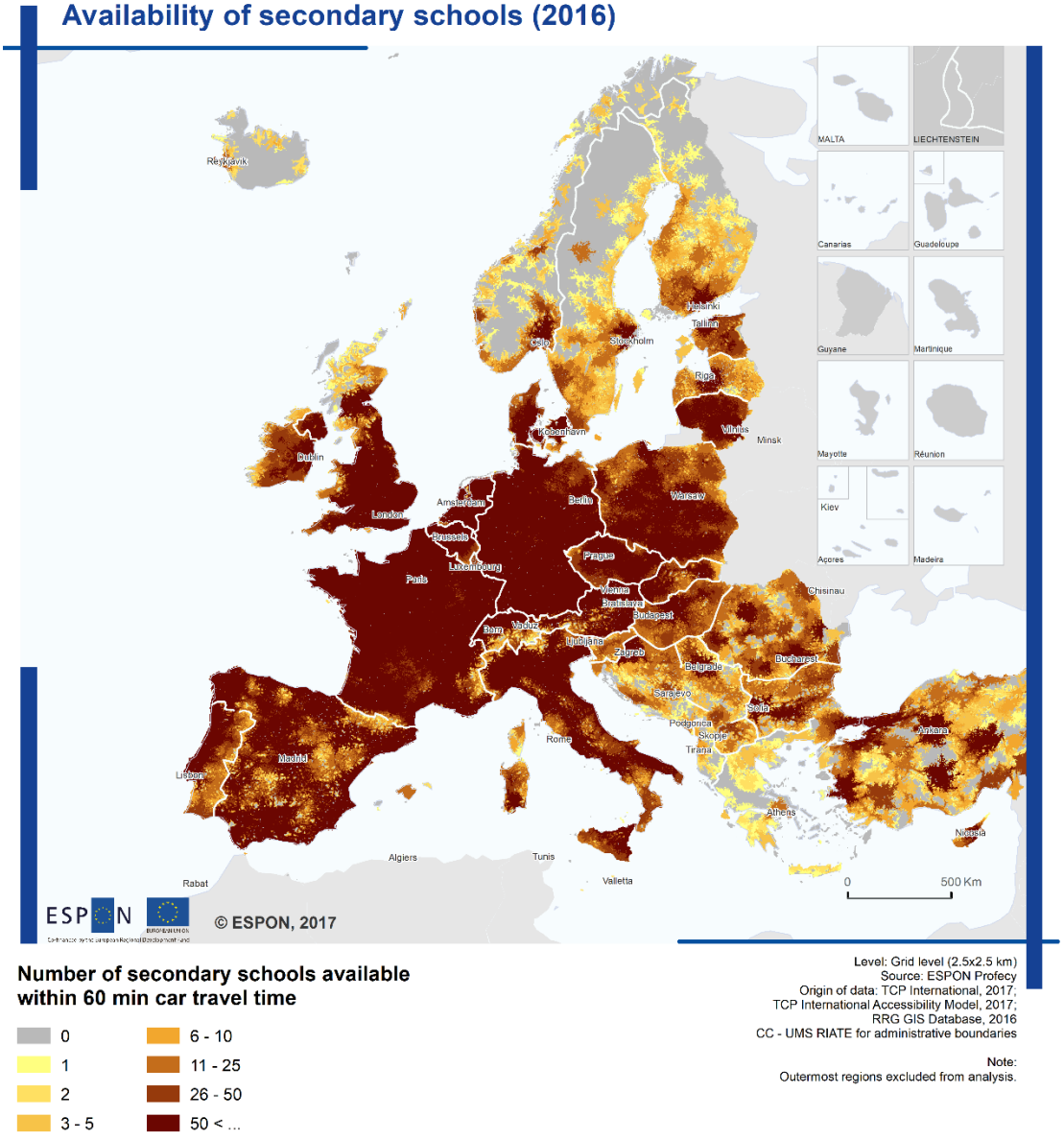
Remarks:

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 - UMS RIATE and RRG for administrative boundaries

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

Map 2.54: Availability of secondary schools within 60 min car travel time.



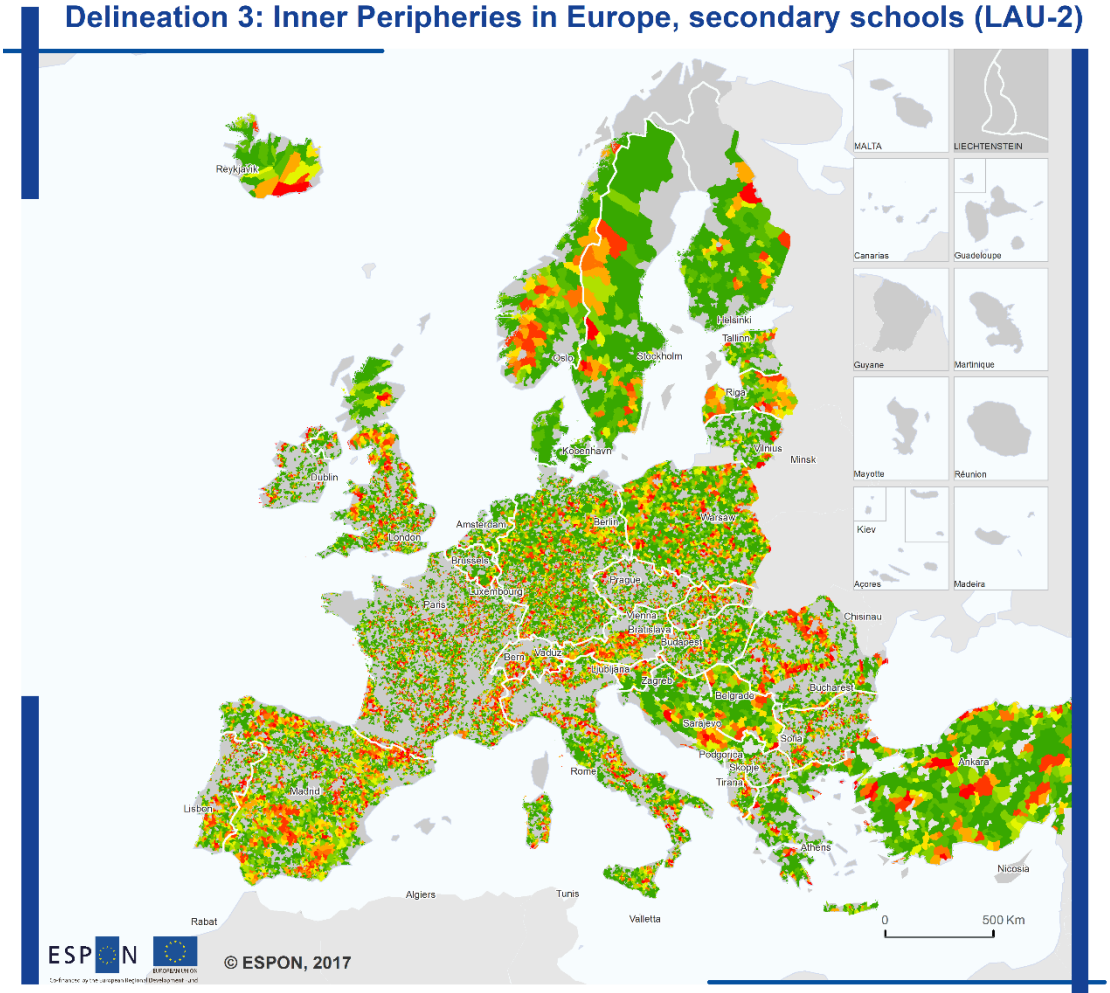
Number of secondary schools available within 60 min car travel time

0	6 - 10
1	11 - 25
2	26 - 50
3 - 5	50 < ...

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 2.55: Access to secondary schools: Overlay of LAU-2 units with IP areas at grid level.



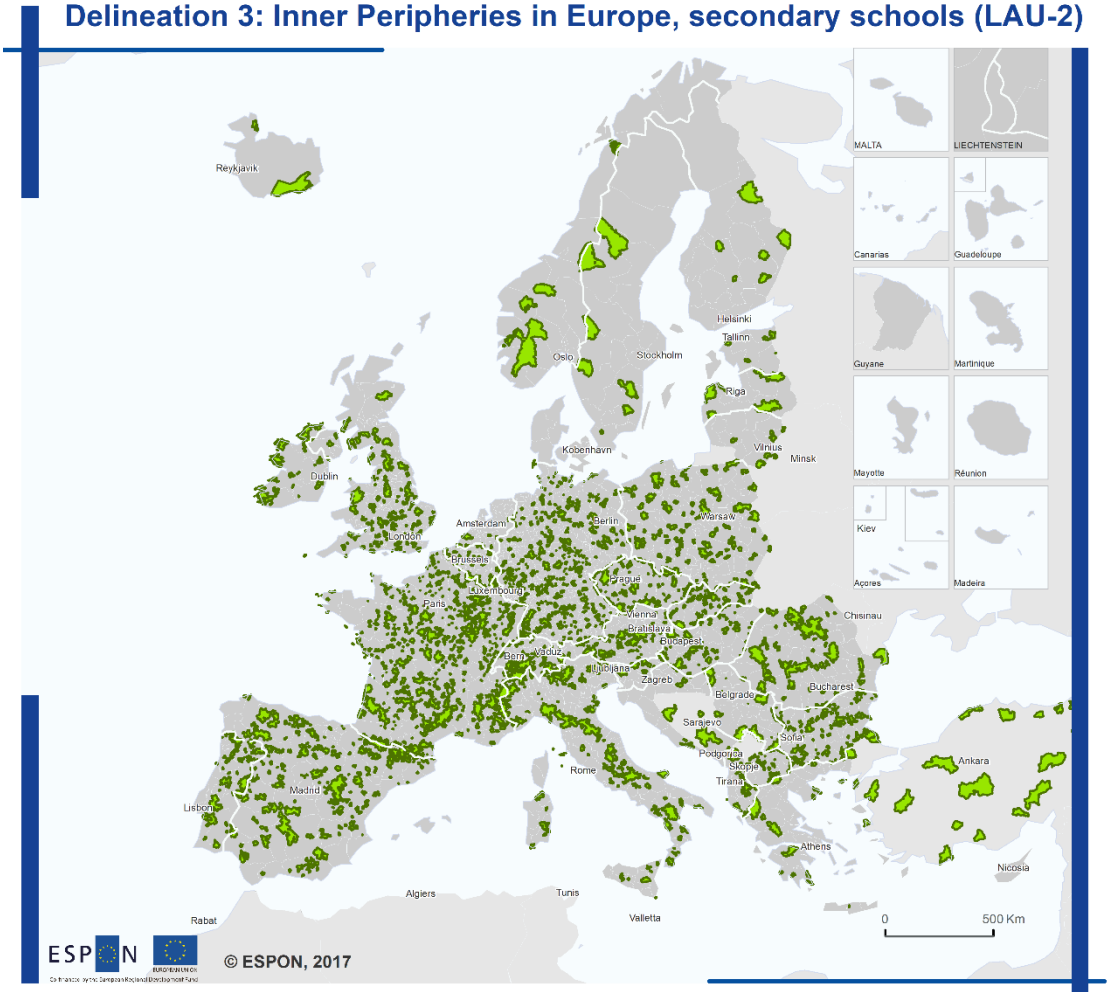
Delineation 3: Acces to secondary schools by car
Share of LAU-2 units overlaid by areas of poor access at grid level (in %)

- 0
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 100

Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.

Map 2.56: Access to secondary schools: Identification of LAU-2 units as inner peripheries.



Delineation 3: Poor access to secondary schools by car
Identification of LAU-2 units as Inner Peripheries

IP regions in Europe

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: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

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

2.5 Train stations

The following maps have been generated as part of the delineation process:

Map 2.57: Access to train stations: Travel time by car.

Map 2.58: Access to train stations: Standardized travel time.

Map 2.59: Access to train stations: Delineation of inner peripheries at grid level.

Map 2.60: Access to train stations: Overlay of NUTS-3 regions with IP areas at grid level.

Map 2.61: Access to train stations: Identification of NUTS-3 regions as inner peripheries.

Map 2.62: Availability of stations within 15 min car travel time.

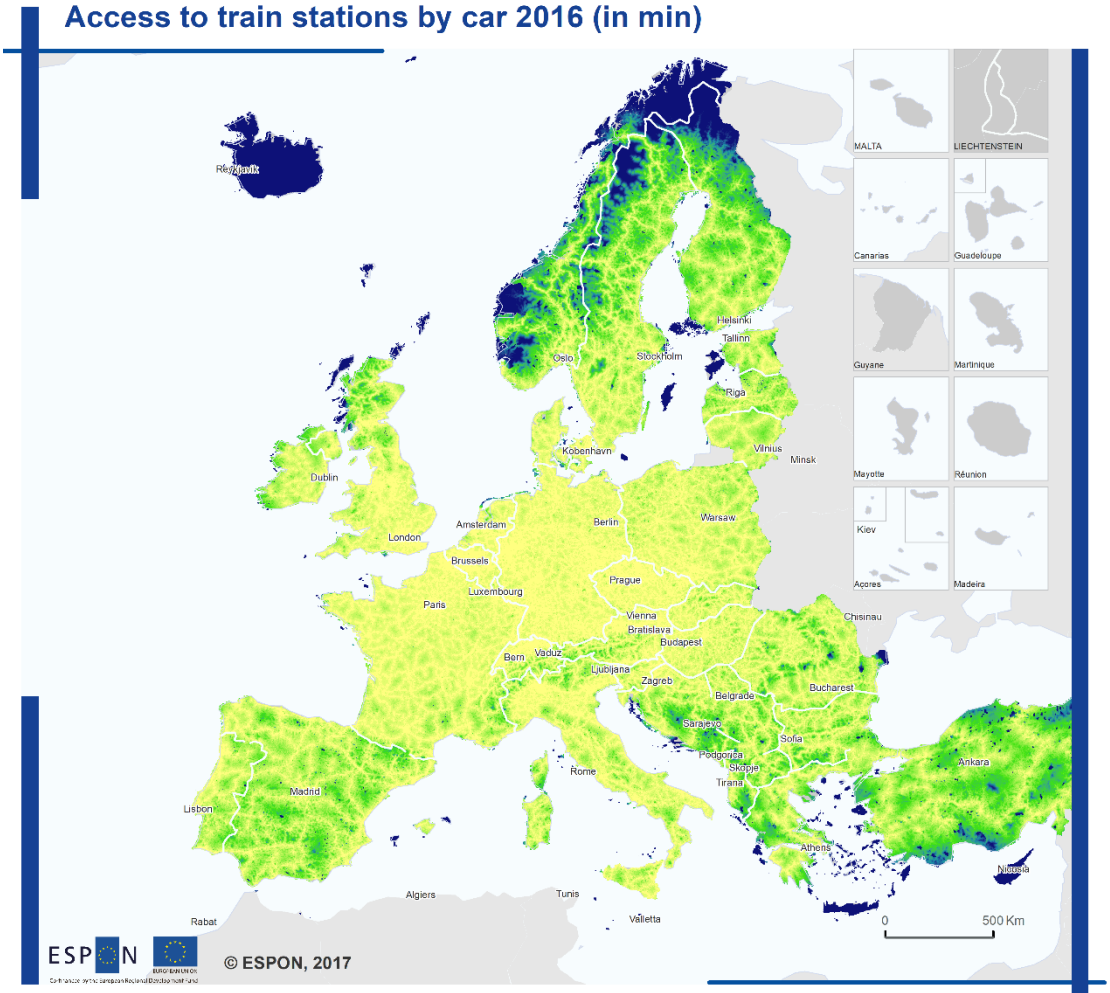
Map 2.63: Access to stations: Overlay of LAU-2 units with IP areas at grid level.

Map 2.64: Access to stations: Identification of LAU-2 units as inner peripheries.

Countries without train networks:

Note that some countries do not have any rail networks (Andorra, Cyprus, Iceland, Liechtenstein, Malta). In case of Andorra and Liechtenstein, access to train stations in the neighbouring countries have been considered; in case of Cyprus, Iceland and Malta this is not possible due to their isolated island location.

Map 2.57: Access to train stations: Travel time by car.



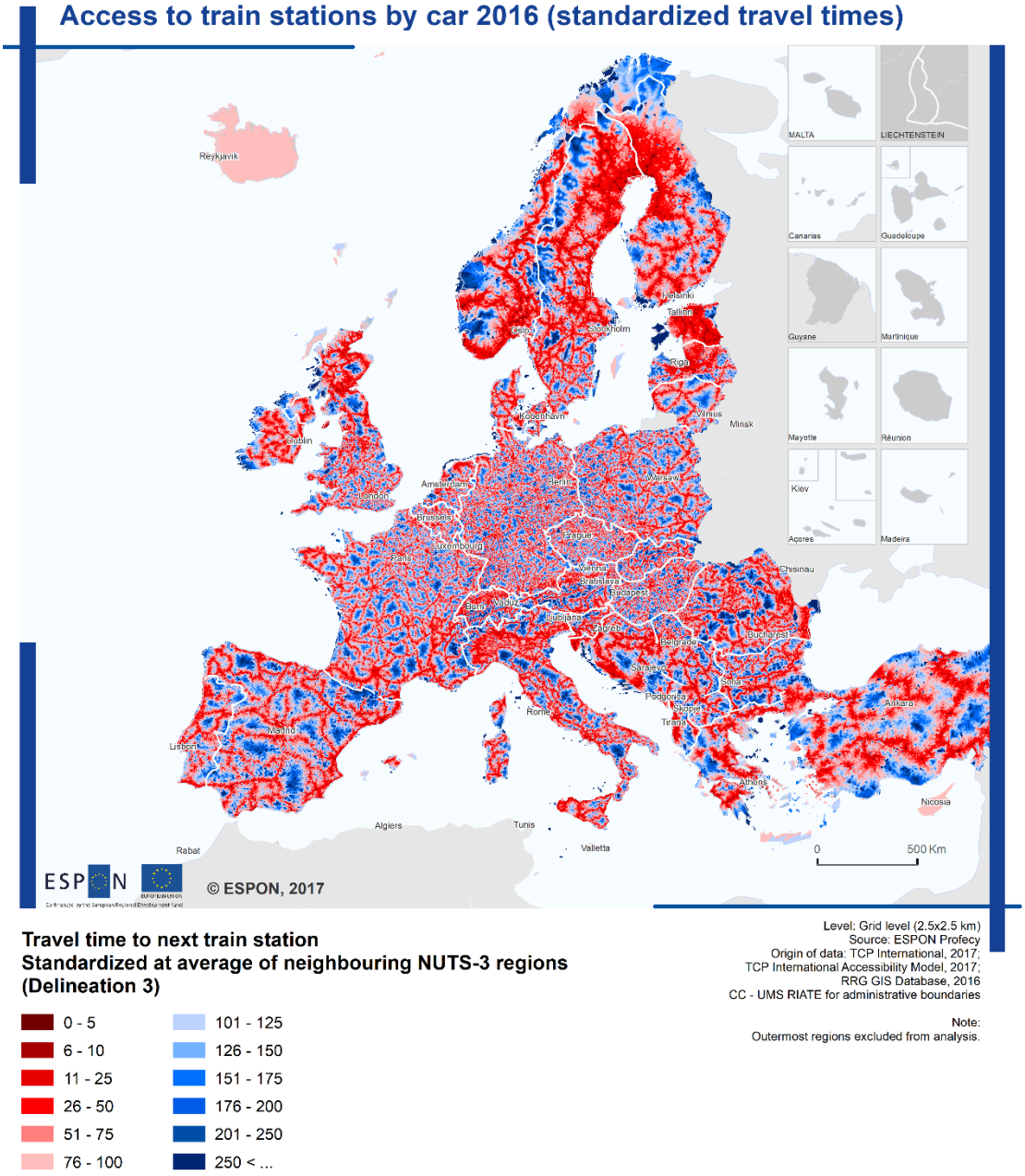
Travel time to passenger train stations (min) (Delineation 3)

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 2.58: Access to train stations: Standardized travel time.



