ITU Cross Regional Seminar on Broadband Access (Fixed, Wireless including Mobile) for CIS, ASP and EUR Regions

Session 5

Case studies on BWA Network Planning

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ITU Consultant, Bulgaria

Content of the presentation :

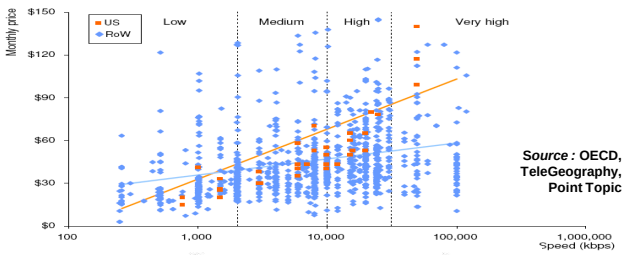
- **Wireless Broadband Access network planning**
- **Case study 1 –** ***Mali (for Operator) :***
  - ***WBA for Bamako urban and suburban area***
- **Case study 2 –** ***Georgia (for Administration) :***
  - ***WBA for Tbilisi suburban rural area***
- **Case study 3 –** ***Tajikistan (for Regulator) :***
  - ***WBA for Dushanbe urban and suburban area***
- **Case study 4 –** ***Moldova (for Administration) :***
  - ***WBA network segment for the capital Chisinau***
  - ***WBA network segment for typical rural area***
- **Case study 5 –** ***Bulgaria (for University) :***
  - ***WBA network segment for small town***
  - ***WBA network segment for rural area***

Broadband in the telecom networks

BB by speed of connection:

- **Low speed (256kbps – 2Mbps)**
- **Mediumspeed (2.5Mpbs-10Mbps)**
- **High speed (10Mpbs-32Mbps)**
- **Very-high speed (above35Mbps)**

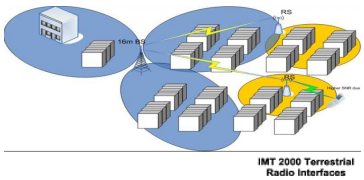
Offered broadband connection – by price and speed



Source : OECD, TeleGeography, Point Topic

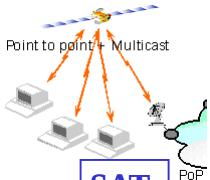
NGN services requiring broadband

Wireless broadband access technologies - WBA



IMT 2000 Terrestrial Radio Interfaces

Terrestrial Wireless



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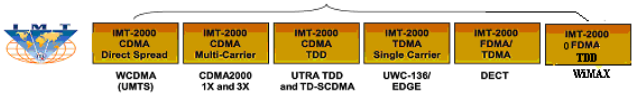
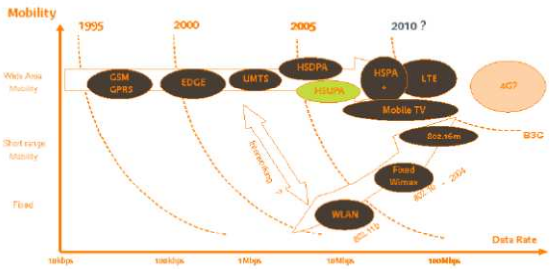
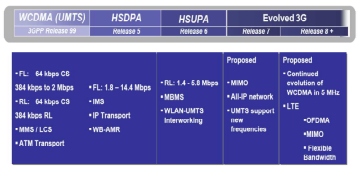
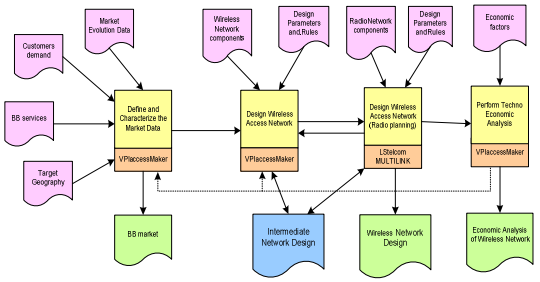
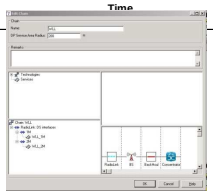




