**ITU-D Regional Development Forum**
**for the Americas Region:**
**"NGN and Broadband, Opportunities and Challenges"**

# Session 4

# Case Study on Broadband Access Network Planning

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*ITC, Bulgaria*

## Content of the presentation :

❖ **Case studies and used planning tools**

❖ **Case study 1 –** *Mali : Bamako urban and suburban (for Operator)*

❖ **Case study 2 –** *Georgia : Tbilisi urban and suburban (for Administration)*

❖ **Case study 3 –** *Tajikistan : Dushanbe urban and suburban (for Regulator)*

❖ **Case study 4 –** *Moldova : Chisinau, typical town and rural area (for Administration)*

# 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**
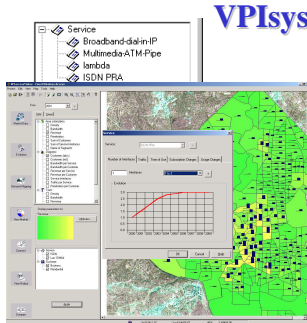
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# Case study tools

## VPIsystems OnePlan Access
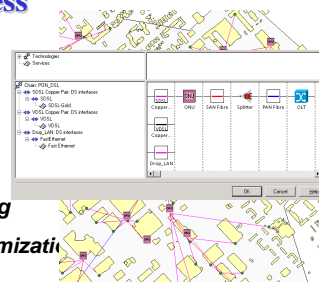


*Market definition*

*Evolution forecasting*

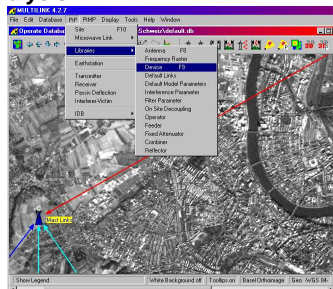*Demand mapping*

*Technology modeling*

*Network design optimization*

*Economy analysis*

## LStelcom  MULTIlink

*MULTIlink is a complete solution*

*for fast microwave link*

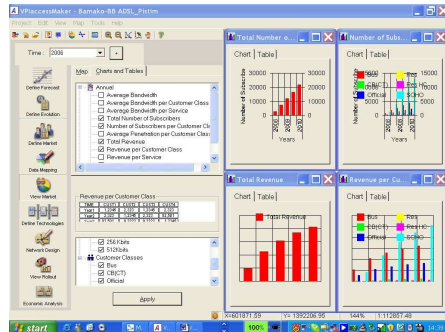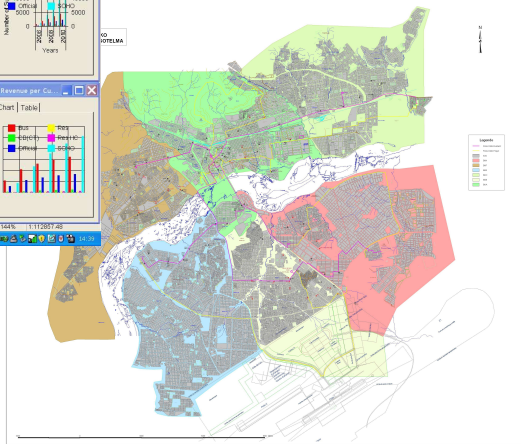*engineering and designing of*

