Strategies to Minimise Broadband Access Roll-out Risk in Rural Areas

Luis Enrique García, Mercedes Garijo
Departamento de Ingeniería Telemática, UPM - ETSIT
Ciudad Universitaria, 28040 SPAIN

Summary

- Discussion about how recent radio and copper technologies can be used to deploy broadband access in rural areas
- Context: Spanish Ministry of Industry Broadband Extension Program
- Different available technologies, access architectures and strategies to fulfil with the extension program are described.
- Finally, some broadband access services in rural areas and their applications are enumerated

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- A comparison of available broadband access technologies
- Rural broadband scenarios and architectures
- Deployment Strategies
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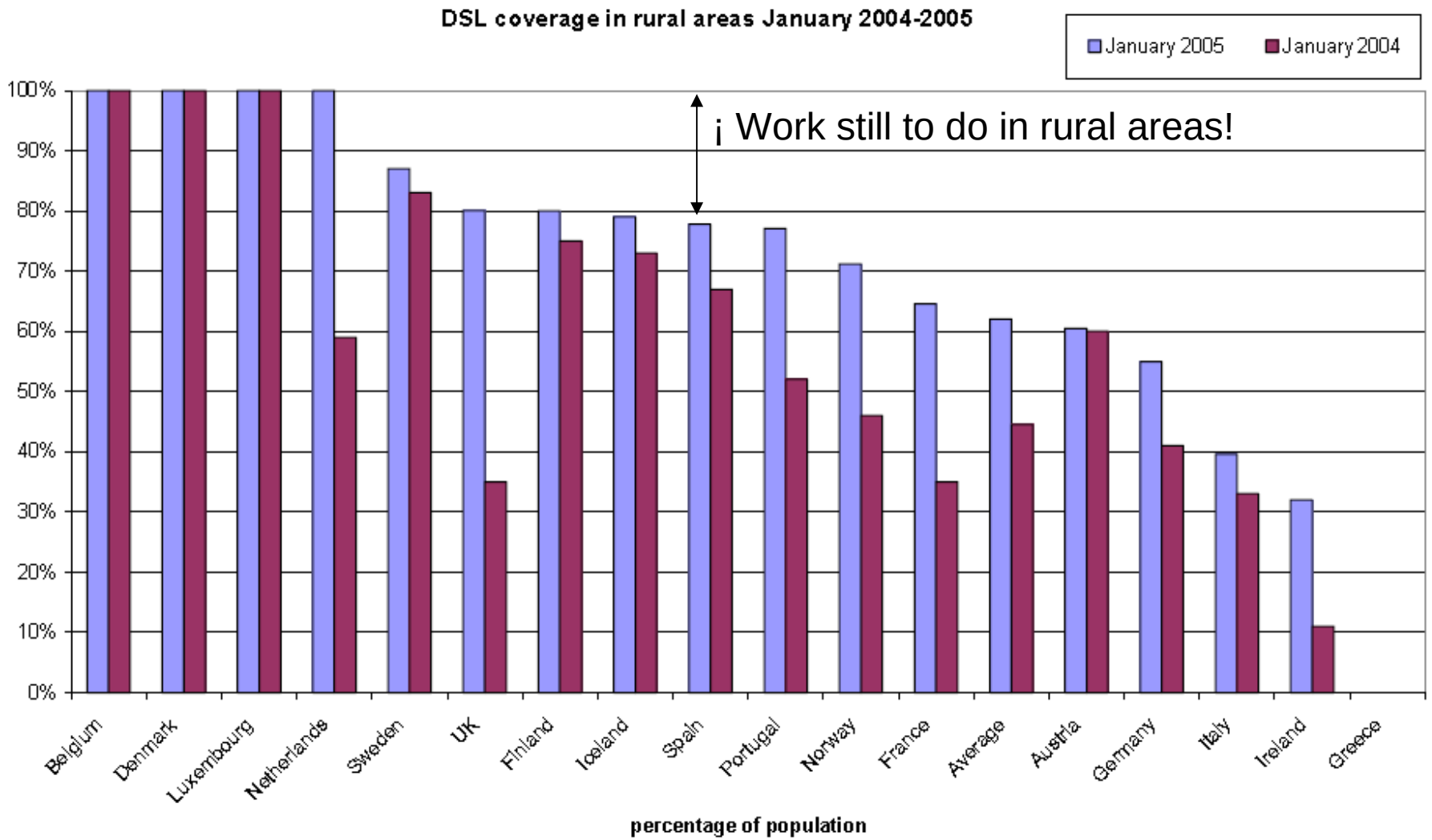
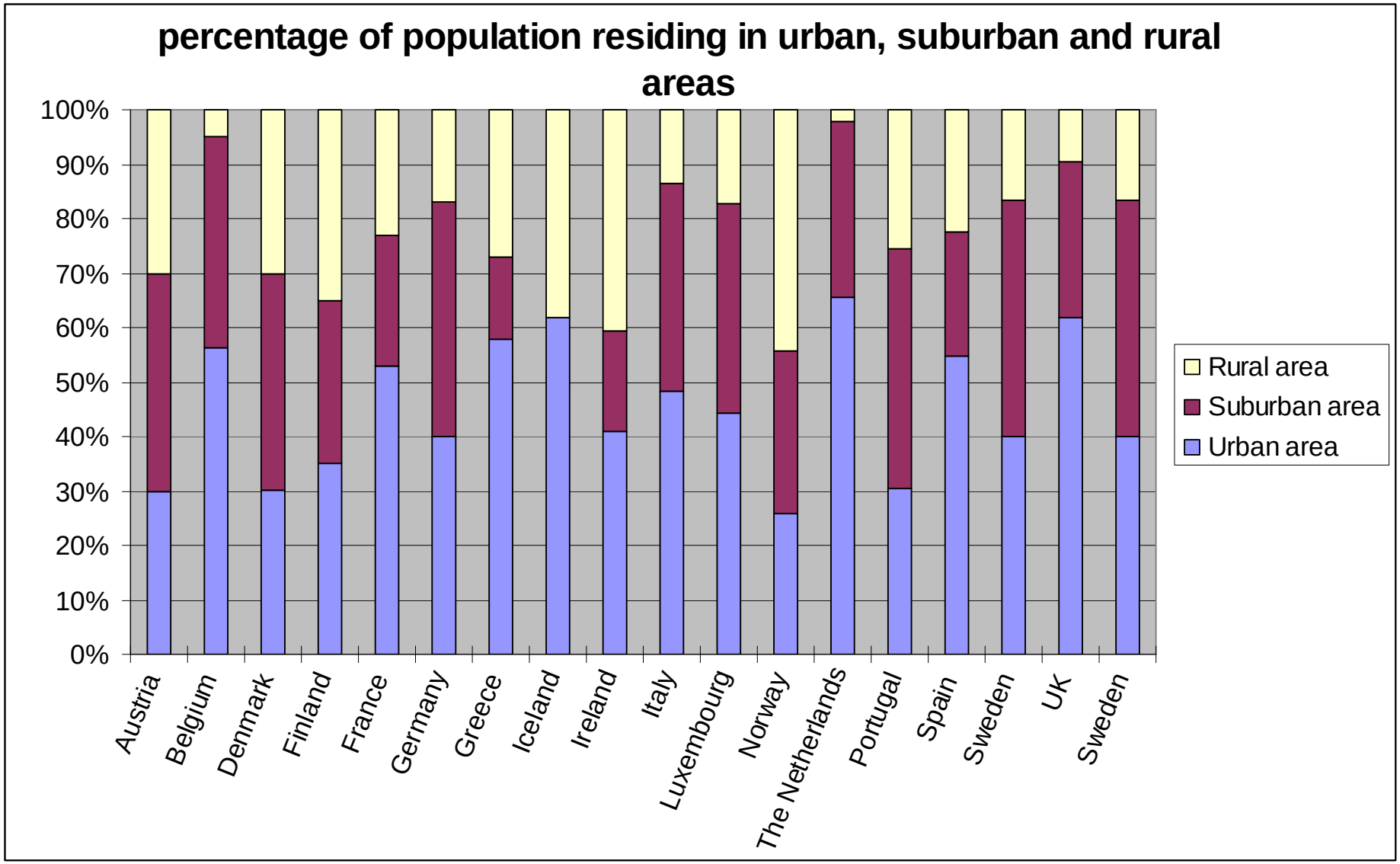
Introduction: Present Situation

