ITU-D Regional Development Forums 2010 on
NGN and Broadband for the Arab Region

"NGN and Broadband, Opportunities and Challenges"

Session 10

Case Study on Broadband Access Network Planning

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HCTP/ITC, Bulgaria

Content of the presentation :

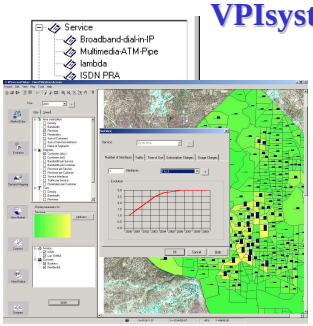
- Case studies and used planning tools
- Case study 1 – *Mali (for Operator) :*
  - *BB access network for Bamako urban and suburban area*
- Case study 2 – *Georgia (for Administration) :*
  - *Overall country BB market*
  - *BB access network for Tbilisi urban and suburban area*
- Case study 3 – *Tajikistan (for Regulator) :*
  - *Overall country BB market*
  - *BB access network for Dushanbe urban and suburban area*
- Case study 4 – *Moldova (for Administration) :*
  - *Overall country BB market*
  - *BB access network for the capital Chisinau*
  - *BB access network for Typical town*
  - *BB access network for typical rural area*

Case studies on broadband access network planning

- 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 case studies are from ITU projects on assisting of developing countries and are performed with professional NP tools, available through ITU partners

Case study tools

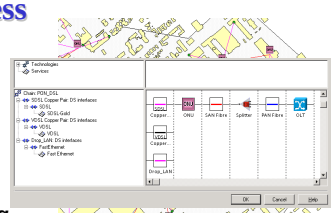
VPIsystems OnePlan Access



Market definition

Evolution forecasting

Demand mapping



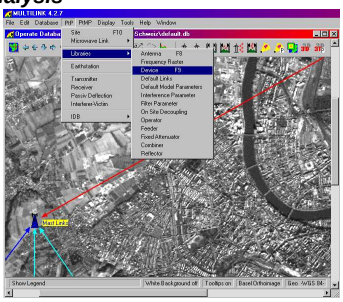
Technology modeling

Network design optimizatio

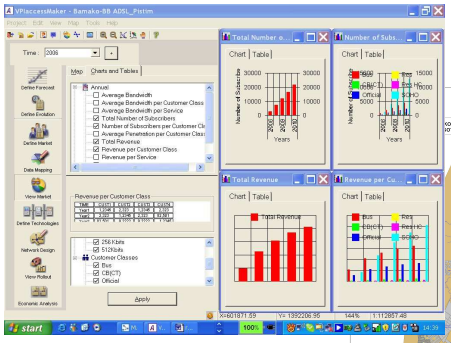
Economy analysis

LStelcom MULTIlink

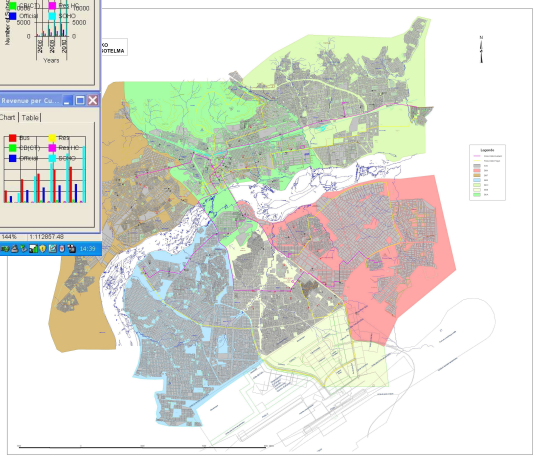
MULTIlink is a complete solution for fast microwave link engineering and designing of PMP/WLL/LMDS networks.



Case study Mali (Bamako) – BB market



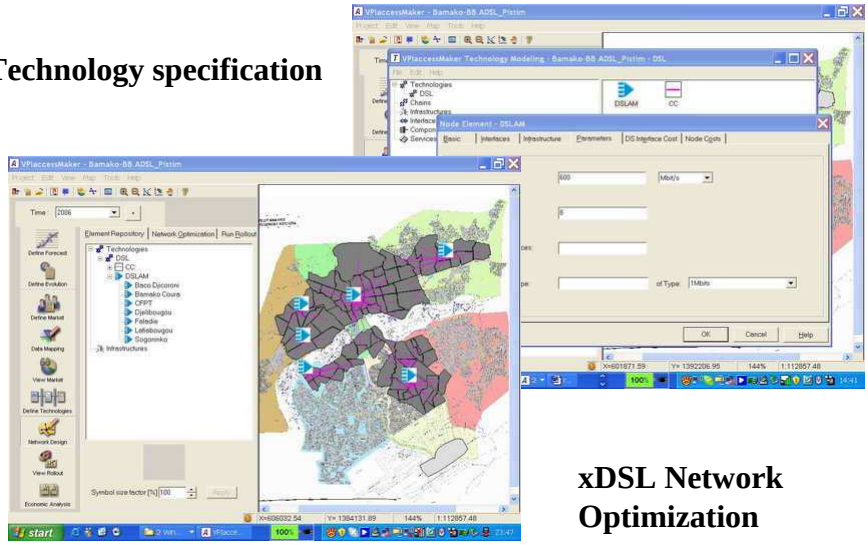
Customer market and revenue



Wireline xDSL (urban) and WiMAX overlay (urban and suburban)

Case study Bamako - xDSL access network :