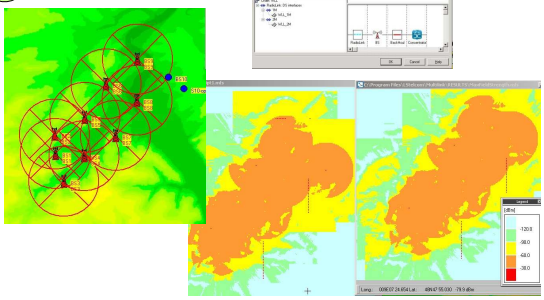


BWA Network Planning

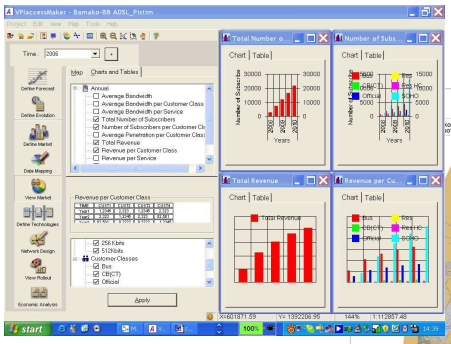




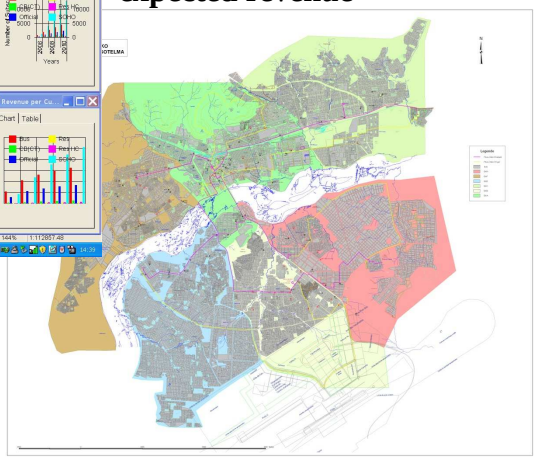
- *Services/Customers modeling*
- *BWA Technology modeling*
- *Optimization of access network*
- *Design of radio network*
- *Feasibility studies*



Case study Mali (Bamako) – BB market

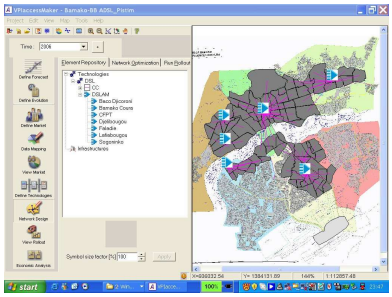


BB Customer market and expected revenue

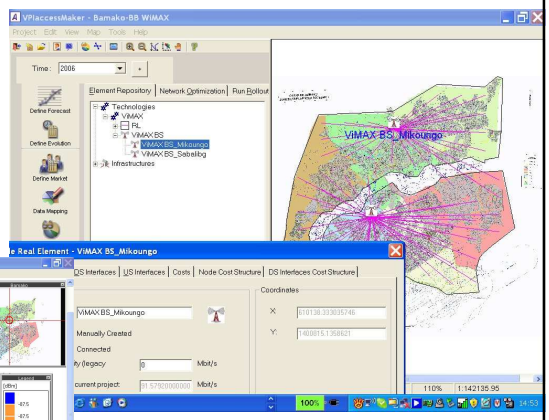


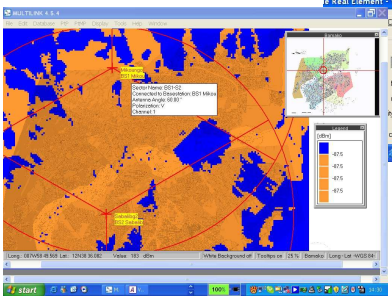
Wireline for urban and wireless overlay for urban and for the suburban areas

Case study Bamako – BB Wireless overlay network



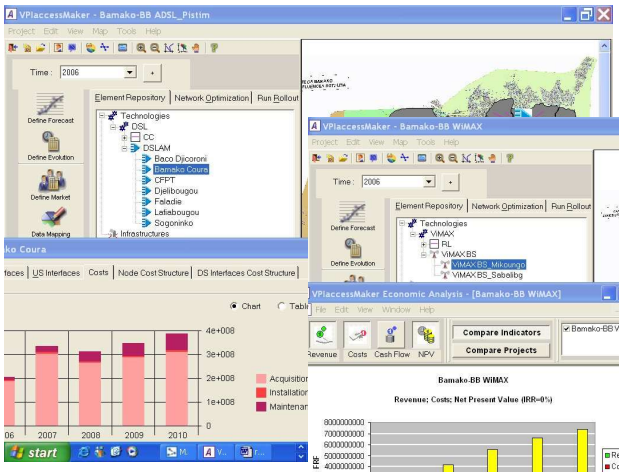
Wireline BB in the urban area



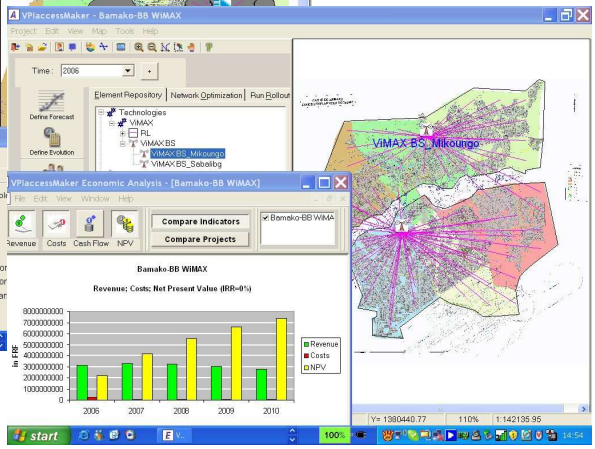


Wireless overlay network in the urban area and for the suburbs

Case study Bamako - Economic Analysis :

