

North-Western Kuhmo Village Optical Fibre Cooperative (Finland)

Working Document



This case study was prepared in the framework of the ENRD Thematic Work on Smart and Competitive Rural Businesses (https://enrd.ec.europa.eu/thematic-work/smart-and-competitive-rural-areas/rural-businesses_en) that was running between August 2016 and July 2017. A comparative case study was developed entitled '[Community broadband: New digital opportunities for rural areas](#)' based on the experience of North-Western Kuhmo Village Optical Fibre Cooperative and the Molenwaard Community Broadband case example (the Netherlands).

FACTS

Location: North-Western Kuhmo, Finland

Timing of the initiative: From 09/2013 to 12/2015

EAFRD-funding: Measure 321 (period 2007-2013) funding: €1,394,160 (out of which €766,788 national co-financing); additional LEADER funding for the construction of two network extensions.

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Summary of main results:

- ✓ Close to 200 kilometres optical fibre network built, offering 100MB data transfer speed
- ✓ More than 200 households (74%) joined the network
- ✓ Cost-effective construction of the network (due to local engagement and voluntary work)
- ✓ Increased competition among telecom companies/ service providers, lowering Internet access prices.





Short description of the project

The project aimed at enhancing the quality of life, access to services and entrepreneurial and economic conditions in a sparsely populated countryside by offering fast internet connections based on optical fibre network. The target area was North-Western Kuhmo and its six villages in very sparsely populated Eastern Finland: Hietaperä, Ylä-Vieksi, Vuosanka¹, Härmänkylä, Kuusamonkylä, Iivantiira.

¹ While it was in the original plans, the Vuosanka routes were never built due to the lack of interest. Instead, the Cooperative was able to build the full route to Kuhmo (from Merjaniementie to the center of the city).



1. SETTING UP THE BROADBAND INFRASTRUCTURE

1.1 How to start it off?

Kuhmo is in a **very sparsely populated Eastern Finnish countryside**. It hosts one of the most well-known international Chamber Music Festivals in Finland every Summer. The main trigger for this project was the need for video conferencing tools in Kuhmo's International Centre of Chamber of Music in their communication with other leading schools and experts. Project manager Philip Donner (who used to work as a researcher in the Sibelius Academy, Helsinki) and a colleague used video conferencing facilities to set up an audio-visual networking teaching unit in 2001. The video-conferencing tool was used to collaborate with international organisations and experts across the world.

He had been looking at the Canadian experience on how to overcome accessibility issues in local community development. They soon realised that the quality of broadband was not appropriate to use video-conferencing tools at the quality-level of their counterparts in Canada (the number of partners who could be on-line as well as the quality of sound and image was much weaker in the case of the Finnish partners).

Setting up appropriate broadband connectivity could not only help to overcome the difficulties regarding the use of the video-conferencing tools, but could also improve other basic services in the area. Due to the remoteness of the area (where the nearest shop was 50km away), it was evident that they needed to construct their own broadband network.

Policy shift in rural broadband support

At the time, the Government supported some pilot networks, called WiMAX². However, it soon turned out that WiMAX is not a suitable system in many areas (e.g. it can be obstructed by large hills, which becomes especially problematic as natural obstacles, such as trees, grow), and in the longer run not necessary cheaper option than fibre network, which offer a sustainable solution. The capacity of fibre networks can also be enhanced with relatively small investment.

In 2008, a study prepared in Oxford (UK) showed that, despite common belief, Finland is among the lagging behind countries as far as fast and superfast broadband coverage is concerned. During this period, there was a shift in the policy-approach. In December 2008 the Finnish Government reviewed its communications policy guidelines and formulated a memorandum (that later became a legislation) called '**Broadband for Everyone 2015**'. It was decided that if communications service cannot be provided on commercial terms, **public aid may be granted to ensure that services are available to all**. Two aims were set for the development of broadband connection: a downstream rate of 1 Mbit/s by 2010 and 100 Mbit/s by 2015.

The national-level policy change (see above) gave an opportunity to establish an **Internet Network Cooperative** in 2013, which is a non-profit organisation. The Cooperative is an association of rural inhabitants and companies. The involvement of villages was not without challenges, as it took time to settle the differences and some conflicts between them (see challenges).

The initiators also looked for **technological advice** to understand what the best ways are to set up a fibre network (e.g. which kind of cables to use, etc.). They engaged in an online exchange/ expert forum with Swedish-speaking experts, who were advising on how to set up the first networks.

² WiMAX (Worldwide Interoperability for Microwave Access) is a family of wireless communication standards. A WiMAX tower is similar in concept to a cell-phone tower; it can provide coverage to a large area.



1.2 What are the technical specificities of the broadband infrastructure set up?

The project built close to 200 kilometres of optical fibre network, offering very fast two-way (symmetric) 100 Mbps Internet data and 1 Gbps Intranet data transfer speed. Well-functioning public services that are based on two-way communication setting call for a low latency, highspeed two-way solution, which is sustainable as capacity needs grow. According to the initiators, 1 Gbps is the fibre network speed that is worth investing in (these networks can be upgraded easily compared to mobile networks, such as WiMAX).