*PMP/WLL/LMDS networks.*

## Case study Bamako – urban and suburban area :

**Customer market and revenue**



**Wireline xDSL
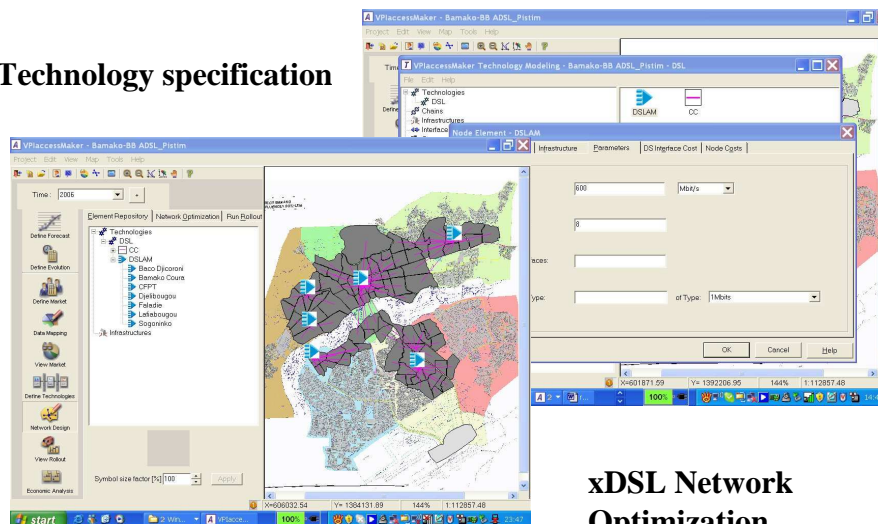and
WiMAX  overlay**

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## Case study Bamako - Planning xDSL :
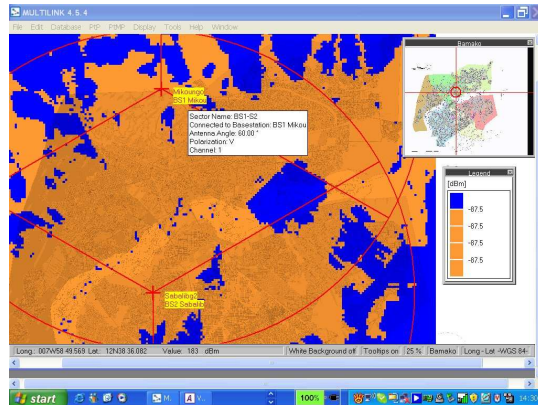
**Technology specification**



**xDSL Network
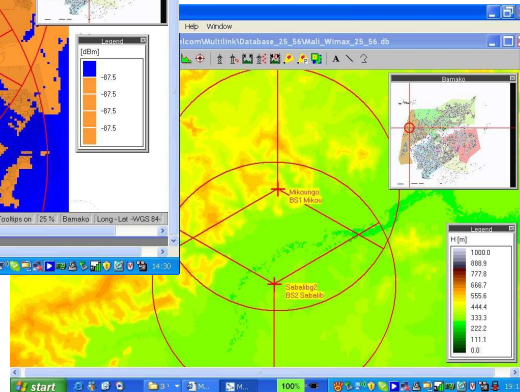Optimization**

ITU-D Forum          Santo Domingo, Dominican Republic, 25 – 27 November  2009          Session 4-IS  - 6
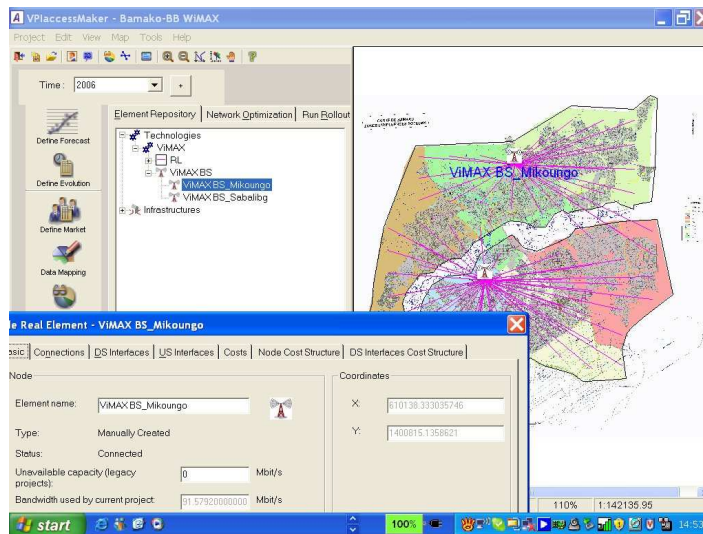
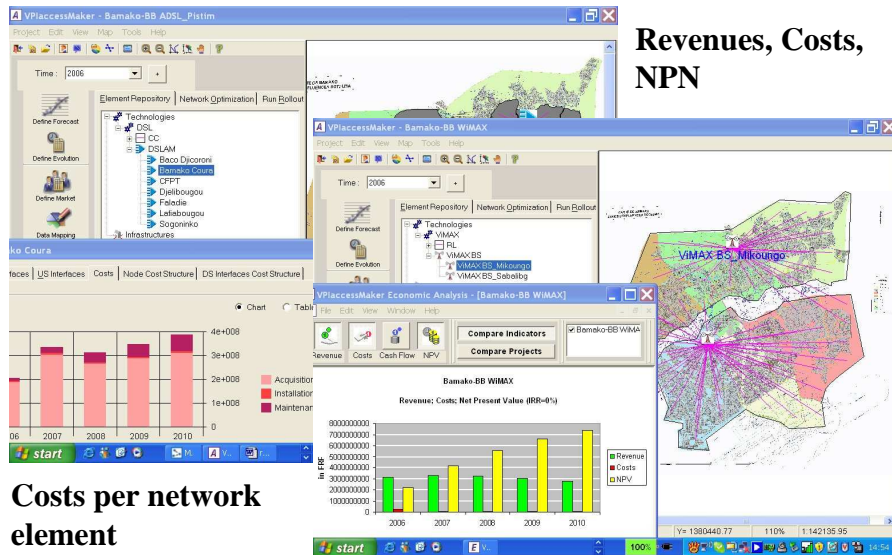**Case study Bamako - Planning wireless :**