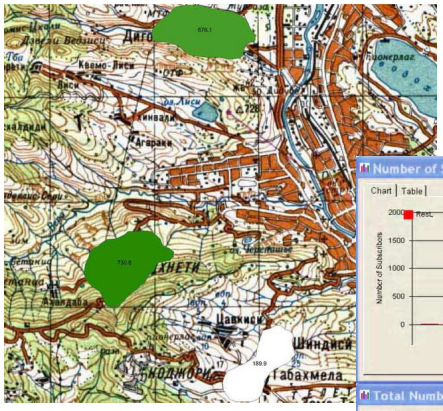


Revenues, Costs, NPN



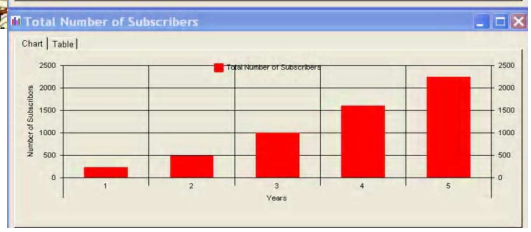
Costs per network element

Case study Georgia (Tbilisi) – suburban area :



Tbilisi suburban region (Tskneti, Dighomi, Tabaxmela, Chindisi)

Number of customers per village (year +4)



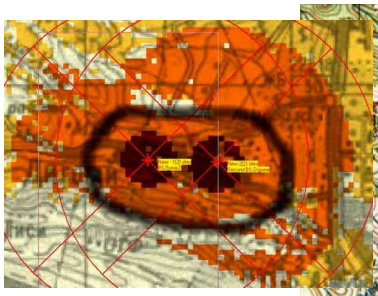
Number of BB customers per customer class

Case study Tbilisi suburbs - mountain rural area :

Wireline (xDSL)
vs.
Wireless (WiMAX)

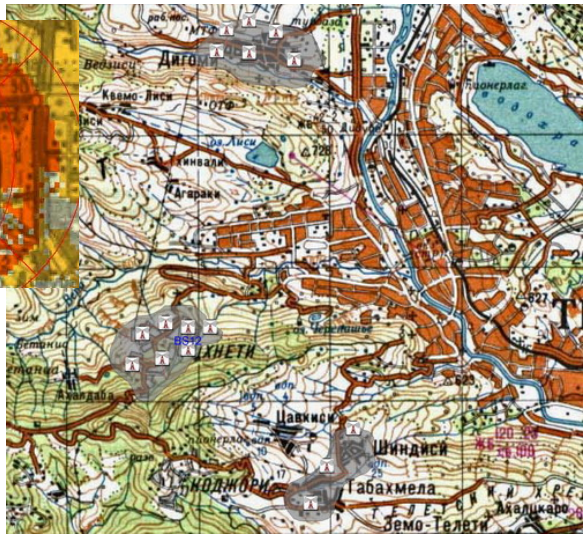
Results for wireline

Case study Tbilisi suburbs – Wireless access network :



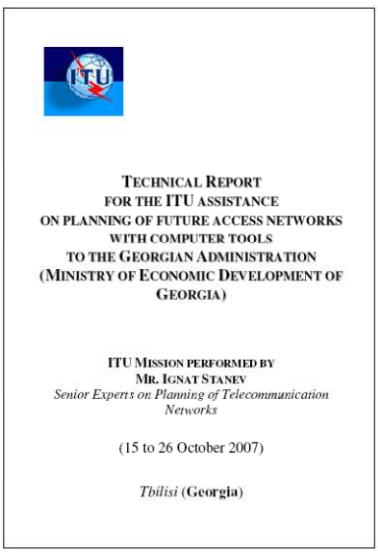
Year +2

Results for wireless (WiMAX)