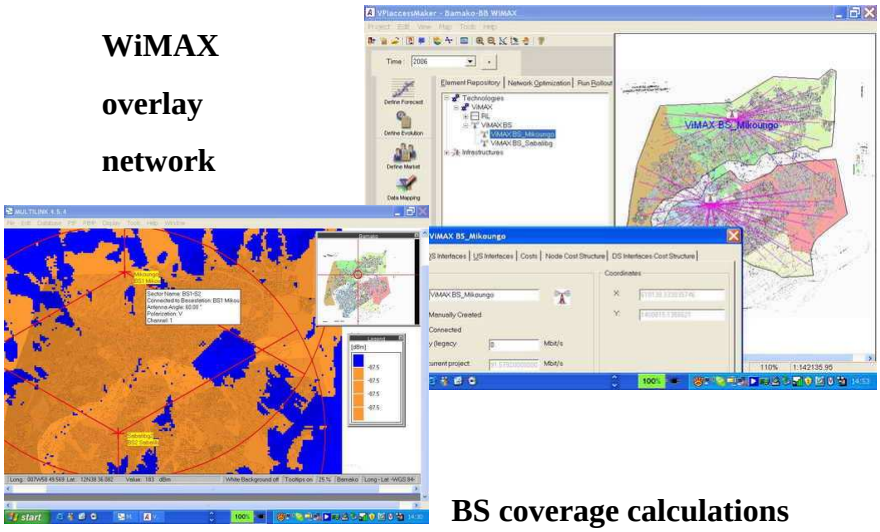
Technology specification



xDSL Network Optimization

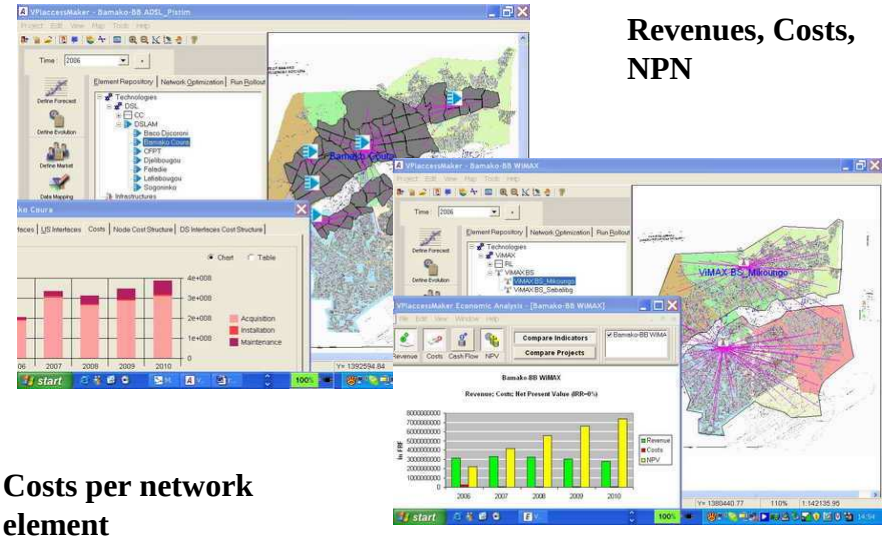
Case study Bamako – Wireless access network :

WiMAX overlay network



BS coverage calculations

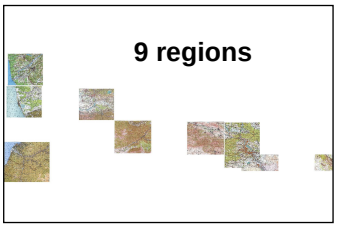
Case study Bamako - Economic Analysis :



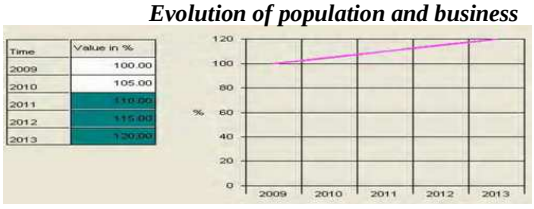
Revenues, Costs, NPN

Costs per network element

Case Study Georgia - BB market



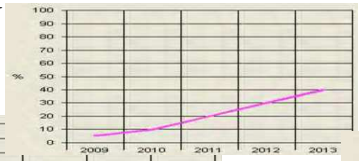
Evolution of population and business

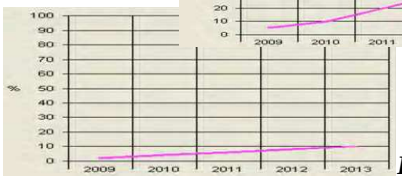


Penetration of broadband services

Services:
- **Voice**
- **Fast Internet**
- **IPTV/Video on demand**
- **FTTO connection**

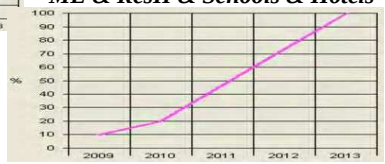
SOHO & ResM



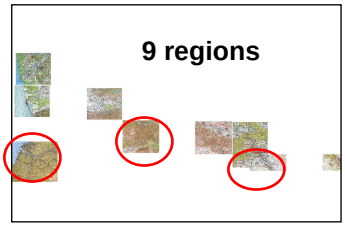


ResL

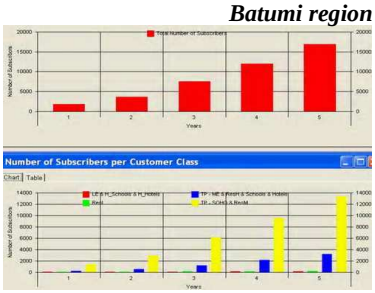
ME & ResH & Schools & Hotels



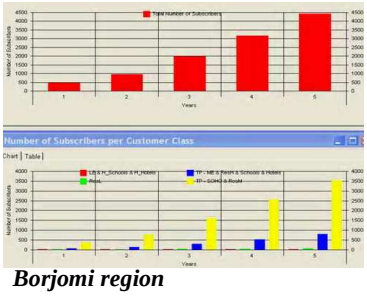
Case study Georgia - BB market



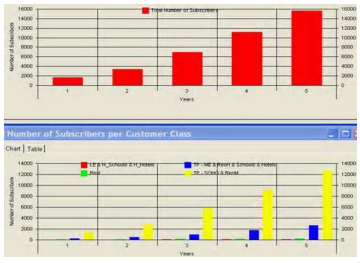
Batumi region



Total number of customers and per customer class



Borjomi region

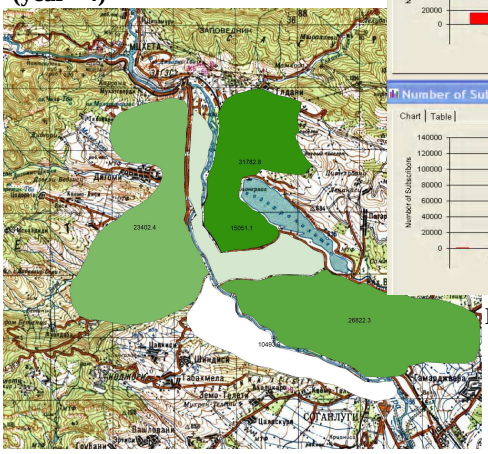


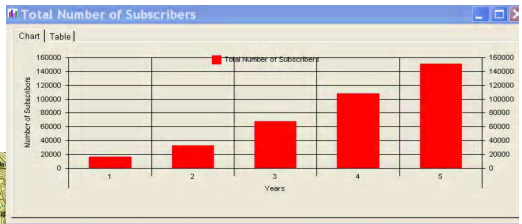
Rustavi region

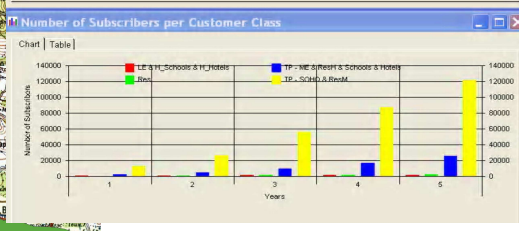
Case study Tbilisi – urban area :

Tbilisi city (5 districts)

Number of customers per district (year +4)