- **Stimulate broadband access demand is one of the main European Union priorities** to promote economical development
- **Good coverage of broadband** access exists, **but demand is still low** in many European countries
- Actions are being taken to **stimulate the use of broadband access services** in public administrations, schools, town councils, libraries, etc. Some European countries apply also a reduction in taxes for citizens hiring these services
- Also, actions to **extend coverage of broadband access technologies in rural and isolated areas** are being taken, to reduce the digital gap between European regions
- **The case of Spain**: 40% of municipalities (1,4 million people) with an offer of broadband services inferior to the one found in urban areas

DSL Coverage in Rural Areas per European Country



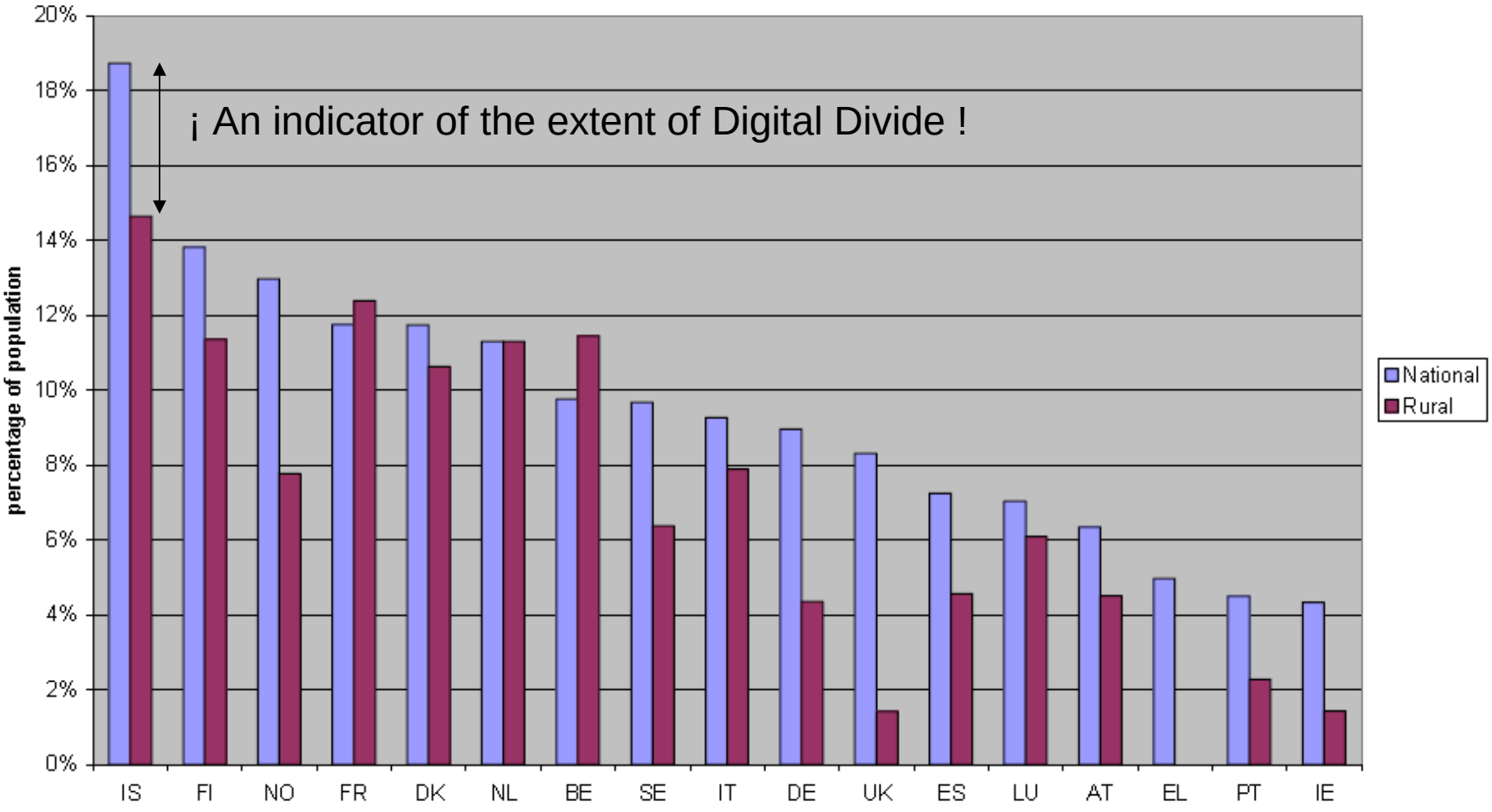
Source: Digital Divide Forum Report



Source: Digital Divide Forum Report

DSL Services Take-up

DSL Penetration/Coverage ratio per country (January 2005)