1.3 What are the financial requirements for setting up and operating the network?

The total budget of the network construction project was €1,884,000:

- RDP/EAFRD funding: €627,372, national public match funding from the state was €766,788,
- Private funding: €122,460 (including private persons and the village association – which is not the same as the Cooperative). A bank loan covered most of the cost of earthwork - the real estate properties of the village network were presented to the bank as collateral.
- Value of villagers' voluntary work: €367,380.

1.4 How to engage the community?

The Cooperative organised **village and neighbourhood gatherings**, where benefits of information society and opportunities of fast internet connections were discussed. This animation work (household by household) ensured the commitment of local communities for the idea of setting up the broadband infrastructure.

The community members have played an important role in both organising and sustaining the broadband infrastructure.

This included periodical checks (e.g. on network traffic), and carry out repairs when necessary. One of the main target groups of the broadband infrastructure is elderly people, who often need assistance in using internet technology (also carried out by the Cooperative).

Committed local people were willing to invest a huge amount of **voluntary work during the construction phase**, with their tractors and excavators, worth a total of 36,000 hours and €367,380 (where 1 machine hour equals 2 hours human work). The cooperative carried out the investment in a much more cost-effective way than commercial investors would have, by committing the villagers beforehand and utilising their voluntary work. High penetration produced an affordable price per subscriber.

Parallel to this process, the Cooperative negotiated with different telecommunication companies about the service / connection provision for the network. The **Cooperative is the owner** of the broadband infrastructure.

The Cooperative is proudest of its ability to challenge the prevailing thinking on internet service provision. The project proved that bottom-up movement, open source thinking and few individuals' expertise is enough to overcome the resistance to change.

Specific challenges & lessons during the setting up of the broadband infrastructure

Several challenges have been identified in relation to setting up the Kuhmo broadband:

- The experience of Kuhmo showed that **bottom-up initiatives can achieve very high network penetration rates** (i.e. subscribers per number of households), as the activated village members also want to subscribe to the fibre route that they constructed themselves.
- **Setting up the Cooperative**, engaging various villages in the process, has been very challenging. Municipal leaders were often not supportive (and in some cases counterproductive) in this process. The negotiations took very long and were resource-intensive.



- Similarly, **building cooperation with telecom companies** has been very challenging. The initiators have been trying to set up cooperation with a regional telecom company for the past 2-3 years. Commercial telecom companies often fear competition and therefore are against community broadband. In the case of the Kuhmo Network they created a lot of obstacles, e.g. by trying to engage the 'easiest' set of households offering them connection; this way playing them out against other – more difficult to engage – households. The market approach is often difficult to align with local needs (e.g. does not allow full engagement of the community, sets too high prices for subscribers, etc.). One of the biggest achievements of the Kuhmo Cooperative was to induce competition in the market and therefore, lower prices (see below).
- There were doubts whether **older people living in rural areas** (e.g. in the middle of the forests) would find any relevant use of fast internet connections. The Cooperative managed to prove that the elderly people, with their growing need to access to services, formed a very relevant target group of the project. When younger, more pro-information society politicians have entered the municipal decision-making circles, the attitudes have also been turning towards the need to improve digitisation.
- Although public policy became supportive of rural broadband investments (see 'Broadband for Everyone 2015' above), at the start the various public schemes/ calls were **requiring substantial co-financing** that was not suitable for many small local projects. Another challenge linked to financing is that existing investments in broadband infrastructure cannot be provided as guarantee for loans.
- The initial expectation was that policies on broadband infrastructure and connectivity will automatically trigger positive effects in terms of enhancing public services through new connectivity. However, this often has not happened. There is lack of experience on how broadband connectivity is used at the local level. Although the project showed the advantages of a bottom-up oriented approach, this insight is not applied in health and welfare development.
- Policies often do not recognise that **public money invested in community broadband has no negative impact on competition**, especially since in a rural situation where no service providers offer their services. It must be recognised that cooperatives are non-profit organisations, where all profits are shared by the rural inhabitants, who at the end of the process benefit from lower prices and growing networks.



2. OPERATING THE BROADBAND INFRASTRUCTURE AND SERVICES

2.1 Who provides the internet services?

As a result of the Cooperative's negotiations, and after making several concessions (i.e. temporarily giving up on two extension areas³ and spending extra 24,000€ on the route to the access point) the North-Western Kuhmo Network was connected to a large national Internet service provider (Telia) in Autumn 2015. By the end of 2017, the initiators reached agreement with a nation-wide mobile service-provider, Elisa Telecom about a ten-year rental of one fibre pair for their mobile access points (terrestrials) and another one for Elisa's national network.