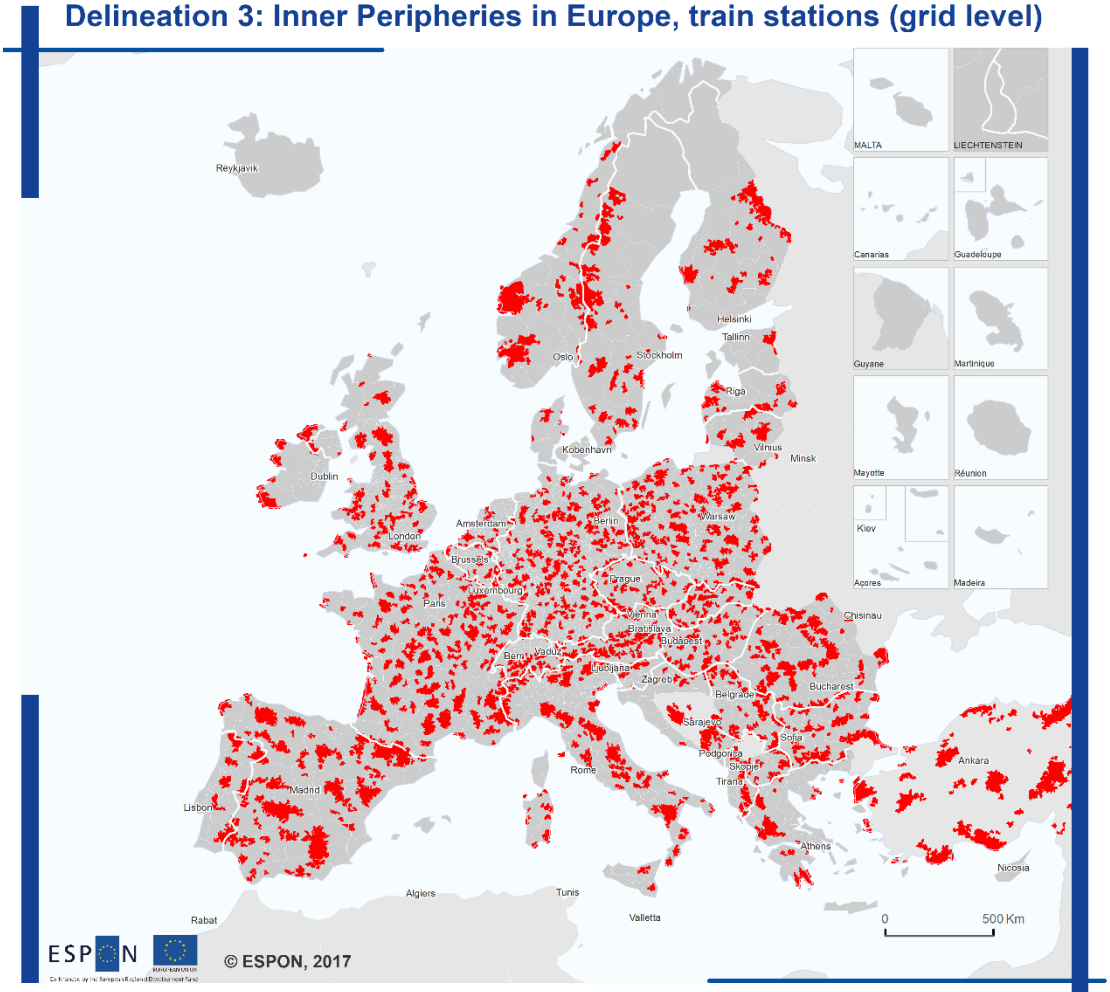
Travel time to next train station
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 250
- 250 < ...

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 2.59: Access to train stations: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon access to passenger train stations by car

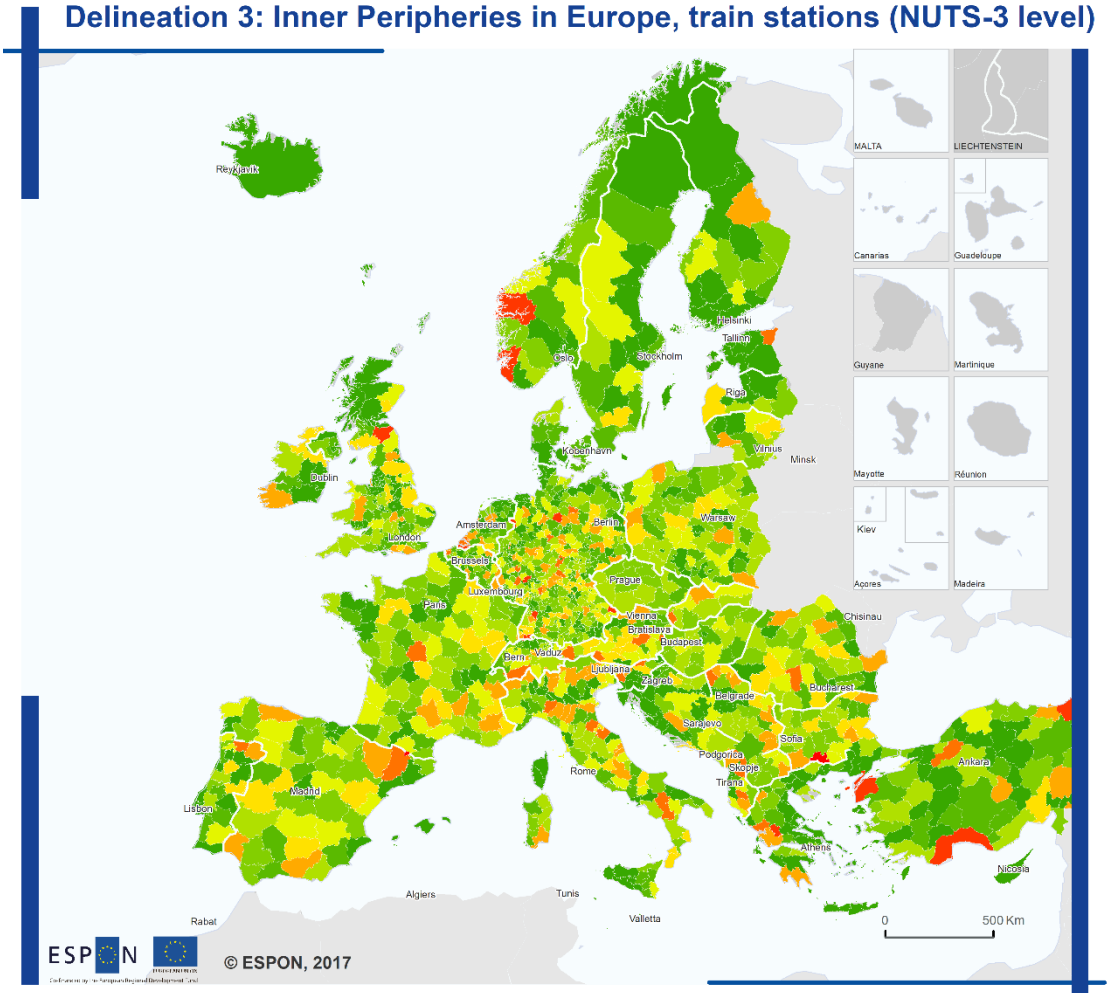
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 760 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 974

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 2.60: Access to train stations: Overlay of NUTS-3 regions with IP areas at grid level.



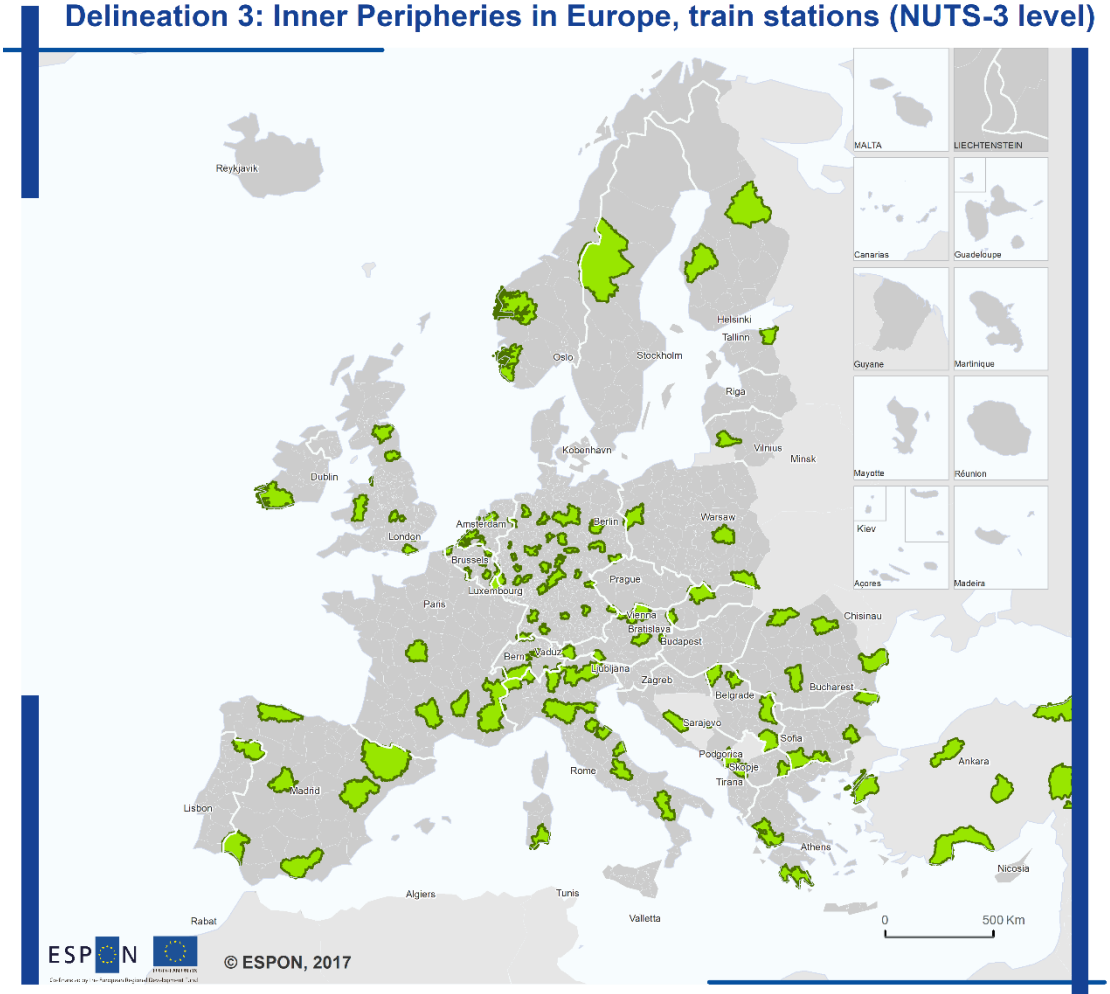
Delineation 3: Acces to passenger train stations by car
Share of NUTS-3 regions overlaid by areas of poor access at grid level (in %)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 40
- 41 - 50
- 51 - 75
- 76 - 100

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

Note:
Outermost regions excluded from analysis.

Map 2.61: Access to train stations: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to passenger train stations by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

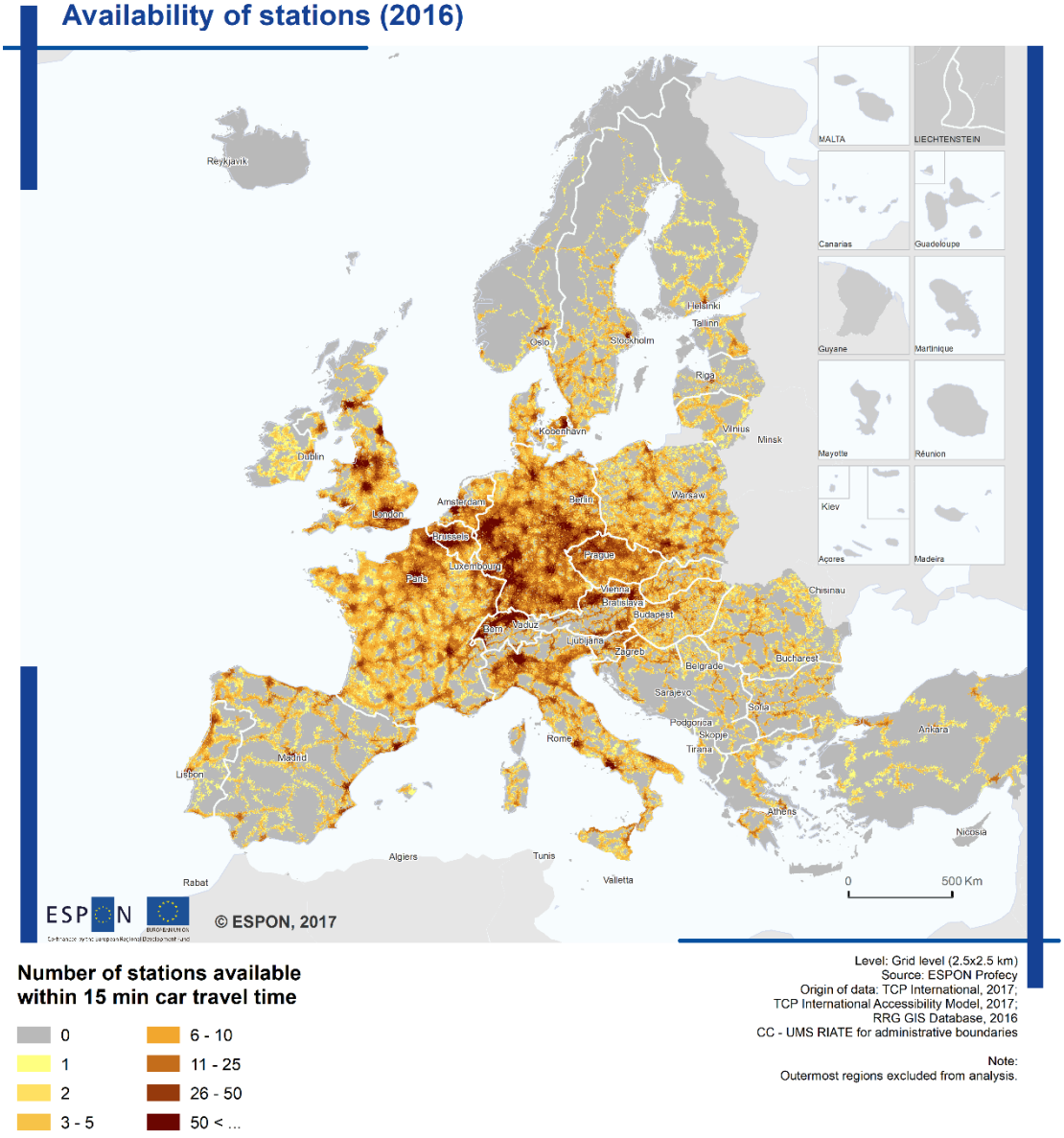
Remarks:

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

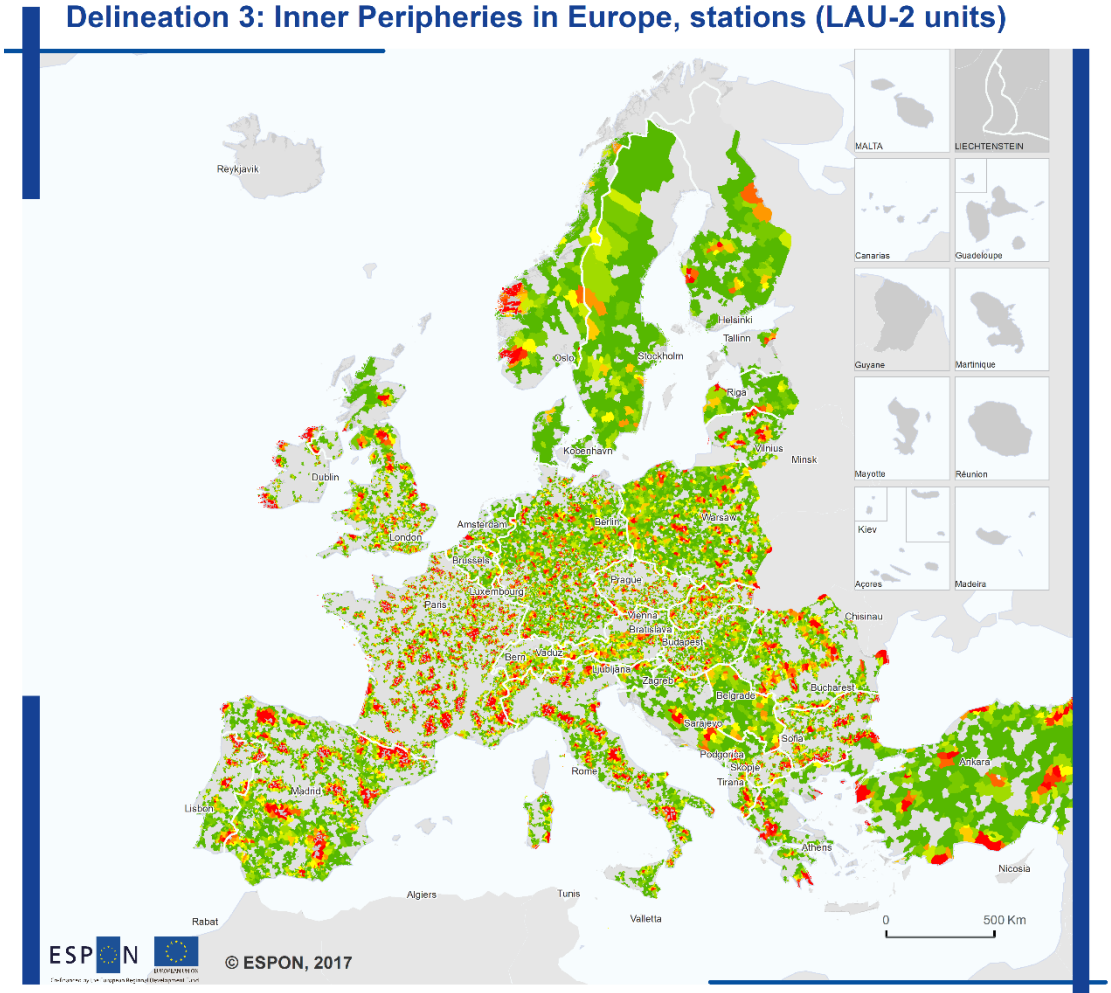
Level: NUTS-3 (NUTS 2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for administrative boundaries

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

Map 2.62: Availability of stations within 15 min car travel time.