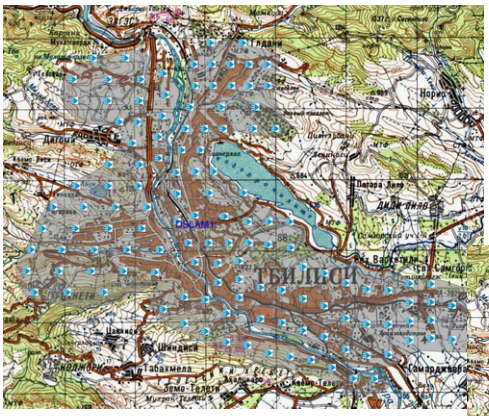




Number of customers per customer class

4 customer classes

Case study Tbilisi – access network for urban area :

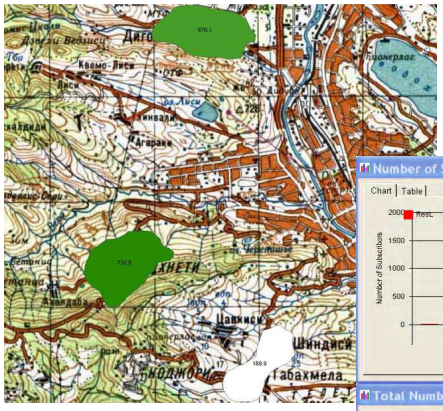


Technical solution xDSL for VoIP, Fast Internet, IPTV/Video (134 DSLAMs)

Tbilisi city (5 districts)

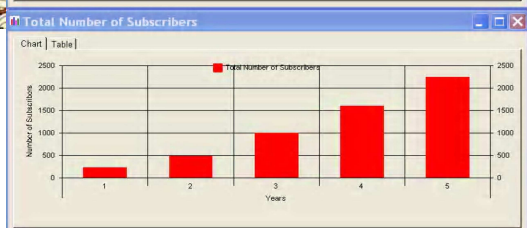
Technical solution FTTO (7 Agg. Nodes)

Case study Tbilisi – suburban area :



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

Number of customers per customer class



Number of customers per village (year +4)

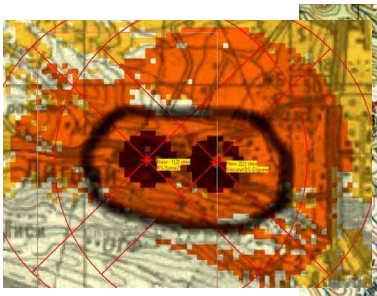
3 customer classes

Case study Tbilisi suburbs - mountain rural area :

Wireline xDSL
vs.
Wireless WiMAX

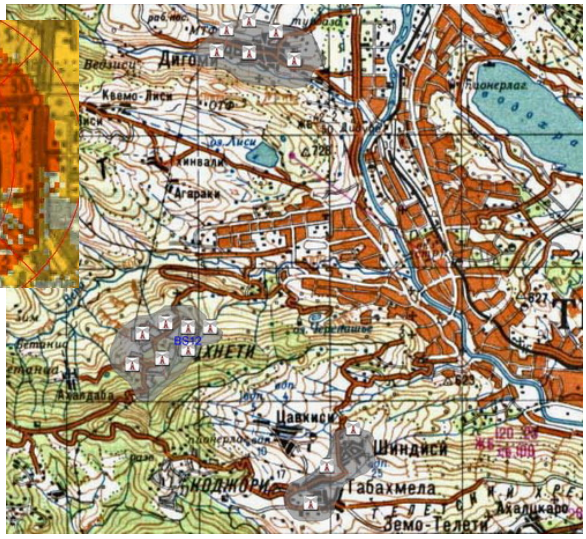
Results for xDSL

Case study Tbilisi suburbs – Wireless access network :



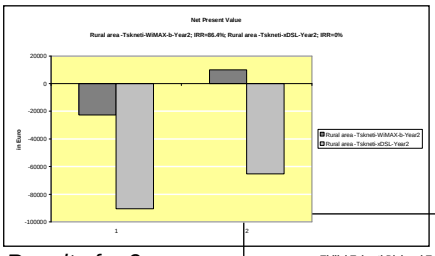
Year +2

Results for wireless (WiMAX)



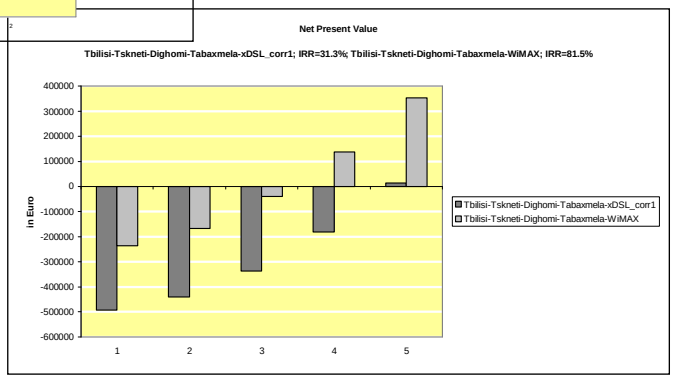
Year +5

Case study Tbilisi suburbs - Economic Analysis :