BS sites location

BS coverage calculations

**Case study Bamako – Wireless access network :**

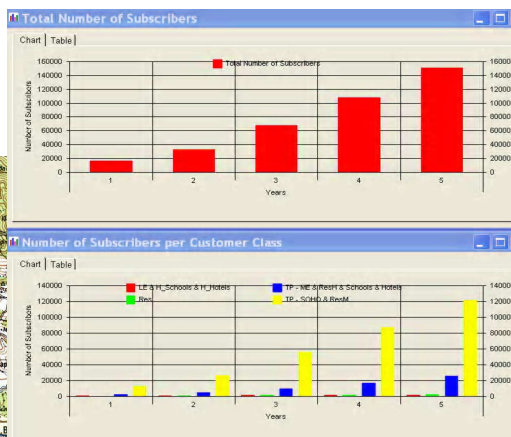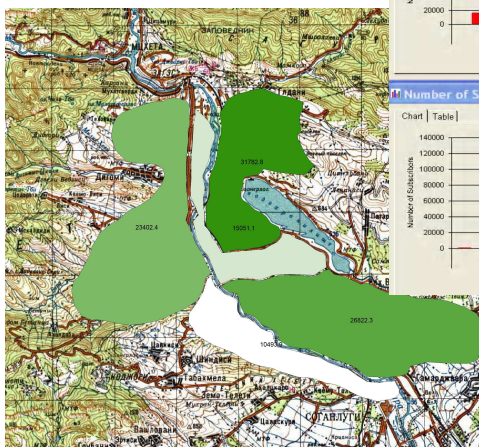WiMAX overlay network

## Case study Bamako - Economic Analysis :

**Revenues, Costs, NPN**

**Costs per network element**

## Case study Tbilisi – urban area :

**Tbilisi city (5 districts)**

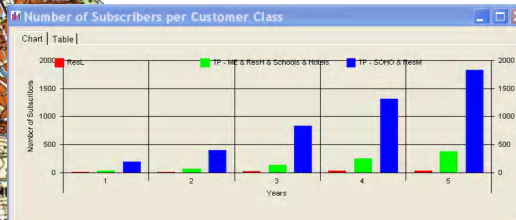**Market study**

**4 customer classes**

**Forecast for 5 years**

## Case study Tbilisi – suburban area :

**Tbilisi suburban region (Tskneti, Dighomi, Tabaxmela, Chindisi )**
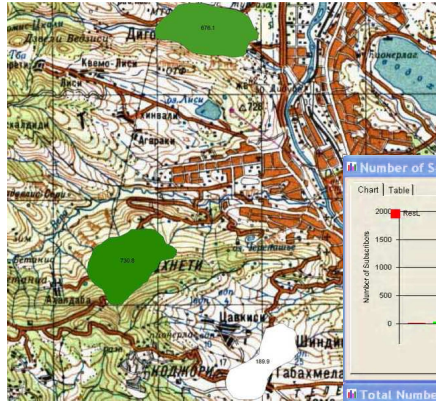
**Market study**

**3 customer classes**
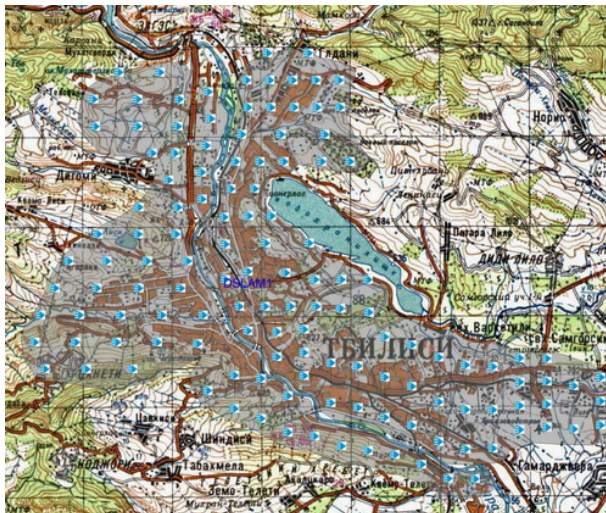
**Forecast for 2 years and 5 years**
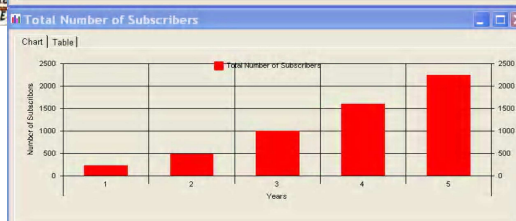
## Case study Tbilisi – access network for urban area :