Main stages and challenges to secure appropriate and affordable service provision

The north-western Kuhmo village network has secured agreement for an appropriate and affordable service provision through several stages:

- **The first step** was to **find a provider who was willing to offer the cooperative an Internet access point**. One of the main challenges of isolated rural areas is the lack of competing service providers that often result in the dominant position of a single service provider. This was the case of the Kuhmo Network. The dominant Internet provider in the region denied access to services; and once the Finnish Competition Authority ruled against this decision of the telecom company; they tripled their price. Instead of bringing the matter to court, the Kuhmo Network looked for other strategies.
- As a **second step** the Kuhmo Network **tried to reach for an alternative service provider**. Due to the cost-effective construction, the village network had a reserve budget that enabled them to reach the municipal centre, where a competing company could offer an access point. However, the service provider of the municipal centre demanded extra payment for the right to offer connection in the municipal centre. Therefore, the first-year agreement was expensive.
- As a final step and after making a **survey on 'interest of large telecom companies in renting core net fibre pairs'**, a nation-wide service provider, Elisa responded to the query of Kuhmo village network. The third step was taken, when through proactive steps from the network, an agreement was reached with Elisa (as described above).

2.2 How is the broadband infrastructure operated & financially sustained?

The Cooperative is responsible for sustaining and operating the broadband infrastructure. The main users of the broadband infrastructure are private households (including elderly people) and rural businesses, that now have improved access to digital services. The monthly fee of fast-speed internet connection has been €28 per household (with an increase to €35 after October 2017) that the Cooperative is charging from its members (it is the Cooperative who pays for the internet services to Telia). Economies of scale could be reached through committing more villages and subscribers.⁴ By reaching 600 to 800 subscribers (which could be achieved by building networks for all rural areas or at least some semi-urban settlements) the network could be sustainable. Currently, less than 1 full time equivalent (FTE) work is invested in the project yearly on a voluntary basis.

³ The Cooperative was later able to construct the village networks for the extension area in Viexinjoki and Iivantiira through projects financed from the EAFRD/ LEADER.

⁴ The fixed costs do not change (the switching room is within a community-owned building). The project is dependent on new subscribers to pay back loans.



Financial investment (temporary funding) is needed for improving the network and for these further loans are required (to progress the initiative).

2.3 What have been the main outputs, results of the project?

a) Outputs and results

- The project built close to 200 kilometres of optical fibre network, offering very fast 100MB data transfer speed.
- More than 200⁵ of the total of 270 households in the area decided to join to the network and thus improve their access to services, rural business and tele-work opportunities as well as property price.
- The commercial teleoperator had estimated €12,600 costs per household but the cooperative carried out the investment in a much more cost-effective way.

Can village cooperatives be operational in producing a free telecom market?

The most successful aspects of the project

- Compared to the state program “Broadband for All 2015”, the project had a very different, bottom-up approach. The state program has supported backbone cable construction to the sparsely populated areas, without fully considering how rural households could afford joining them. The result is a large amount of cable constructed at a high price but often with very low penetration.
- The Cooperative approach started from the neighbourhoods and villagers themselves – and the result was then based on their needs, with hundreds of customers and very cost-effective implementation.
- One of the main entrepreneurs came from the project area. The municipality did not consider the increase in tax income, which could have circulated to further village network projects. The construction company has now expanded its fibre construction activities to become a regular part of the company’s business.
- After a period of regional monopoly, the village network showed that commercial construction budgets and consumer prices were overestimated. Since the emergence of the Cooperative the regional telecom company has been forced to compete by lowering price levels by 50%.
- At the outset, only one telecom company offered Internet access for village network constructors. One year after the project, three companies offer such services. Subsequently, the market situation drives prices down.
- The project is not profit-oriented but aims to improve the quality of life of rural citizens and opportunities for businesses. Small pilots like this are needed to respond to local needs and interest in a bottom-up way, testing methods and approaches.

b) Long-term sustainability

The Cooperative has been maintaining and further expanding its network since the RDP funding stopped. The new RDP (2014-20) is supporting the extension to Vieksinjoki-Katerma village and LAG Living Kainuu LEADER is supporting a similar investment in Juttua-Hiekkala village. This an attempt to produce a low-risk expansion model, based on the idea of self-reliant village networks joining the cooperative.

⁵ The initial target was 160 households.



The municipality, which declares fibre networks to be part of the core development strategy, must also give an input to facilitate construction of rural networks which would cover the whole municipality. This can be facilitated by cooperation with telecom companies in construction of core networks with overlapping village network initiatives. Meanwhile the Finnish state has consolidated its ownership in CINIA, which could become a nationwide core network provider.

The agreement reached with a nation-wide service provider (Elisa Telecom) helped to save money that drastically improved the economy of the village network cooperative. The new income enabled the cooperative to start paying back its loans. As the competition increased among bulk internet service providers, Internet access prices went down by a quarter or more among all telecoms operators.