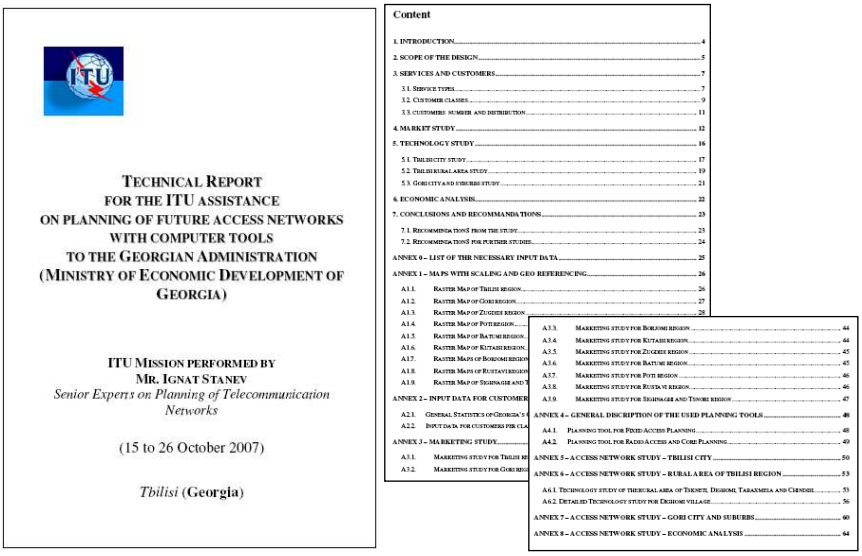
Results for 2 year period

NPN results : Wireline xDSL vs. Wireless WiMAX



Results for 5 year period

Case Study Georgia - reports



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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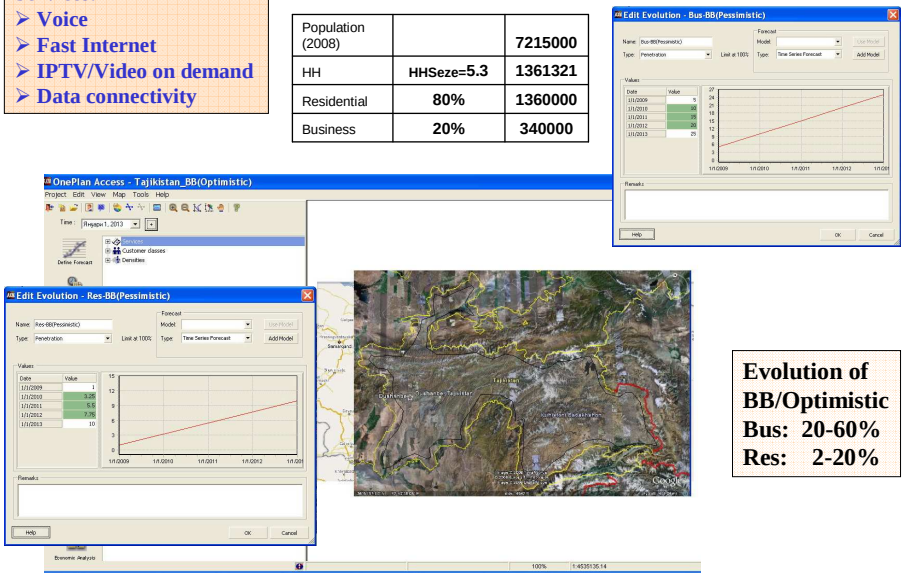
Case Study Tajikistan - BB market

Services:
- **Voice**
- **Fast Internet**
- **IPTV/Video on demand**
- **Data connectivity**

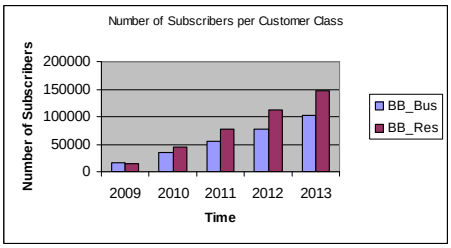
Population (2008)		7215000
HH	HHSeze=5.3	1361321
Residential	80%	1360000
Business	20%	340000



Evolution of BB/Optimistic
Bus: 20-60%
Res: 2-20%

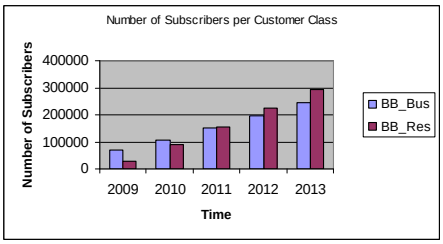
Case study Tajikistan - BB market

Number of BB customers (pessimistic)

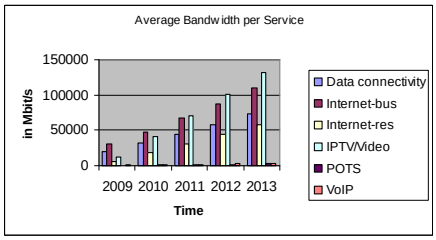


Target av. access speed:
- **RES : 1,5 Mbit/s**
- **BUS : 2 Mbit/s**

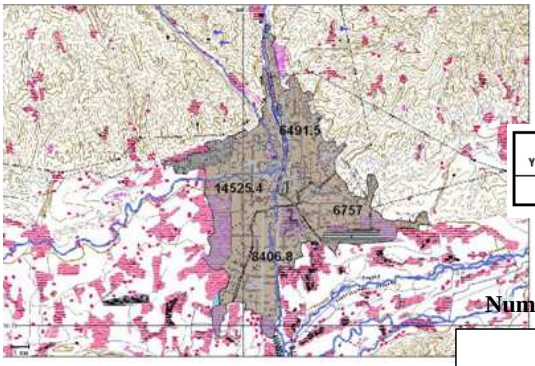
Number of BB customers (optimistic)



Estimated bandwidth requirements (optimistic)



Case study Dushanbe – urban and suburban area :

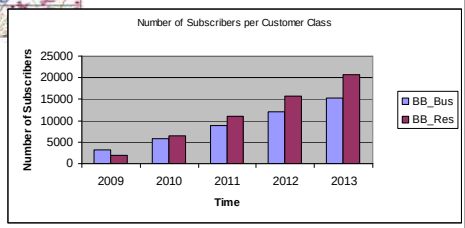


Number of customers per district (year +5)

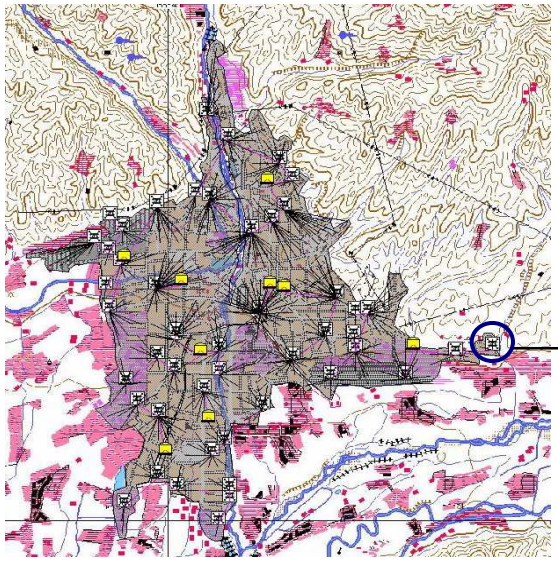
Dushanbe urban (4 districts)

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

Number of customers per customer class



Case study Dushanbe – access network for urban area :

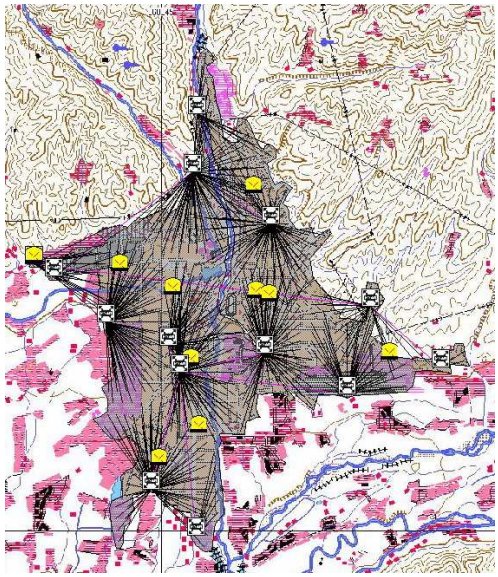


Dushanbe city
(4 districts)

Wireline xDSL - Target solution (year +5)