Source: Digital Divide Forum Report

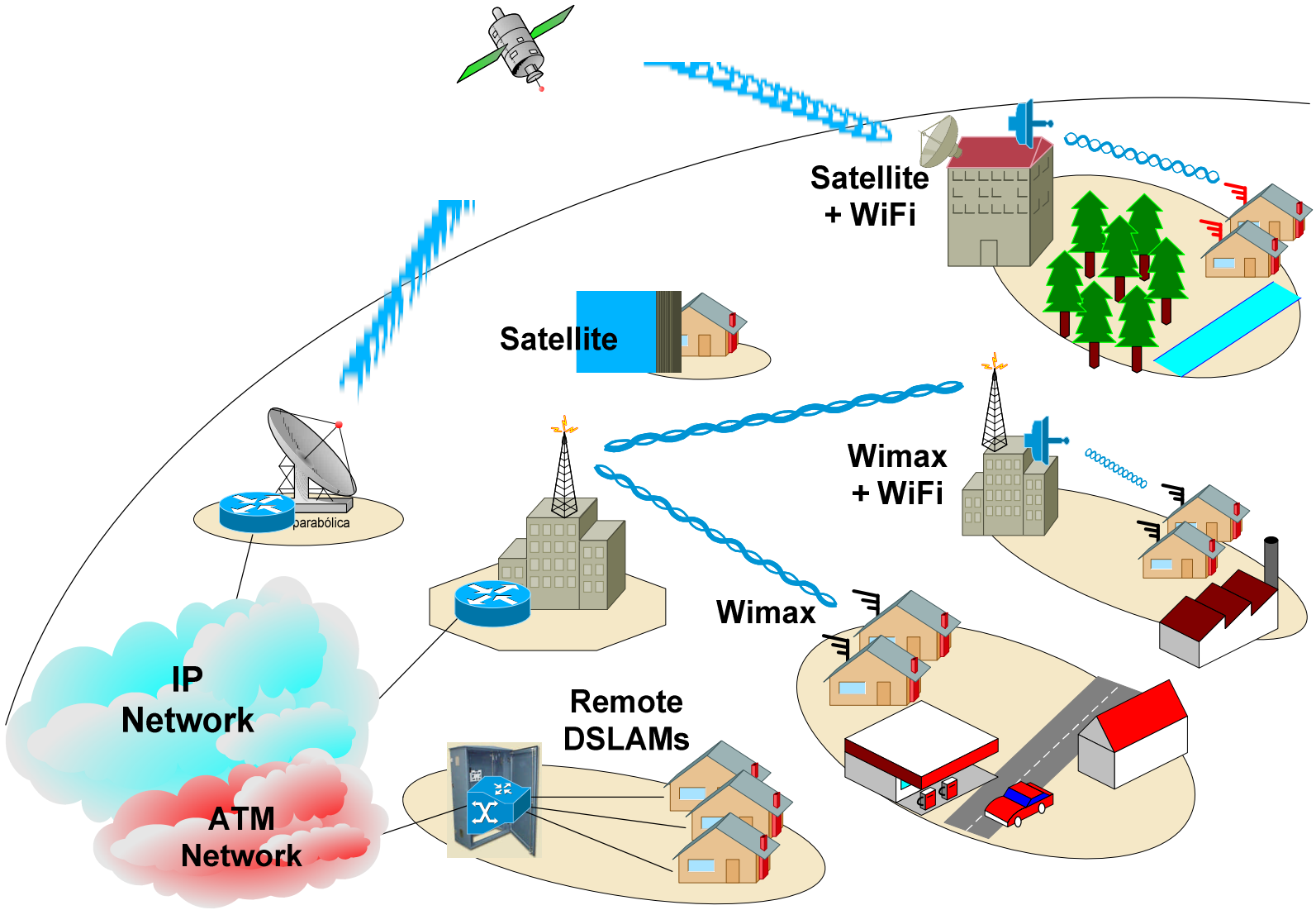
Spanish Rural Broadband Extension Program (1)

- Launched by **Spanish Ministry of Industry in May 2005 to extend coverage of broadband access services in rural areas**
- **Public tender, winner operators will receive European and Spanish funds** to subsidize part of their investments in network infrastructures to extend coverage in the next four years
- Offered funds (not surpassing 30% of the investments) are composed of: **credits without interest and non returnable funds**
- **Criteria to select winner proposals**: services comparable to those found in urban areas, the greater coverage with the less investments, the best technological solutions, deployed infrastructures must be shared with the rest of telecommunication operators
- 2,5 million people will benefit from the program