Map 2.63: Access to stations: Overlay of LAU-2 units with IP areas at grid level.



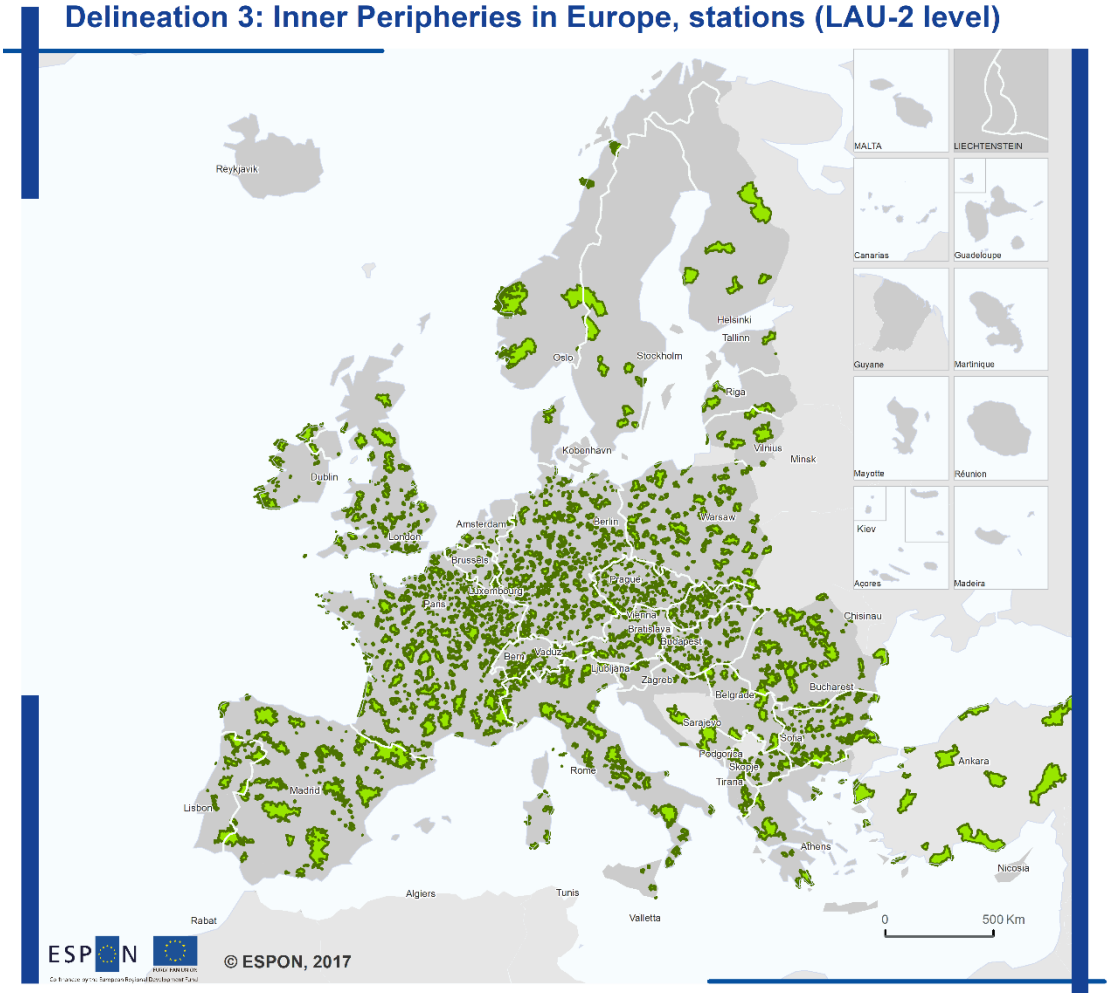
Delineation 3: Access to stations by car
Share of LAU-2 units overlaid by areas of poor access at grid level (in %)

- 0
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.

Map 2.64: Access to stations: Identification of LAU-2 units as inner peripheries.



Remarks:

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

2.6 Retail sector (supermarkets and convenient stores)

Supermarkets and convenient stores have been identified as relevant infrastructure to represent the restail sector. However, they have not been treated as separate SGIs, rather they were treated as one SGI type, reflecting the different characteristics of the retail sector in the different countries.

The following maps have been generated as part of the delineation process:

Map 2.65: Access to shops (supermarkets, convenient stores): Travel time by car.

Map 2.66: Access to shops (supermarkets, convenient stores): Standardized travel times.

Map 2.67: Access to shops (supermarkets, convenient stores): Delineation of inner peripheries at grid level.

Map 2.68: Access to shops (supermarkets, convenient stores): Overlay of NUTS-3 regions with IP areas at grid level.

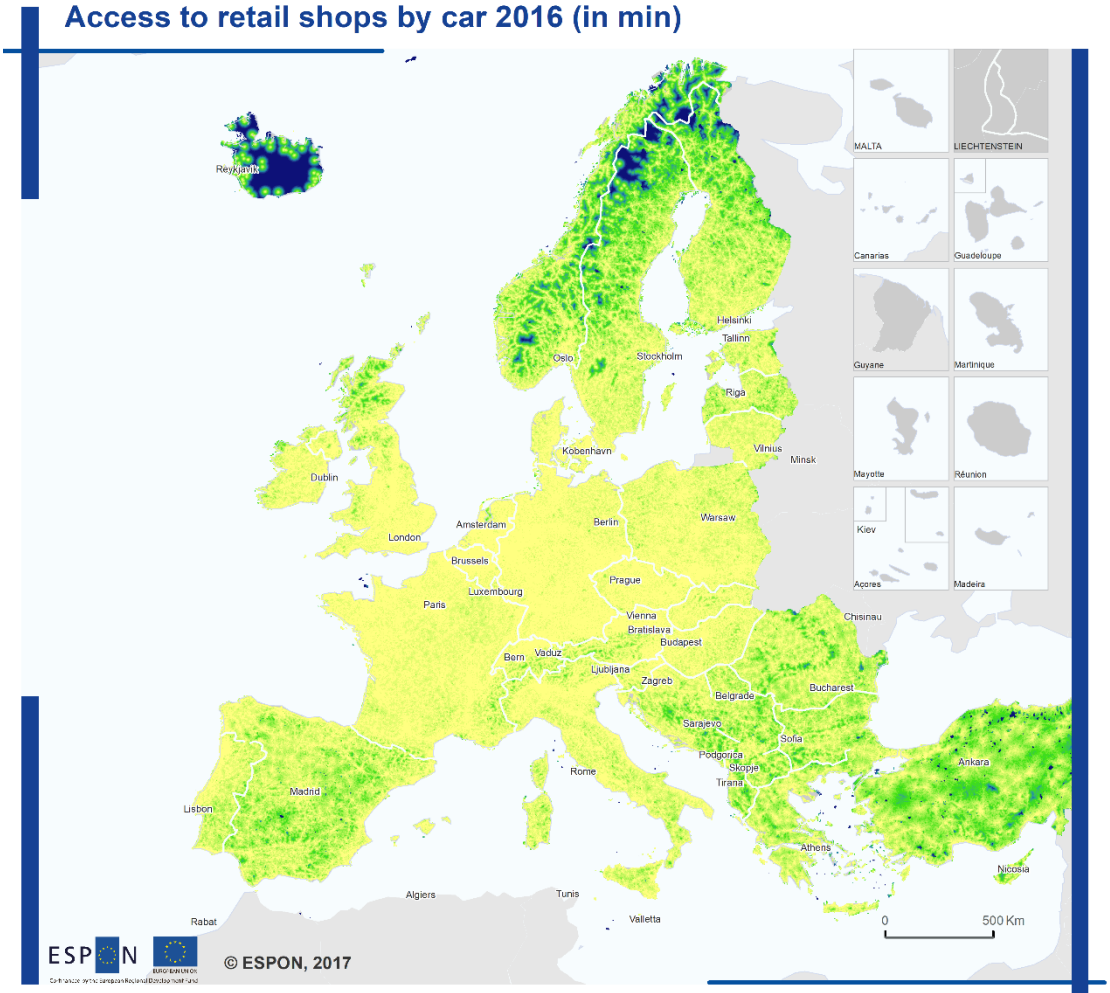
Map 2.69: Access to shops (supermarkets, convenient stores): Identification of NUTS-3 regions as inner peripheries.

Map 2.70: Availability of shops within 15 min car travel times.

Map 2.71: Access to shops: Overlay of LAU-2 units with IP areas at grid level.

Map 2.72: Access to shops: Identification of LAU-2 units as inner peripheries.

Map 2.65: Access to shops (supermarkets, convenient stores): Travel time by car.



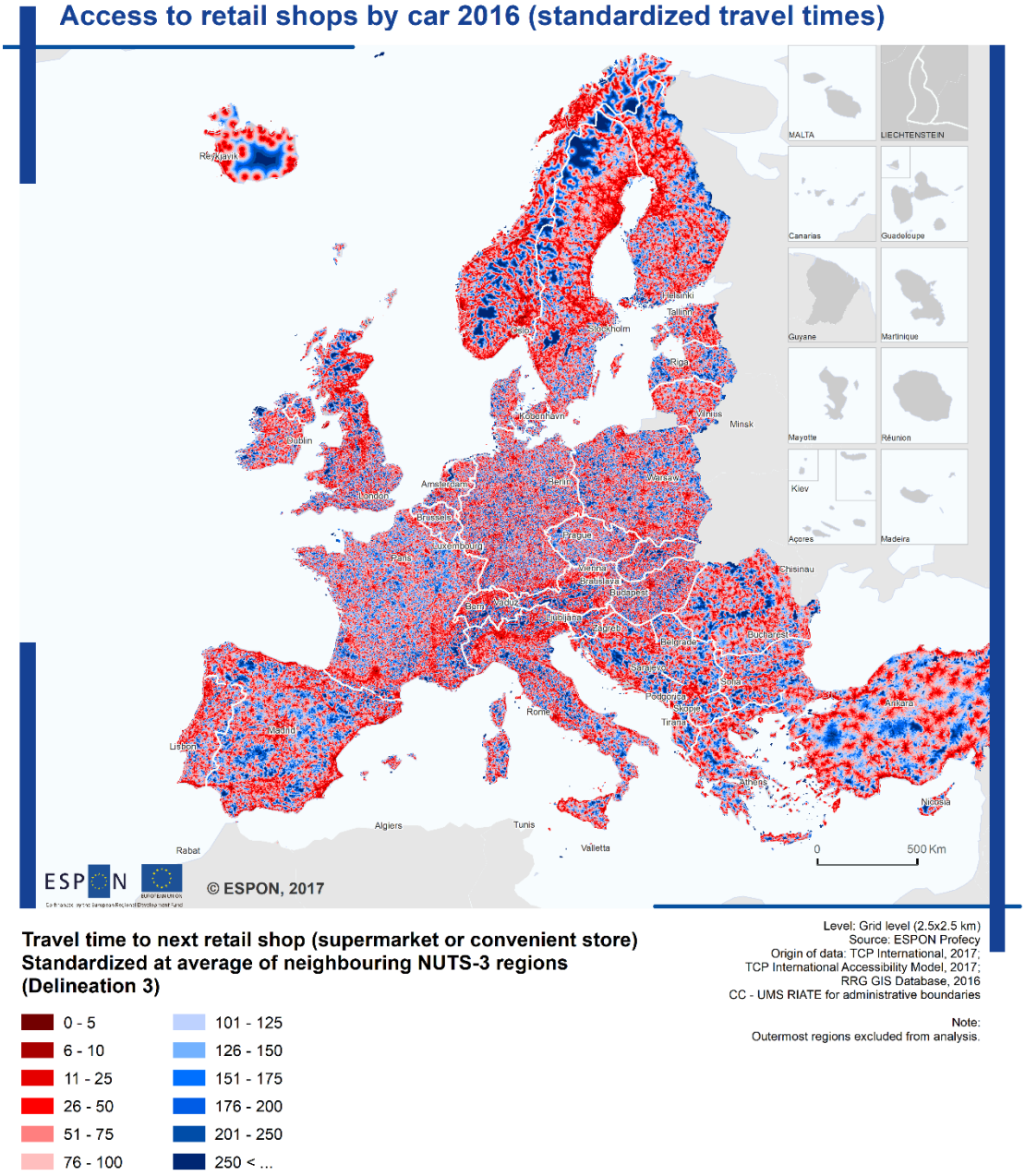
Travel time to next shop (supermarket or convenient store) (min) (Delineation 3)

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 2.66: Access to shops (supermarkets, convenient stores): Standardized travel times.



Travel time to next retail shop (supermarket or convenient store)
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

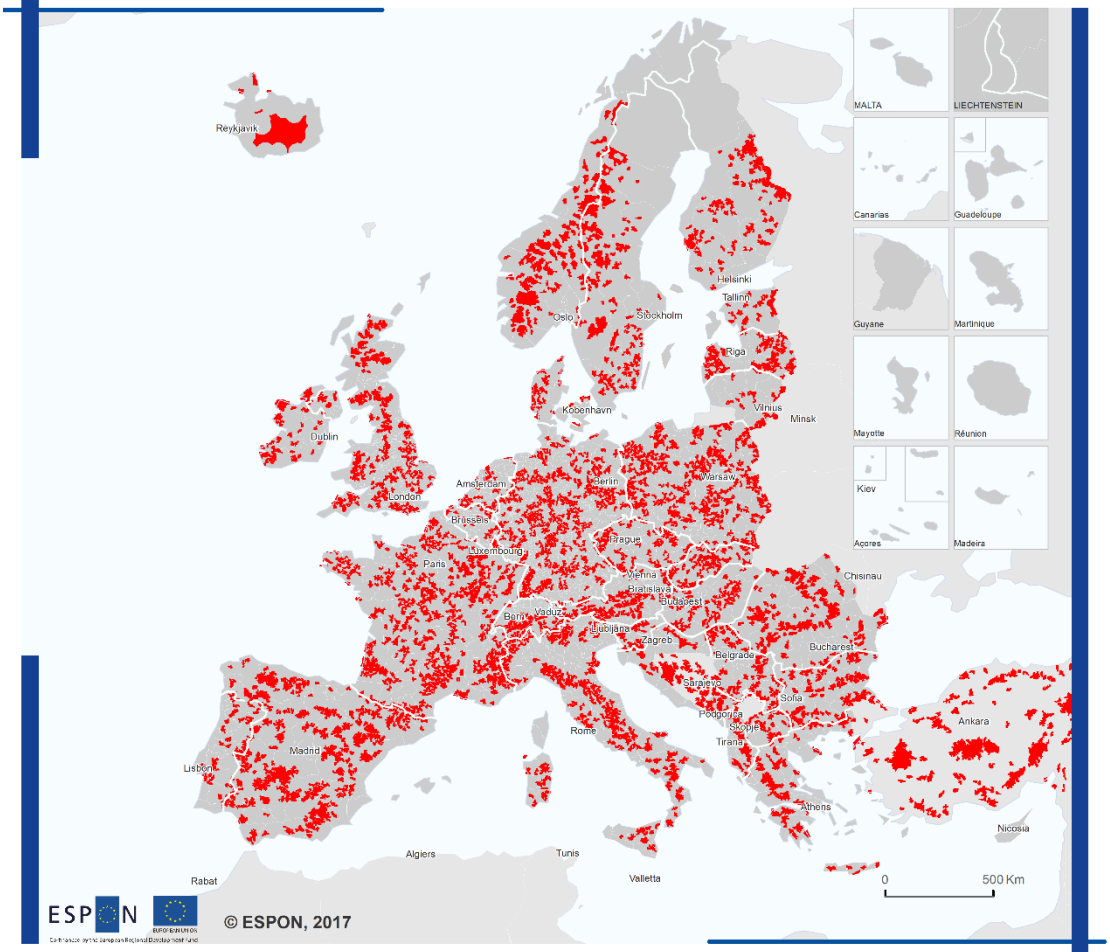
- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 250
- 250 < ...

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 2.67: Access to shops (supermarkets, convenient stores): Delineation of inner peripheries at grid level.