**Tbilisi city
(5 districts)**

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

## Case study Tbilisi – access network for urban area :
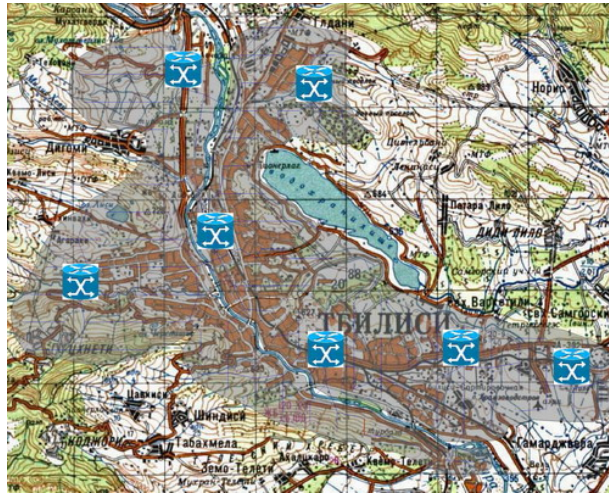


Tbilisi city
(5 districts)
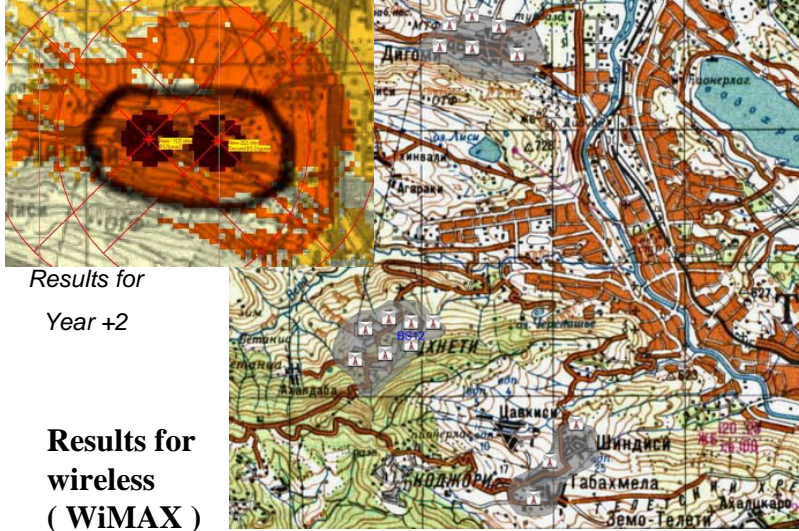
Technical
solution FTTO
(7 Agg. Nodes)

## Case study Tbilisi suburbs - mountain rural area :

Wireline xDSL
vs.
Wireless WiMAX



**Results for xDSL**
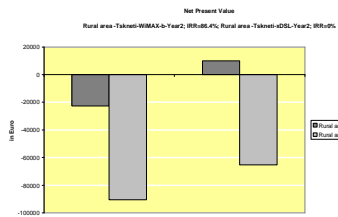
**Case study Tbilisi suburbs – Wireless access network :**

*Results for*

*Year +2*

**Results for wireless ( WiMAX )**

**Case study Tbilisi - Economic Analysis :**

*Results for 2*

*year period*

**Revenues, Costs, NPN**

*Results for 5*

*year period*
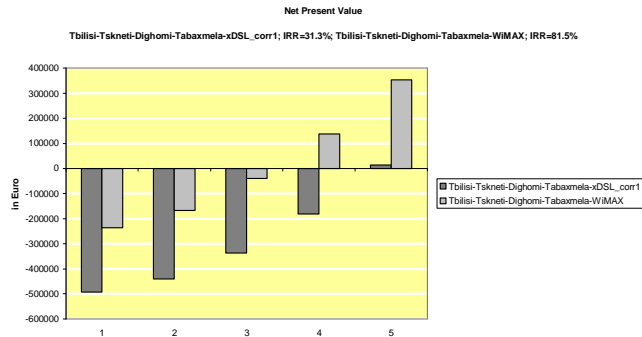
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# Case study Dushanbe – urban and suburban area :

**Dushanbe suburban (sample with 5 villages)**
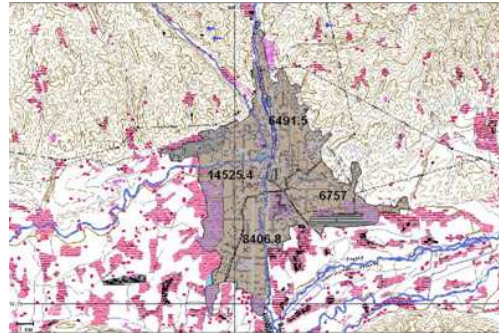
**Dushanbe urban   (4 districts)**
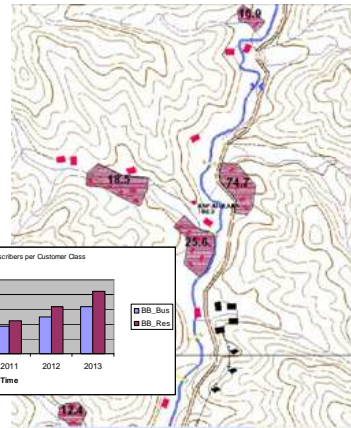
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# Case study Dushanbe – access network for urban area :
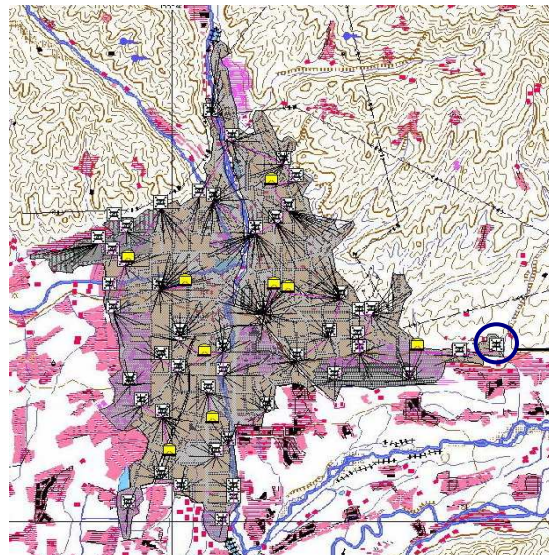
**Dushanbe city (4 districts)**
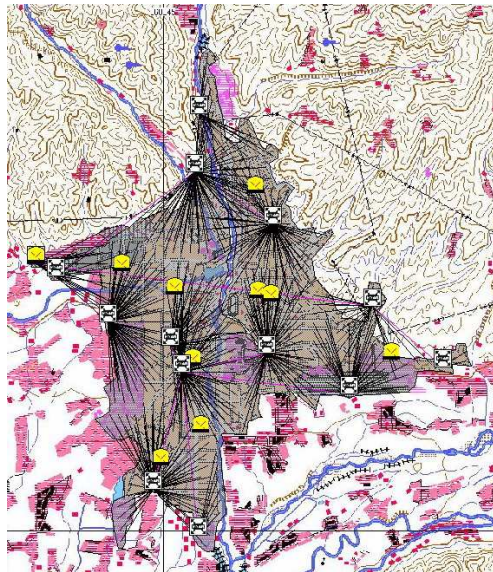
**Wireline xDSL and WiMAX  overlay**