Year +5

Case Study Georgia - BB access plan

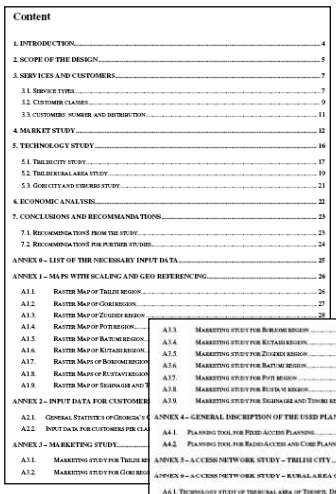


TECHNICAL REPORT
FOR THE ITU ASSISTANCE
ON PLANNING OF FUTURE ACCESS NETWORKS
WITH COMPUTER TOOLS
TO THE GEORGIAN ADMINISTRATION
(MINISTRY OF ECONOMIC DEVELOPMENT OF GEORGIA)

ITU MISSION PERFORMED BY
MR. IGNAT STANEV
Senior Experts on Planning of Telecommunication Networks

(15 to 26 October 2007)

Tbilisi (Georgia)



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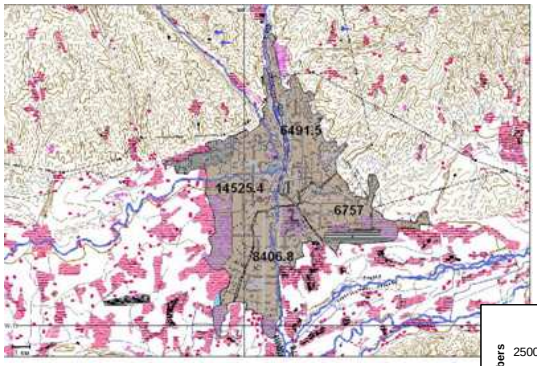
Case study Tajikistan (Dushanbe) – urban and suburban area :

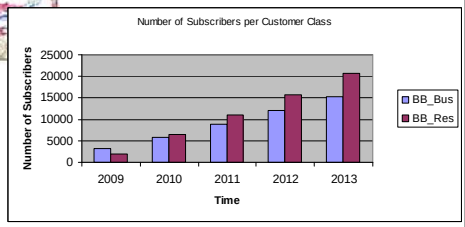


Dushanbe urban (4 districts)

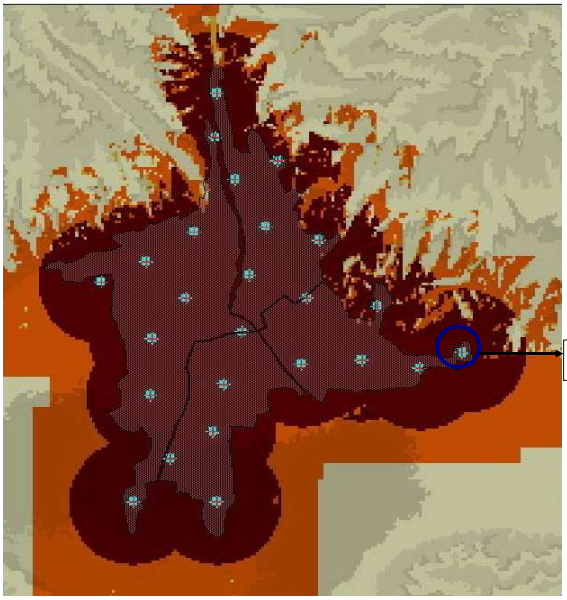
Year	Total Number of Customers	Class 1 : Residential	Class 2 : Business
5	36181	20785	15396

Number of BB customers per district (year +5)

Number of BB customers per customer class



Case study Dushanbe – access network for urban area :

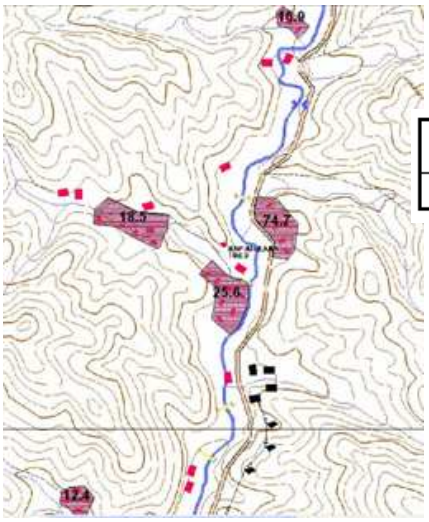


Dushanbe city (4 districts)

Wireless overlay

Technical solution WiMAX for VoIP, Data, Internet, IPTV/Video (25 BSs)

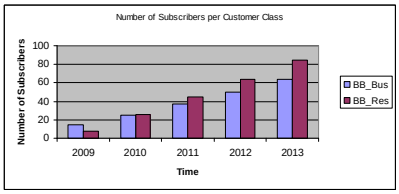
Case study Dushanbe –suburban area :