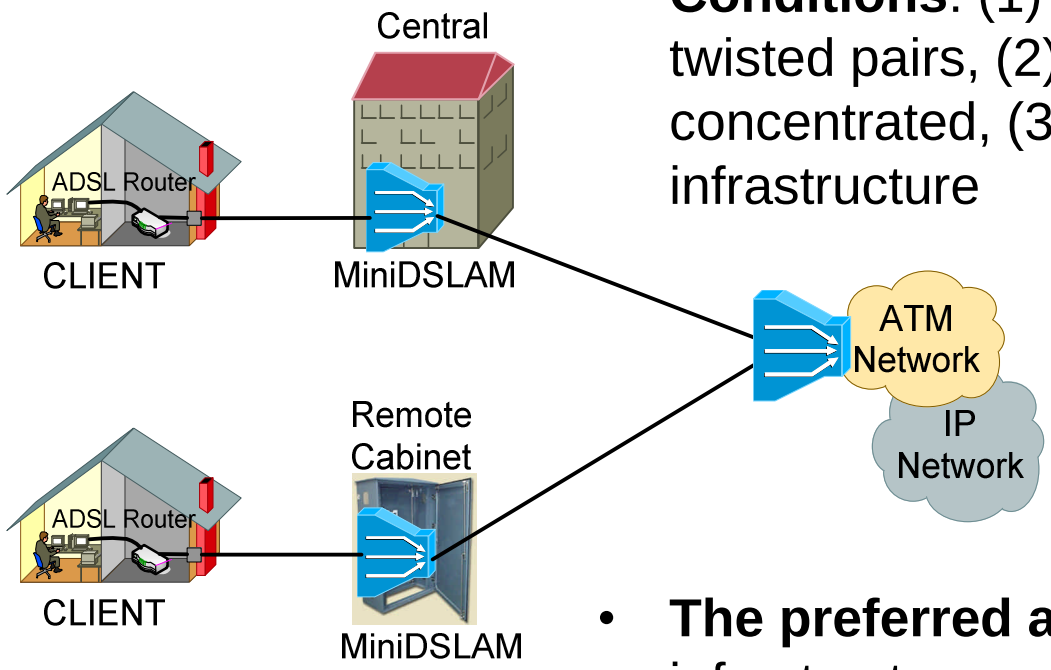
Spanish Rural Broadband Extension Program (2)

Comparison of Broadband Access Technologies

Rural Broadband Access Architectures



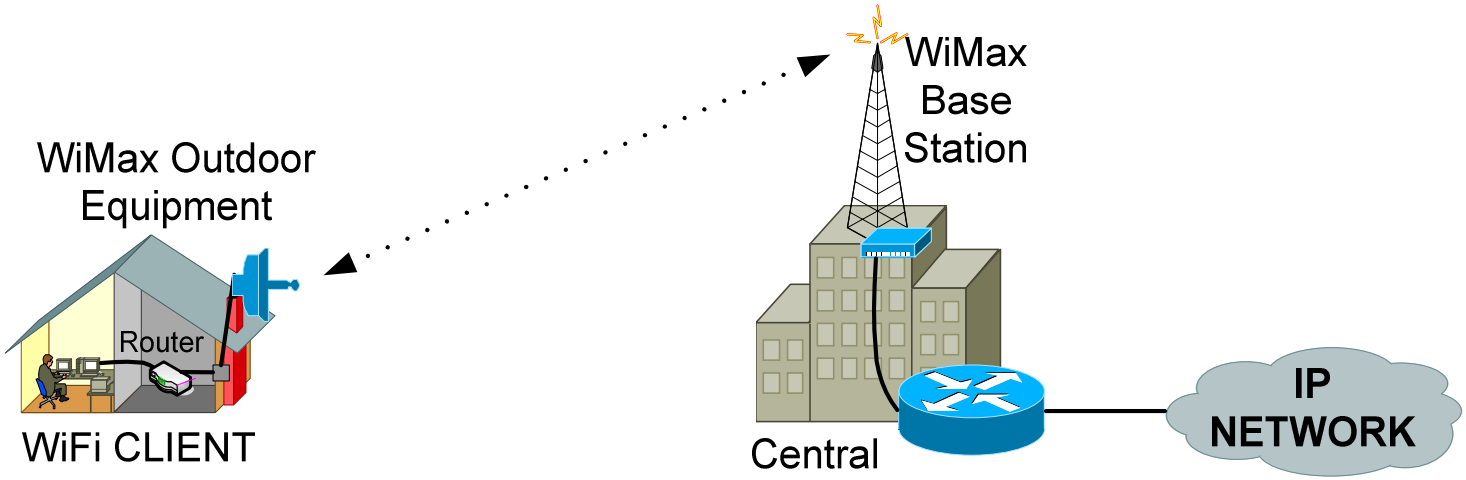
xDSL Rural Broadband Access Architectures



- Deploy **remote DSLAMs in outdoor cabinets** connected to the ATM or IP network by terrestrial links
- **Conditions**: (1) existence of suitable copper twisted pairs, (2) demand sufficiently high and concentrated, (3) existence of previously deployed infrastructure

- **The preferred architecture**: a great part of the infrastructure can be amortised in 20 years and can be shared by other applications
- A very wide range of services can be offered