MSAN

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

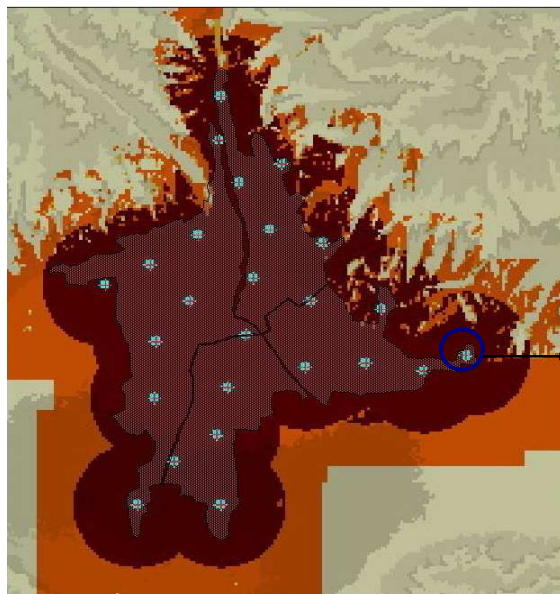## Case study Dushanbe – access network for urban area :



**Dushanbe city
(4 districts)**

**Wireline xDSL -
Initial solution
(year +1)**

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

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## Case study Dushanbe – access network for urban area :
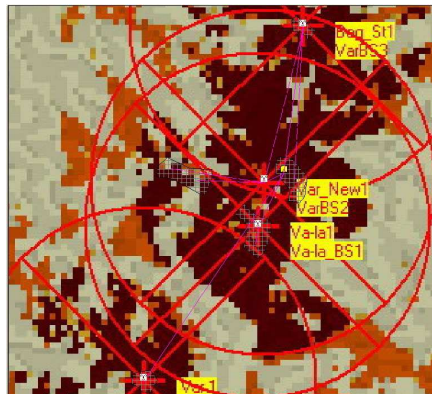


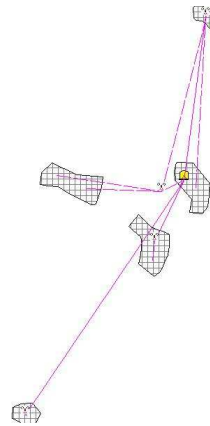**Dushanbe city
(4 districts)**

**WiMAX  overlay**

BS

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

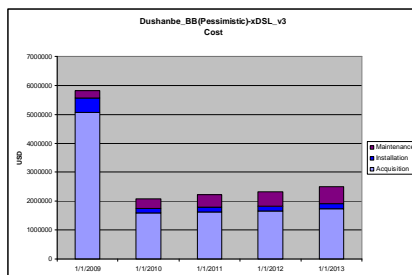# Case study Dushanbe suburbs – Wireless access network :



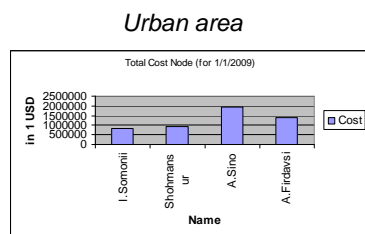**Dushanbe suburban (sample with 5 villages)**

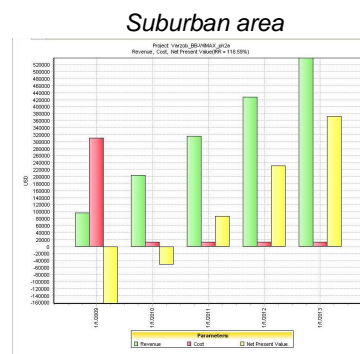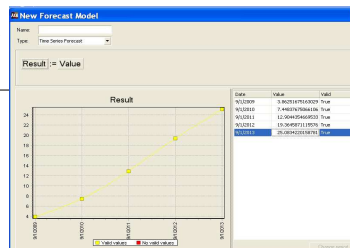**Results for wireless ( WiMAX )**