Technical solution xDSL for VoIP, Data, Internet, IPTV/Video
(49 MSANs and 9 EANs)

Case study Dushanbe – access network for urban area :

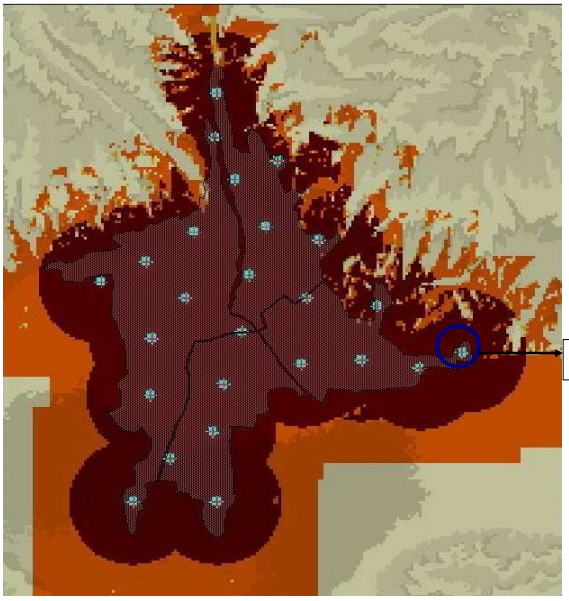


Dushanbe city
(4 districts)

Wireline xDSL - Initial solution (year +1)

Technical solution xDSL for VoIP, Data, Internet, IPTV/Video
(14 MSANs)

Case study Dushanbe – access network for urban area :

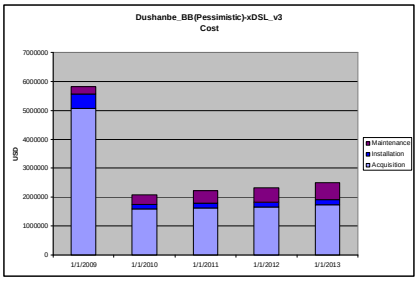


Dushanbe city
(4 districts)

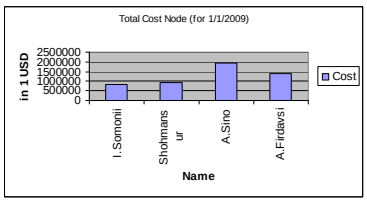
WiMAX overlay

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

Case study Dushanbe urban - Economic Results :

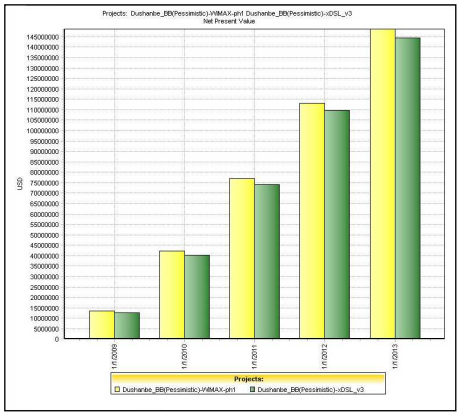


Costs for the 5 year period

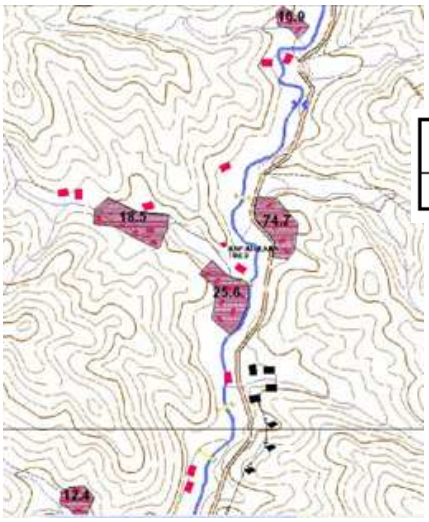


Costs for the first year

NPN for xDSL and WiMAX solutions



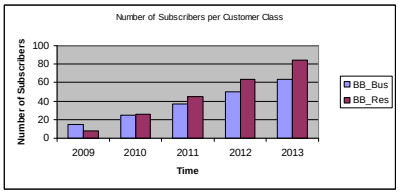
Case study Dushanbe –suburban area :



Number of customers per village (year +5)

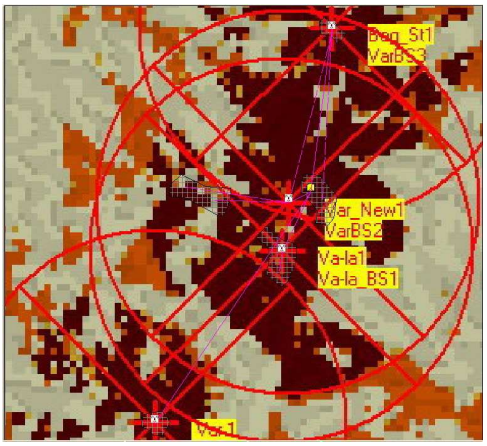
Dushanbe suburban (sample with 5 villages)

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



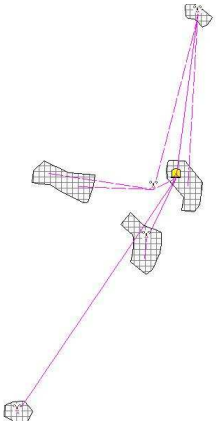
Number of customers per customer class

Case study Dushanbe suburban – wireless access network :

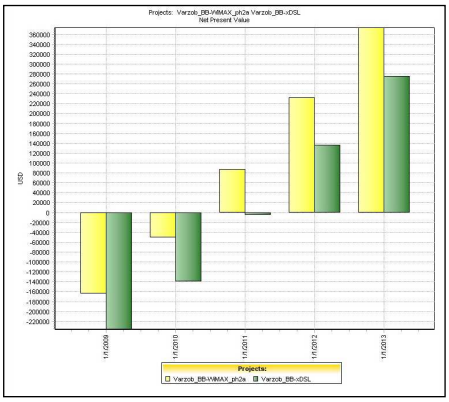


Results for wireless (3 BS - WiMAX)

Dushanbe suburban (sample with 5 villages)

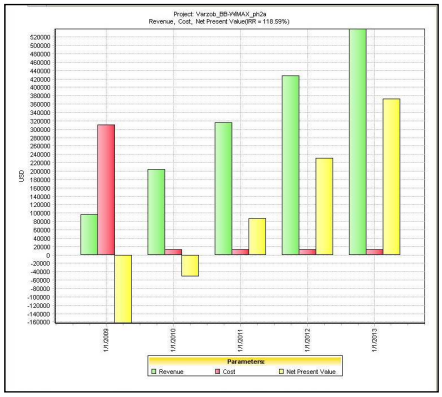


Case study Dushanbe suburban- Economic Results :