Number of customers per village (year +5)

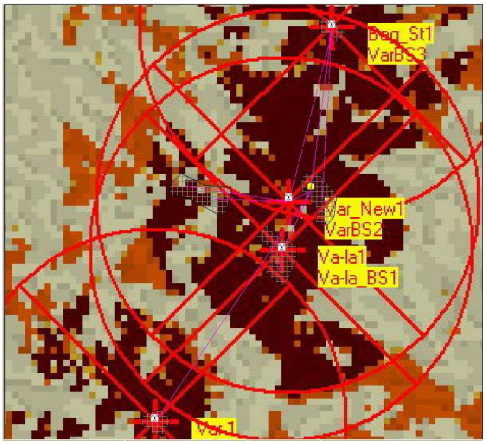
Dushanbe suburban (sample with 5 villages)

Year	Total Number of Customers	Class 1 : Residential	Class 2 : Business
5	148	84	64



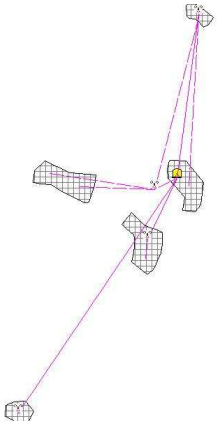
Number of customers per customer class

Case study Dushanbe suburban – wireless access network :

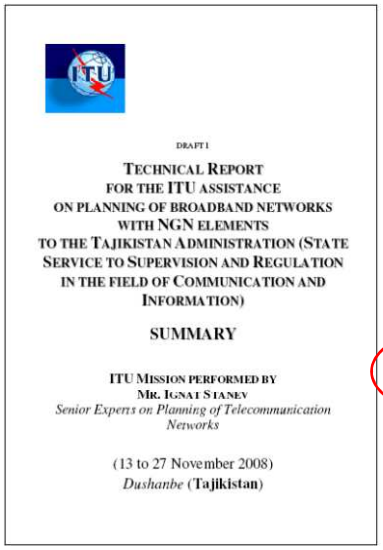


Results for wireless (3 BS - WiMAX)

Dushanbe suburban (sample with 5 villages)



Case Study Tajikistan - BB access plan



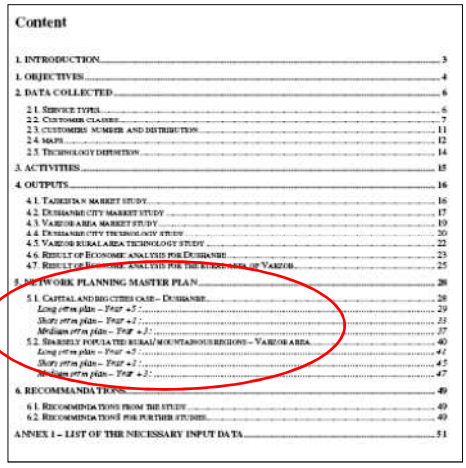
DRAFT 1

TECHNICAL REPORT
FOR THE ITU ASSISTANCE
ON PLANNING OF BROADBAND NETWORKS
WITH NGN ELEMENTS
TO THE TAJIKISTAN ADMINISTRATION (STATE
SERVICE TO SUPERVISION AND REGULATION
IN THE FIELD OF COMMUNICATION AND
INFORMATION)

SUMMARY

ITU MISSION PERFORMED BY
MR. IGNAT STANEV
Senior Experts on Planning of Telecommunication Networks

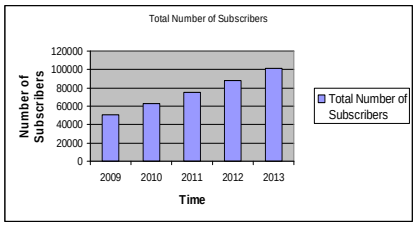
(13 to 27 November 2008)
Dushanbe (Tajikistan)



Content

Case study Moldova (Chisinau) - BB market :

➢ Pessimistic scenario (20%)



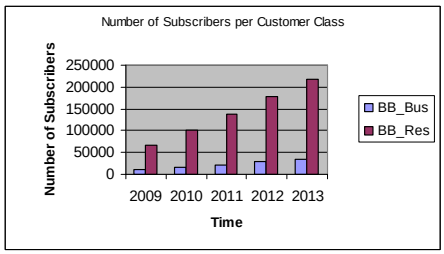
Estimated market segment

year	xDSL	WiMAX	FTTB	LAN+CATV
2009	67.4%	0.1%	17.4%	15.1%
2009	50916	76	13144	11407
2013	70%	2%	23%	5%
2013	101238	2893	33264	7231
Difference	50322	2817	20119	-4176