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# Case study Dushanbe - Economic Results :



*Urban area*



*Results for initial network*

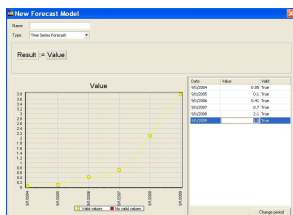*Results for 5 year period*

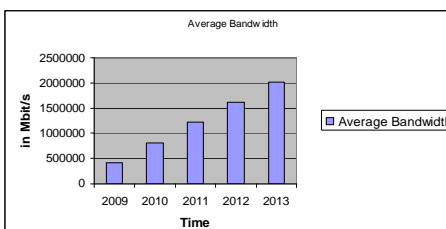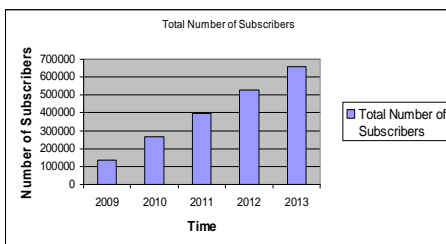**Revenues, Costs, NPN**

*Suburban area*

# Case study Moldova BB market – Forecasting :

## Evolution of BB customers
## Logistic model
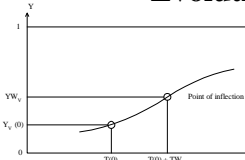
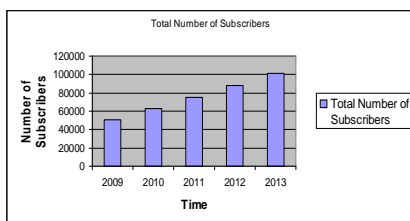**Total number of BB customers**

**Estimated bandwidth requirements**

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# Case study Chisinau - BB market :

## ➢ Pessimistic scenario

### 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

### 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 |
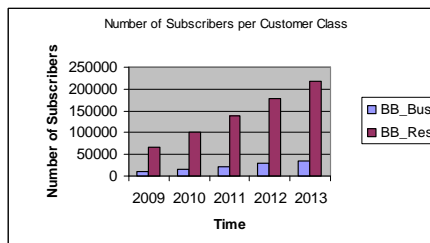
Case study Chisinau - BB access network :
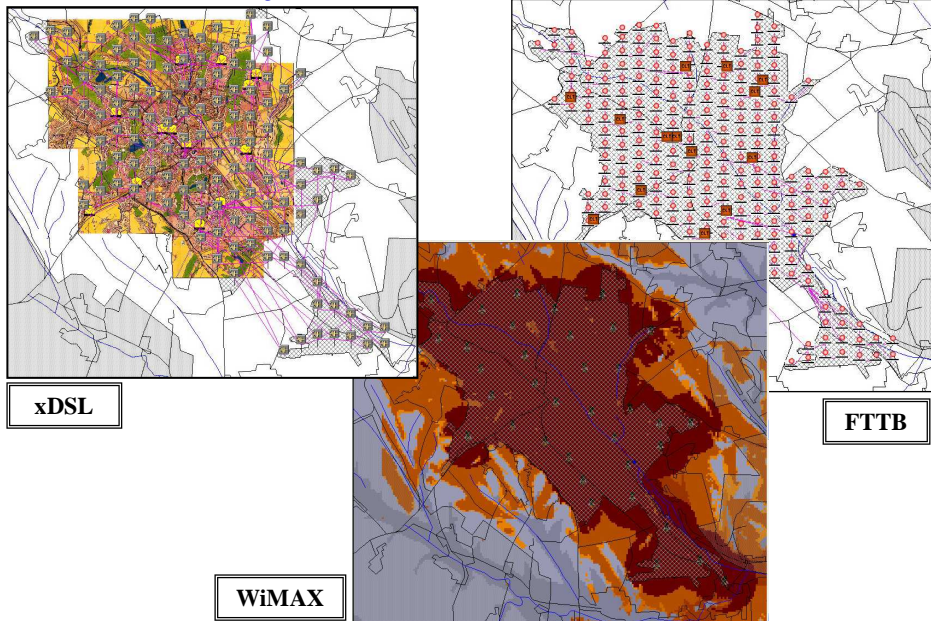
xDSL