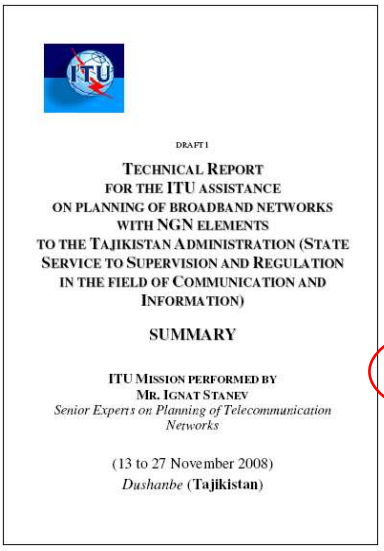


WiMAX vs. xDSL – NPV results

Revenues, Costs, NPN for WiMAX



Case Study Tajikistan - reports



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
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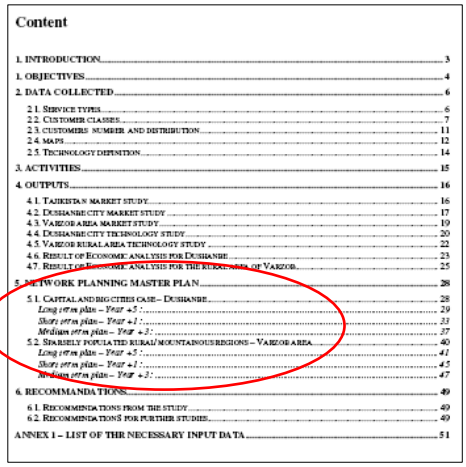
Senior Experts on Planning of Telecommunication Networks

(13 to 27 November 2008)
Dushanbe (Tajikistan)



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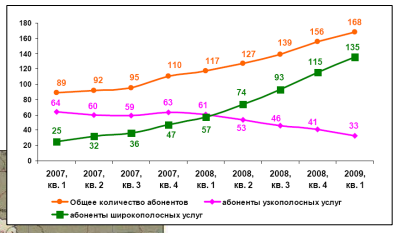
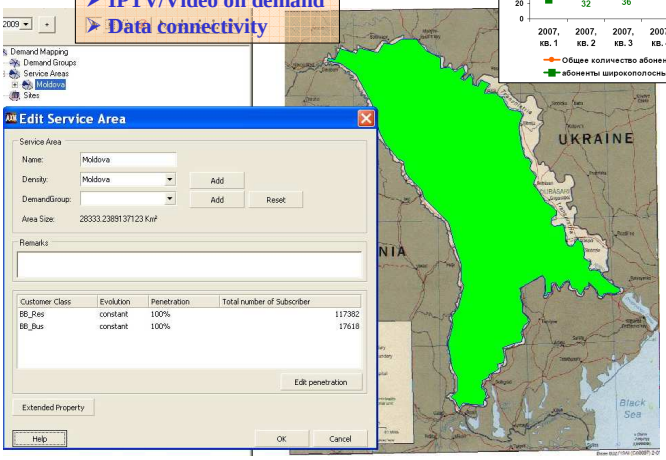
Case Study Moldova - BB market

➢BB Customer data 2009

Services:
- ➢ Voice
- ➢ Fast Internet
- ➢ IPTV/Video on demand
- ➢ Data connectivity



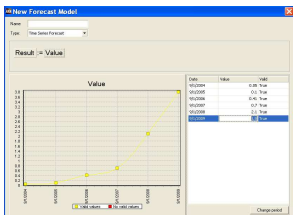


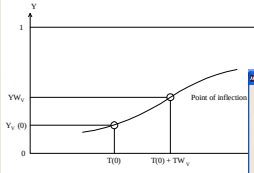
BB Customers (2009)	135000
Residential	117382
Business	17618

MID strategy is of 20% BB customer penetration in 5 years

Case study Moldova - BB market

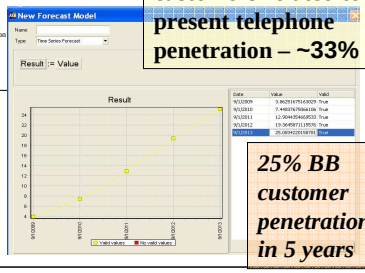
➢BB Customer forecast



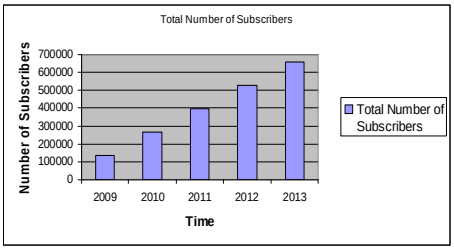


Logistic model

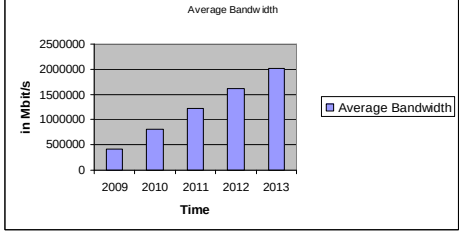
Saturation of BB customers related to present telephone penetration – ~33%



Total number of BB customers



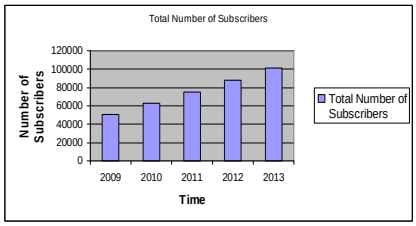
25% BB customer penetration in 5 years



Estimated bandwidth requirements

Case study for capital Chisinau - BB market :