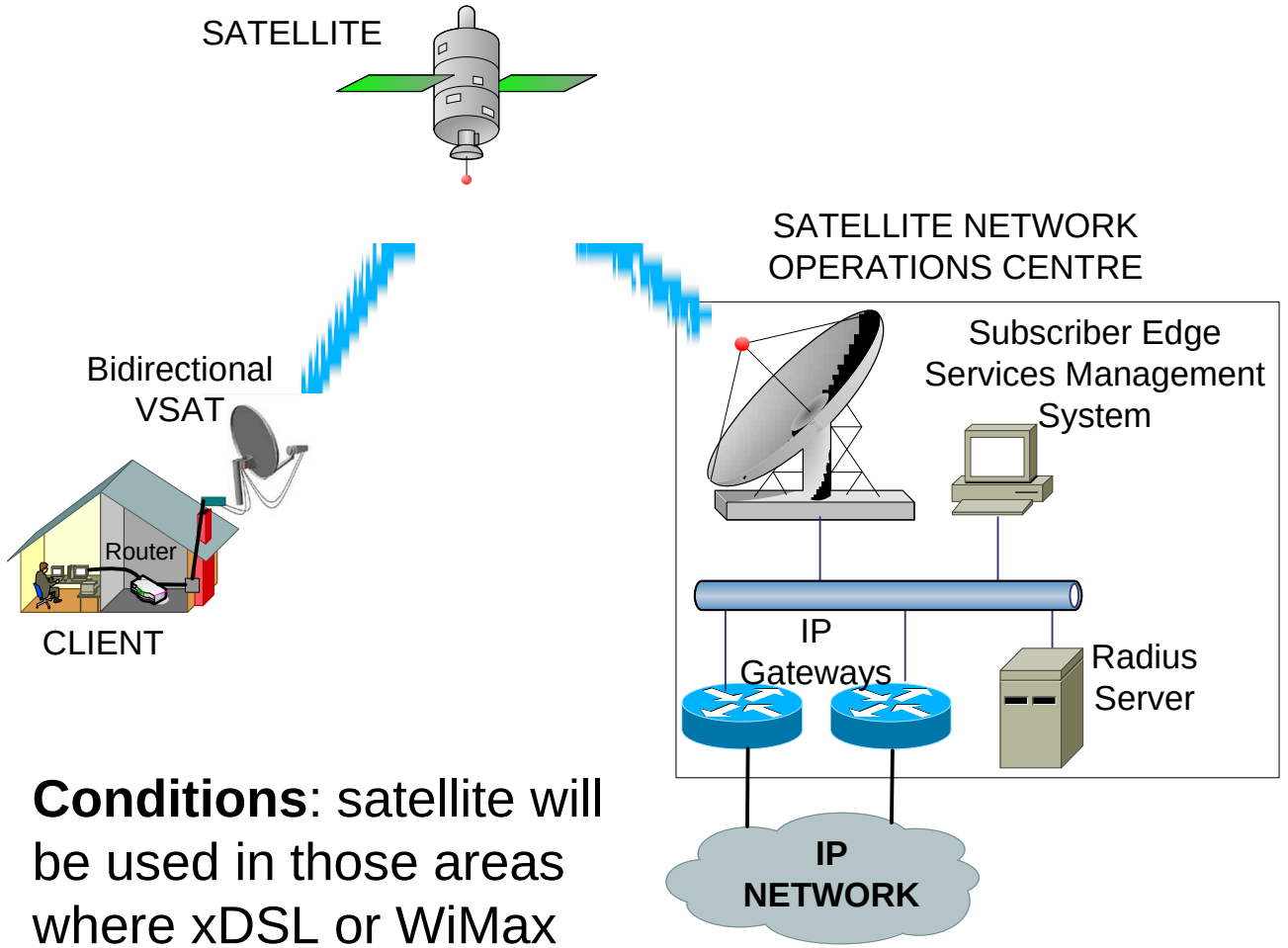
WiMax Rural Broadband Access Architectures



- **WiMax base stations located at strategic points** (15 km LOS, 3 km NLOS). Base Stations connected to the IP network by a terrestrial or radio link. Outdoor and indoor equipment at client side at the beginning
- **Conditions**: (1) copper twisted pairs not suitable, (2) lack of deployed infrastructures, (3) demand dispersed over relatively wide area, (4) LMDS base stations or other radio infrastructures exist, (5) expected demand: enterprises, city councils, schools, etc