Delineation 3: Inner Peripheries in Europe, retail shops (grid level)



Delineation 3: Inner peripheries in Europe (grid areas) based upon access to retail shops by car

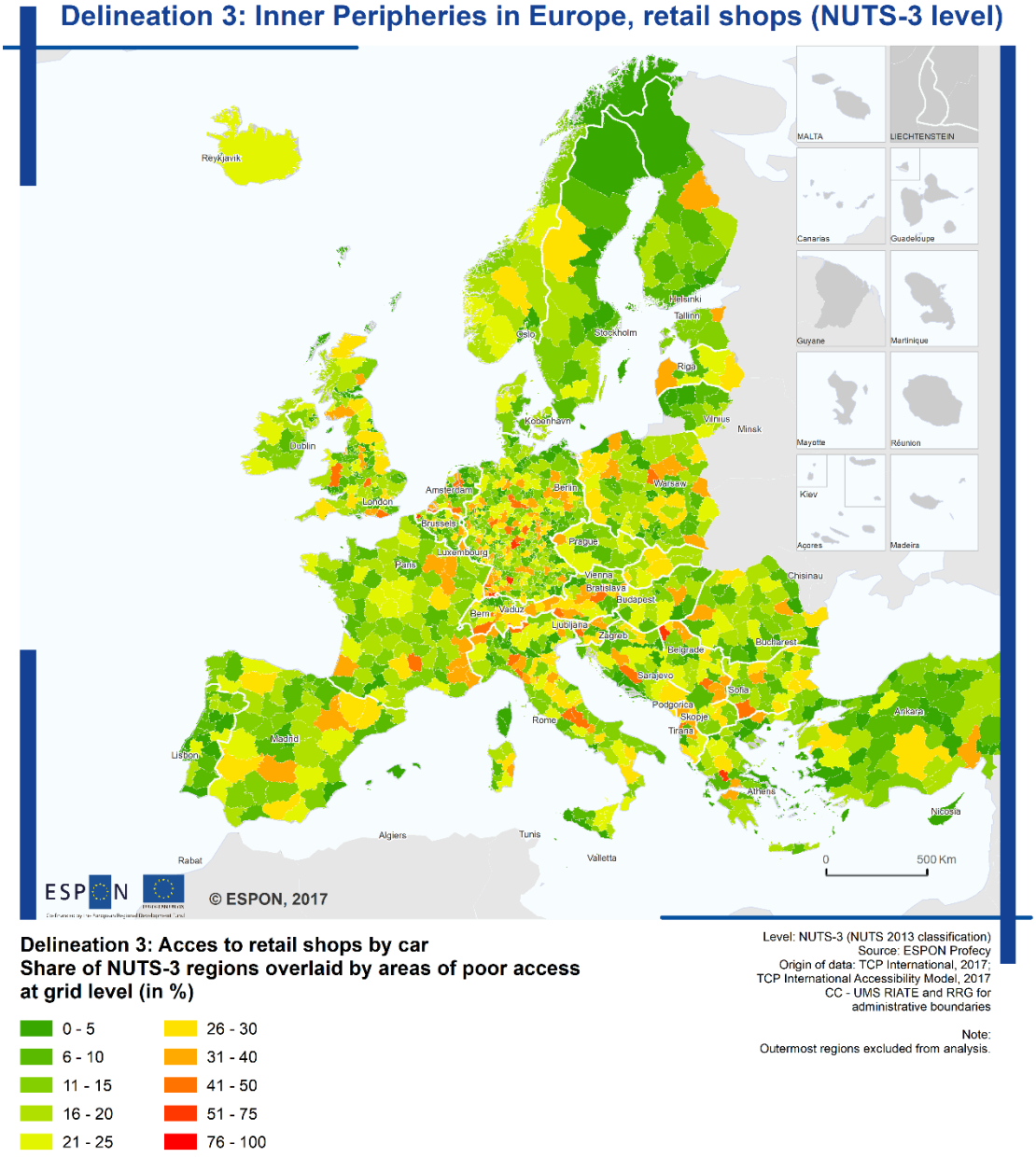
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 550 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small lislands and in outermost regions removed
- total number of patches for ESPON space: 1,423

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

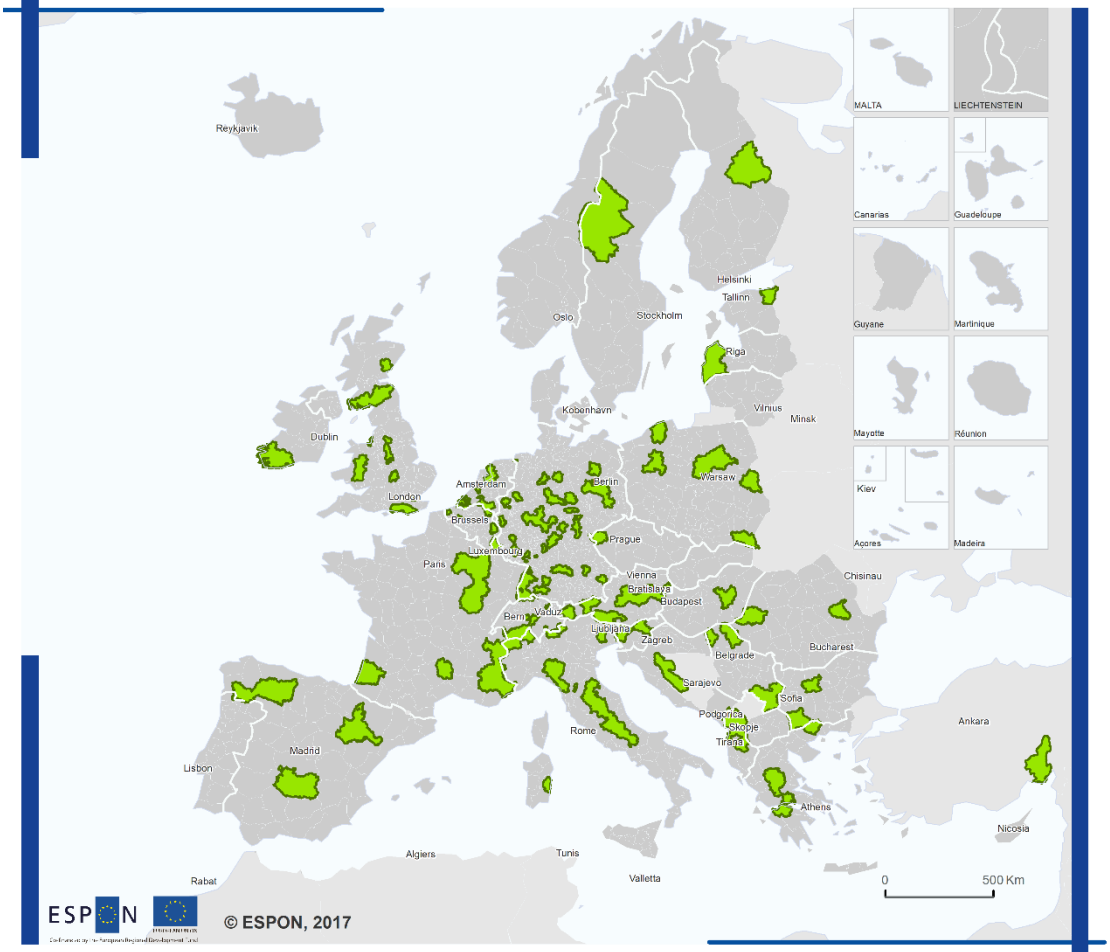
Note:
Outermost regions excluded from analysis.

Map 2.68: Access to shops (supermarkets, convenient stores): Overlay of NUTS-3 regions with IP areas at grid level.



Map 2.69: Access to shops (supermarkets, convenient stores): Identification of NUTS-3 regions as inner peripheries.

Delineation 3: Inner Peripheries in Europe, retail shops (NUTS-3 level)



Delineation 3: Poor access to retail shops by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

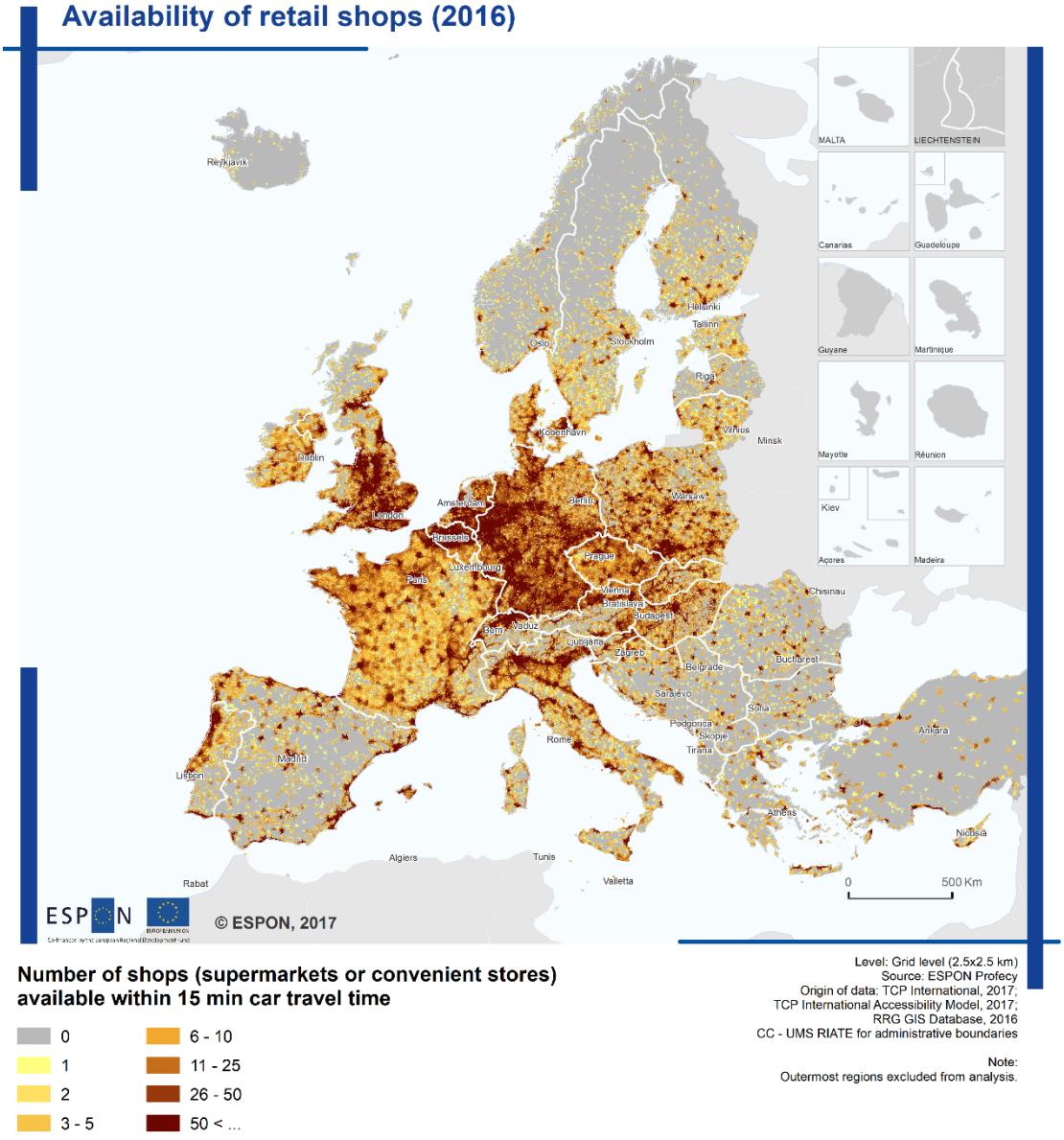
Remarks:

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

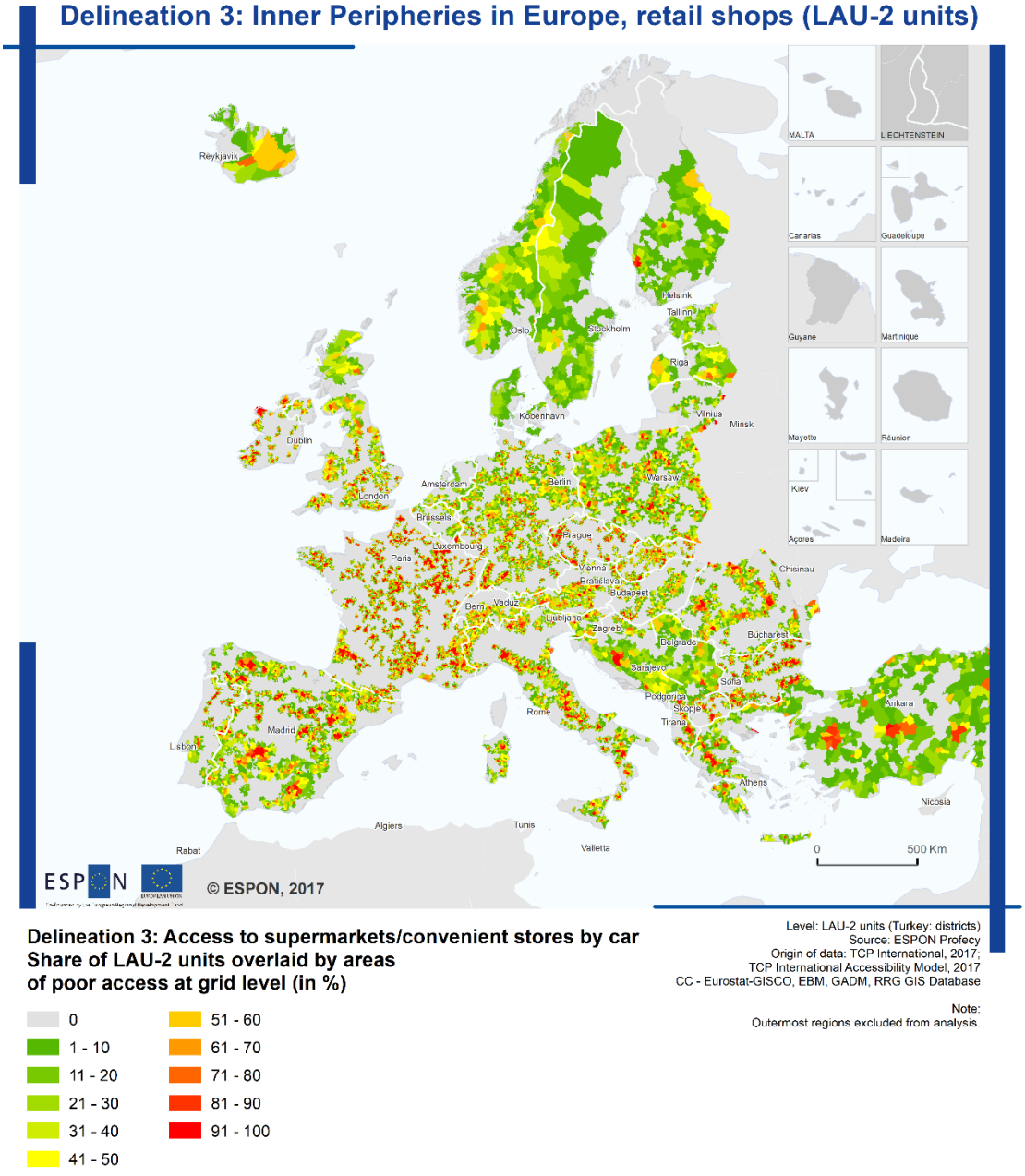
Level: NUTS-3 (NUTS 2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for administrative boundaries

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

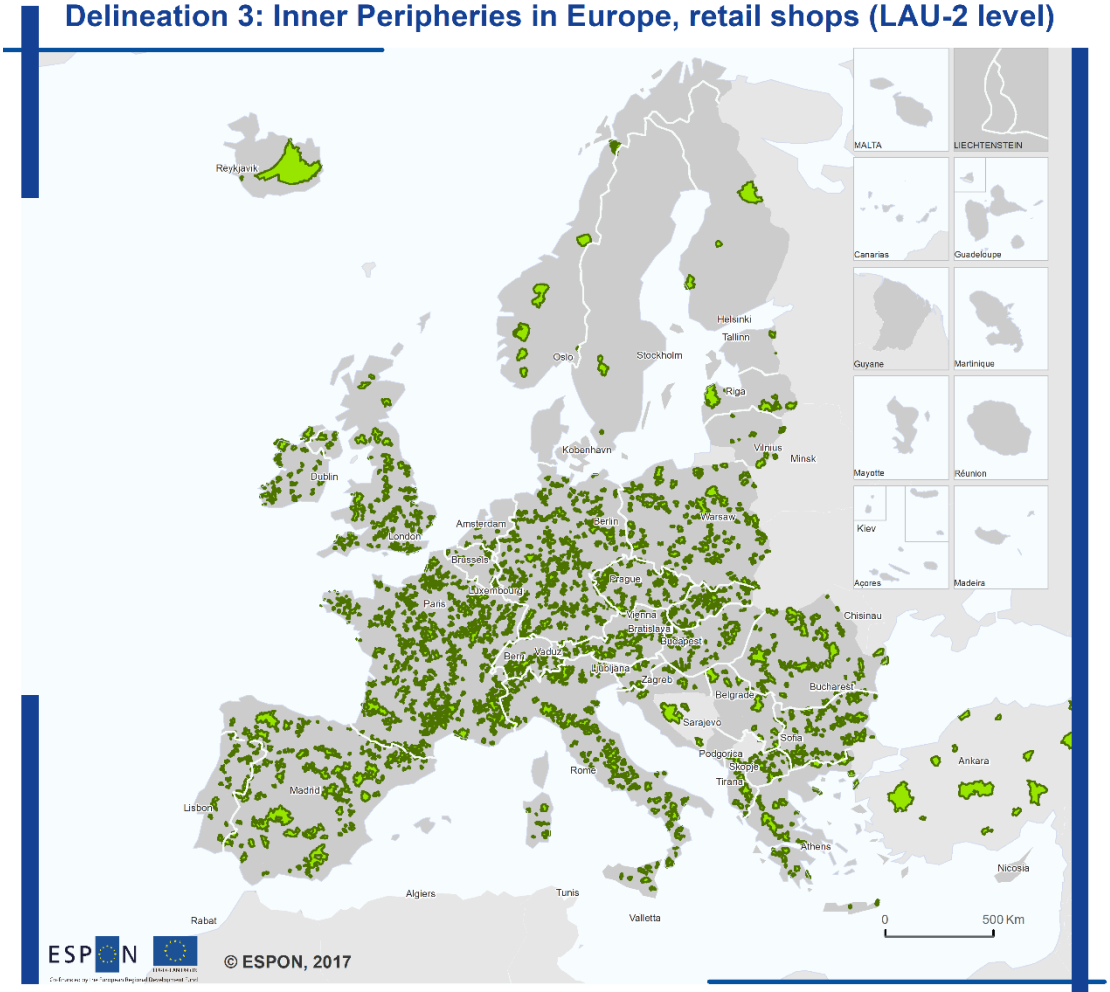
Map 2.70: Availability of shops within 15 min car travel times.



Map 2.71: Access to shops: Overlay of LAU-2 units with IP areas at grid level.



Map 2.72: Access to shops: Identification of LAU-2 units as inner peripheries.



Remarks:

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

2.7 Jobs (places of work / urban morphological zones)

The following maps have been generated as part of the delineation process:

Map 2.73: Access to jobs: Travel time by car.

Map 2.74: Access to jobs: Standardized travel times.

Map 2.75: Access to jobs: Delineation of inner peripheries at grid level.

