

Work Package 3 In-Depth Analysis & Good Practise Review

Deliverable 2:

**Regional / National and International
satellite broadband implementation case
studies**

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SABER (Satellite Broadband for European Regions) is a CIP ICT PSP co-funded Thematic Network

For more info see: <http://www.project-saber.eu/>

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The European Commission is evaluating the compliance of the document within the current EU regulatory framework.

Following the approval of the European Commission the official version will be published.

Meanwhile the use of this information is submitted to prior consent of the project coordinator. In any case, the source of the information must be quoted.

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0. Preface

In addition to relying on input from its 24 partner organisations, SABER has built into its methodology a validation process whereby the project seeks input from external sources to validate the findings of SABER's research and the usefulness of the deliverables created for their target audience. European Commission services were widely engaged; representatives from DG CNECT, DG AGRI and DG REGIO provided feedback on SABER deliverables through bilateral meetings, in writing and through participation on panels in SABER workshops.

Other network organisations such as NEREUS and Eurisy, the European Space Agency and the European Investment Bank have also been engaged through workshops and bilateral meetings. Additionally a validation panel was created drawing from key contacts of the consortium partners who were well placed to offer a perspective on the deliverables and organisations that expressed an interest in SABER's activities were engaged. Annex I: Validation Methodology outlines the validation methodology, a summary of the validation findings and how SABER has responded or will respond to the validation findings.

1. Executive Summary

Deliverable 2 is divided into two parts: the review and analysis of National Broadband Plans and the review and analytical synthesis of relevant past and ongoing satellite broadband implementation cases.

SABER partners analysed Member State broadband strategies through four indicators and consider them against the same elements contained in the DAE, namely:

- targeted basic broadband speed;
- current percentage of population covered by basic broadband;
- targeted basic broadband coverage;
- scheduled achievement of the basic broadband coverage target.

It appears from this analysis that:

1. there is no harmonisation in the targets and in the inclusion of satellite technology in the NBP
2. complete basic broadband coverage is far from being reached in many countries, especially in the most recent EU members.

From the review of the broadband strategies, SABER partners highlighted common features and good practices that can be deployed in future National Broadband Plans.

To illustrate concretely the analysis; extracts from the official documents are set out.

Based on these elements, SABER partners produced some recommendations for future broadband strategies concerning the recognition of satellite technology among all available technologies that provide broadband.

SABER partners also highlighted eight relevant regional cases where satellite broadband was deployed all around Europe: Norway (Agder), Greece (Trikala), UK (Devon, Wales, Northern Ireland), France (Auvergne), Spain (Galicia) and Italy (Bolzano).

Based on the analysis of these case studies, SABER partners came to a classification of

implementation models, namely:

- direct subsidy to end-users (Wales);
- qualification of multiple ISPs by a call-off procedure (Auvergne, Galicia);
- selection of a single ISP by a call for tender (Devon, Northern Ireland);
- selection of a single ISP for the provisioning of 100% broadband coverage with a multi-technology approach through a call for tender (Northern Ireland, Trikala).

Each model is described in depth, leading to a pros and cons analysis table. From all these elements, SABER partners express some recommendations and suggestions:

- the qualification of multiple ISPs model is the most effective;
- set up of a registration portal, through a regional database and mapping of the households;
- planning multiple calls for grant application of limited duration;
- communication on satellite capabilities must be open and honest.

2. Introduction

The main objective of this deliverable is to present good practice case studies and to analyse Member States' National Broadband Plans in order to identify the elements to be taken into account to successfully achieve further deployment of satellite broadband in the EU.

This document is the result of the active collaboration of all SABER partners with the specific contribution of the experienced regions that shared their experience in deploying satellite solutions with the other members.

All the information, analysis and recommendations included in the deliverable are the outcome of SABER partners' extensive intelligence gathering. Specifically:

1. research and review of Member State national broadband plans
2. Collation of best practice of satellite broadband services deployments in the EU
3. Review and synthesis of relevant past partner projects
4. Specific discussion on the deliverable subjects in 2 Workshops (Cork and Brussels) to iteratively review, and validate the network's findings and good practice case studies.

Final review of the document on the basis of partners comments, analysis and discussion.

3. Review of Member States (national) broadband plans

According to Action 46 of the Digital Agenda for Europe “Member States to develop national broadband plans”, the Member States should develop national broadband plans to be operational by 2012. National Broadband Plans (NBPs) are the legislative frameworks aimed at improving broadband Internet access for citizens and business. These documents specify different sets of indicators, policies and a range of targets, defined on the basis of the DAE objectives. The Commission reports annually on progress as part of the Digital Agenda governance through “Broadband Coverage in Europe” Reports.

3.1 General presentation of the review

3.1.1. Chosen indicators for the analysis

Most of the Member States’ broadband strategies focus on complete coverage for basic broadband to achieve the 2013 Digital Agenda Target.