➢ **Pessimistic scenario (20%)**



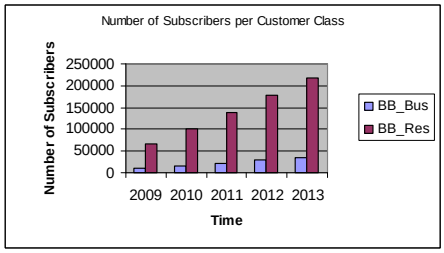
Estimated market segment

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

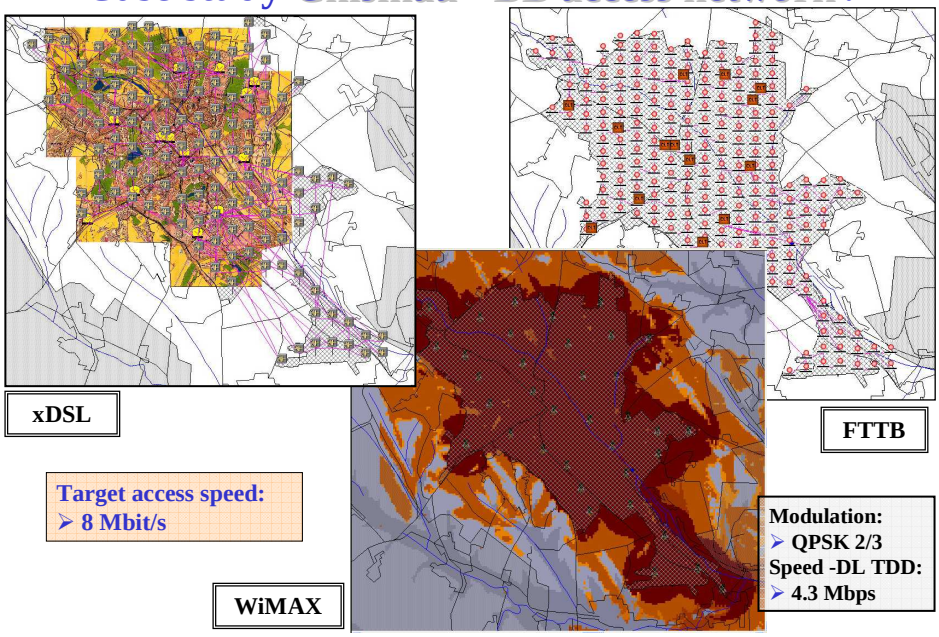
➢ **Optimistic scenario (35%)**

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

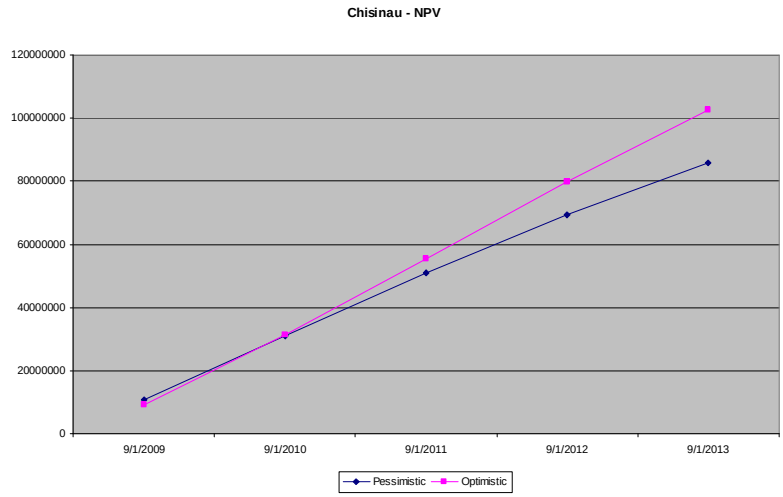
FTTB

Target access speed:
➢ **8 Mbit/s**

WiMAX

Modulation:
➢ **QPSK 2/3**
Speed -DL TDD:
➢ **4.3 Mbps**

Case study Chisinau – economic results

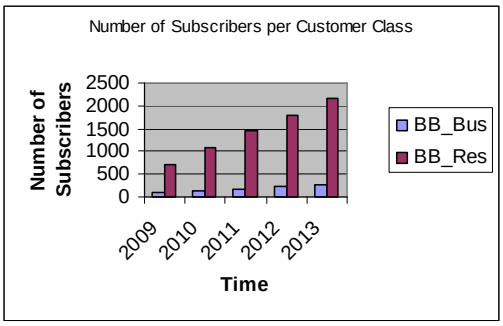


Results for NPV : xDSL+ WiMAX + FTTB

Case study for typical town - BB market :

	Target of BB penetration (2013)	BB penetration (2009)	% BB residential	% BB business
Nisporeni	**20%**	**6.7%**	**89%**	**11%**

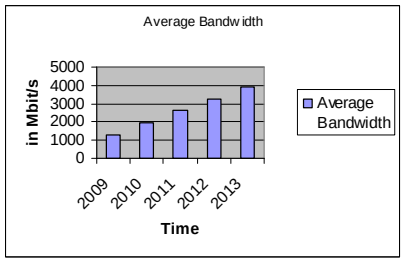
BB Customers



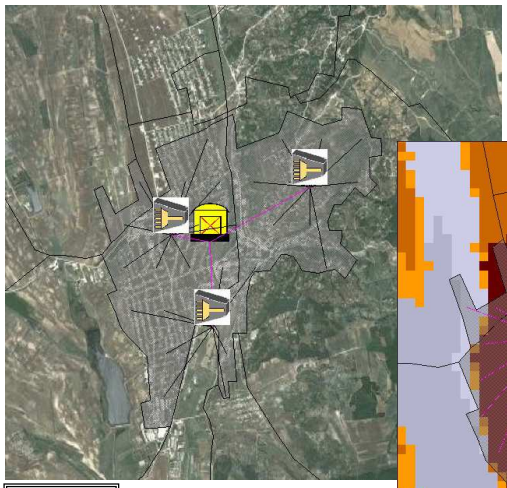
Market segment xDSL –
- **2009 – 100%**
- **2013 - 70%**

Market segment WiMAX –
- **2009 – 0%**
- **2013 - 30%**

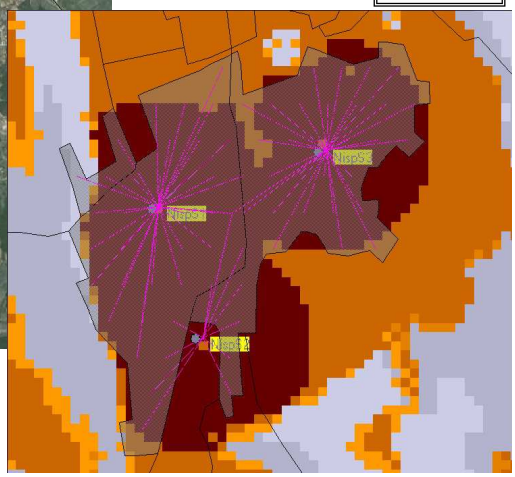
Bandwidth requirements



Case study town - BB access network :