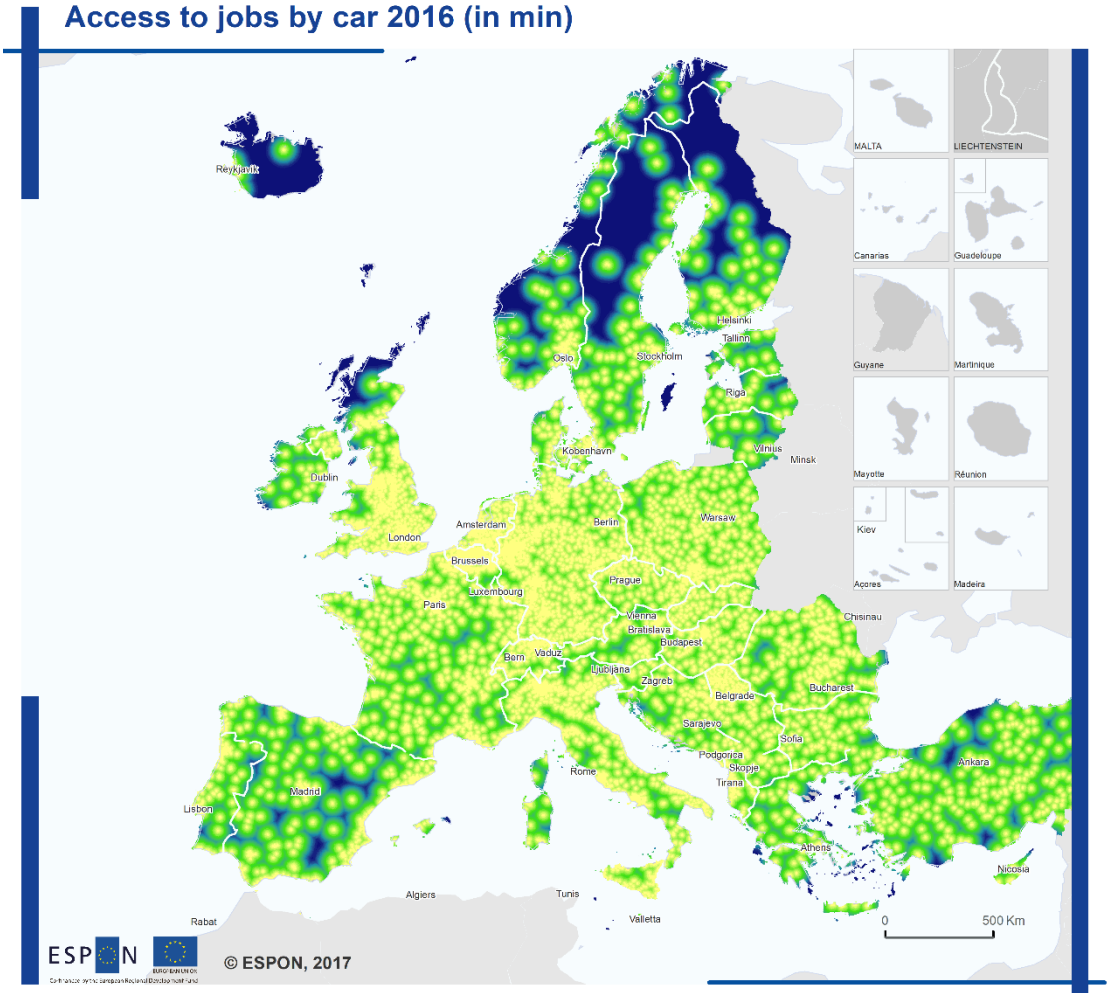
Map 2.76: Access to jobs: Overlay of NUTS-3 regions with IP areas at grid level.

Map 2.77: Access to jobs: Identification of NUTS-3 regions as inner peripheries.

Map 2.78: Access to jobs: Overlay of LAU-2 units with IP areas at grid level.

Map 2.79: Access to jobs: Identification of LAU-2 units as inner peripheries.

Map 2.73: Access to jobs: Travel time by car.



Travel time to urban settlements (min) (Delineation 3)

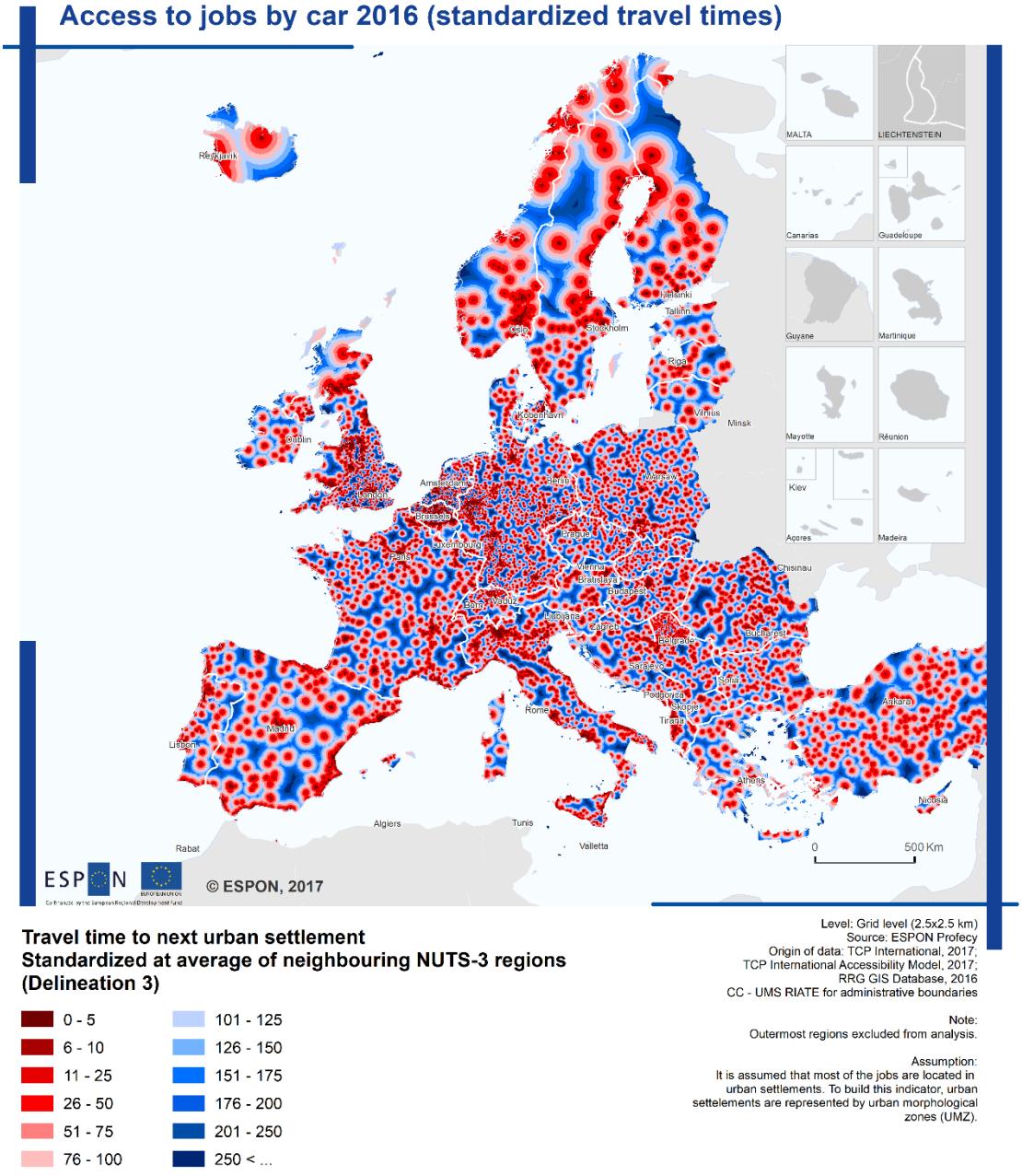
0 - 10	101 - 110
11 - 20	111 - 120
21 - 30	121 - 130
31 - 40	131 - 140
41 - 50	141 - 150
51 - 60	151 - 160
61 - 70	161 - 170
71 - 80	171 - 180
81 - 90	181 - 200
91 - 100	200 < ...

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.

Assumption:
It is assumed that most of the jobs are located in urban settlements. To build this indicator, urban settelements are represented by urban morphological zones (UMZ).

Map 2.74: Access to jobs: Standardized travel times.



Travel time to next urban settlement
Standardized at average of neighbouring NUTS-3 regions
(Delineation 3)

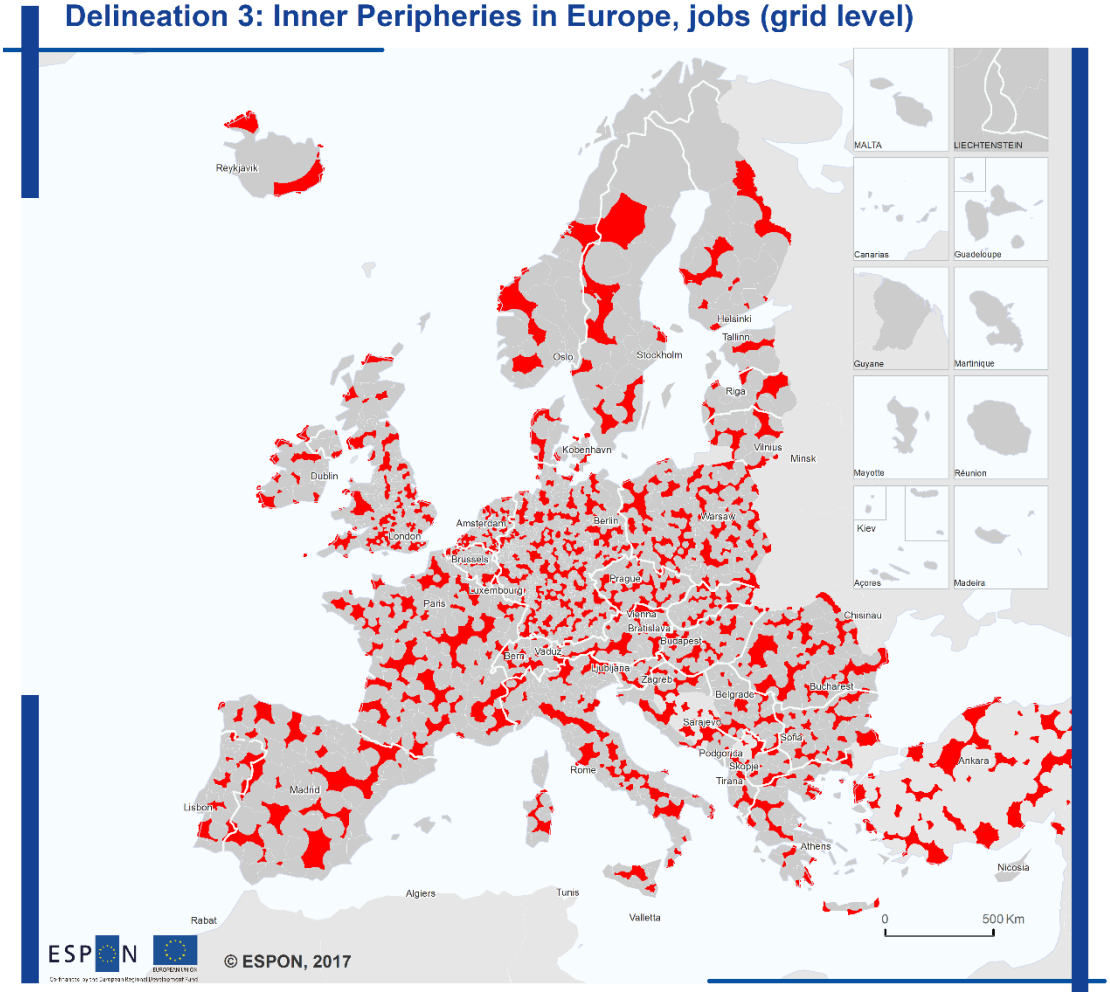
0 - 5	101 - 125
6 - 10	126 - 150
11 - 25	151 - 175
26 - 50	176 - 200
51 - 75	201 - 250
76 - 100	250 < ...

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.

Assumption:
It is assumed that most of the jobs are located in urban settlements. To build this indicator, urban settelements are represented by urban morphological zones (UMZ).

Map 2.75: Access to jobs: Delineation of inner peripheries at grid level.



Delineation 3: Inner peripheries in Europe (grid areas) based upon access to jobs by car

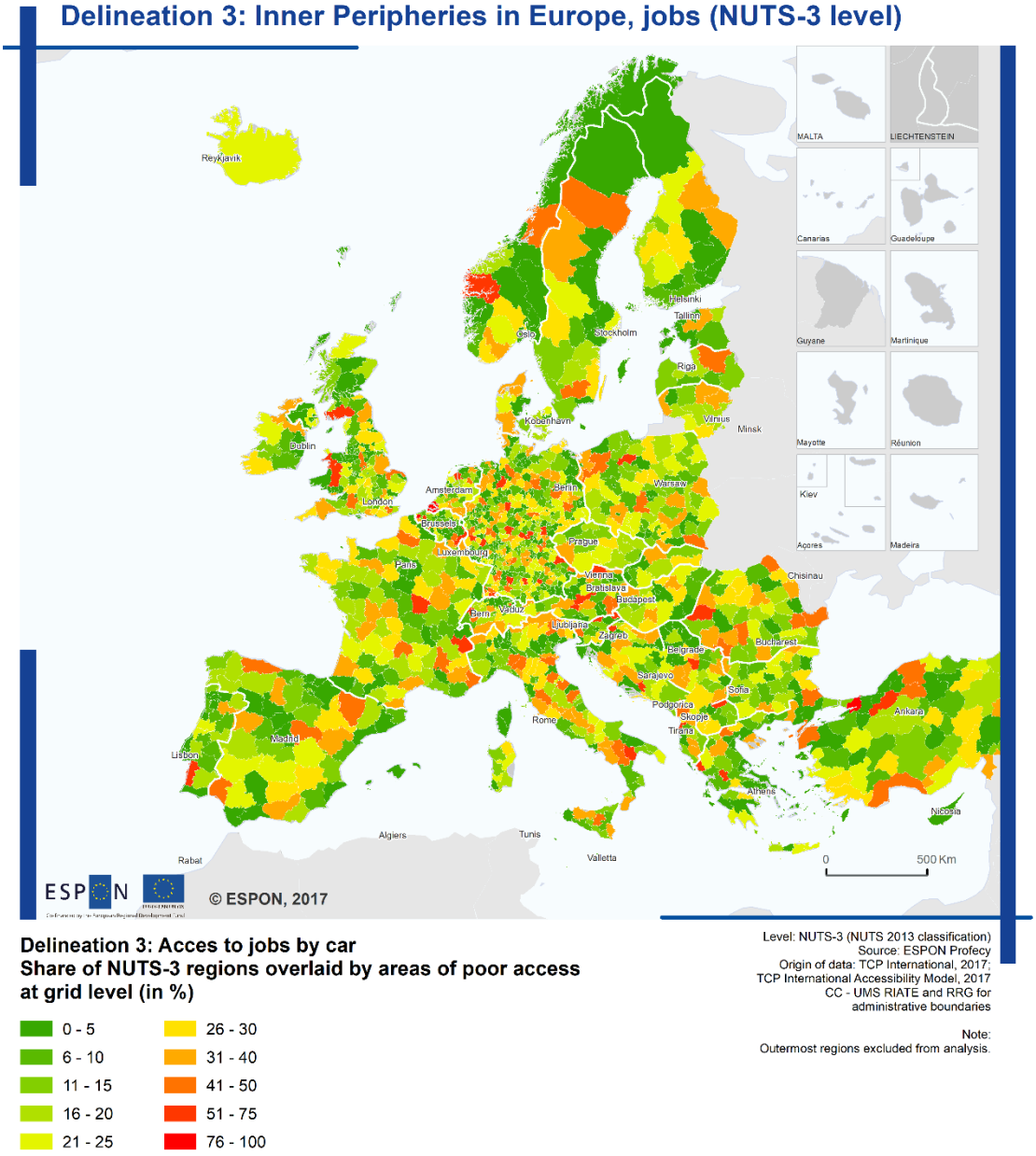
Areas identified as inner peripheries at grid level

Notes:
- minimum patch size: 100 sqkm
- average patch size: 2,085 sqkm
- neighboring grid cells merged, cell boundaries smoothed
- patches on small islands and in outermost regions removed
- total number of patches for ESPON space: 465

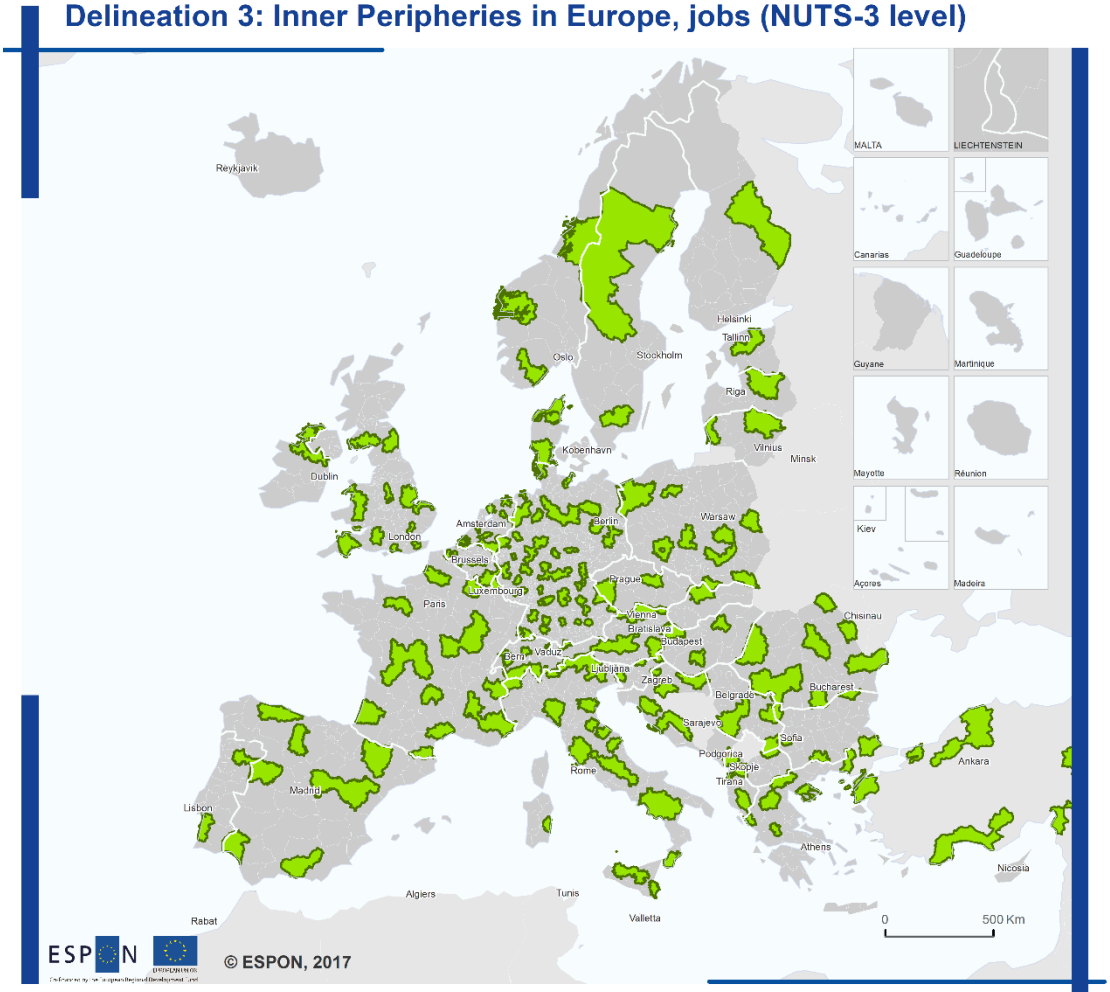
Level: Grid level (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 2.76: Access to jobs: Overlay of NUTS-3 regions with IP areas at grid level.



Map 2.77: Access to jobs: Identification of NUTS-3 regions as inner peripheries.