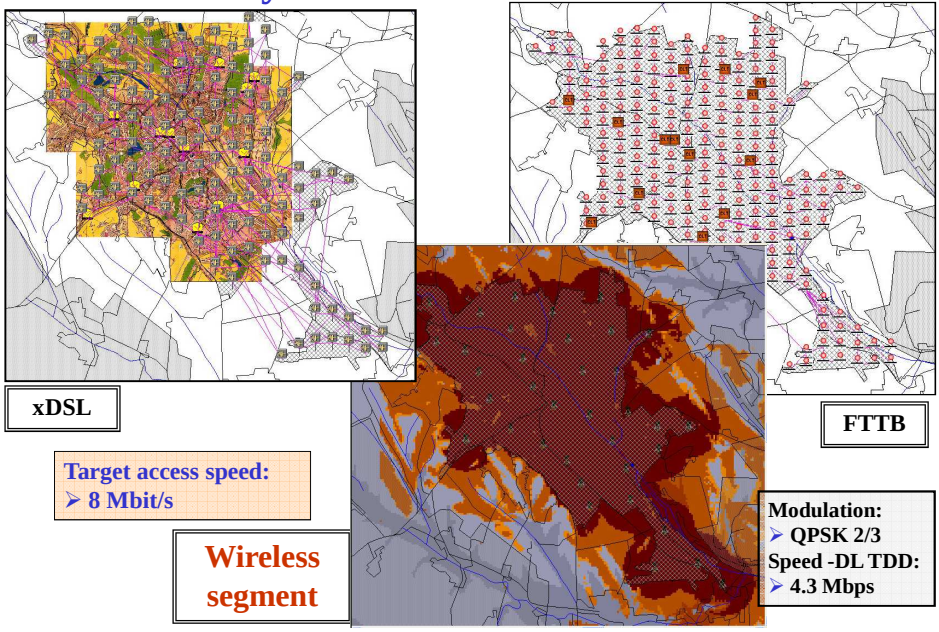
➢ Optimistic scenario (35%)

Estimated market segment

year	xDSL	WiMAX	FTTB	LAN+CATV
2009	67.4%	0.1%	17.4%	15.1%
2009	50916	76	13144	11407
2013	70%	2%	23%	5%
2013	177167	5062	58212	12655
Difference	126251	4986	45064	1248



Case study Chisinau - BB access network :



xDSL

FTTB

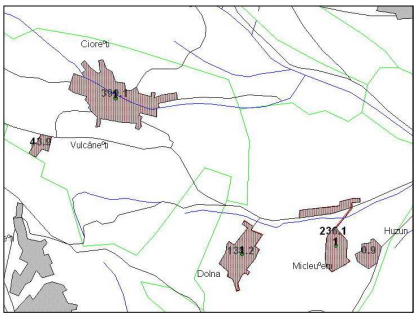
Target access speed:
- **8 Mbit/s**

Wireless segment

Modulation:
- **QPSK 2/3**

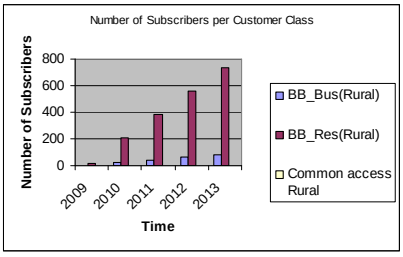
Speed -DL TDD:
- **4.3 Mbps**

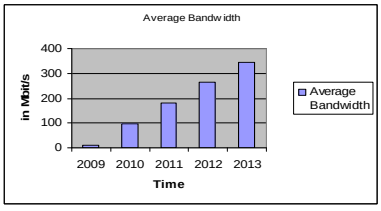
Case study for typical rural area - BB market :



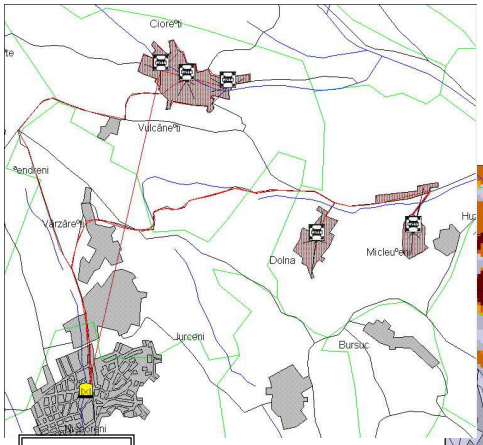
Village	Households	telephones	BB total	BB residential	BB business
Cioresti	1273	752	19	17	2
Vulcanesti	140				
Dolna	428	279			
Micleuseni	753	347			
Huzun	30				