FTTB

WiMAX

Case study Chisinau – economic results

Chisinau - NPV
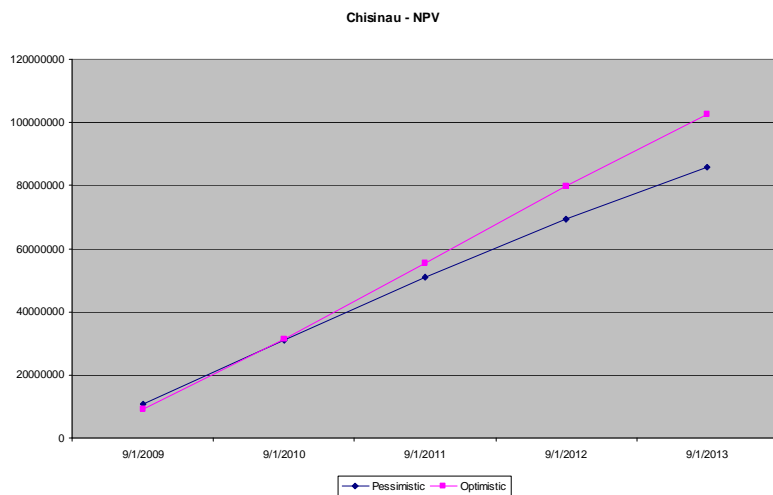
Results for NPV : xDSL+ WiMAX + FTTB

# Case study for typical town (Nisporeny) - BB market :

**BB Customers**

Number of Subscribers per Customer Class



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

**Bandwidth requirements**

Average Bandwidth
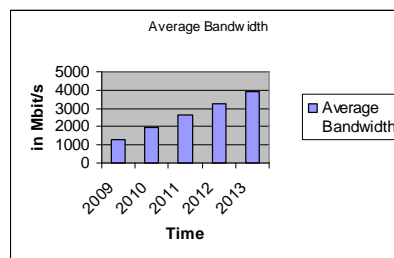


**Market segment xDSL –**
- **2009 – 100%**
- **2013 - 70%**

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# Case study Nisporeny - BB access network :
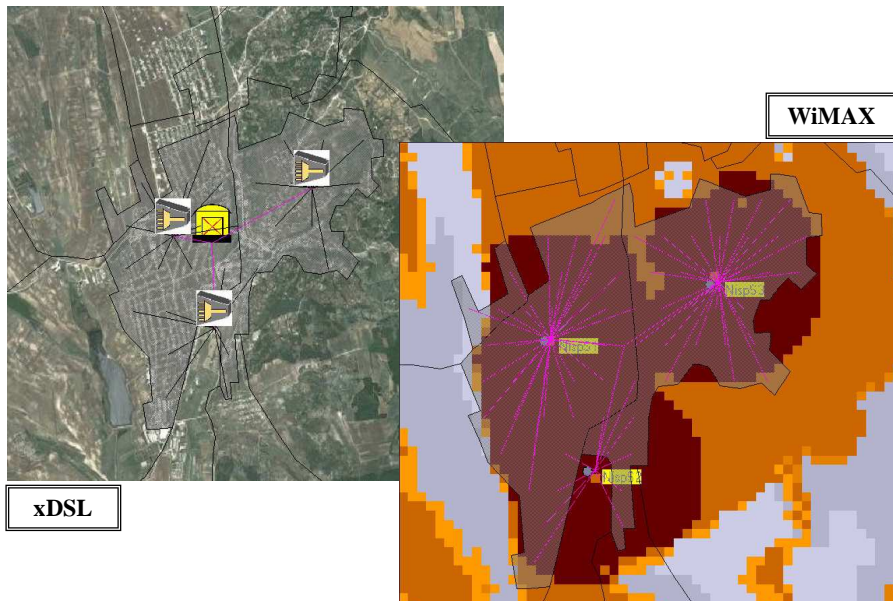


WiMAX

xDSL

## Case study Nisporeny – economic results

**NPV - Nisporeni**



Legend: ◆ WxDSL&WiMAX

(Y-axis: 0, 200000, 400000, 600000, 800000, 1000000, 1200000; X-axis: 9/1/2009, 9/1/2010, 9/1/2011, 9/1/2012, 9/1/2013)

### Results for NPV : xDSL + WiMAX

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## Case study for typical rural area
## (Nisporeny rural) - BB market :
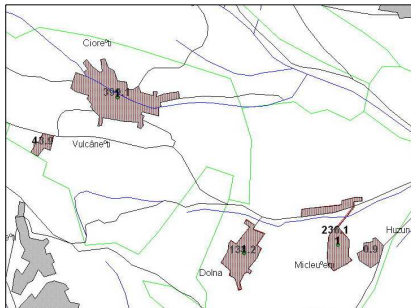


| Village | Households | telephones | BB total | BB residential | BB business |
|---------|-----------|-----------|----------|----------------|-------------|
| Cioresti | 1273 | 752 | 19 | 17 | 2 |
| Vulcanesti | 140 | | | | |
| Dolna | 428 | 279 | | | |
| Micleuseni | 753 | 347 | | | |
| Huzun | 30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