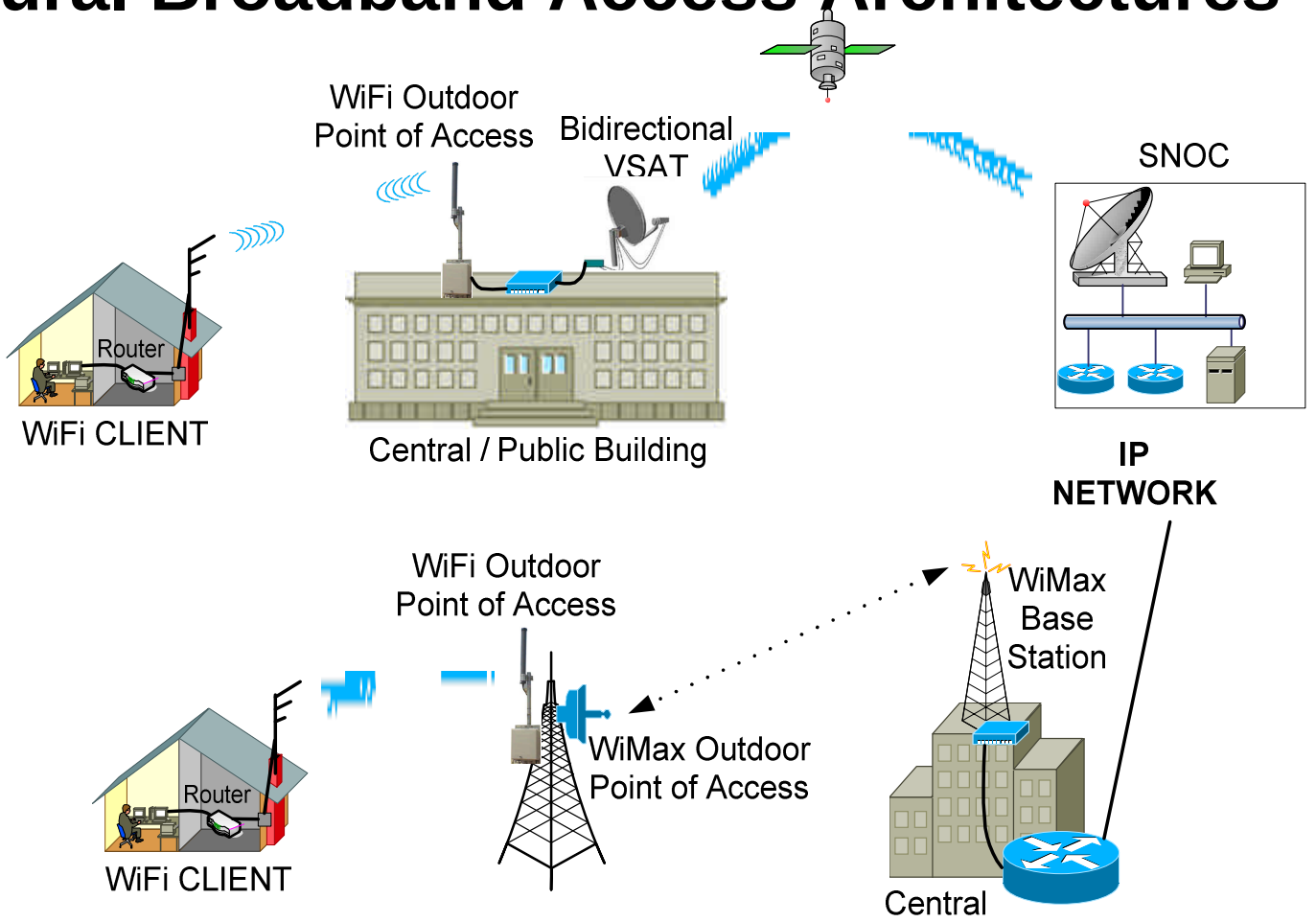
Satellite Rural Broadband Access Architectures

- A **transponder** in a satellite must be hired and a **Satellite Operations Centre** (SOC) must be deployed.
- This will have the antennae to reach the end users via the satellite and **IP gateways** to control QoS and traffic of the different users.



- **Conditions**: satellite will be used in those areas where xDSL or WiMax cannot be economically deployed.