Evolution of the xDSL customers :
- **10% penetration goal**
- **90% residential; 10% business**
- **1 common access point per village**
- **market segment**
  - **if xDSL exists -70% of the market**
  - **if only telephones -50% of the market**





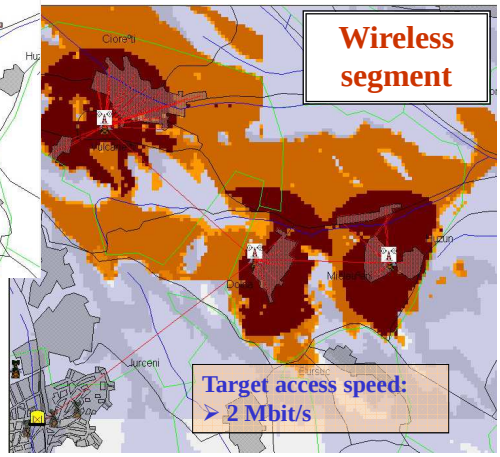
Case study rural - BB access network :



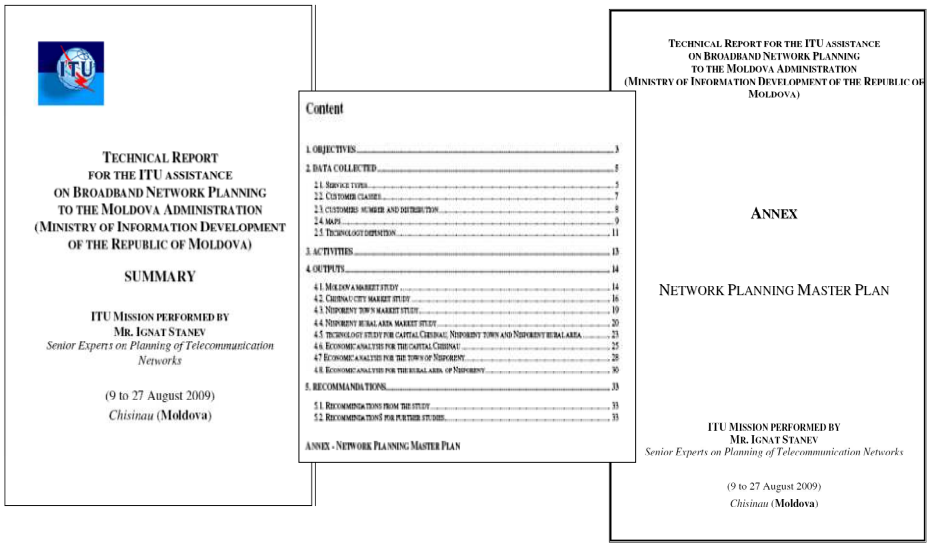
xDSL

Market segment of xDSL :
- **if xDSL exists -70% of the market**
- **if only telephones -50% of the market**

Market segment of WiMAX :
- **if xDSL exists -30% of the market**
- **if only telephones -50% of the market**
- **if nothing -100% of the market**



Case Study Moldova - BB access plan



TECHNICAL REPORT
FOR THE ITU ASSISTANCE
ON BROADBAND NETWORK PLANNING
TO THE MOLDOVA ADMINISTRATION
(MINISTRY OF INFORMATION DEVELOPMENT
OF THE REPUBLIC OF MOLDOVA)

SUMMARY

ITU MISSION PERFORMED BY
MR. IGNAT STANEV
Senior Experts on Planning of Telecommunication Networks

(9 to 27 August 2009)
Chisinau (Moldova)

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ANNEX - NETWORK PLANNING MASTER PLAN

TECHNICAL REPORT FOR THE ITU ASSISTANCE
ON BROADBAND NETWORK PLANNING
TO THE MOLDOVA ADMINISTRATION
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ANNEX

NETWORK PLANNING MASTER PLAN

ITU MISSION PERFORMED BY
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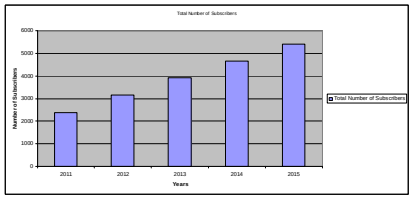
Senior Experts on Planning of Telecommunication Networks

(9 to 27 August 2009)
Chisinau (Moldova)