Delineation 3: Poor access to jobs by car
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe

non-IP NUTS-3 regions

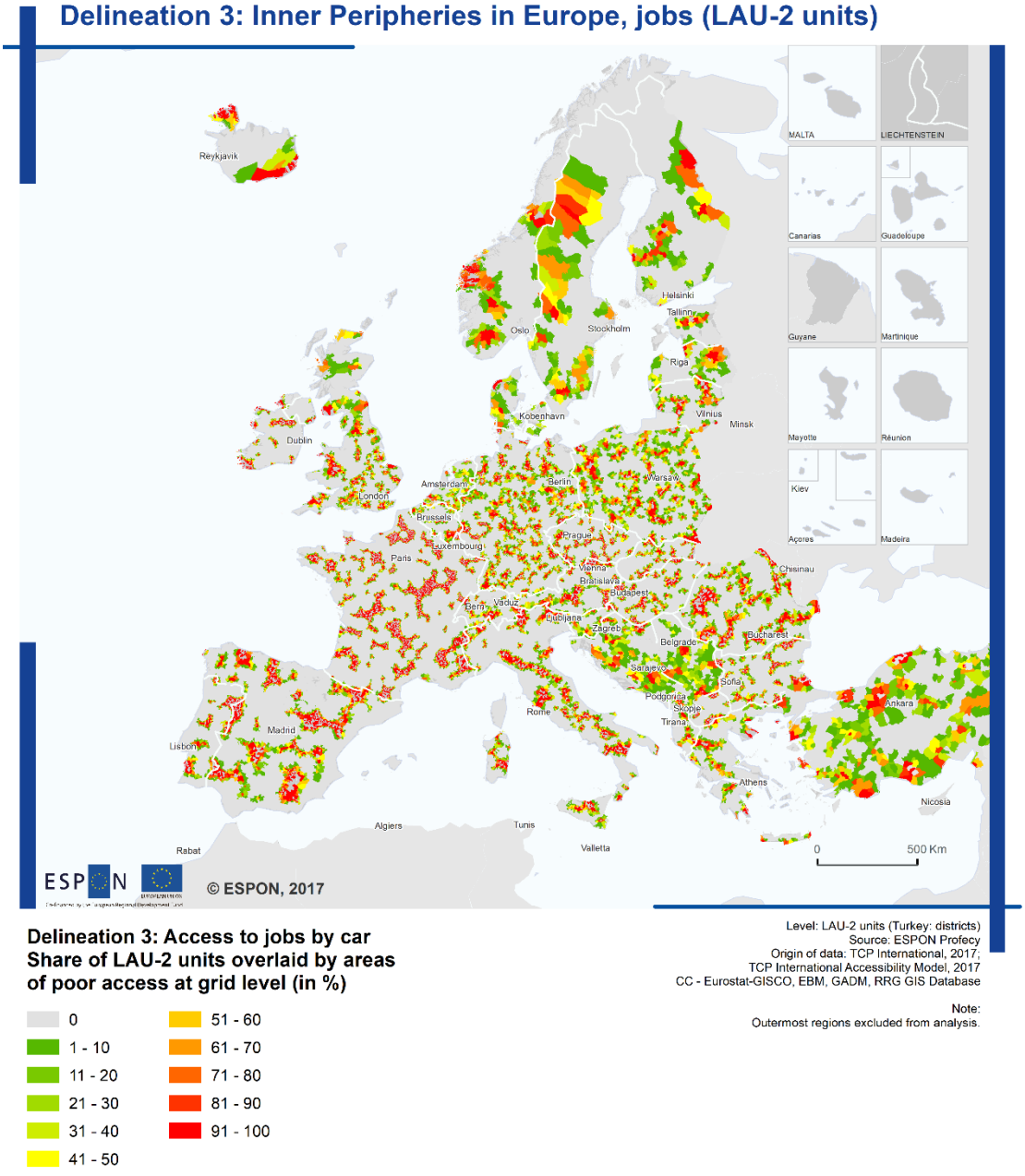
Remarks:

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

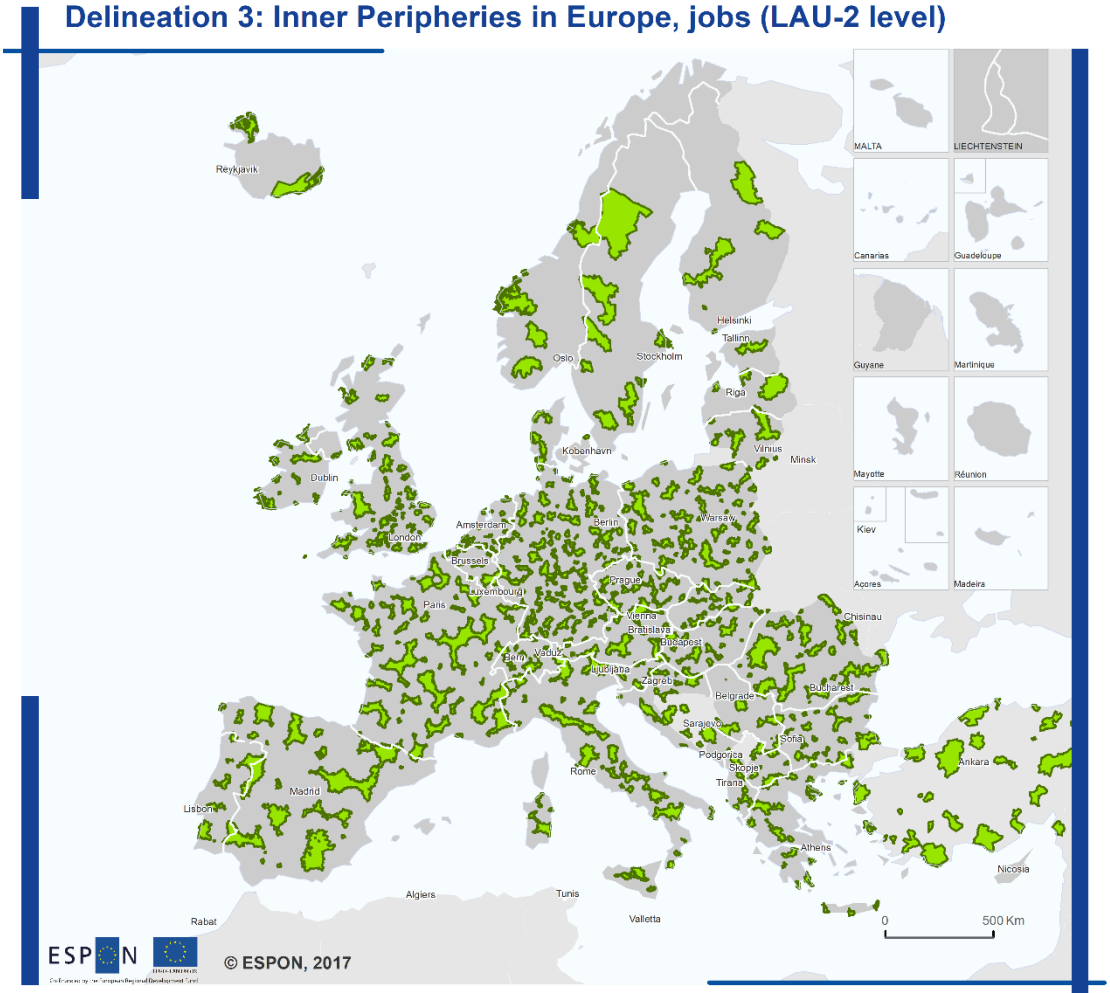
Level: NUTS-3 (NUTS 2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - UMS RIATE and RRG for
administrative boundaries

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

Map 2.78: Access to jobs: Overlay of LAU-2 units with IP areas at grid level.



Map 2.79: Access to jobs: Identification of LAU-2 units as inner peripheries.



Delineation 3: Poor access to jobs 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 - Eurostat-GISCO, EBM, GADM, RRG GIS Database

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

3 Combining the individual results for Delineation 3

3.1 Individual results

The map series presented in Chapter 2 show many areas appearing as inner peripheries for several SGIs; however, a detailed view reveals that the shape of the patch boundaries differ between the SGIs, so as their total numbers and average sizes (Table 3.1). There is a clear tendency that with increasing number of facilities per SGI the number of IP patches will also increase, while at the same time the average patch size decreases. In other words, the higher the number of facilities per SGIs, the higher the degree of fragmentation of IP areas will be (more but smaller IP patches).

Table 3.1. Characteristics of IP patches at grid level by type of SGI.

SGI	Number of facilities in ESPON space	Number of IP patches at grid level	Average size of IP patch at grid level (km^2)
Banks	94,619	1,231	580
Cinemas	8,385	810	730
Doctors	49,023	774	600
Hospitals	11,691	1,102	695
Pharmacies	92,583	1,069	600
Retail sector	206,045	1,423	550
Primary schools	163,488	1,309	600
Secondary schools	40,707	1,046	650
Train stations	35,225	974	760
UMZ (jobs)	5,078	465	2,085

While the detailed individual results of the previous analyses represent a value in themselves, attempts shall be made in this Chapter to aggregeate or combine them into one final and overall delineation.

3.2 Options explored

Different options have been explored as how to combine the individual results presented in Chapter 2, to generate one single and overall delineation of Inner Peripheries.

Table 3.2 contrasts the basic options that were explored:

Table 3.2. Options to combine individual results for Delineation 3.

General type	Rationale	Implementation	Abbr.
Weighting SGIs	Not all types of services have the same importance. Some of them appear to be more crucial for public service provision than others. This has to be taken into account through weightings. Following the Italian example of identifying inner peripheries, hospitals (=health care), primary schools (=basic education) and train stations (=basic provision of public transport) have been identified as the most relevant services. Essentially, these three services get a maximum weight, while the remaining services get zero weights.	*'OR' implementation*: All areas are considered as inner peripheries which suffer from poor access to hospitals OR poor access to primary schools OR poor access to train stations.	*W1*
		'AND' implementation All areas are considered as inner peripheries which suffer from poor access to hospitals AND poor access to primary schools AND poor access to train stations.	W2
Counting assignments	An area will not immeadiately constitute an inner periphery if it faces poor access to only one, two or three services; in reality, the problems aggravate, i.e. the higher the number of different services is that cannot at all or can only be poorly reached (whatever the service type is), the larger the problem of inner peripherality is. Also, people have quite a different perception of the importance of services, depending on their personal situation[2], so that it is difficult to weight services against each other, as done in options W1 and W2.	All areas will be considered as inner peripheries which have poor access to 5 or more SGIs (whatever type of SGI).	C
Counting and weighting	It is basically acknowledged that problems aggravate the higher the number of services is that can only be poorly reached; however, it is also true that the problems of peripherality even more aggravate of crucial services are not accessible.	All areas will be considered as inner peripheries which have poor access to 5 or more SGIs (whatever type of SGI), but only if they suffer from poor access to hospitals or poor access to primary schools or poor access to train stations (=combination of W1 and C)	CW

All four options have been implemented at grid level.

Results for option W1 reveal that large areas in Europe would be considered as inner peripheries. In fact, one could argue that the majority of the territory of the European Union is

[2] For instance, elderly people may be more concerned about health care, while young families with children may be more concerned about easy access to education and retail facilities.

considered as IP (Map 3.1). Results for option W2 highlight only small and spatially scattered patches of IP, which only very rarely form continuous IP areas (Map 3.2).

Intuitively, when comparing outcomes for options W1 and W2, option W1 might be considered to overestimate IP areas in Europe, while option W2 might underestimate the extent of IP areas.

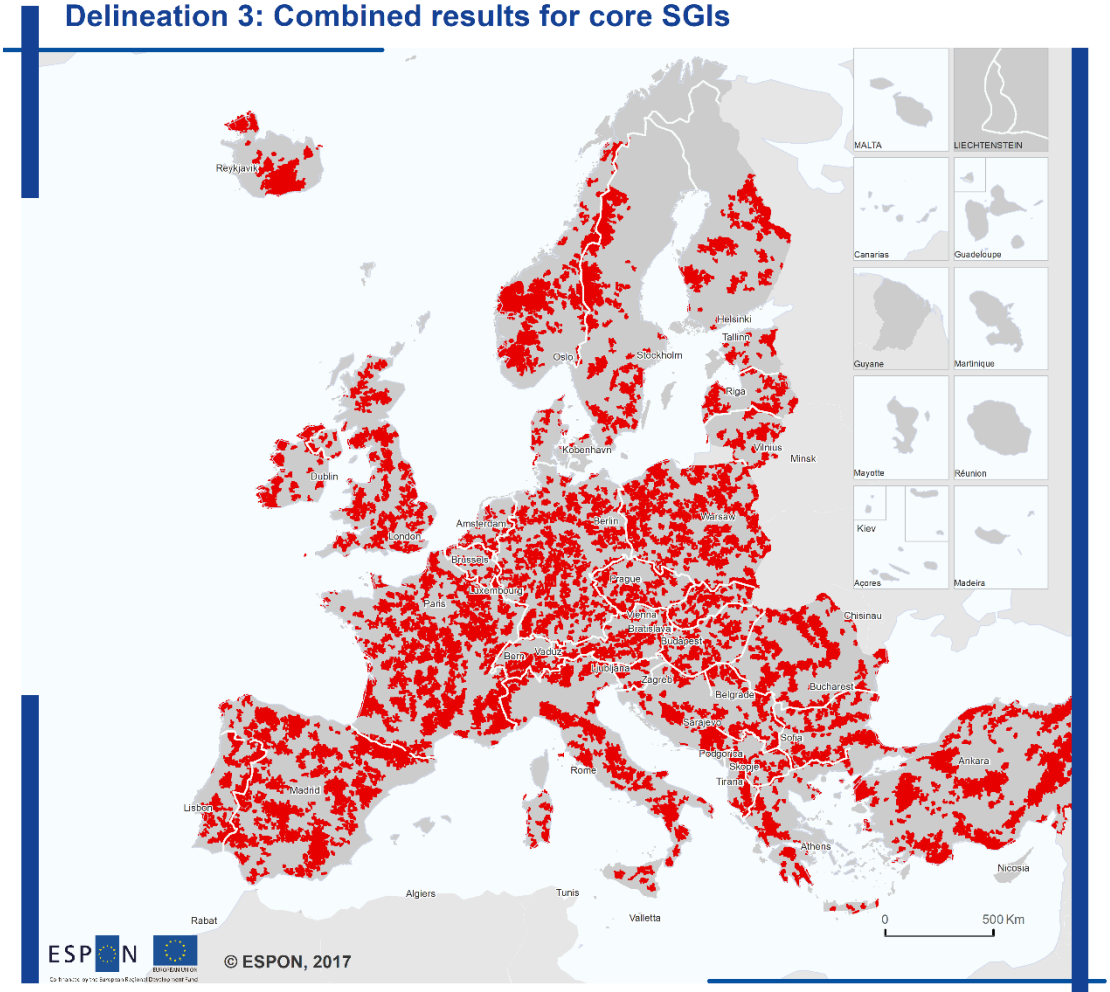
In contrast to these two examples, option C does not weight any SGI above the others just by counting the number of SGIs which are poorly accessible (Map 3.3). Comparing the spatial coverage, results of option C cover less areas compared to option W1, but more compared to option W2.

Nevertheless, results of Option C are interesting in itself. They illustrate that large parts of Europe and the majority of LAU-2 units (Map 3.4 for whole of Europe, and Map 3.5: for illustrative zoom-ins) in Europe do have poor accessibility to one or more SGIs. The larger this number is, the more accessibility and service problems aggravate. Poor access to one or more SGIs may not be perceived as problematic by local population; however, the higher the number of facilities is that can only poorly be reached, or cannot be reached at all, the higher the awareness of people that a lack of service provision is a key (negative) location factor. These maps show, that areas close to a regional centre are generally not suffering from poor access but that they suffer more the farther they are away from the next centre.

Eventually option CW was tested combining the counting and weighting approach. It appeared that 99% of all areas that have poor access to five or more SGIs at the same time have poor access to hospitals, to primary schools or to train stations[3]. So, results of options CW and C very much overlap. For this reason, option CW was selected as the method to combine the individual results for Delineation 3.

[3] 50% of all areas that have poor access to five or more SGIs even have, at the same time, poor access to hospitals and to primary schools and to hospitals.

Map 3.1: Delineation 3: IP areas in Europe according to option W1 (weighting – 'OR').



IP areas in Europe (grid level) with poor access to hospitals, primary schools and train stations

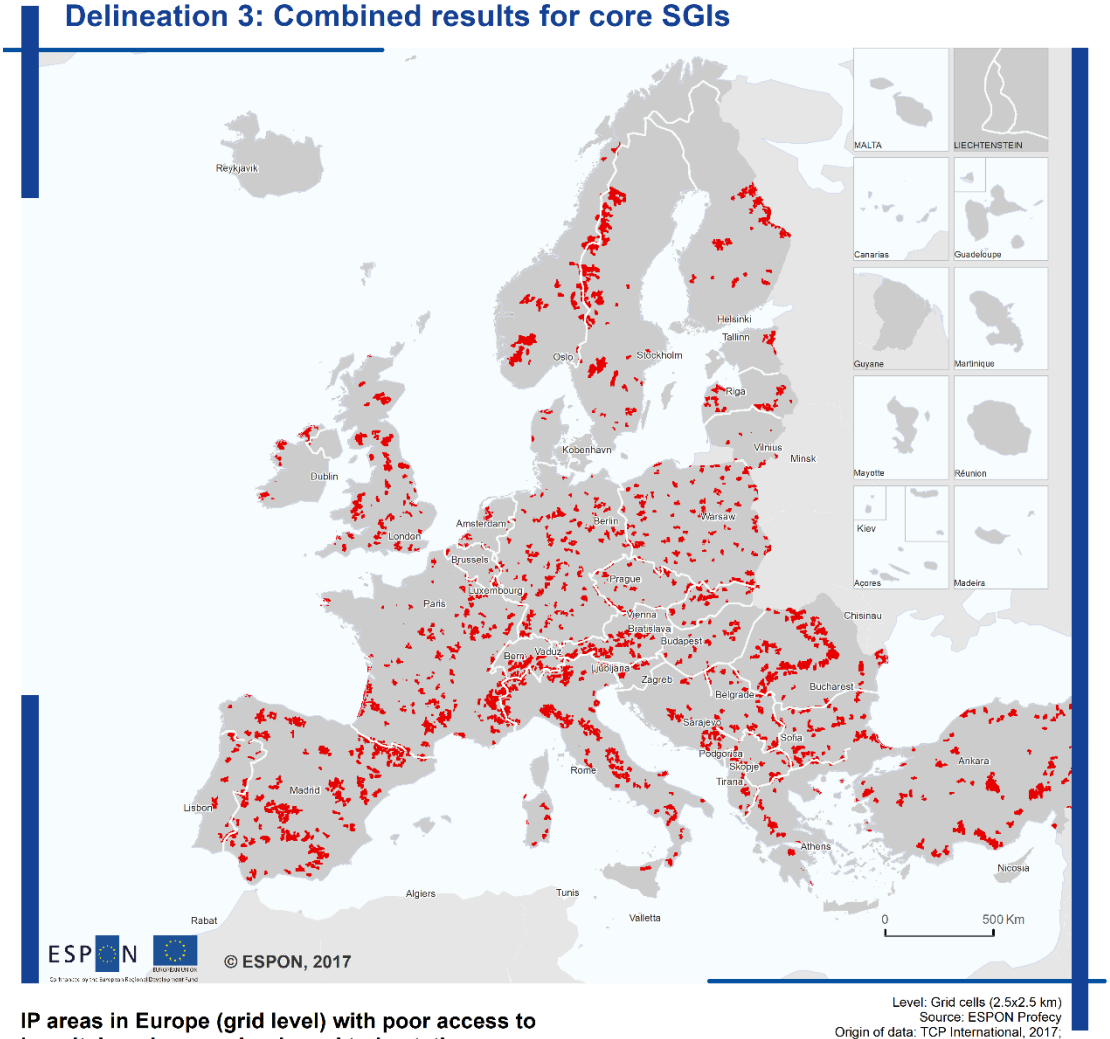
non-IP area IP area

IP areas represent grid cells with poor access to hospitals OR poor access to primary schools OR poor access to train stations.

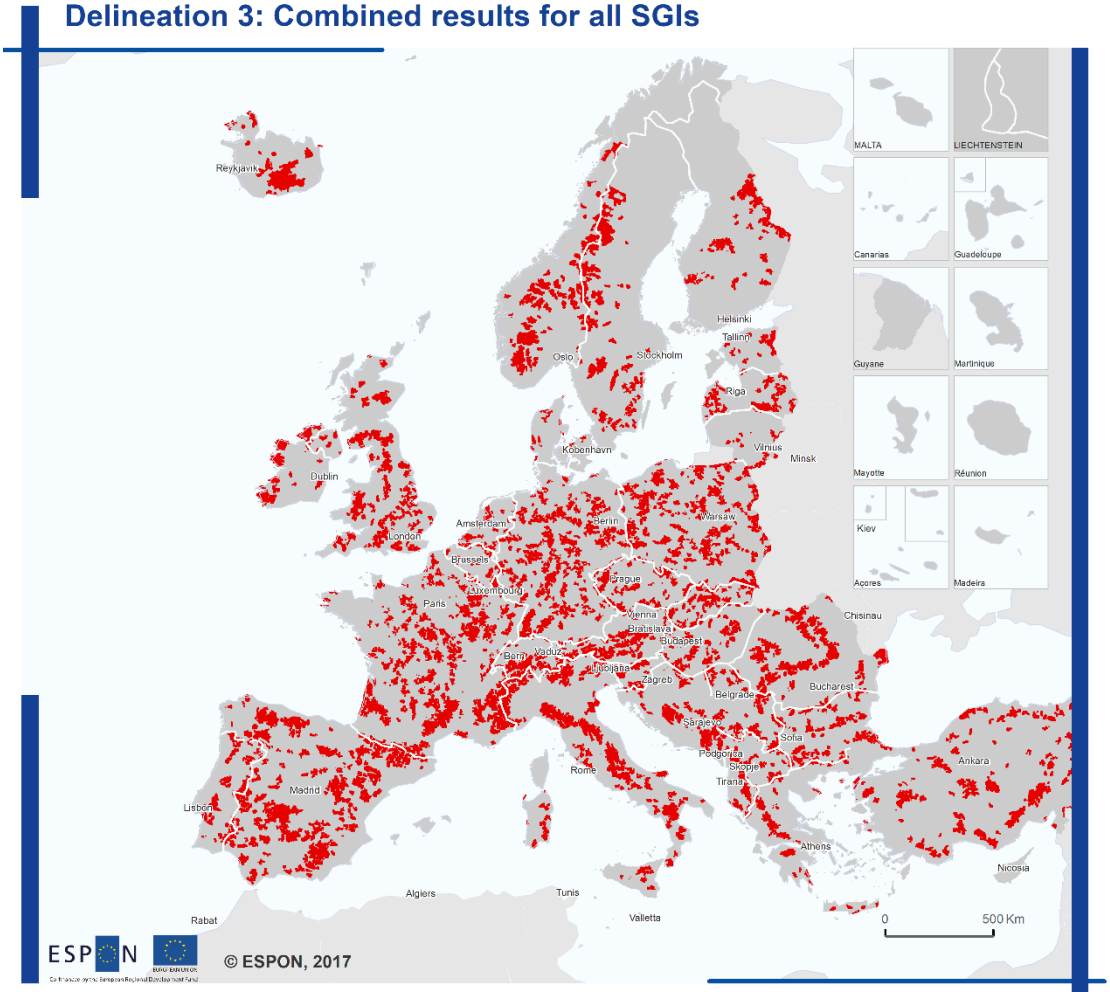
Level: Grid cells (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017; TCP International Accessibility Model, 2017
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

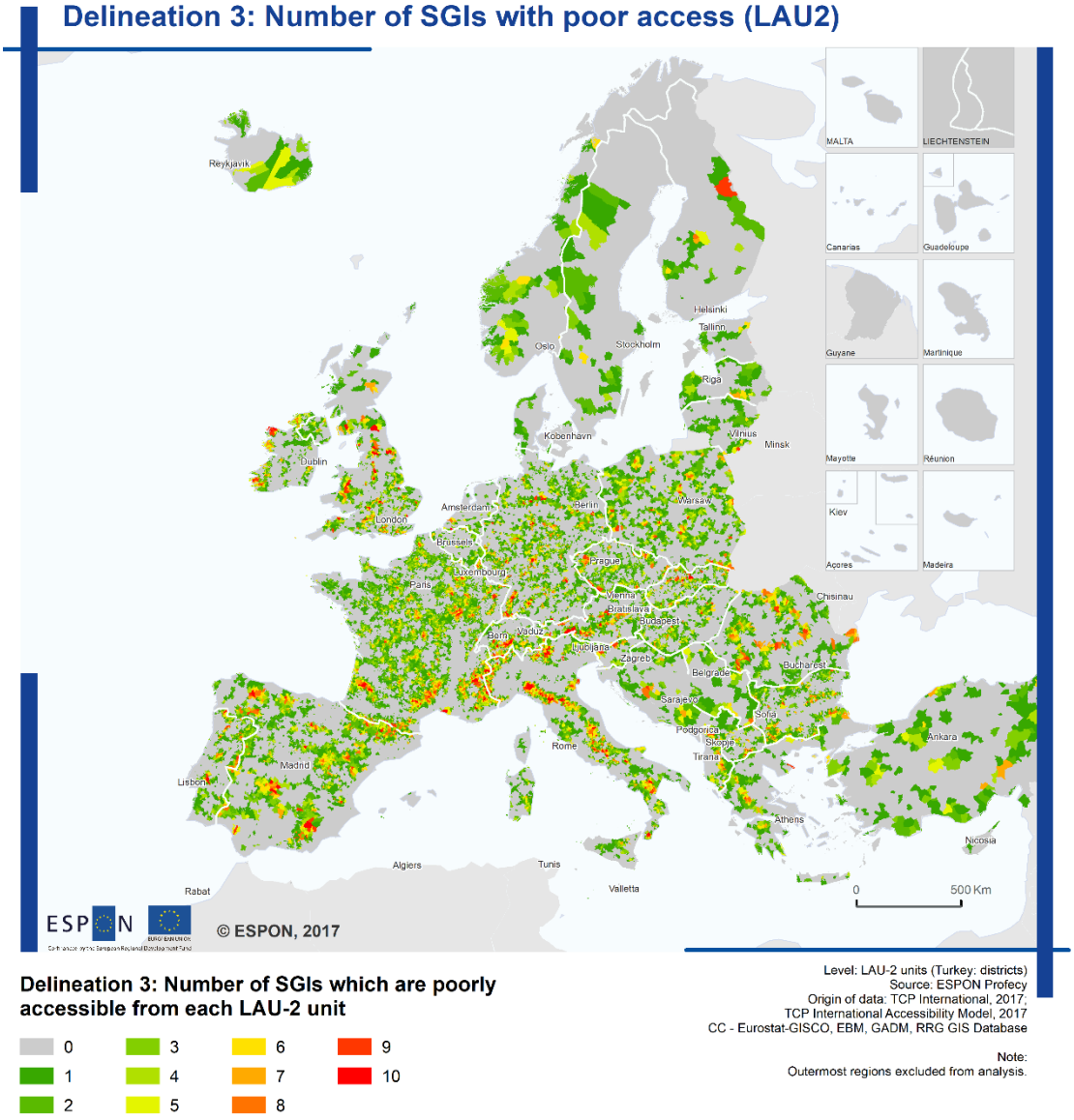
Map 3.2: Delineation 3: IP areas in Europe according to option W2 (weighting – 'AND').



Map 3.3: Delineation 3: IP areas in Europe according to option C (counting).

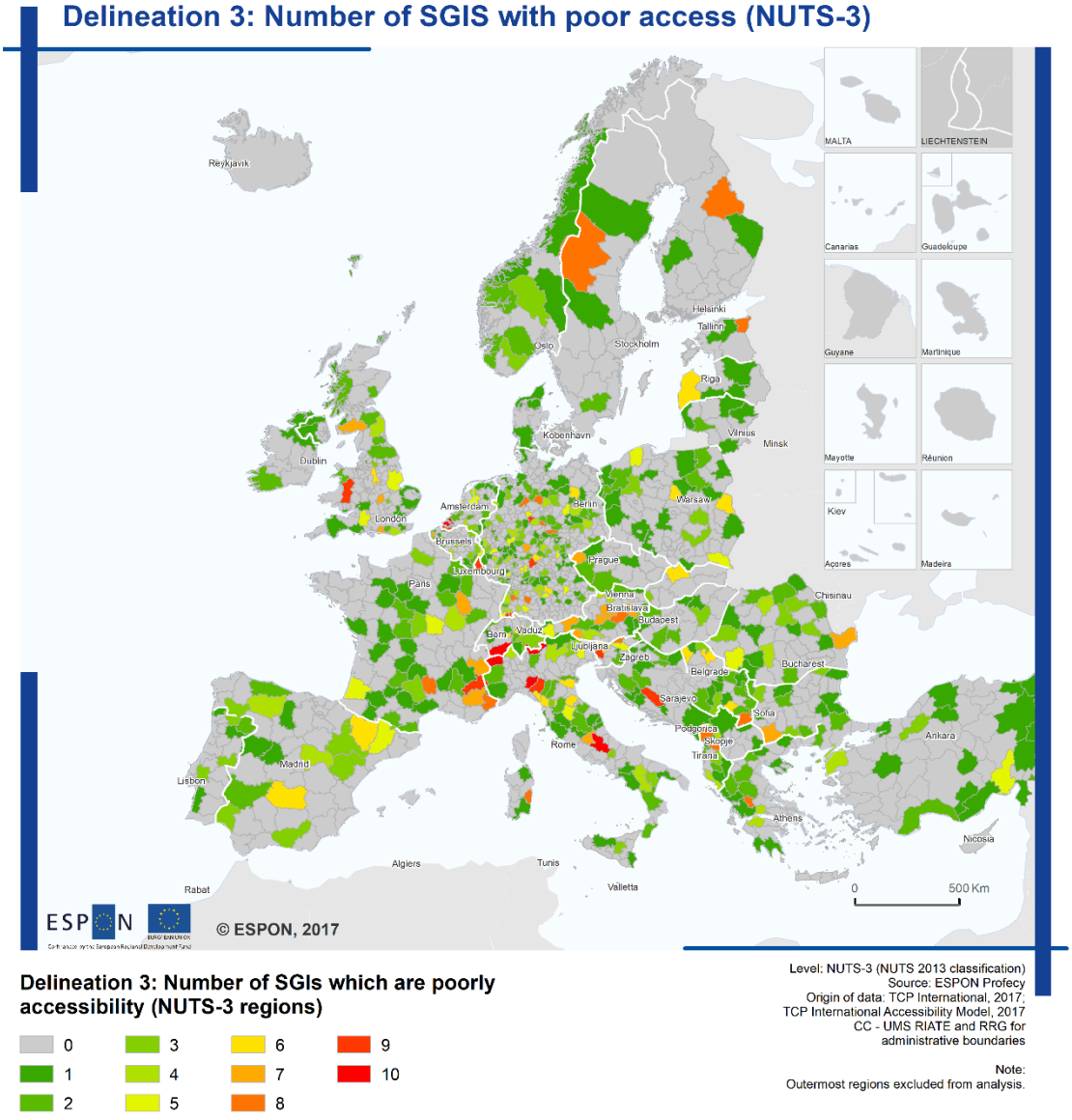


Map 3.4: Delineation 3. Number of SGIs that are poorly accessible (LAU-2 units).



Map 3.5: Delineation 3. Number of SGIs that are poorly accessible (LAU-2 units; zoom-ins for Spain (top left), Poland (top right), and Italy (bottom)).

Map 3.6: Delineation 3. Number of SGIs that are poorly accessible (NUTS-3 regions).



3.3 Areas identified as Inner Peripheries in Delineation 3

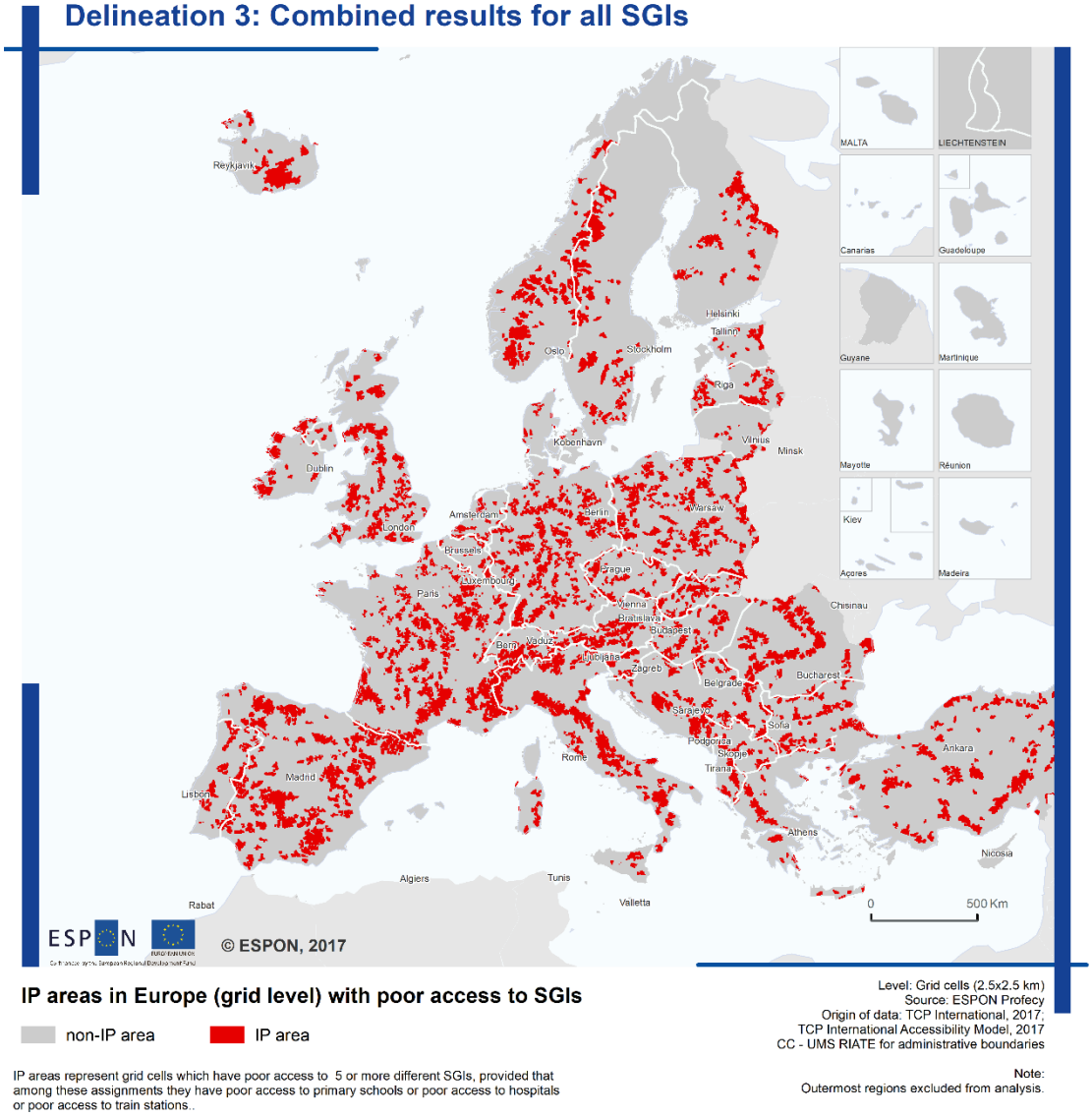
After testing different options (see previous Chapter), it was decided to combine results for individual SGIs for Delineation 3 as follows:

Inner peripheries with poor access to services-of-general-interest:

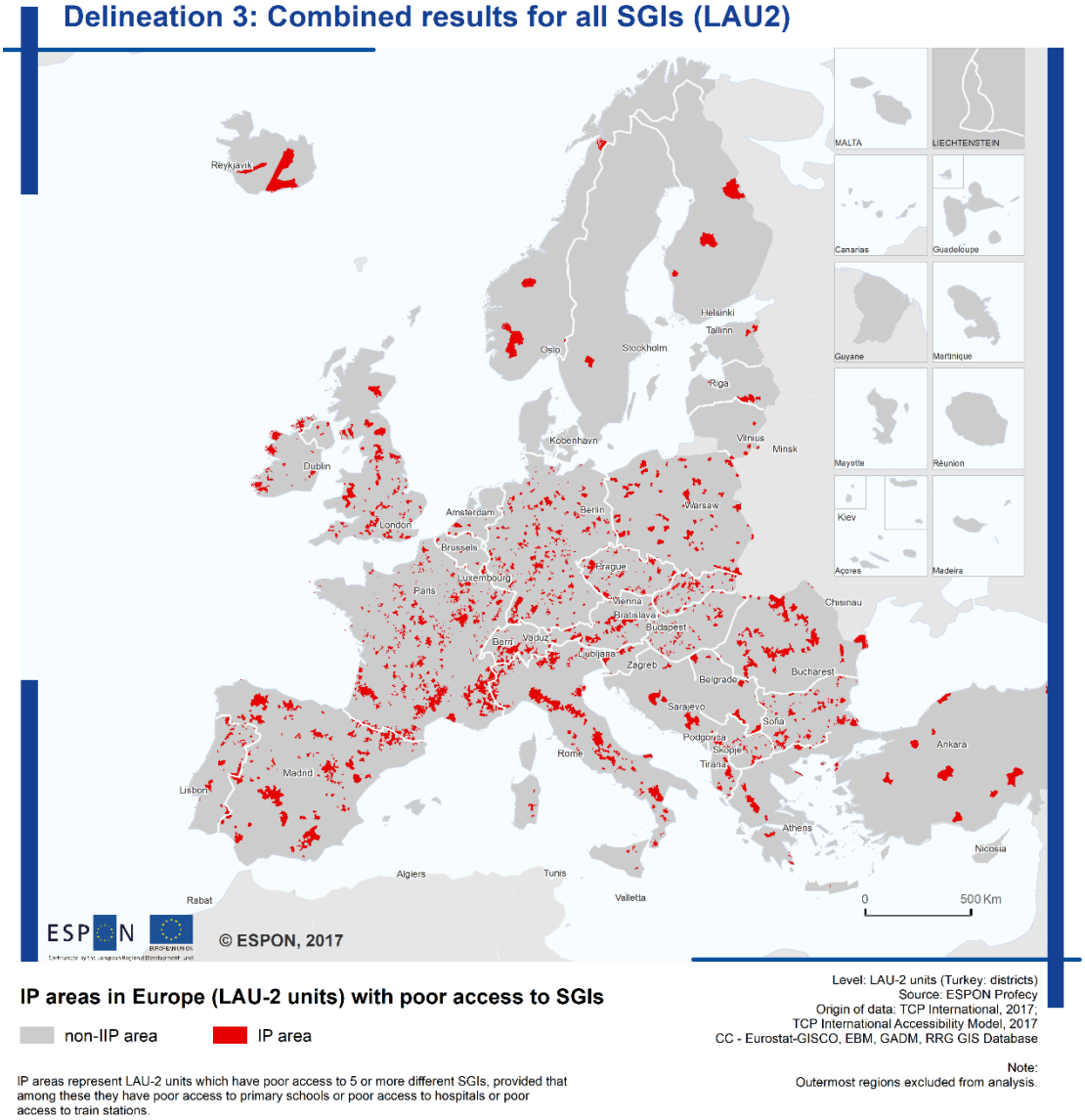
All areas in Europe that have poor access to five or more services-of-general-interest, whatever the type of service is, which at the same time have poor access to hospitals (=health care) or poor access to primary schools (=basic education) or poor access to train stations (=basic provision of public transport), are considered an Inner Periphery.

