



This project demonstrates how the collaboration between a Polytechnic University and a local policy maker can be valuable in building and operating a broadband network.

It also demonstrates that the assistance provided by a technical-scientific staff is important not only for technological purposes but also for supporting policy makers to start and consolidate local network management.

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Wireless Verrua Italy

In Verrua Savoia, a commune of Turin in the region of Piedmont, 1,500 people live in small communities spread over nearly 32 km² of valleys and steep hillsides. The area's topography and low population density make it too expensive for large telecommunications companies to invest in building a broadband network there.

In 2010, one of these inhabitants, a professor at the nearby Polytechnic University of Turin, built and operated an experimental broadband network on behalf of the Municipal Administration and with the collaboration of the TOP-IX Consortium. The network provided high-speed Internet access, initially for free and later for an annual subscription of €50.

The "Verrua senza Fili" (Wireless Verrua) project was promoted by the Municipal Administration and managed by the iXem Labs of Polytechnic University of Turin in order to overcome the digital divide which often limits the activities of citizens and businesses in this mountainous area.

"When Professor Trincherò first told me about his project, I thought it could revitalise Verrua and also make it more attractive for newcomers," said Eldio Ginevro, a former mayor. "So many have left this area recently." Many residents of Verrua Savoia, like in other rural parts of Italy, left in the 1950s and '60s to take industrial jobs in nearby cities. The already spread-out village became increasingly fragmented and social life wore thin. Today, the impact of the experiment is easy to see. "The Internet has helped us aggregate people again," said Rev. Corrado Cotti, the parish priest, a former editor of the local paper and one of the pioneers of the experiment.

The project is based on experiments with low-

cost communications devices that allow very high bandwidth (up to 70 Mbps) over medium and long distances (over 30 km). By using these devices, it was possible to build a wireless network over a hilly area of significant size (about 32 km²), which was challenging for radio signal propagation.

In 2004, iXem Labs developed an implementation scheme to facilitate the adoption of intelligent systems in rural areas. It was based on the creation of a very low-cost broadband last-mile Intranet network; the construction of extremely low-cost sensors and controllers; active participation of the residents; as well as support by university students during the design, production and technological transfer phases.

The first step was bandwidth availability. In order to bridge this initial gap, a local wireless network was set up to interconnect the surrounding villages. To lower the costs, network design and the construction of hardware components was developed first by a group of university students during their courses and internships, and the inhabitants of Verrua participated in the network's set-up by installing their equipment independently.

Following the deployment of wireless transmitters in August 2010, citizens started using the service from 1 October of that year, without data limits and with faster connectivity than offered by traditional rural ADSL. Internet connectivity was provided free of charge to all subscribers, transporting bandwidth from an Internet exchange point to the village by means of a high performance point-to-point radio link. 120 houses were connected in the first four months, with a further 120 in just over three years.



Photo: Verrua

The project concluded in December 2014, having covered 99% of the territory and connected 99% of its inhabitants. In the course of its four years, the project interconnected 13 schools and deployed eight Wi-Fi and high-performance local area networks (HIPERLAN).

In November 2014, the residents of Verrua announced the launch of the “Associazione Senza Fili, Senza Confini” (“Wireless, Borderless Association”), a non-profit citizens’ Internet service provider group charged with the task of bringing Internet access to the 1,400 local residents.

For a small fee, locals can join the Association and become owners of their own network. Members receive a 20 Mbps wireless connection, while the majority of neighbouring towns have

only a 640 Kbps (Kilobits per second) wireless connection. The residents’ direct involvement in the connectivity of their township is important for the success of the project: the membership fee, which is relatively low compared to market standards, finances the network.

Five residents are on the Association board and coordinate the paid work of the experts who manage the network, together with younger residents. They also offer courses to people who want to learn how to use the Internet. These courses are free for Association members.

“With the association, we are proving that this experiment of democracy from the bottom is ready to take off,” Professor Trincherro stated. “Our goal is to bridge the infrastructural and cultural digital divide.”

Good practices in project planning

- ✓ Taking into account the impact of the plan on territorial cohesion (sustainable territorial economic development, competitiveness, better connectivity of territories)
- ✓ Deep involvement of the inhabitants, investing in local projects, stimulating/aggregating demand for high-speed connectivity
- ✓ Involving appropriate expertise (technical, financial, legal, marketing, regulatory)

Leading organisation	iXem Labs of Polytechnic University of Turin
Financing	The project was financed as a research project by the Polytechnic University of Turin and through an investment of €15,000 made by the Municipality of Verrua Savoia in the start up phase.
Speed / Performance	Up to 70 Mbps (Megabits per second)
Technology	8 Wi-Fi networks and HIPERLAN deployed, with an average real bi-directional bandwidth of 1,2 Mbps 13 schools interconnected with a super-fast intranet
Average price of standard service for households	€50/year (free at the beginning of the experiment)
The network	In just over four years, 99% of the territory was covered and 99% of the inhabitants were connected.