

**Perspective Services in
Post-NGN, 4G and 5G**

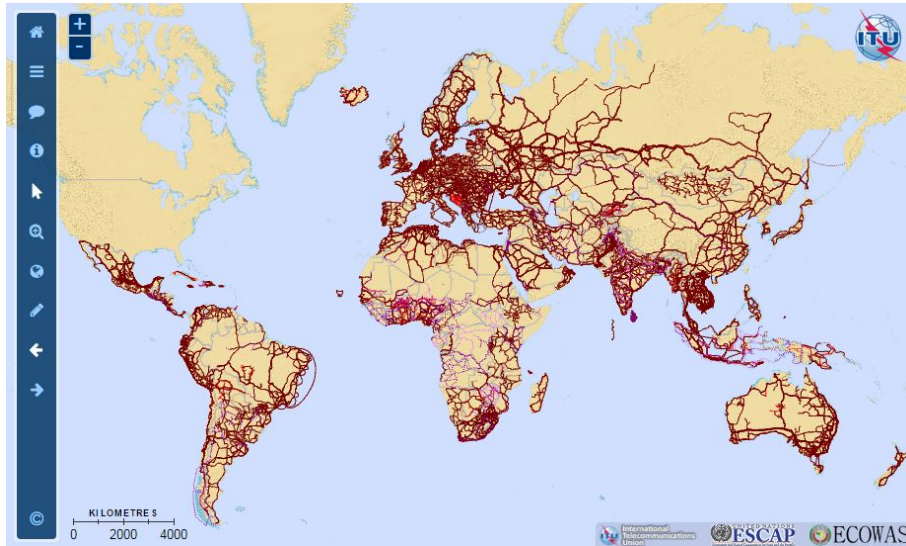
**Kiev, Ukraine, 7-9 June
2017**

ITU

**Interactive
Transmission
Maps**

June 2017

Introduction



1) Purpose: To quantify supply-side indicators for the reach of broadband networks.

2) Research: Desk research, primary research in conjunction with ITU Regional Offices, and working with partner organisations such as UKE, ECOWAS, ESCAP, TeleGeography.

3) Validation: The map is validated by network operators and administrations through the ITU Regional Offices and recorded in the Validation Framework.

4) Outputs: Broadband Capacity Indicators.

Broadband Transmission Capacity Indicators

Underneath the map is a database, containing records of each individual link, node and operator. The following indicators are either compiled or calculated from this database:

Indicator 1: Transmission network length (Route kilometres)

Indicator 2: Node locations

Indicator 3: Equipment type of terrestrial transmission network

Indicator 4: Network capacity (bit rate)

Indicator 5: Number of optical fibres within the cable

Indicator 6: Operational status of the transmission network

Indicator 7a: Percentage of population within reach of transmission networks

Indicator 7b: Percentage of area within reach of transmission networks

ITU Interactive Transmission Map Research Status: May 2017

| Region | CIS | ARB | AFR | ASP | AMS | EUR | Total |
|------------------|-------|-------|-------|-------|-------|-------|----------------|
| Countries | 12/12 | 19/23 | 41/44 | 38/39 | 32/35 | 42/43 | 184/196 |
| Operators | 36 | 39 | 71 | 82 | 71 | 92 | 394 |
| Links | 2,359 | 1,332 | 4,041 | 7,433 | 4,352 | 6,821 | 26,338 |
| Nodes | 1,213 | 797 | 2,938 | 4,851 | 3,142 | 4,915 | 17,953 |

Indicator 1: Transmission Network Length (Route-Kms), Mar 2016

| | | | | | | | |
|---------|-----------|---------|---------|-----------|-----------|-----------|-------------------|
| - Drawn | 387,775 | 183,327 | 312,630 | 780,452 | 376,618 | 440,243 | 2,481,193 |
| - Total | 1,220,019 | 333,764 | 400,728 | 4,568,922 | 1,116,336 | 2,509,836 | 10,149,605 |

Indicator 7a: Population within range of operational fibre node (%), Dec 2016

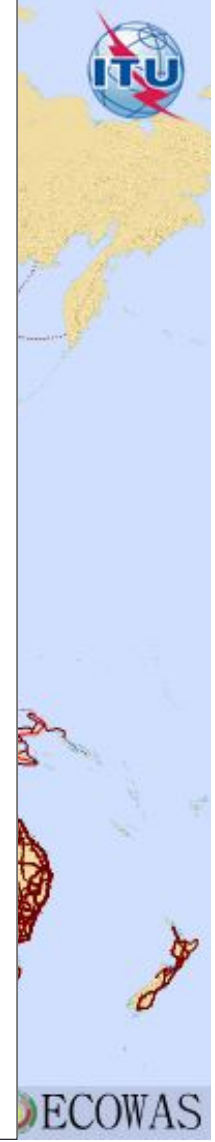
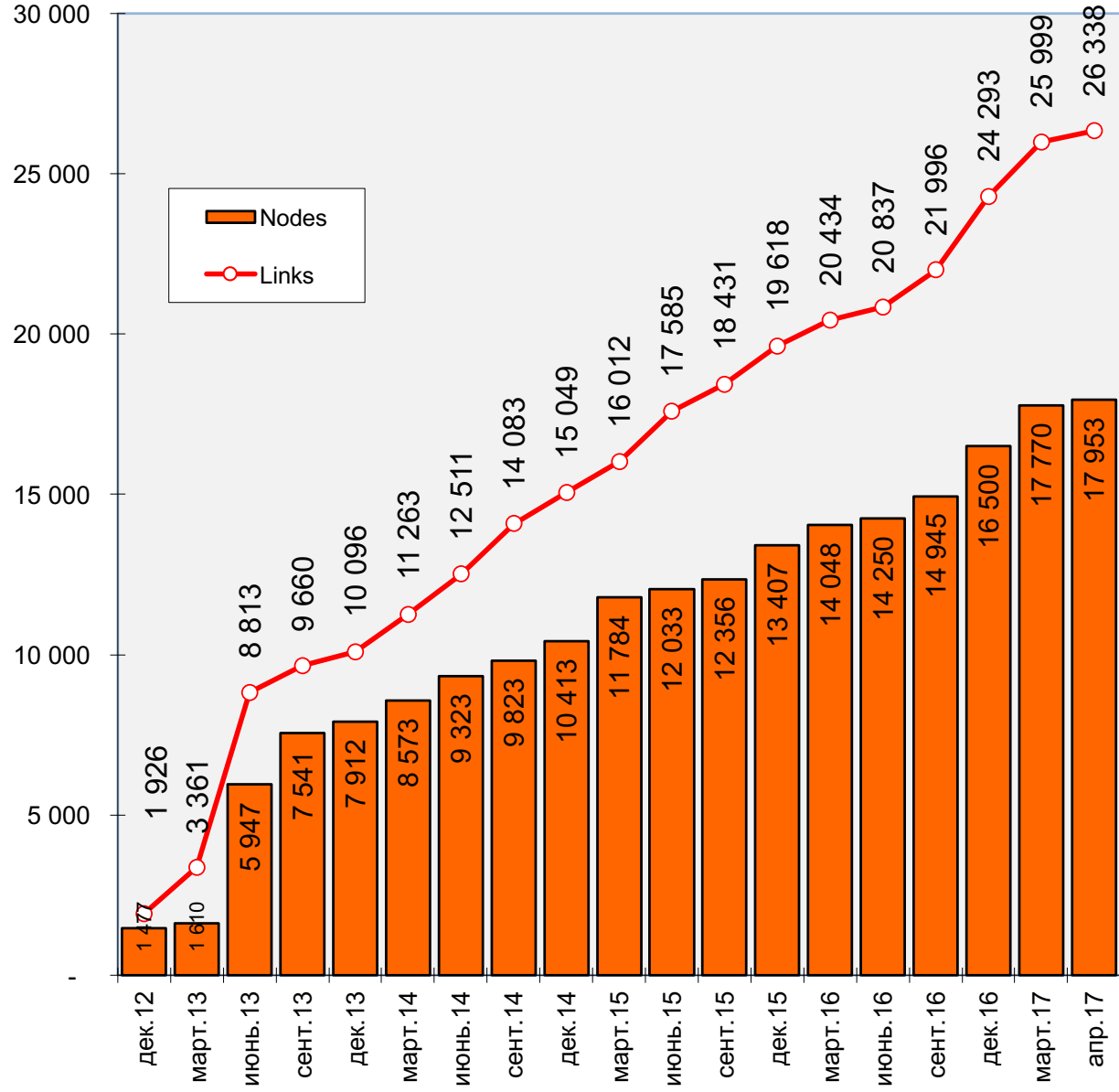
| | | | | | | | |
|---------|------|------|------|------|------|------|-------------|
| - 10-km | 34.9 | 21.8 | 20.4 | 18.1 | 22.2 | 35.5 | 21.3 |
| - 25-km | 65.7 | 50.4 | 42.2 | 44.4 | 43.8 | 58.1 | 46.4 |
| - 50-km | 82.7 | 72.9 | 63.7 | 68.1 | 53.2 | 68.6 | 66.4 |

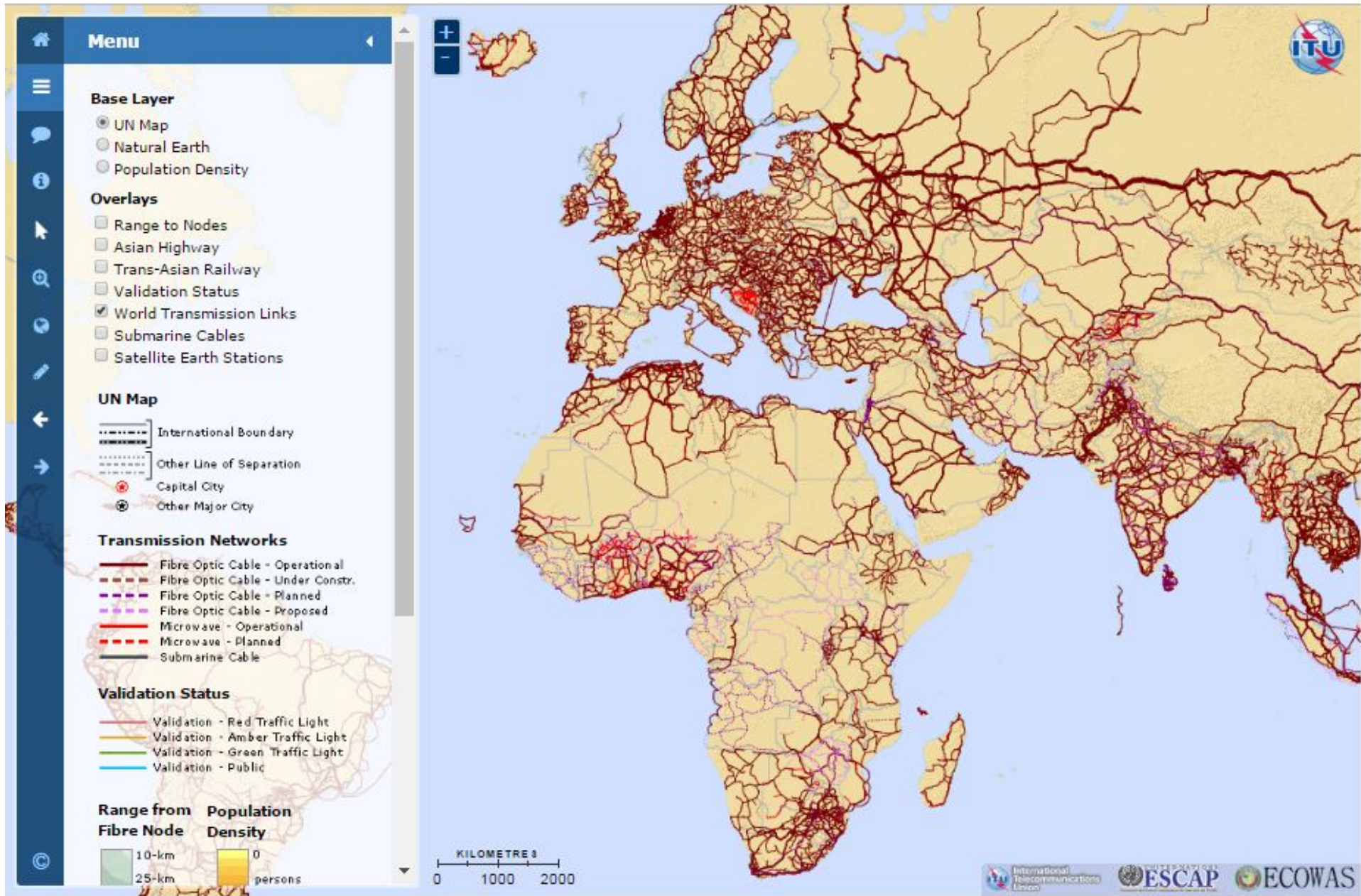
Indicator 7b: Population within range of operational fibre node (millions), Dec 2016

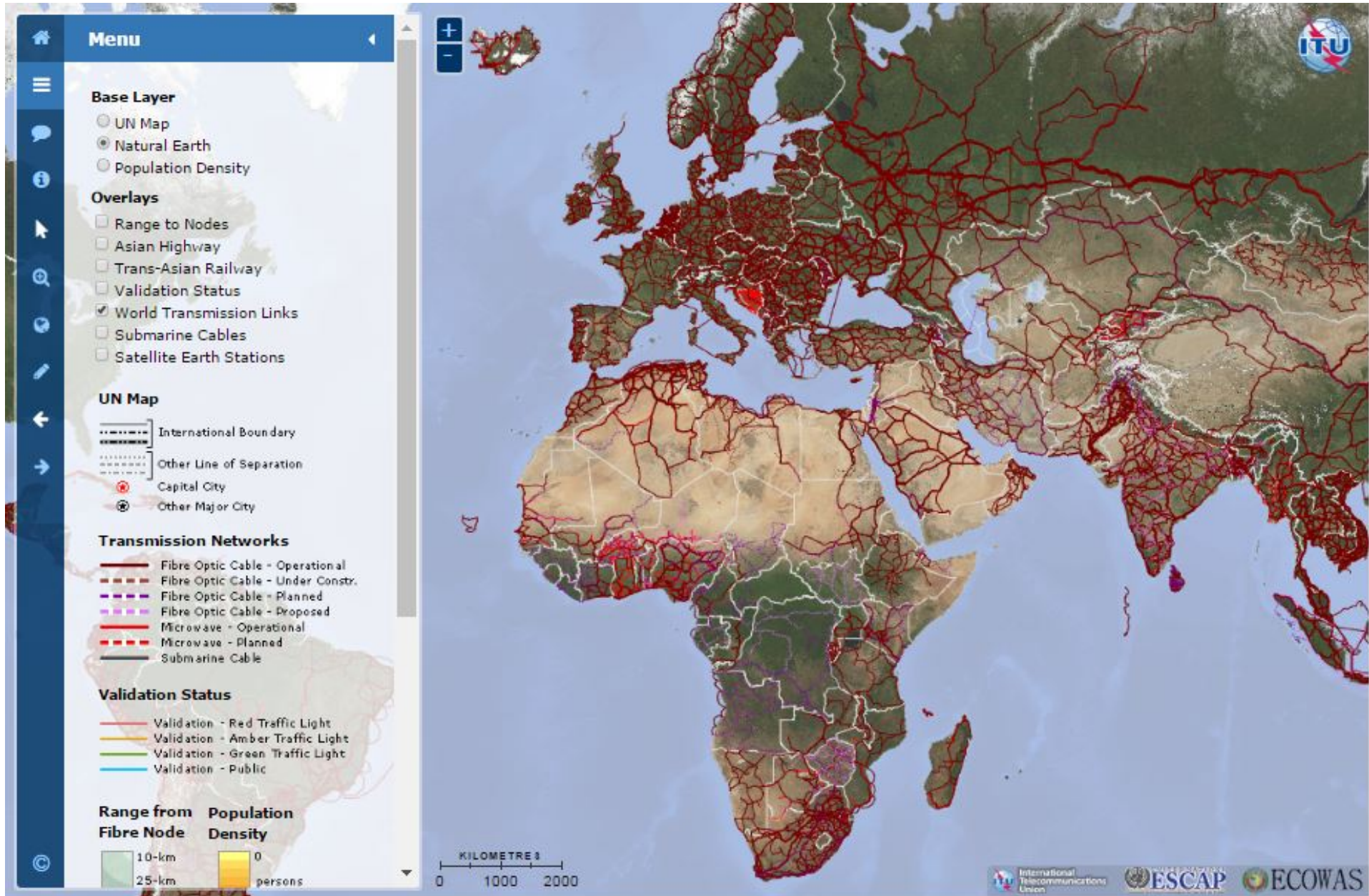
| | | | | | | | |
|---------|-------|-------|-------|---------|-------|-------|--------------------|
| - 10-km | 98.7 | 84.5 | 195.4 | 744.0 | 221.2 | 224.0 | 1,567,808.4 |
| - 25-km | 185.6 | 195.5 | 403.4 | 1,824.4 | 436.2 | 336.5 | 3,411,568.2 |
| - 50-km | 233.8 | 282.6 | 608.8 | 2,798.2 | 529.6 | 433.1 | 4,886,193.0 |

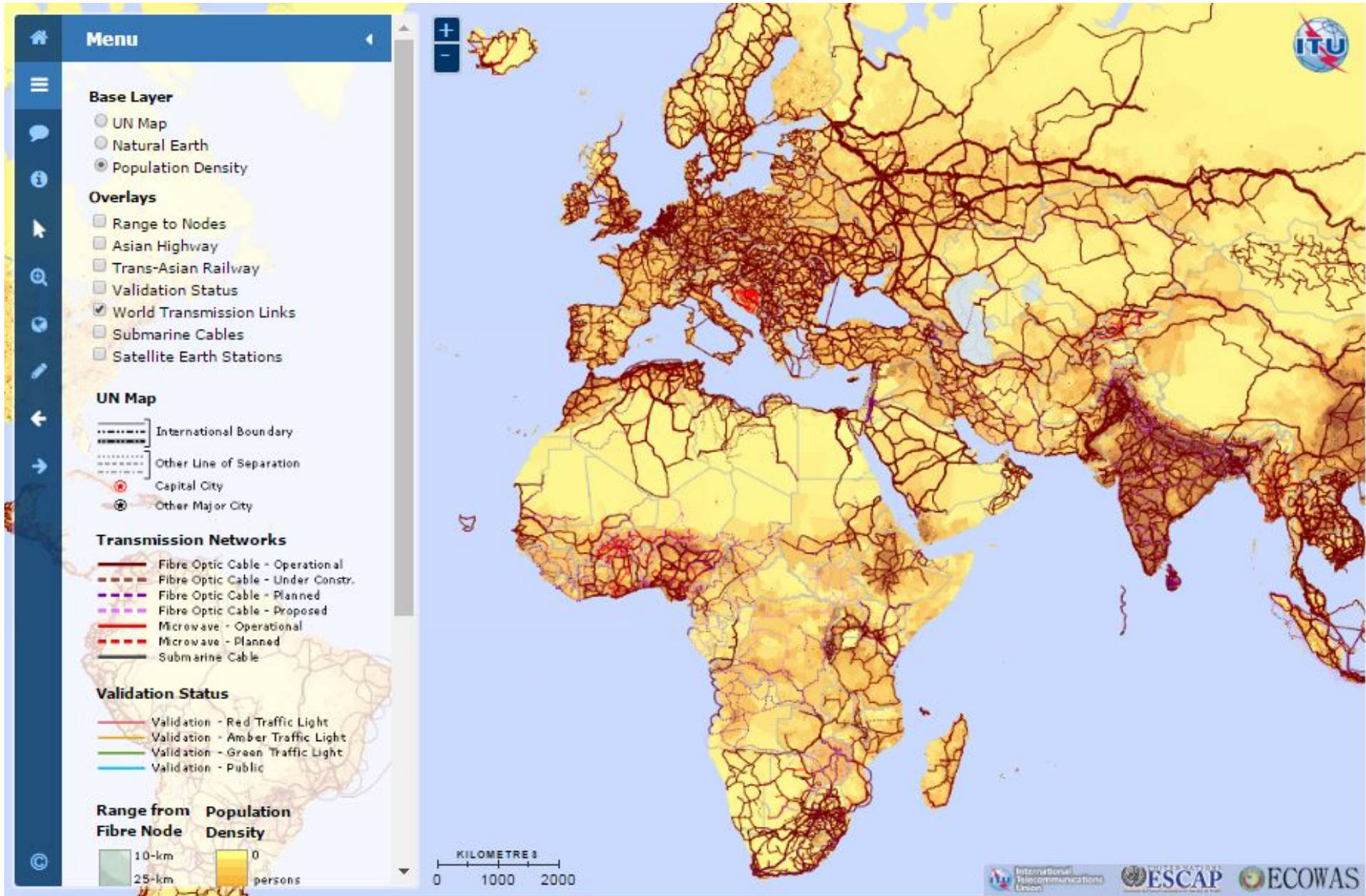


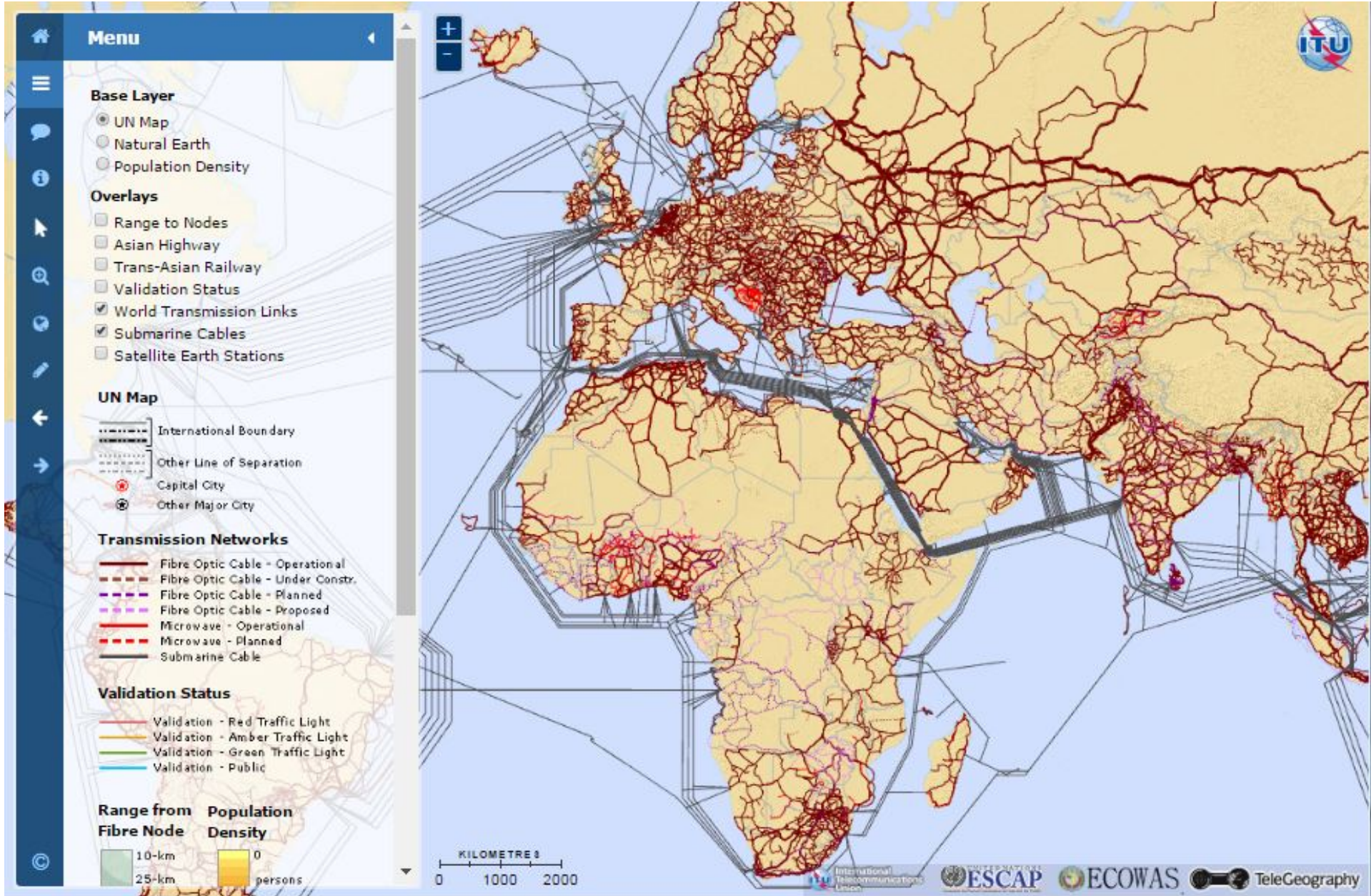
Total Links and Nodes

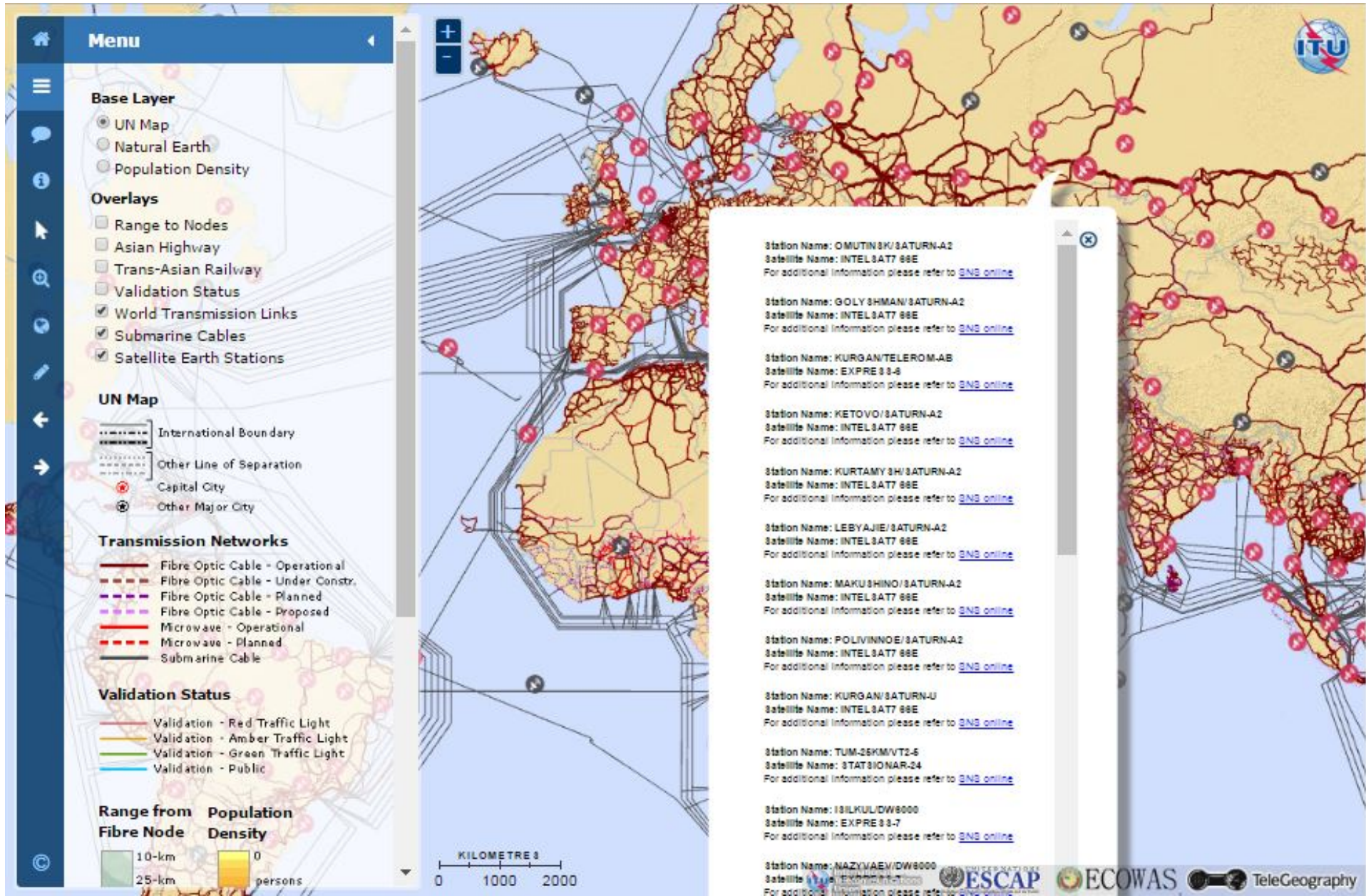












TIES Password Protected Map and Validation Framework

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Type the name of operator or country into the search box

Validation Procedure

A simple traffic light system is used to indicate the validation status of each piece of network infrastructure shown in the map. In order to see the current status of any line on the map, select the 'Validation Status' checkbox in the map layers panel. Each transmission line falls under one of the four categories: RED, AMBER, GREEN or PUBLIC. The objective of the validation exercise is to engage network operators and administrations to verify the data, whilst it remains visible (albeit protected) behind TIES. As the status will progress from either RED, AMBER or GREEN through to light green, a detailed description of this classification, please scroll to the bottom of this page.

Navigate by country

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Navigate by Validation Status

Or navigate by Region

To change validation status

1. Check your network on the map. Go to the [ITU Interactive Transmission Map](#) and check the information shown for your network. The map layer called Validation Status indicates whether this network is classified as RED, AMBER, GREEN or PUBLIC (see below). If you hover your mouse over any line, a small image of the source material used to draw the map appears in the left hand side. Click this image to go through to the homepage of the operator.

- Overlays**
- Population density
 - Range to Nodes
 - Validation Status
 - World Transmission
 - Labels
 - Operator Data



public/

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TAG ARCHIVES: ROMANIA

Romania: SC Telecomunicatii CFA SA

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Source: [SC Telecomunicatii CFA SA](#), 2014. <http://www.tccfr.ro/index-4.html>



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Research Status

This table shows the research, production and validation status of each network operator. Filter the map by clicking on the up and down arrows to sort by research, production or validation status. This table is updated at the end of each month. Last Updated: **4 April 2017.**

Show entries

Search:

| COUNTRY | REGION | OPERATOR | DATA | PUBLIC | RFI | ADDED | MAP | STATUS | VALID |
|------------------------|--------|---------------------------------|------|--------|-----|-------|-----|--------|-------|
| Austria | EUR | Telekom Austria | Y | Y | 0 | Y | Y | Green | N |
| Belgium | EUR | Mobistar | Y | Y | 0 | Y | Y | Public | N |
| Belgium | EUR | Syntego | Y | Y | 0 | Y | Y | Public | N |
| Bosnia and Herzegovina | EUR | RAK | Y | Y | 0 | Y | Y | Green | N |
| | | GCN | Y | Y | 0 | Y | Y | Public | N |
| | | Neterra | Y | Y | 0 | Y | Y | Public | N |
| | | Novatel | Y | Y | 0 | Y | Y | Public | N |

The Research Status table is updated at the end of each month

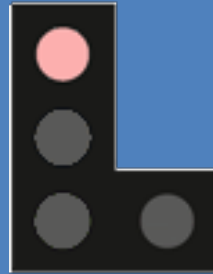
Click link here to go through to the operators homepage

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Each link in the map is given a validation status.

We use a simple traffic light system:

- Validation - Red Traffic Light
- Validation - Amber Traffic Light
- Validation - Green Traffic Light
- Validation - Public



Red: Information was sourced from a restricted document (for example on TIES), a potentially unreliable publicly available source (such as a third party), may contain information which is confidential or regarded as sensitive by the network operator, and/or is very old and could be out of date (if it is more than 3-5 years old). Information must be validated by network operator or stakeholder to provide clearance that the information is correct, up-to-date, and is not confidential.



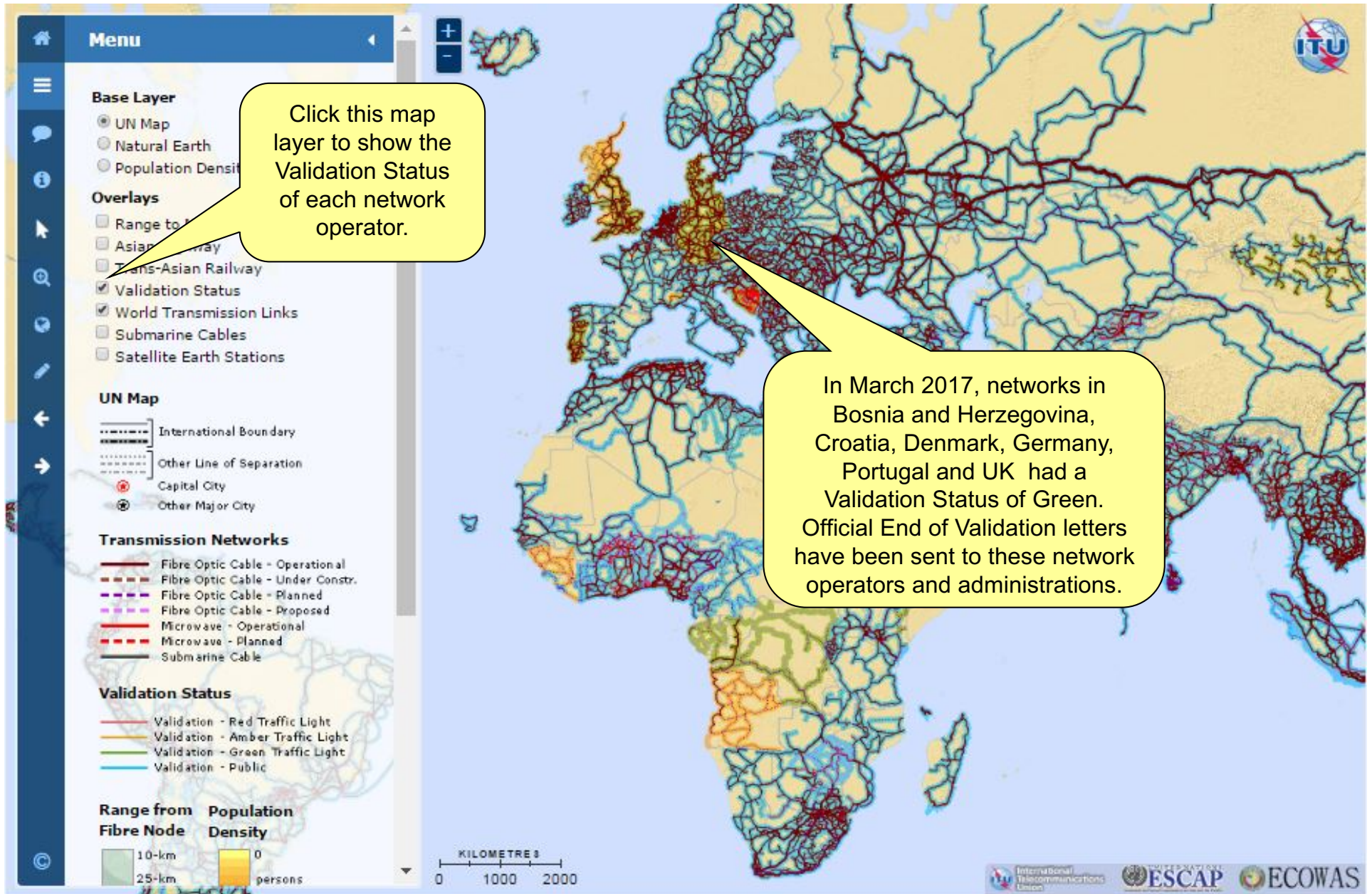
Amber: Information was not taken from a publicly available source, may be unreliable because of difficulties reading or interpreting the source material, and/or may be old and out of date. Operator is asked to provide clearance that the information is correct, up-to-date, and is not confidential.

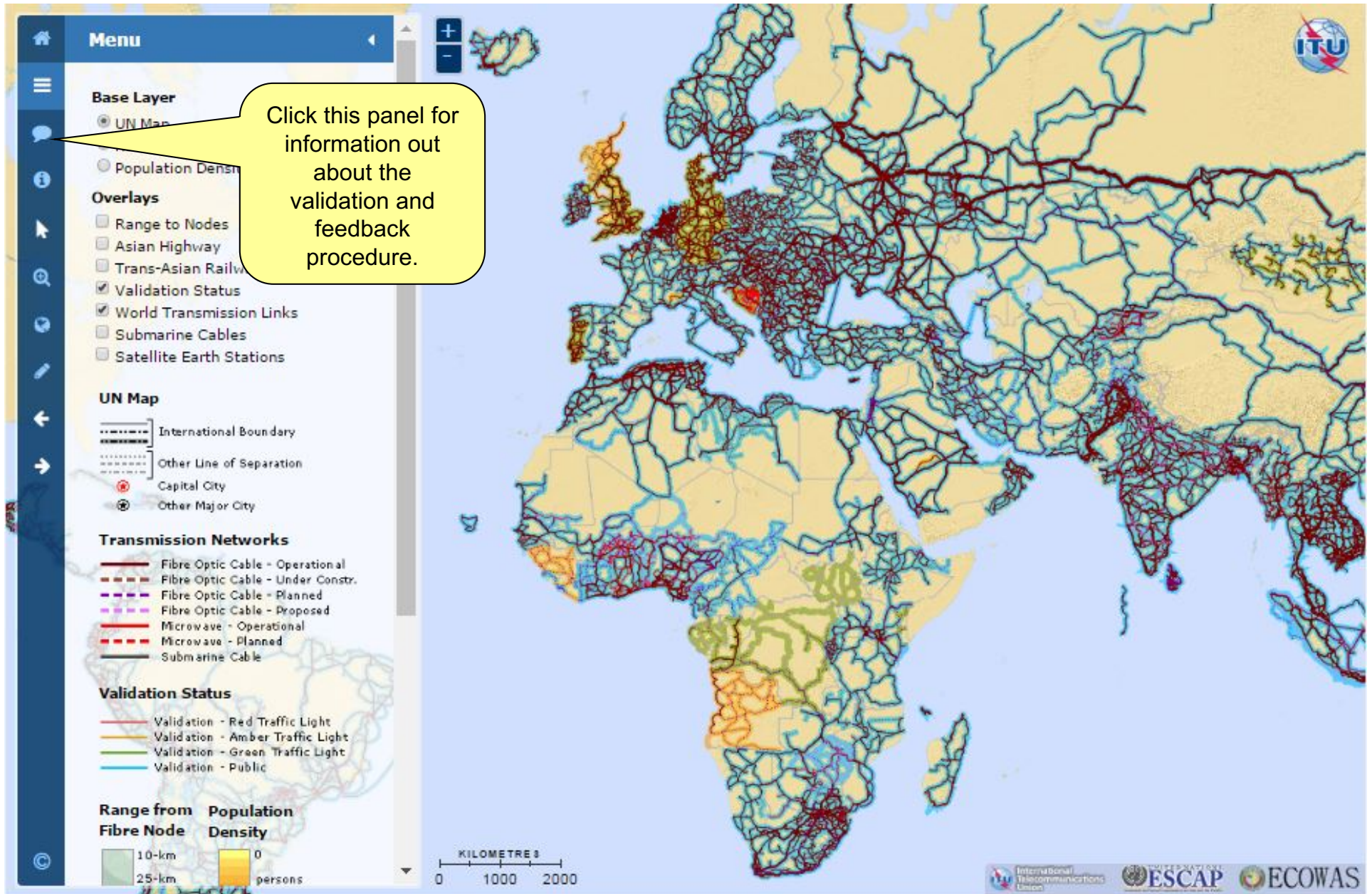


Green: Information was sourced from an authentic, reliable publicly available source (such as a company website, annual report, presentation, or other publication), and has been deliberately put into the public domain by the network operator or administration (it is therefore not confidential). The information is current and correct, and there is no reason why a public version could not be put into the public domain.



Public: Information has been actively checked and validated by stakeholder through the TIES interactive web map platform, specifically granting permission for this information to be put into the public domain.





Validation and Feedback

Validation

We use a simple traffic light system to show the status of each piece of network infrastructure. To display the current status of a particular network link, enable the 'Validity' layer checkbox. For a detailed description of the traffic light symbology, please refer to the [validation framework](#).

Feedback

If you notice that a line needs to be added or corrected, or other changes made to the map, please use the sketch tool in the toolbar to add lines on to the map. Then email the sketch to tdn@itu.int to be corrected in the map. Lines which are sketched on to the map in this way are only temporary, and will disappear from your browser.

For further detailed information regarding the feedback loop please consult the [user guide](#).

Click this link here to open the Validation Framework, or go to <https://www.itu.int/itu-d/tnd-map/validation/>

KILOMETRE 3
0 1000 2000

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Indicators

Broadband Capacity Indicators

[Indicator 1: Transmission network length \(Route kilometres\)](#)

[Indicator 7a: Population within reach of transmission networks](#)

[Indicator 7b: Area within reach of transmission networks](#)

Indicator Definitions

Indicator 1: **Transmission network length (Route kilometers)**

Definition: *Transmission network length* refers to the physical length of fibre optic cable in a network irrespective of the number of optical fibres contained within the constituent cables of that network (see Indicator 5: Cable structure), and can also be applied to microwave terrestrial networks. It is expressed in route kilometres (route-kms).

Clarifications and scope: Transmission network length (Route kilometers) can also be applied to microwave terrestrial transmission networks in order to enable comparison on a like-for-like basis, even though the number of microwave 'hops' is also used (a 'hop' is the point-to-point link between one microwave radio antenna and the next. for example there are four 'hops' between

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Indicator 1: Route Kilometres

Indicator 1: Transmission network length (Route kilometres)

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Search:

| COUNTRY | REGION | ROUTE | ROUTE | ROUTE | ROUTE | OPERATORS |
|-----------------|--------|-------------|-------------|-------------|-------------|---|
| | | KMS 2013 | KMS 2014 | KMS 2015 | KMS 2016 | |
| Slovak Republic | EUR | n.a. | 5,858 | 5,858 | 16,924 | Energotel, GTS, Level 3, Slovak Telekom, SWAN |
| Slovenia | EUR | n.a. | n.a. | 2,500 | 9,563 | Delkom, Stelkom, Slovenske Zeleznice, Telekom Slovenije, Telemach |
| Spain | EUR | n.a. | 11,653 | 179,922 | 235,222 | Adif, Jazztel, Iberdola, Iberfibre, Telefonica, Ufinet, Vodafone |
| Sweden | EUR | n.a. | 54,175 | 54,175 | 54,175 | Easyfibre, IP-Only, TDC |
| Switzerland | EUR | n.a. | n.a. | n.a. | 60,714 | EUNetworks, SBB, Swisscom, Switch |

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Indicator 7a: Population within reach of transmission networks

Indicator 7a: Population within reach of transmission networks 2016

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Search:

| COUNTRY | REGION | 10-KM | 25-KM | 50-KM | 10-KM | 25-KM | 50-KM |
|----------------|--------|-------|-------|-------|------------|------------|------------|
| Czech Republic | EUR | 69.8 | 98.5 | 100.0 | 7,543,387 | 10,652,916 | 10,811,805 |
| Denmark | EUR | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Estonia | EUR | 86.8 | 99.5 | 100.0 | 1,108,293 | 1,270,389 | 1,276,554 |
| Finland | EUR | 20.9 | 40.8 | 55.5 | 1,142,860 | 2,235,086 | 3,039,982 |
| France | EUR | 45.8 | 77.3 | 97.2 | 29,904,448 | 50,465,107 | 63,468,819 |
| Germany | EUR | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Greece | EUR | 43.2 | 80.4 | 94.8 | 4,808,465 | 8,941,700 | 10,545,720 |
| Hungary | EUR | 60.9 | 98.1 | 100.0 | 6,018,691 | 9,700,884 | 9,889,593 |

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Indicator 7b: Area within reach of transmission networks

Indicator 7b: Area within reach of transmission networks 2016

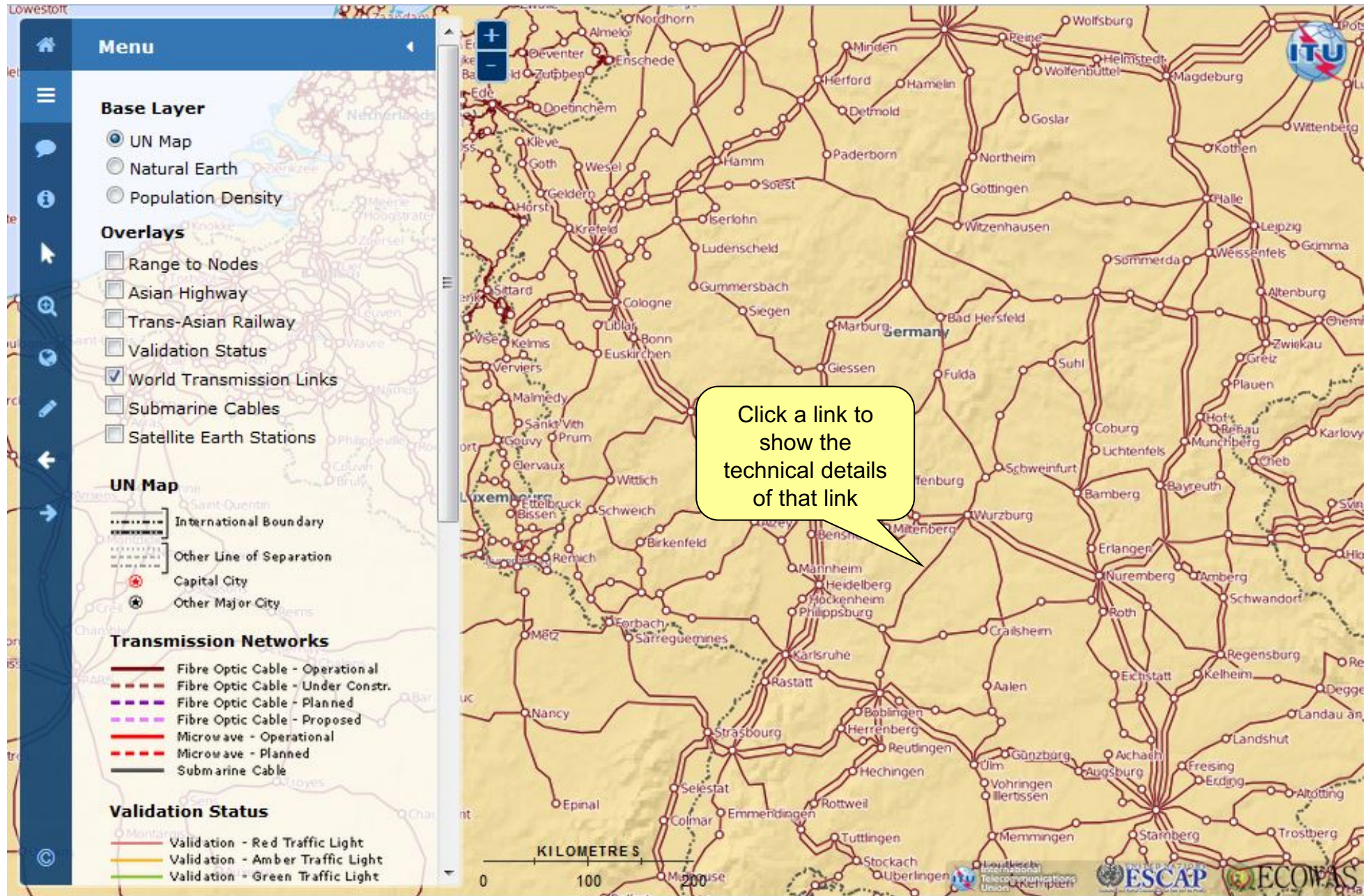
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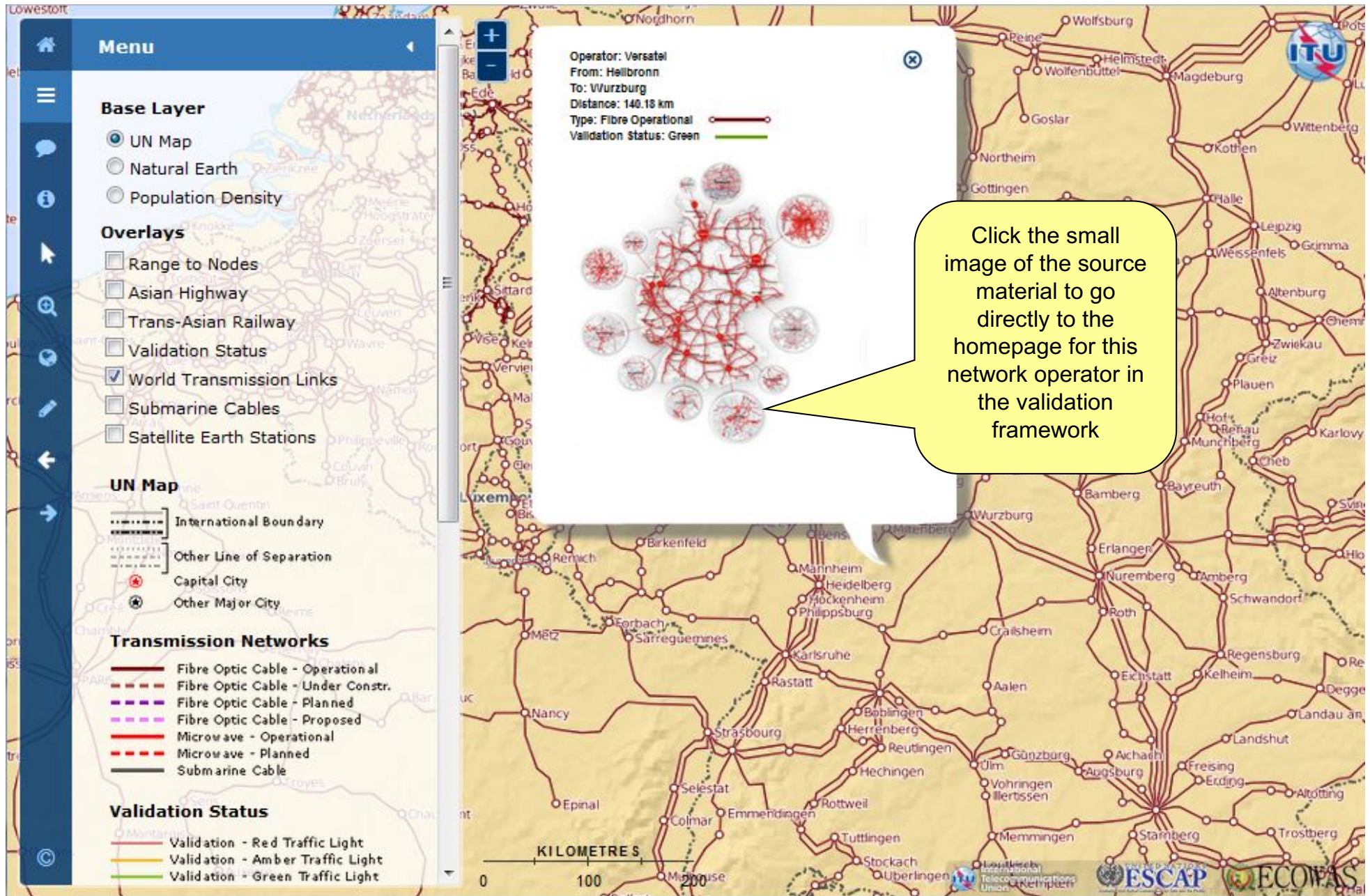
Search:

| COUNTRY | REGION | 10-KM | 25-KM | 50-KM | 10-KM | 25-KM | 50-KM |
|----------------|--------|-------|-------|-------|-----------|-----------|-------------|
| Czech Republic | EUR | 44.8 | 96.2 | 100.0 | 84,577.7 | 181,412.2 | 188,612.9 |
| Denmark | EUR | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Estonia | EUR | 47.5 | 98.2 | 100.0 | 79,627.8 | 164,711.9 | 167,666.8 |
| Finland | EUR | 1.1 | 6.1 | 16.3 | 19,761.3 | 111,748.2 | 299,069.9 |
| France | EUR | 10.0 | 45.7 | 90.6 | 115,871.1 | 531,541.9 | 1,054,274.7 |
| Germany | EUR | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Greece | EUR | 12.1 | 54.7 | 90.6 | 26,601.0 | 120,504.6 | 199,536.7 |
| Hungary | EUR | 35.2 | 96.2 | 100.0 | 70,995.3 | 193,691.1 | 201,410.0 |
| Iceland | EUR | 30.8 | 72.7 | 95.6 | 176,036.3 | 415,852.5 | 546,414.8 |

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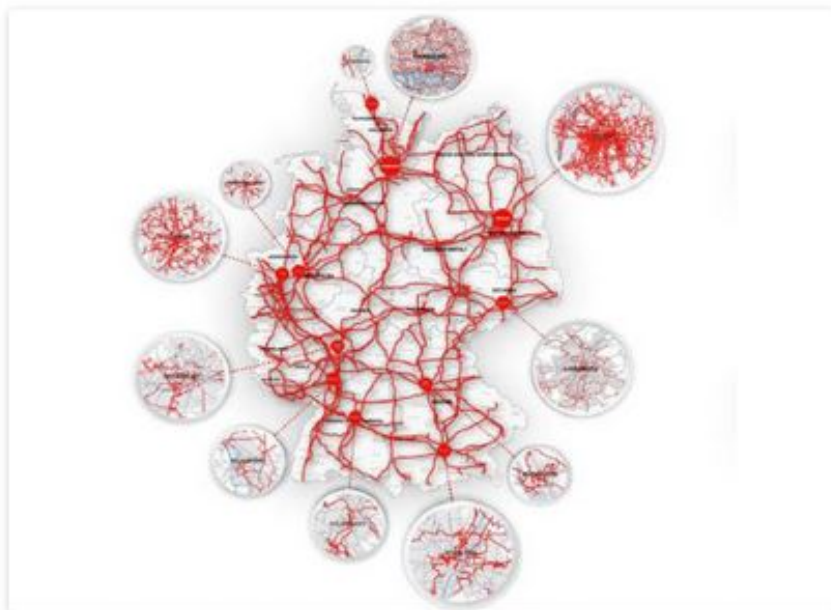
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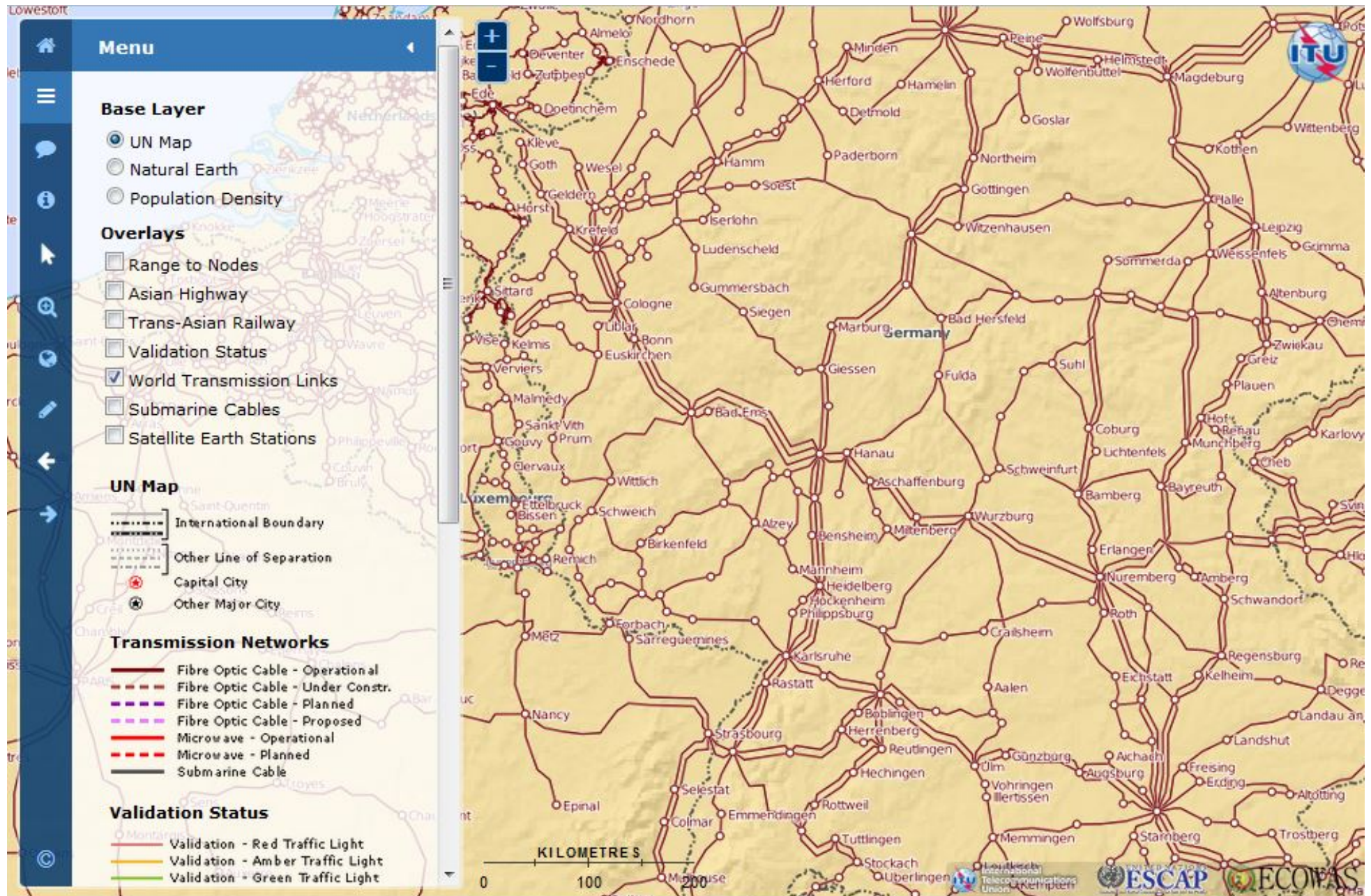
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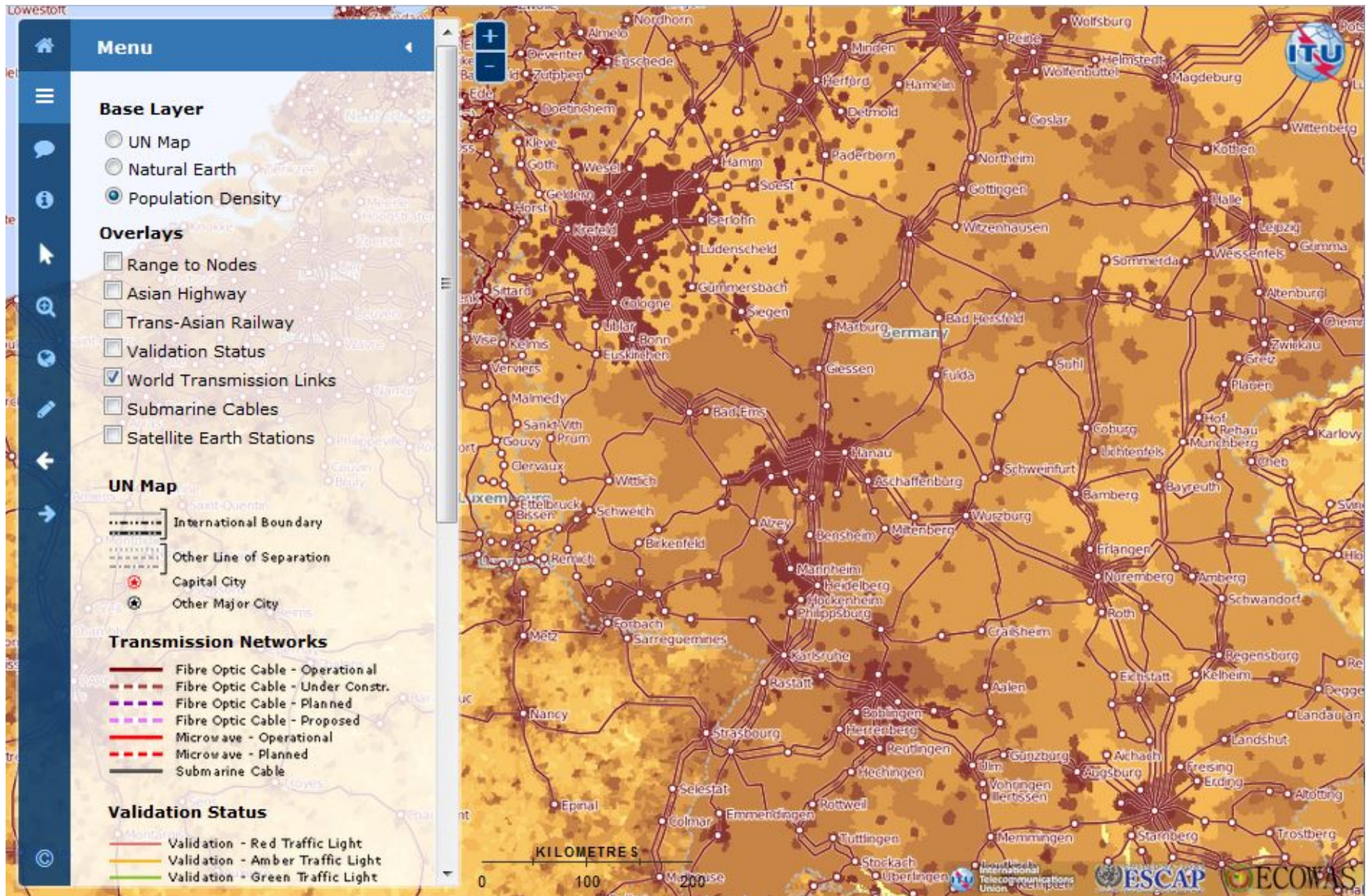


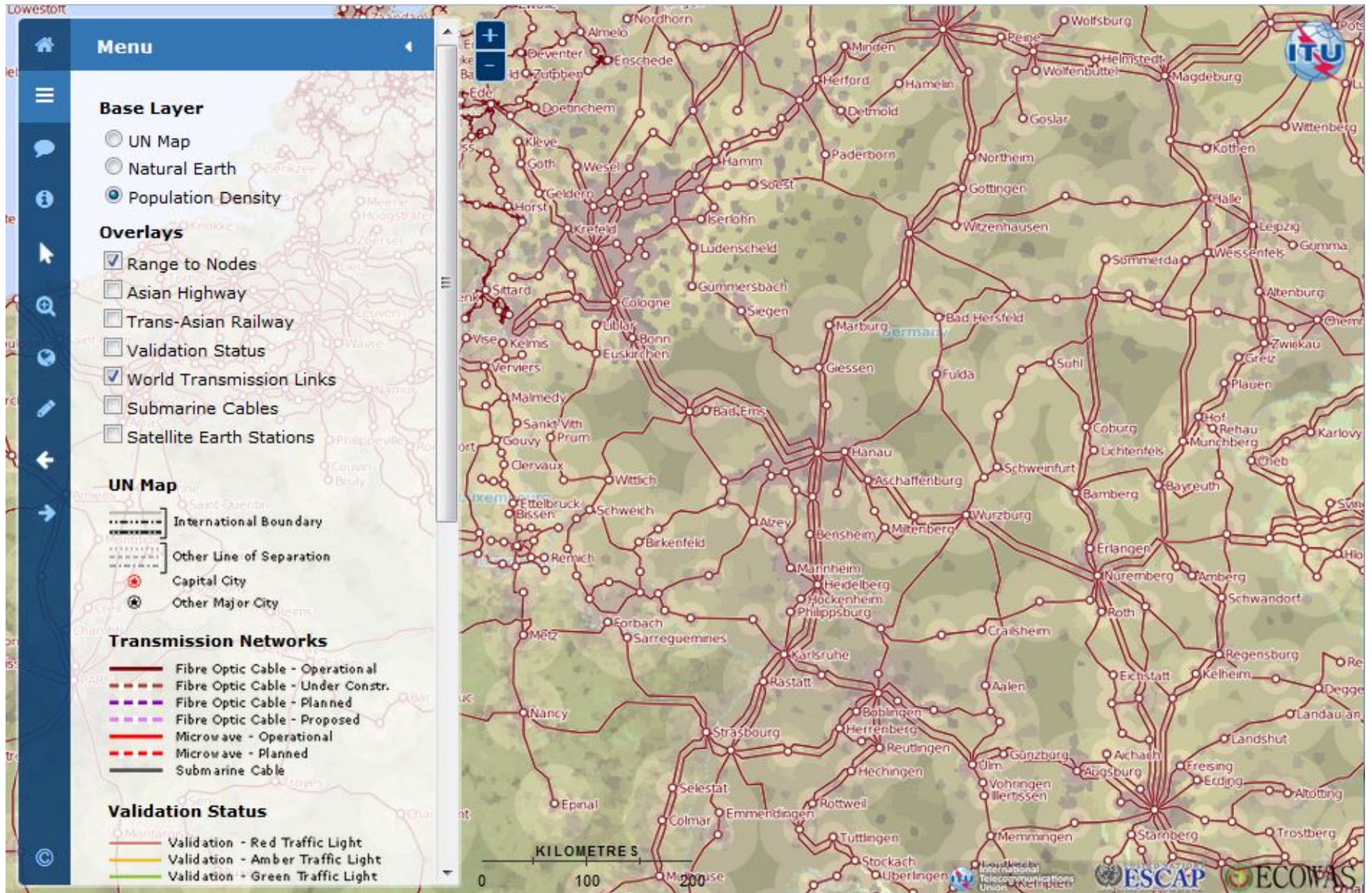
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Summary

- The scope of IMT-2020 is much broader than previous generations of mobile broadband communication systems.
- IMT-2020 will be a cornerstone for all of the activities related to attaining the goals in the 2030 Agenda for Sustainable Development
- Mapping the high-speed traffic pathways will help to overcome the missing gaps and provide readiness for future technologies (such as 5G) to come.

Thank you

We value your feedback and contributions. Please log in using your ITU TIES username and password, to submit comments, feedback and to validate the information shown in the map through the Validation Framework.

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