Following maps illustrate the final results of this definition for all spatial levels considered in PROFECY, i.e. for the grid level (Map 3.7), LAU-2 level (Map 3.8) and NUTS-3 level (Map 3.9). When comparing these three maps, the number and thus the extent of areas/units identified as inner peripheries decrease, the 'higher' the spatial level. This is because when overlaying the grid results with LAU-2 units and NUTS-3 regions, the share of territory overlaid by grid IP patches diminishes, and thus the number of units/regions identified as inner peripheries decreases.

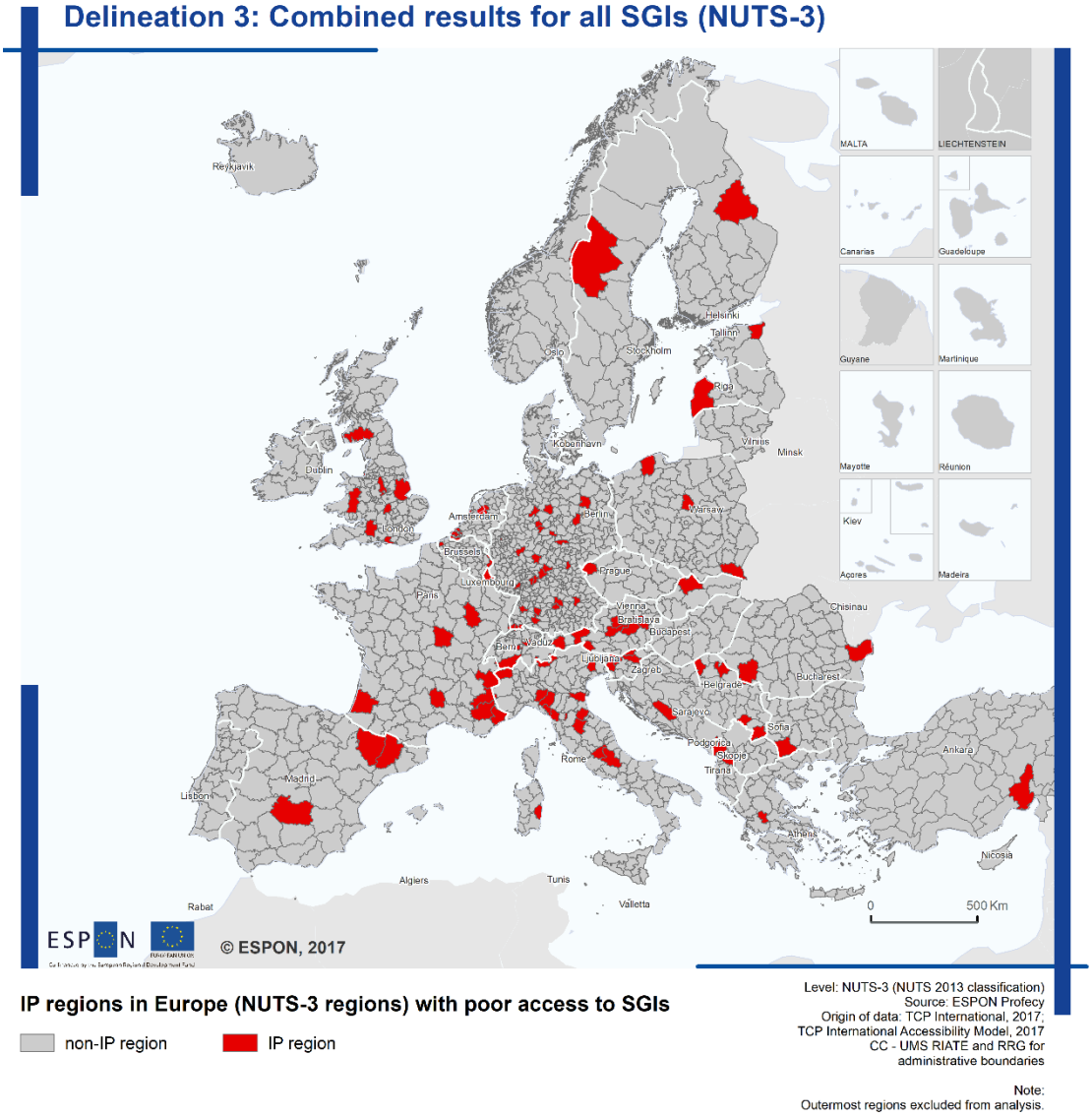
Map 3.7: Delineation 3: IP areas in Europe (grid level).



Map 3.8: Delineation 3: IP areas in Europe (LAU-2 units).

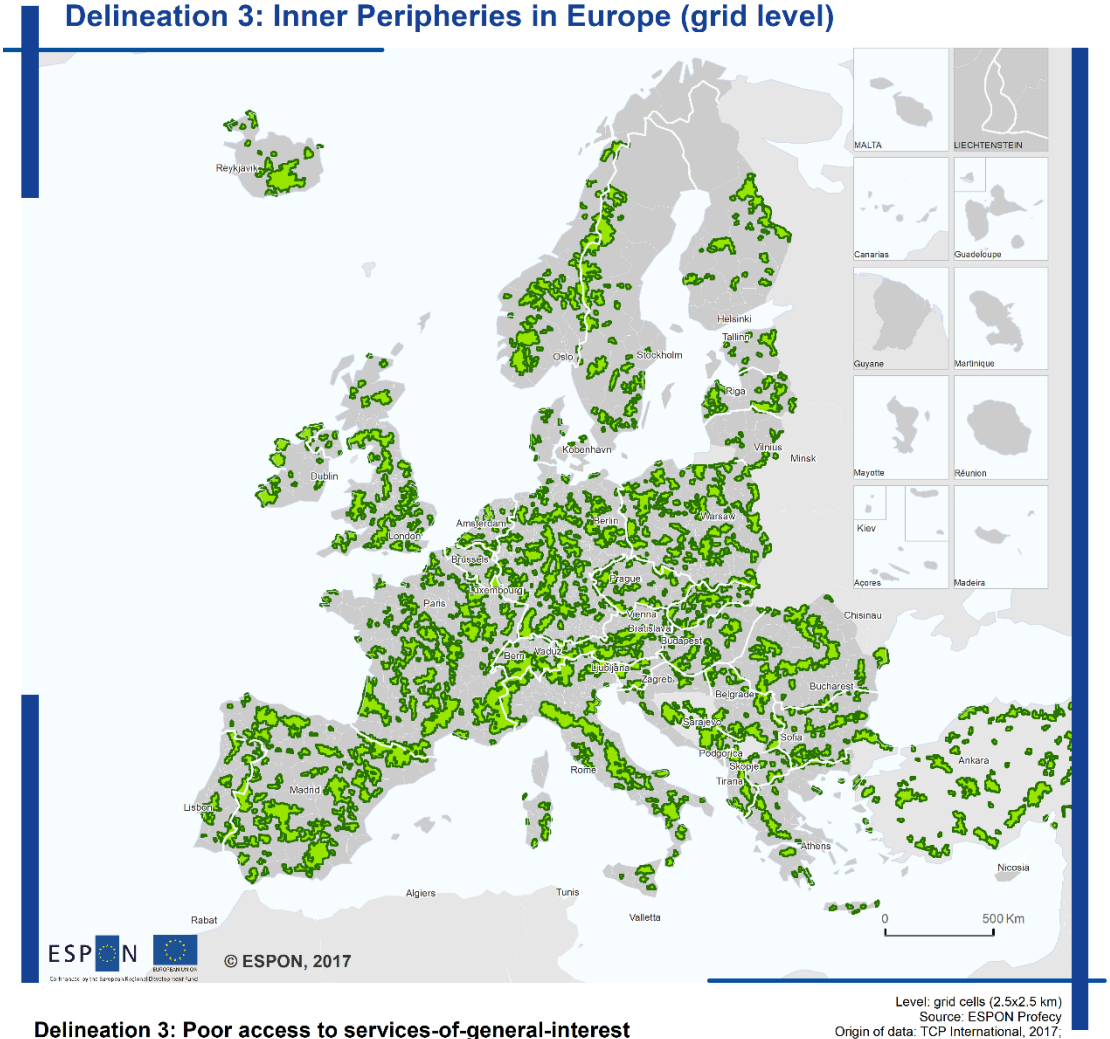


Map 3.9: Delineation 3: IP areas in Europe (NUTS-3 regions).



As a final step in the process of delineating inner peripheries, neighbouring IP areas / units / regions have been merged to build continuously areas of inner peripheries. These results are illustrated for all three levels in following Maps 3.10 to 3.12.

Map 3.10: Access to services-to-general-interest: Identification of grid areas as inner peripheries.



Delineation 3: Poor access to services-of-general-interest
Identification of grid areas as Inner Peripheries

IP areas in Europe

non-IP area

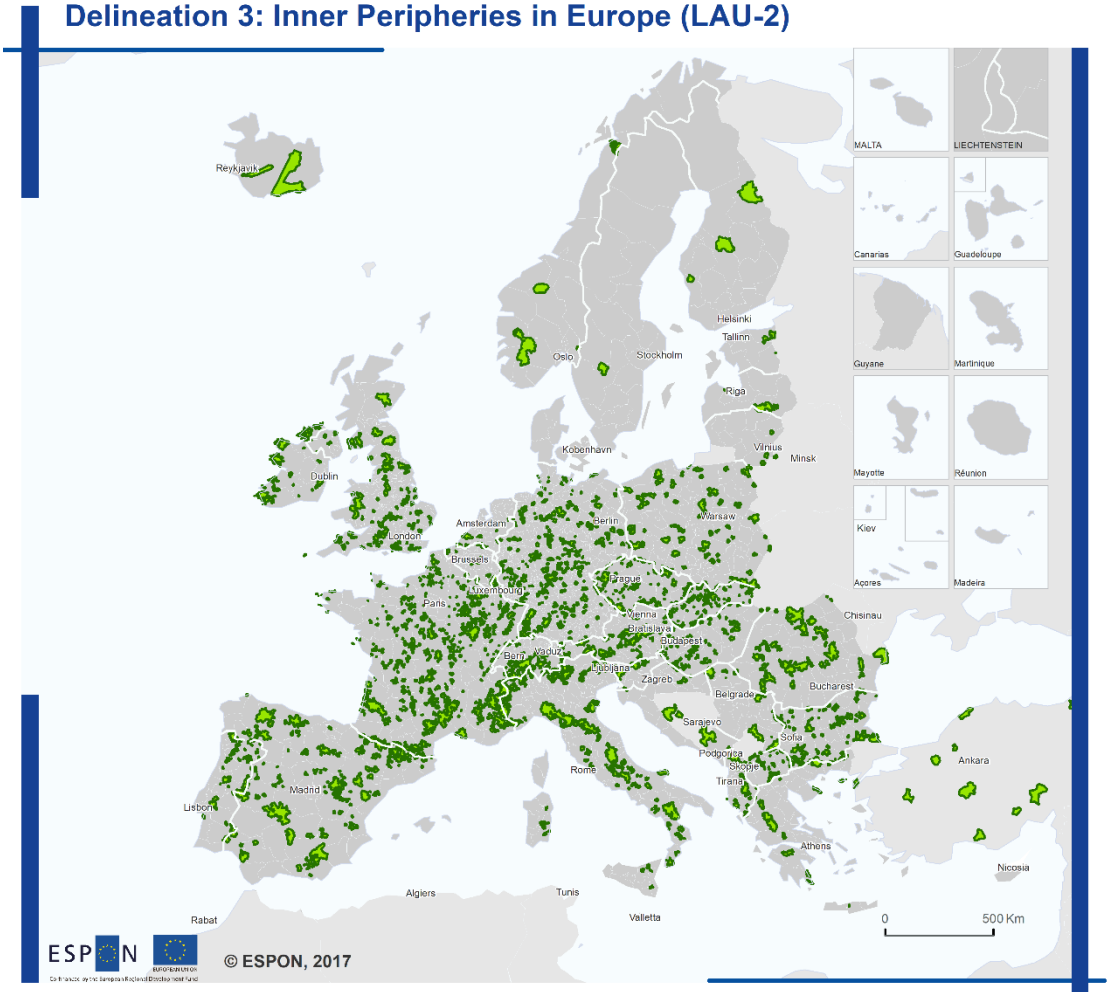
Remarks:

IP regions include all areas who have poor acces to five or more services-of-general-interest, and at the same time have poor access to hospitals or to primary schools or to train stations.

Level: grid cells (2.5x2.5 km)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, RRG GIS Database

Note:
Outermost regions excluded from analysis.

Map 3.11: Access to services-to-general-interest: Identification of LAU-2 units as inner peripheries.



Delineation 3: Poor access to services-of-general-interest
Identification of LAU-2 units as Inner Peripheries

IP regions in Europe

non-IP regions

Remarks:

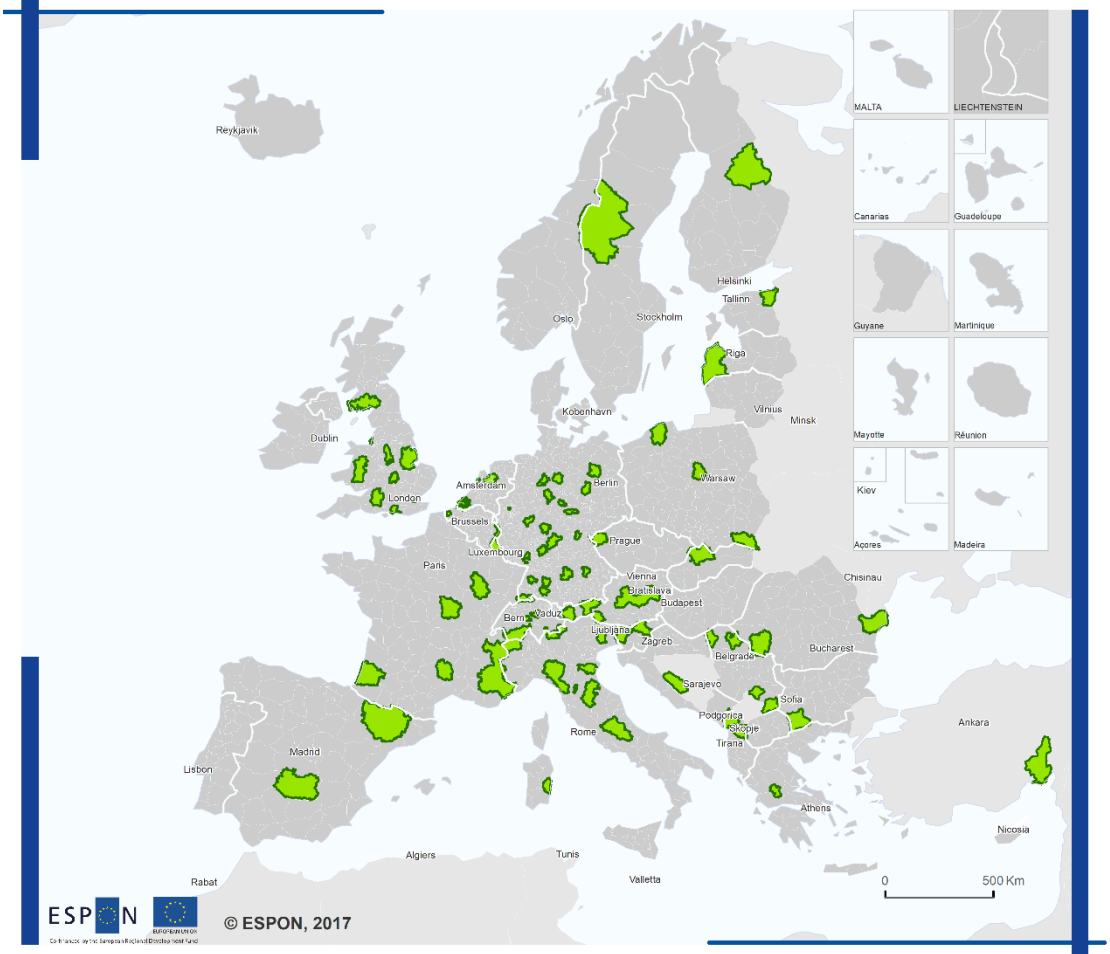
IP regions include all LAU-2 units who have poor acces to five or more services-of-general-interest, and at the same time have poor access to hospitals or to primary schools or to train stations.

Level: LAU-2 units (Turkey: districts)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
TCP International Accessibility Model, 2017
CC - Eurostat-GISCO, EBM, GADM, RRG GIS Database

Note:
Outermost regions excluded from analysis.

Map 3.12: Access to services-to-general-interest: Identification of NUTS-3 regions as inner peripheries.

Delineation 3: Inner Peripheries in Europe (NUTS-3)



Delineation 3: Poor access to services-of-general-interest
Identification of NUTS-3 regions as Inner Peripheries

IP regions in Europe
non-IP regions

Remarks:
IP regions include all NUTS-3 regions who have poor acces to five or more services-of-general-interest, and at the same time have poor access to hospitals or to primary schools or to train stations.

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

Note:
Outermost regions excluded from analysis.

ESPON 2020 – More information

ESPON EGTC
4 rue Erasme, L-1468 Luxembourg - Grand Duchy of Luxembourg
Phone: +352 20 600 280
Email: **info@espon.eu**
www.espon.eu, **Twitter**, **LinkedIn**, **YouTube**

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