The EU Commission analysis on the ongoing process, underlines that there is a lack of clear operational measures to achieve the target especially in terms of timing and funding.

In this review SABER partners selected five main indicators to analyse the issue:

- targeted basic broadband speed (download);
- current percentage of the population covered by basic broadband (i.e. the measure of broadband gap);
- targeted basic broadband coverage;
- scheduled achievement of the basic broadband coverage target;
- inclusion of satellite technology in the NBPs (essential to reach a real 100% EU coverage).

3.1.2. DAE indicators

All these indicators from national levels have to be considered against the same indicators contained in the DAE, respectively:

1. targeted basic broadband speed (download): 2 Mbps (EU official definition of basic broadband is currently of 144 kbps);
2. current percentage of the population covered by basic broadband: 95.7%¹;
3. targeted basic broadband coverage: 100%;
4. scheduled achievement of the basic broadband coverage target: 2013;
5. inclusion of satellite: YES

¹ COMMUNICATIONS COMMITTEE Working Document - Broadband lines in the EU: situation at 1 July 2012 - 18/02/2013

Extract of the table (see the whole table in Annex):

Country	Basic broadband speed (download)	Population covered by basic broadband (measure of broadband gap)²	Basic Broadband targeted coverage	Basic broadband coverage timing scheduled in the national broadband plan	Satellite included in the national broadband plan
DAE	2 Mbps	95.7% (July 2012)	100%	2013	satellite included
Austria	1 Mbps	95%		2013	
Belgium	2 Mbps	100%	100%	2013	NO
Bulgaria	1 Mbps	91.50%	98% (only 50% for the remote and rural areas)	2015	YES
Cyprus	2 Mbps	100%	100%	2013	
Czech Republic	2 Mbps	94.50%	100%	2013	YES
Denmark	2 Mbps	99%	100%	2013	NO
Estonia		95%	100%	2013	NO
Finland	1 Mbps	97.80%	100%	2010	NO
France	512 kbps	99.30%	100%	2017	YES
Germany	1 Mbps	95.30%	100%		YES
Greece	DAE objective	98.50%	DAE objective	DAE objective	NO
Hungary	DAE objective	93.20%	DAE objective	DAE objective	NO
Ireland	1.2 Mbps	97.10%	DAE objective	DAE objective	NO
Italy	2 Mbps	98.50%	100%	2012	YES
Latvia		89.60%		2008	NO
Lithuania	512 kbps	88.40%	98%	2010	NO
Luxemburg	2 Mbps	100%	100%	2010	YES
Malta	4 Mbps	100.00%	100%		
Netherlands		100%	100%		YES
(Norway)	640 kbps	95.90%	99.80%	2008	YES
Poland	2 Mbps	72.20%	100%	2013	YES
Portugal	DAE objective	99.50%	DAE objective	DAE objective	
Romania	1 Mbps	91.70%	DAE objective	2015	
Slovakia	1 Mbps	91.40%	100%	2013	YES
Slovenia	2 Mbps	90.10%	98%	2012	YES
Spain	1 Mbps	96.90%	100%	2012	NO
Sweden	1 Mbps	98.60%	100%	2013	YES
United Kingdom	2 Mbps	100% ³	100%	2015	YES

² Broadband coverage in Europe in 2011, European Commission, DG Communications Networks, Content & Technology <http://ec.europa.eu/digital-agenda/en/news/study-broadband-coverage-2011>

³ Please note that the figure is justified by the fact that all UK telephone exchanges are enabled for DSL, however the Broadband coverage report itself (e.g. see p.159) admits that this is not performance based and therefore coverage at 2Mb will be <100%

3.1.3. Results

Based on the review of the National Broadband Plans, it transpires that out of the 23 documents found (out of 28 studied countries):

1. More than 55% of the countries explicitly include satellite technology in their NBP (13 out of 23): Bulgaria, Czech Republic, France, Germany, Italy, Luxembourg, the Netherlands, Norway, Poland, Slovakia, Slovenia, Sweden and the UK;
2. a minority do not explicitly include satellite in their broadband strategy (10 out of 23): Belgium, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania and Spain.

The “Broadband coverage in Europe in 2011” report from the European Commission assumes that six countries have already achieved the 100% coverage objective by now.

It appears that three of these countries, namely Luxembourg, the Netherlands and the UK, explicitly include satellite in their NBP. Belgium, where also 100% of the population is covered by broadband, does not mention satellite in its national broadband strategy. Concerning the two other countries (Malta and Cyprus), no information on their NBP were found.

Therefore, at least 50% of the countries that have achieved 100% before the 2013 deadline considered satellite in their mix of technology.

3.2 Analysis of the results

3.2.1. General outcomes

Based on the NBPs that include satellite in their mix of technologies, some general features can be highlighted:

1. necessity of adopting a **mix of technologies** that implement the **use of ALL the available technologies** (*France and the UK*);
2. inclusion of **satellite among the technologies that provide basic broadband** (*Bulgaria, