Broadband mapping & development in the Republic of Serbia

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Talk overview

- DSO transition
- Digital dividend 1 & 2
- Spectrum menagment
- Digital Agenda for Serbia
- BB strategy
- Future projects

DSO transition

- Ministry or Trade, Tourism and Telecommunications was leading the process.

- Other key institutions:
  – Ministry of Culture and Information,
  – NRAs: Regulatory Agency for Electronic Communications and Postal Services (RATEL) and Regulatory Authority for Electronic media (REM),
  – PE ETV – network operator,
  – Public broadcasting services, and national, regional and local broadcasters.

- Throughout IPA project "Assistance to transition from analogue to digital broadcasting in Serbia", both assistance for broadcasting equipment purchase and expert help were obtained.

Transition

- March 2012: Initial network for testing of digital broadcasting
  - Signal broadcasted from 15 locations, population coverage was 15%

- November 2013: Extended initial network
  - Signal broadcasted from 35 locations, population coverage was 75%

- 2015: Final network
  - Population coverage is over 97%

- DSO ended on 7 June 2015.

How to maximize Digital Dividend?

Republic of Serbia
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Trade, Tourism
and Telecommunications

- **Efficient Broadcasting Standard** DVB-T2 – enables high bit rates in TV channel 8MHz (UHF).

- **Efficient compression** allows small bit rates for satisfactory video/audio quality (MPEG-4, part 10, i.e. ITU-T Recommendation H.264 AVC),

- **Single Frequency Networks** introduction over the allotments enable efficient spectrum usage.

- **Efficient TV Distribution Network Architecture** (headends within a decentralized network)

Digital dividend 1

- Spectrum of the "digital dividend 1" has been offered to operators for further enhancement of the mobile broadband.

- Public bidding procedure was carried out by RATEL, in November 2015, in line with the Rulebook on minimum requirements for the issuance of individual licences for the usage of radio frequencies in 791-821/832-862 MHz radio frequency bands, adopted by the Ministry.

- All 3 mobile operators providing services in Serbia obtained 2x5MHz blocks.

- Total price: 105.053.111 EUR

Mobile electronic communications market

- Spectrum refarming in 1800MHz finished.

- Technology neutrality is enabled.

- LTE is implemented (Advanced LTE – 1800/800 Bands).

- Mobile operators needed more spectrum – the 1800MHz auction finished in 2015th (21MEuros for 3x10MHz).

- Broadband in urban areas

700MHz

- Maximization of the digital dividend 1 and 2
  - Decision on broadcasting standard - DVB-T2,
  - Decision on compression standard - MPEG-4 p.10;
  - Design of the final network based on the SFN network type within allotments;

- Digital dividend 2 is ready to be used for mobile broadband

- Selling of *digital dividend is expected to stimulate the investment in the broadband* access networks.

Mobile broadband bit rates in Serbia

Speed (Mbps)	Share	Number of subscribers (including 3G)	4G > 50Mbps
1-2	36,36 %	1.718.699	NA
2-10	61,40 %	2.902.314	
> 10	2,24 %	105.882	

Source: RATEL

A Digital Agenda for Europe

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - COM (2010) 245

A Digital Agenda for Serbia until 2020

1. *Electronic Communications Strategy from 2010 until 2020*
2. *Information Society Strategy from 2010 until 2020*

Adopted in 2010

Broadband development goals

✓ **Strategy for Information Society Development**

"High quality Internet with speed above 100 Mbps should be available for all citizens of Serbia until 2020."

✓ **Strategy for Electronic Communications Development**

"It is necessary that Republic of Serbia reach the following goals:

...

- Increase of networks availability for all users;

- Providing broadband access by FTTH/B/C to all users;

- Broadband services with speed rate of at least 100 Mbps;

- Allocation of 120 MHz band (digital dividend) for mobile broadband access"

The evaluation of the ICT status in the Republic of Serbia

- Insufficient broadband access

- Low speeds

- Insufficient offer of different services,

- Developed broadcasting market,

- There is a need for introduction of coordination mechanisms connecting the actions of different stakeholders.

Broadband Cost Reduction Directive

Re...

and

- Access to infrastructure information – enabling sharing of the costs
- Coordination of civil works – do it once
- Dispute settlement bodies and single information points – speed up permit granting
- "Broadband-ready" label on new buildings

- Most of the issues have been introduced by the Broadband Strategy and its Action Plan,
- Rulebook on technical and other requirements for construction of infrastructure required for installation of electronic communications networks, associated facilities and electronic communications equipment during construction of commercial and residential buildings

Broadband Strategy

Main goals of Broadband Strategy

- Increasing competitiveness on the electronic communications market;

- Increasing the network availability to all users;

- Providing broadband access on the principle of FTTx to all users;

- Defining the framework for sustainable development and exploitation of broadband networks and services;

- Harmonization of the Radio frequency allocation plan with the international one (EU Plan);

- Introducing technological neutrality as one of the main principles of the Electronic Communication Law (adopted in 2010);

Broadband technologies in Serbia

Population – 7.2 mil.

3G subscribers – 4.2 mil.

Broadband subscriber (xDSL, cable, wireless, mobile, FTTx) – 1.46 mil.

47.4%

25.7%

5.5%

1.7%

19.7%

- ADSL
- Cable
- Wireless
- Mobile
- Other
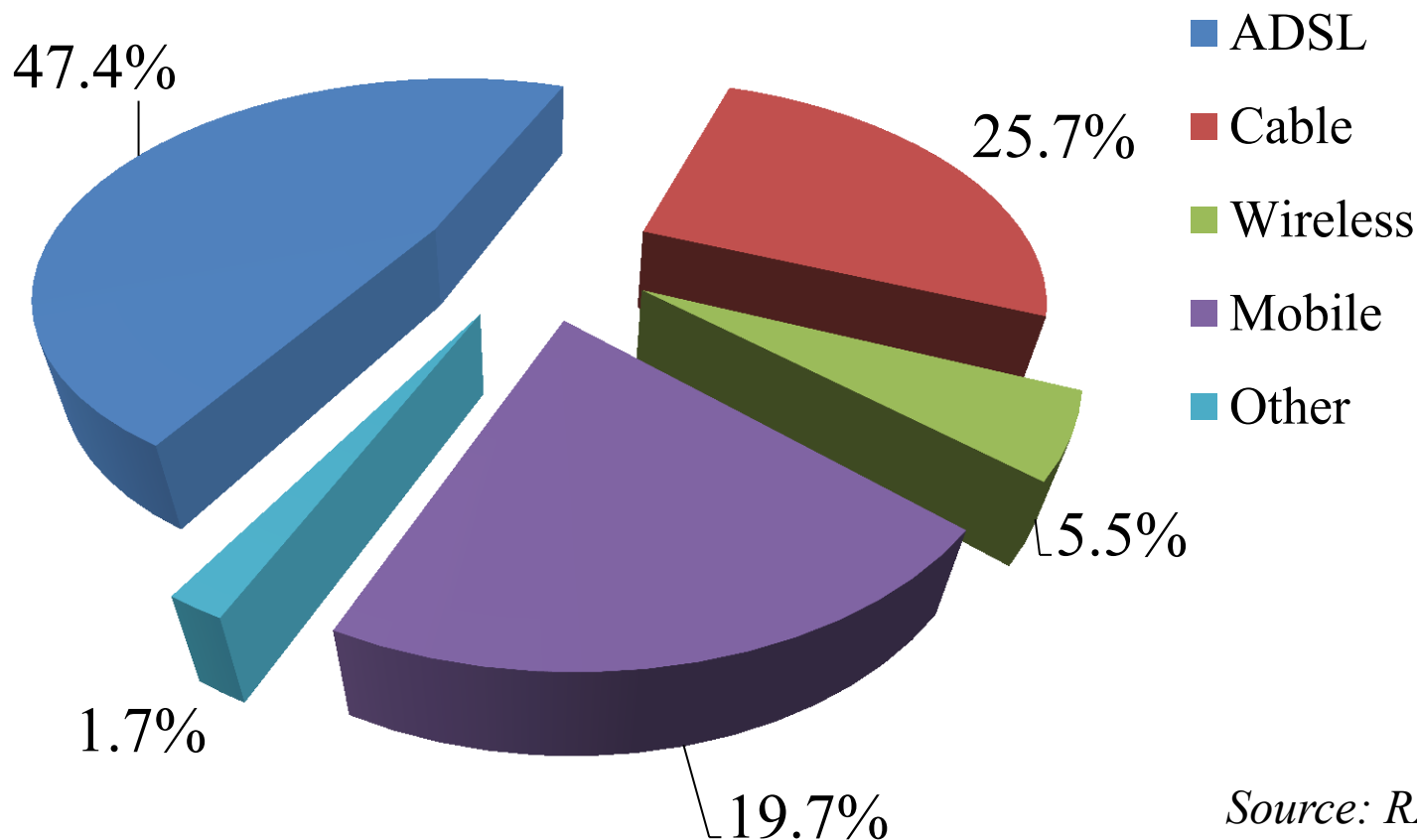
Source: RATEL

Global Competitiveness Index – Serbia Technological readiness 2015.

	%	Rank (of 143 countries)
Individuals using Internet	51,5	65
Fixed broadband Internet subscriptions/100 pop	14,2	50
International Internet bandwidth (kb/s per user)	108,9	27
Mobile broadband subscriptions/100 pop	53,7	39

The Global Competitiveness Report 2015, World Economic Forum

# National electronic communications network
OPEN NETWORK with OPEN SREVICES

TV and radio distribution network

IPTV provider

IP Virtual Service Providers

VoIP provoder

New services

E-government

Multiservice platform

EC network for Special srvices

OPEN SERVICE MODEL

DTV network

Network A

Network B

Special services network

Optical network 1

Right of way network

Optical network 2

Regional optical network

Real service providers

Broker of services to users

One or multiple Networks of the sar Architecture.

Consolidation of network resources

Internet of Things- Internet of Everything

Дигитална дивиденда
790-862 MHz
Блокови 2x30 MHz (+12 MHz)

Примена концепта
макро → микро → пико

2,6 GHz опсег
2500-2690 MHz
Блокови 2x70 MHz + 50 MHz
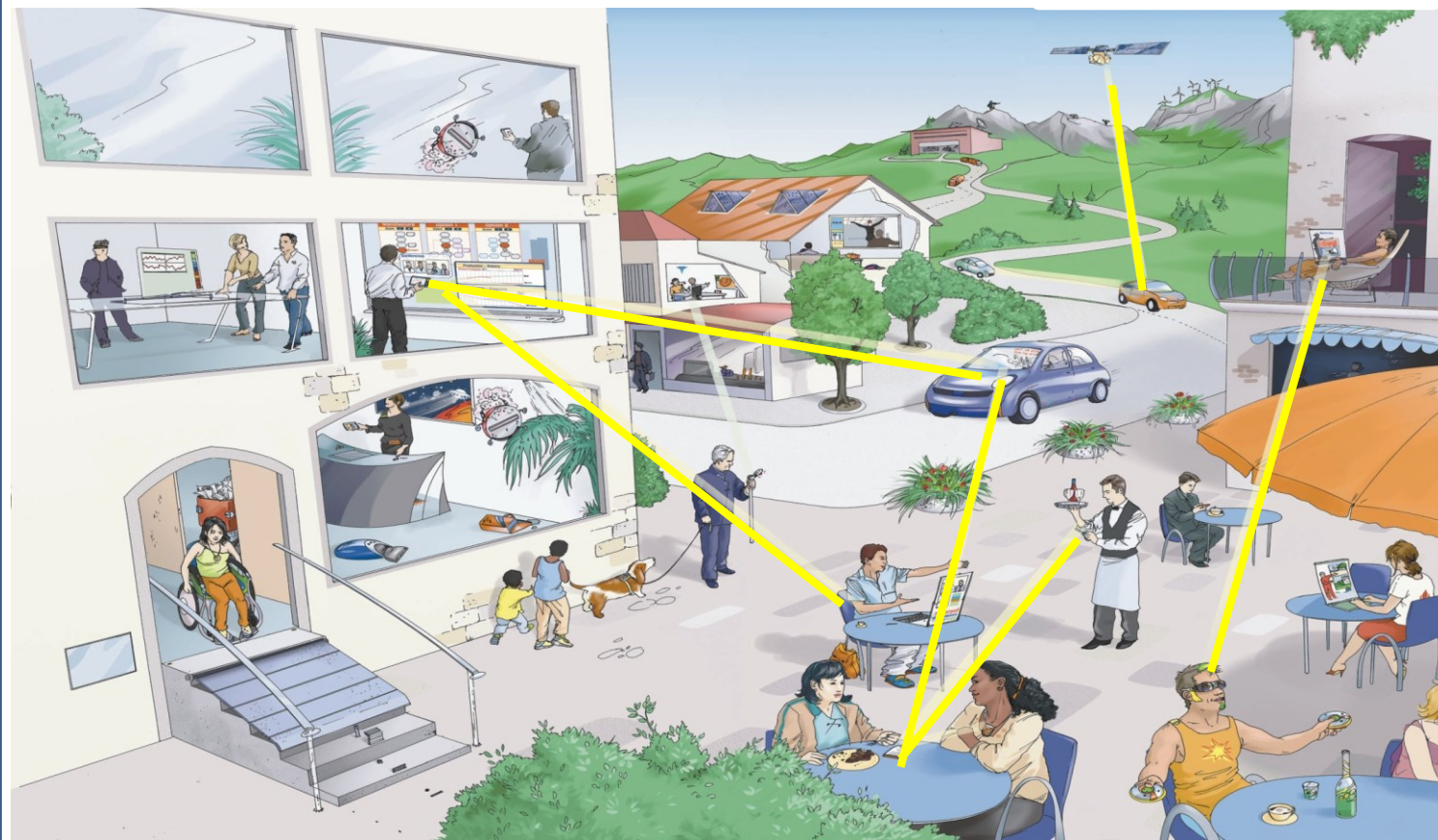
*Future projects*
- developing BB infrastructure

Why to think about mapping of telecom infrastructure?

- The main reasons:

- very low Internet penetration because of lack of infrastructure

- total lack of information about existing infrastructure

- increase investment in the telecommunications sector

- accelerate investments co – financed by EU funds

- accelerate the construction of new generation networks

- identifying rural regions for pilot projects

Maps- network location, network coverage

Republic of Serbia
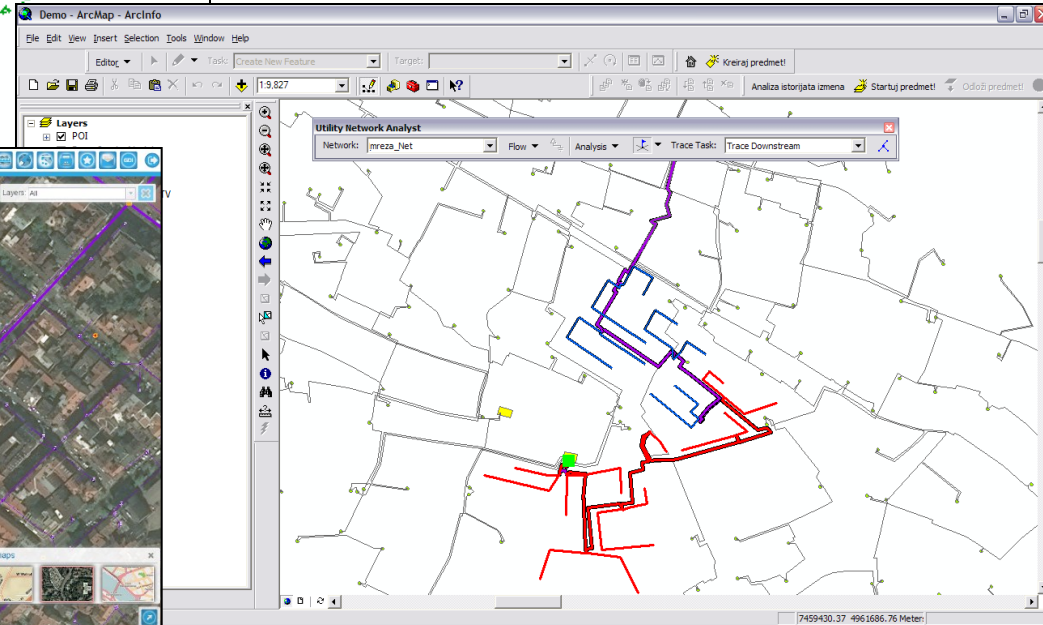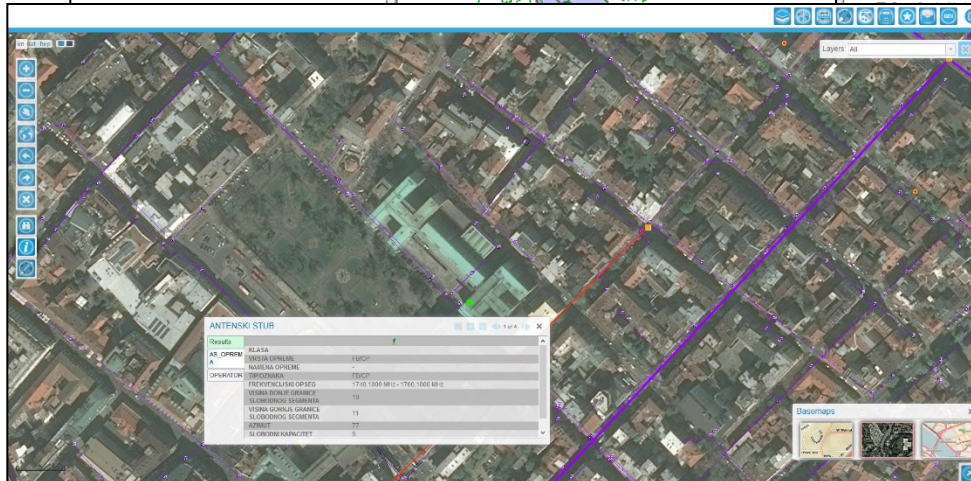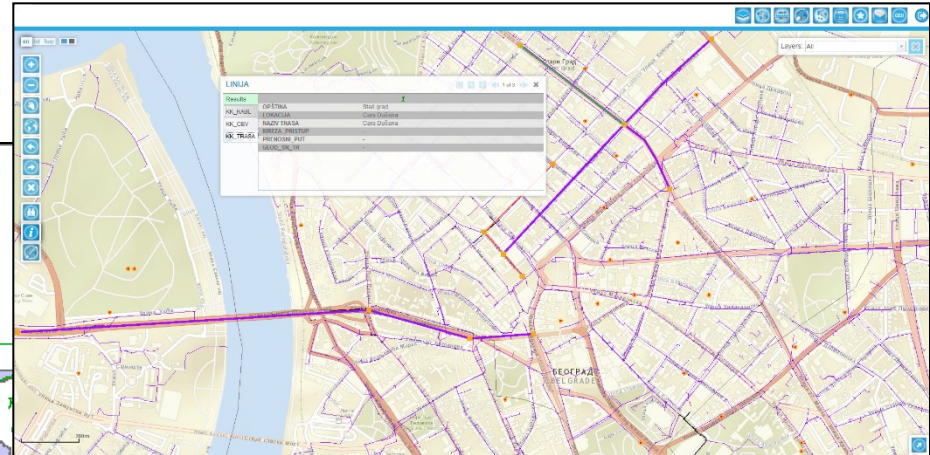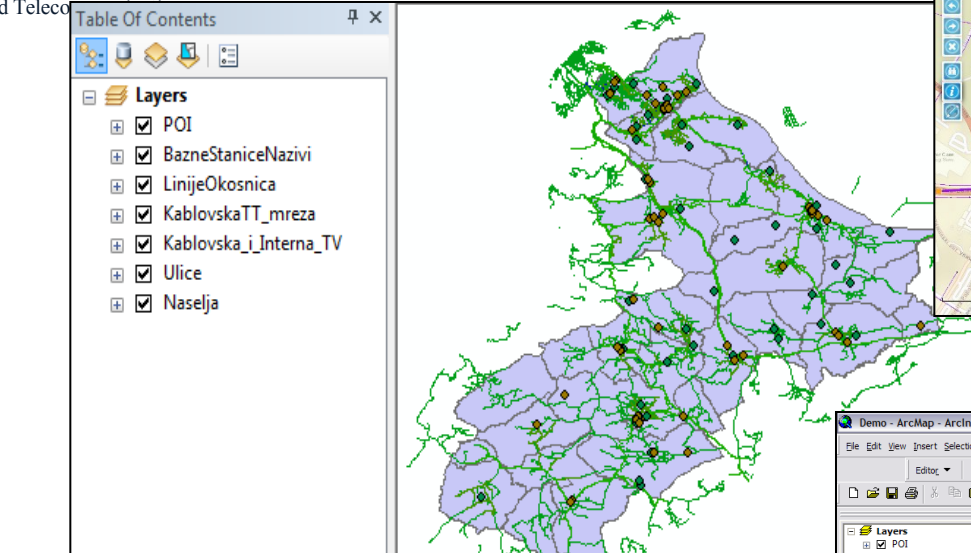
Ministry of
Trade, Tourism
and Teleco...

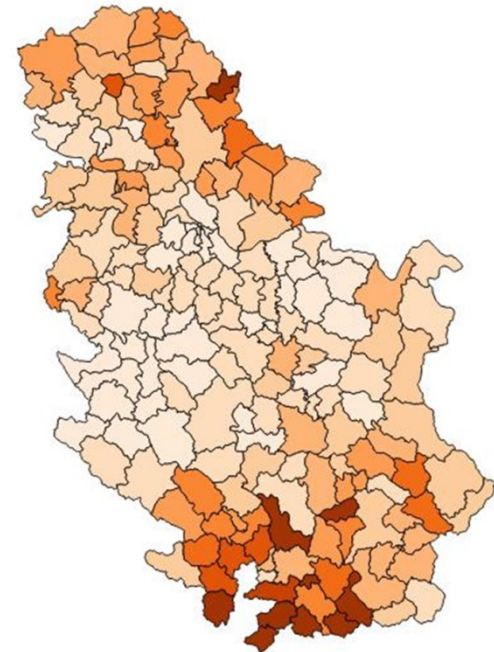# Data capture process - Services

- Data divided on access technology:

  - DSL, VDSL, DOCSIS 1.0/2.0, DOCSIS 3.0, FTTP

  - WiMAX, 2G, 3G, HSPA, LTE, 4G

- Download / upload speed

- ARPU

- QoS

The existing state-owned capacities

- There are fragmented core network capacities in the RS,

- Broadband access networks are not developed/ deployed enough,

- There are underutilized existing optical system networks in Serbia, thus it is necessary to provide the conditions for their use.
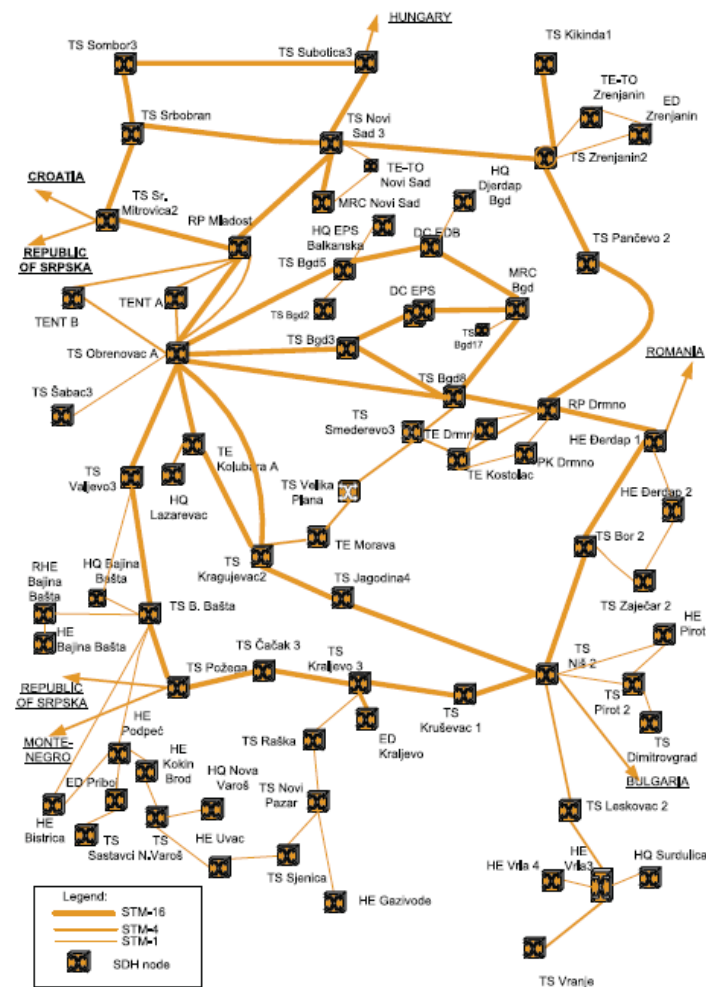
Electric Power Industry of Serbia, Public Enterprise

Physical structure of the EPS optical network

EPS transmission network with SDH nodes and link capacities

Legend:
- STM-16
- STM-4
- STM-1
- SDH node

25

Electric Energy Transmission and Transmission System Control (EMS)

Republic of Serbia
Ministry of

and

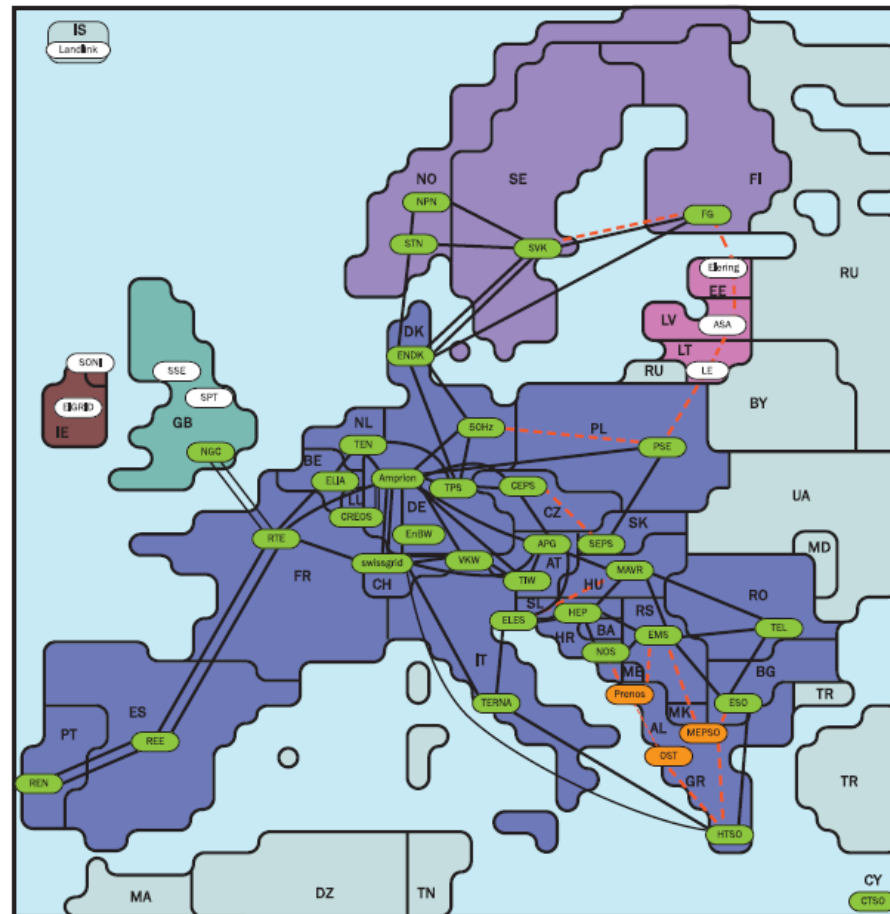**Optical Telecom System (2013)**
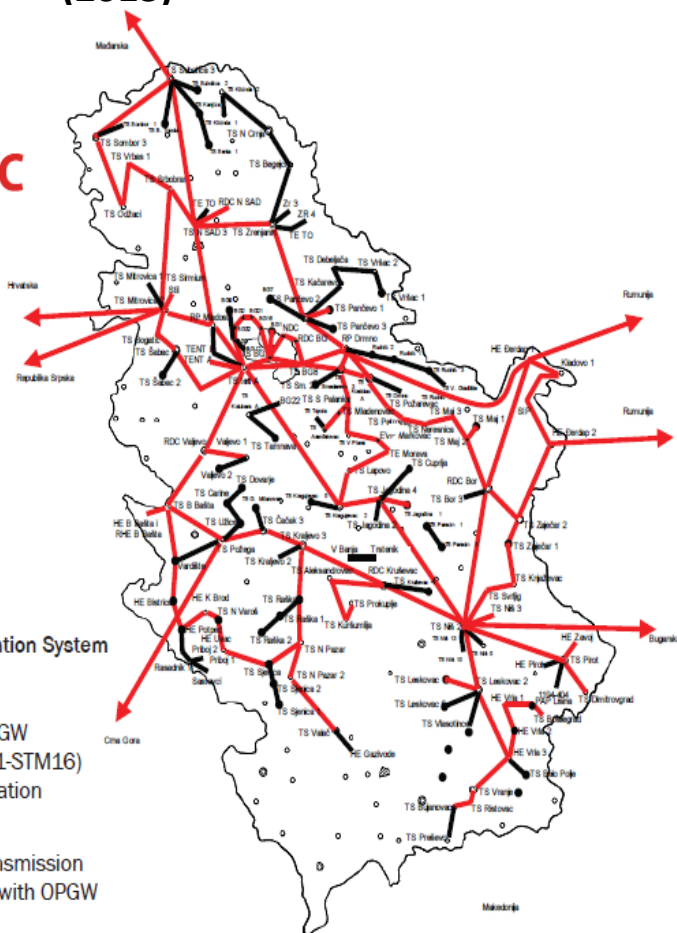
EMS Optical
Telecommunication System
(end of 2011)

— 3729 km of OPGW
with SDH (STM1-STM16)
devices in operation

— EMS power-transmission
lines equipped with OPGW
(end of 2013)

Electronic Highway Backbone connections
Napomena: Črna Gora i Makedonija nisu povezane na EH
Albanija nije član UCTE/ENTSO E

Academic network in the Republic of Serbia AMRES

InterCitys leased lines optical network

Optical InterCitys infrastructure Project SEELight

NoBAL NGA network

- A trilateral project of cross-border empowerment of national public networks of Bulgaria, Romania and Serbia

- Establish cross-border links between the NGA public networks of the three countries

- Invest in NGA broadband in border regions to reach the Digital Agenda 2020 indicators

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