Hybrid WiFi Rural Broadband Access Architectures



Deployment Strategies

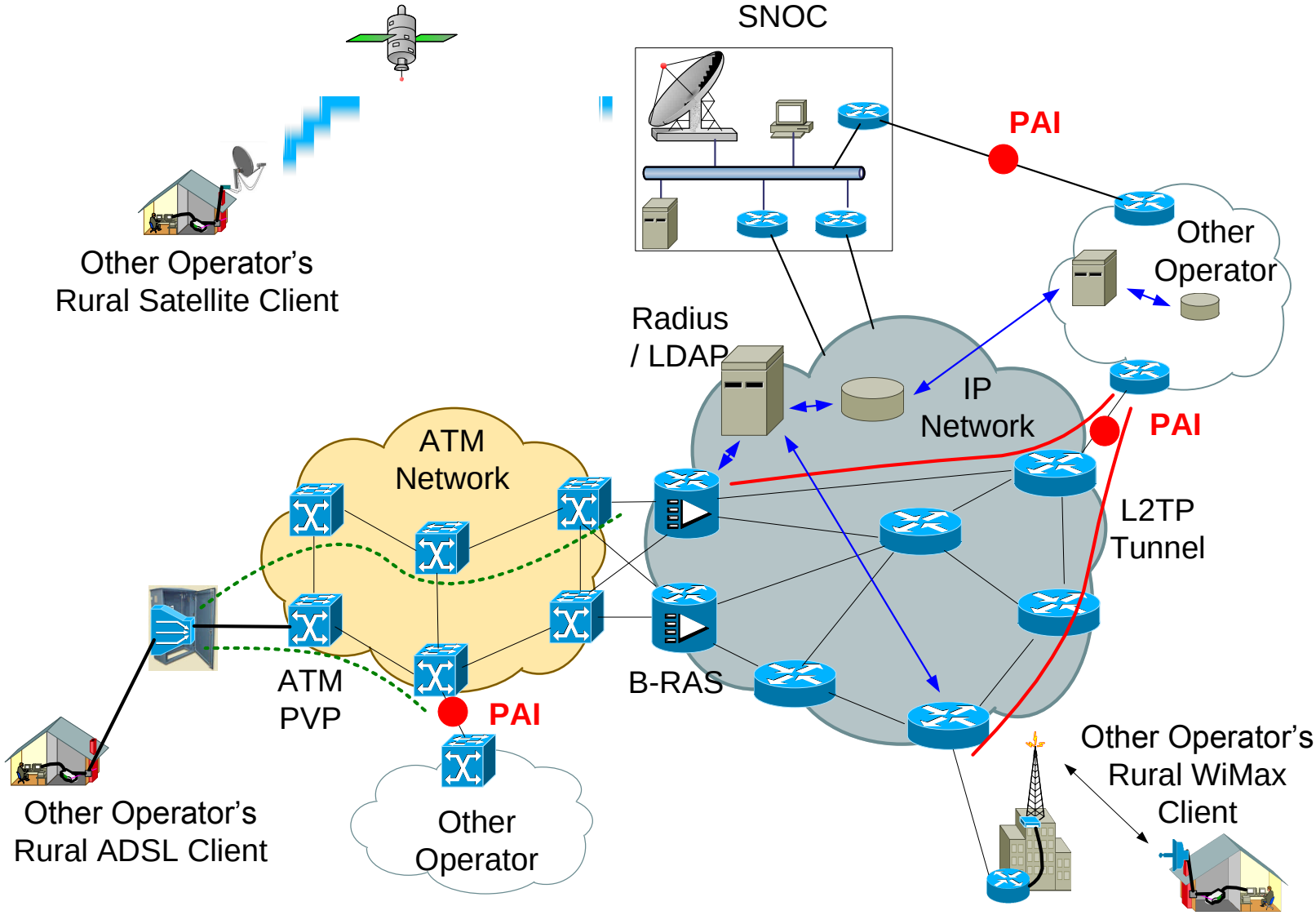
- A good **strategy must be designed to minimize investments and to reduce risks** when deploying rural broadband access networks
- **Complementary technologies**: to use different technologies and architectures for different scenarios to reduce costs
- **A timing strategy to reduce risks**: defer the less suitable technologies (Satellite and WiFi) at the last stages of the rollout plan
- **Areas must be prioritized** according to their expected demand and according to the amount of services that can be offered by the technology to deploy in them

Rural Broadband Services and Applications (1)

Wholesale Services

- Deployed infrastructures must be shared with the rest of network operators according to the existing regulation
- The **same wholesale services that are offered nowadays by the Spanish incumbent operator are replicated by the new rural broadband** services
- **GigaADSL**: Telcos can access their clients' ATM traffic at different areas (109 in Spain) by connecting their ATM switches at previously defined Indirect Access Points
- **Tunneled ADSL IP**: Telcos can access their clients' IP traffic by connecting their IP routers at only one Indirect Access Point for all the Spanish territory. Only transport provided
- A **new wholesale service must be implemented for satellite**

Rural Broadband Wholesale Services



Rural Broadband Services and Applications (2)

Retailer Services

- Internet Access
- E-commerce
- E-learning
- Entertainment
- Virtual Private Networks and Intranet Access

Conclusions

- Deploying broadband access in rural and isolated areas involves **high investments and risks**
- Mainly **due to the high uncertainty in demand, the lack of knowledge of what is going to be the evolution of broadband access technologies** and, thus, the existence of unknown costs which will be correctly quantified only in the implementation phase
- An **in depth analysis of the existing broadband access technologies to define the network access architectures** for the different existing scenarios and a **detailed roll out plan** are vital to reduce risks and costs.
- **Wholesale and retailer services** based on broadband access **must be developed to reduce the digital gap** between urban and rural areas