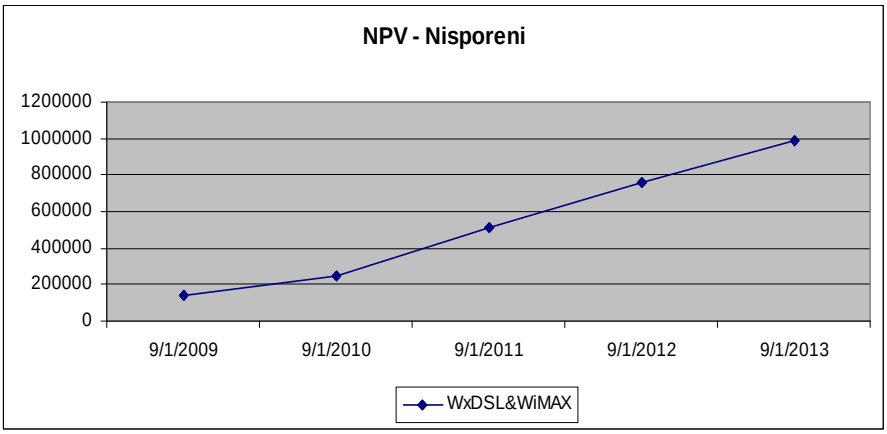
WiMAX



xDSL

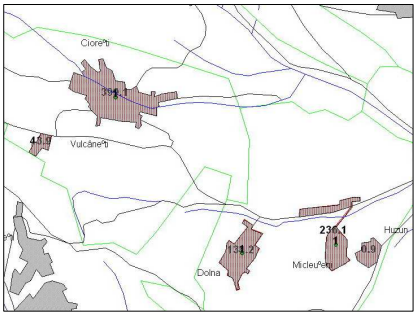
Target access speed:
➢ 4 Mbit/s

Case study town – economic results



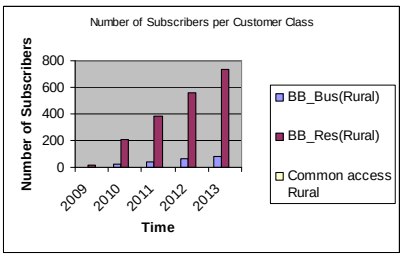
Results for NPV : xDSL + WiMAX

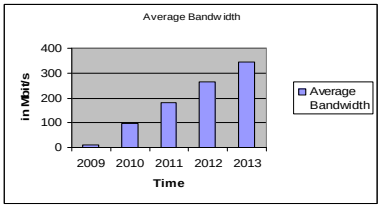
Case study for typical rural area - BB market :



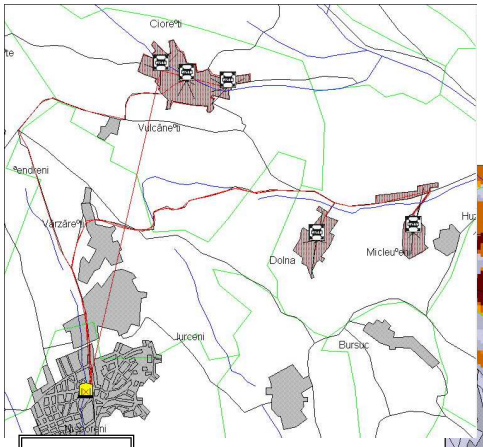
Village	Households	telephones	BB total	BB residential	BB business
Cioresti	1273	752	19	17	2
Vulcanesti	140				
Dolna	428	279			
Micleuseni	753	347			
Huzun	30				

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



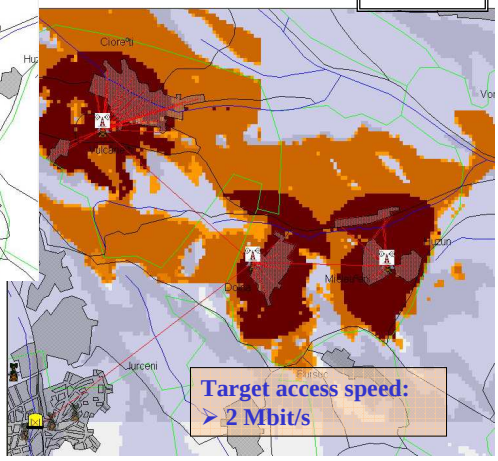


Case study rural - BB access network :



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

WiMAX

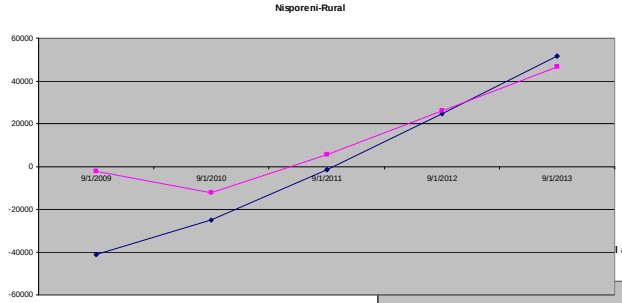


xDSL

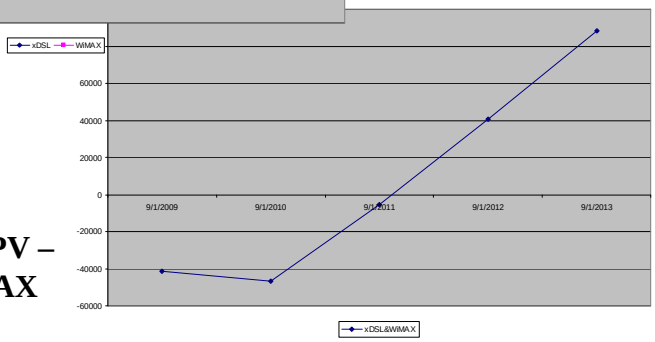
Market segment of xDSL :
- if xDSL exists -70% of the market
- if only telephones -50% of the market

Target access speed:
- 2 Mbit/s

Case study rural – economic results

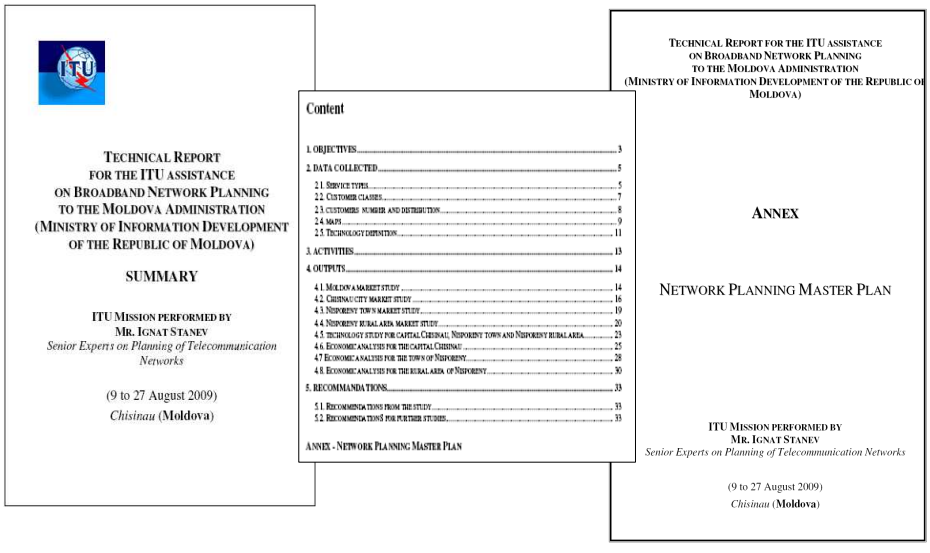


Results for NPV – xDSL & WiMAX



Results for NPV – xDSL + WiMAX

Case Study Moldova - reports



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
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(9 to 27 August 2009)
Chisinau (Moldova)

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

ANNEX

NETWORK PLANNING MASTER PLAN

ITU MISSION PERFORMED BY
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