### BB Customers

**Number of Subscribers per Customer Class**



Legend: ■ BB_Bus(Rural), ■ BB_Res(Rural), ■ Common access Rural

**Average Bandwidth**



Legend: ■ Average Bandwidth
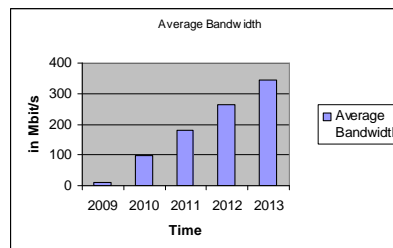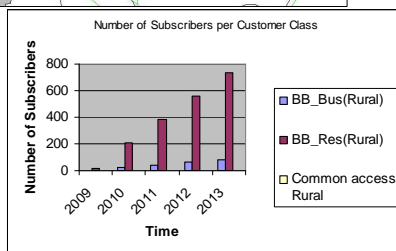
### Bandwidth requirements

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Case study rural - BB access network :
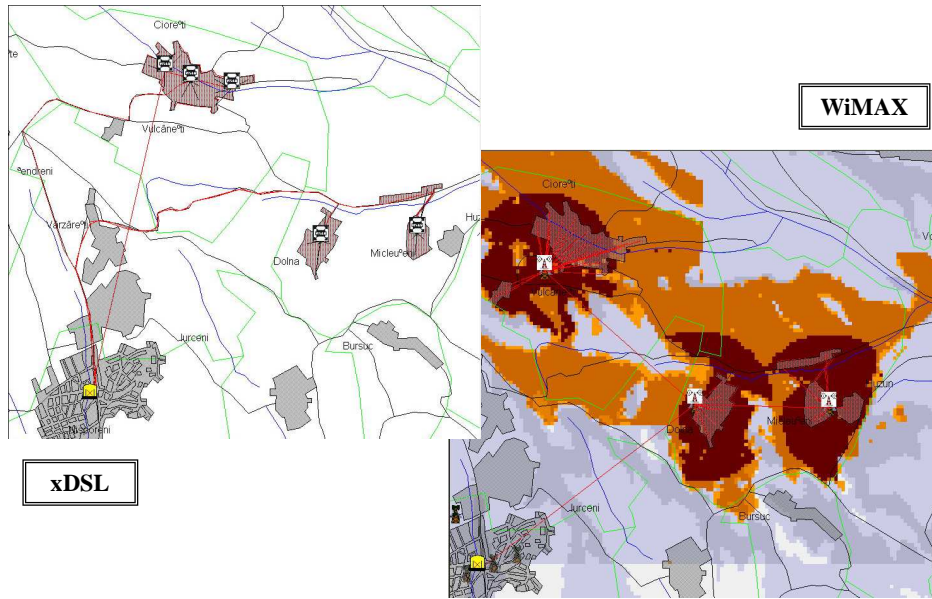
WiMAX

xDSL

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Case study rural – economic results
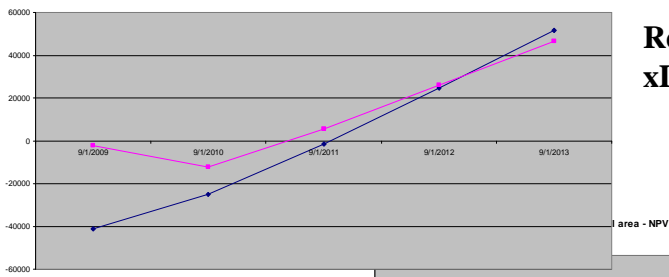
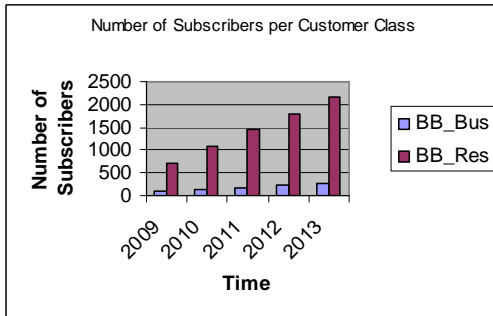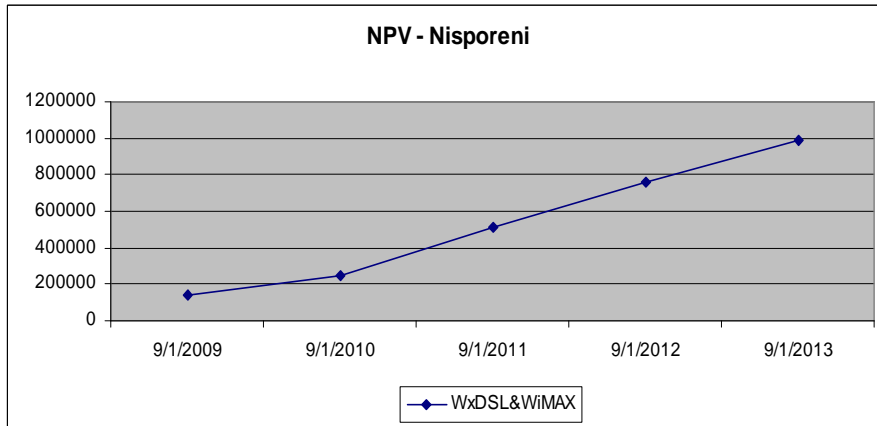Results for NPV – xDSL & WiMAX

Results for NPV – xDSL + WiMAX

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