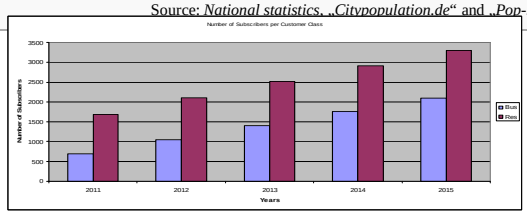
Case study Bulgaria – small town

Total number of BB customers



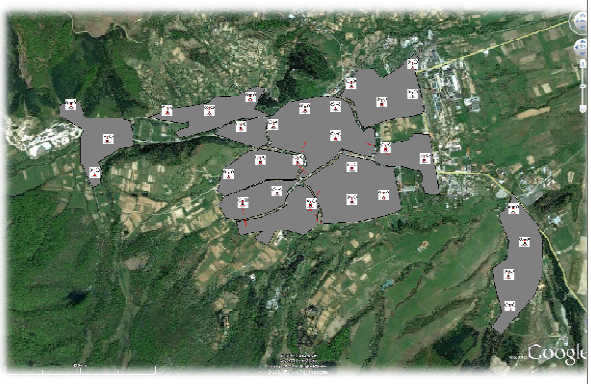
Berkoviza										
year	1946	1956	1965	1975	1985	1992	2001	2005	2007	2009
population	6 876	9 227	11 562	16 167	16 420	16 146	15 459	14 460	14 189	13 917

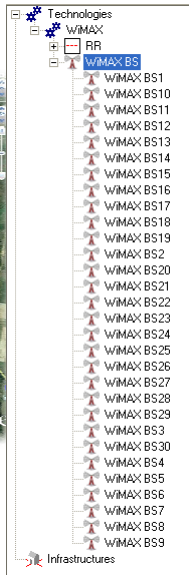
Source: *National statistics, „Citypopulation.de“* and *„Pop-stat.mashke.org“*



Number of BB customers per customer class

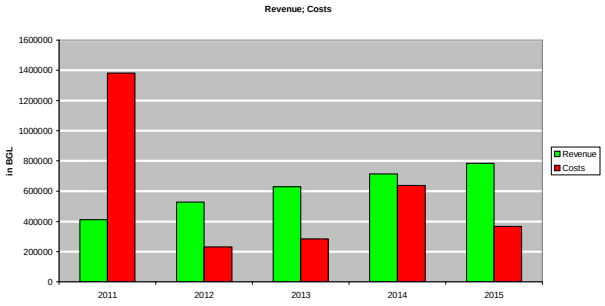
Bulgaria small town - BB access network





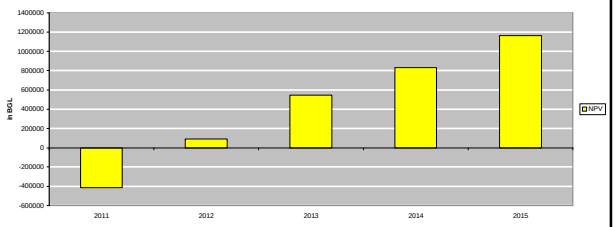
Wireless technology solution

Bulgaria small town – feasibility study



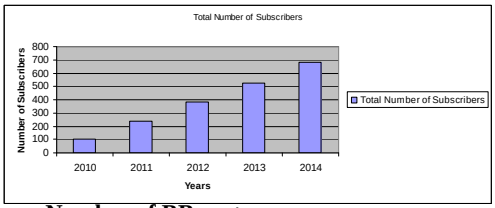
Revenue and expenses

NPV



Case study Bulgaria - rural area

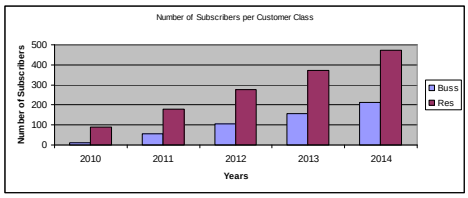
Lucky village	2005 total	2005r. men	2005 women	2006 total	2006 men	2006 women
population	3861	2062	1799	3793	2015	1778



Number of BB customers per year of the planning period

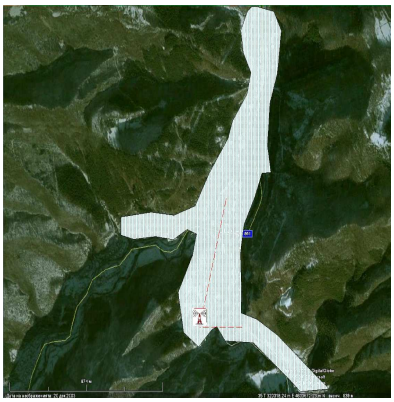
Existing number of broadband customers

	Business	Residential
Rural area	12	89



Number of BB customers per customer class

Bulgaria rural area - BB access network :



Technology wireless solution

1 WiMAX BS connected to one Router

Summary

- The case studies present the planning process that needs to be performed for planning of broadband access networks
- Planning process includes market definition, dimensioning and optimization of the access network elements, economic analysis and results.
- The BWA case studies illustrate ITU projects on assisting of developing countries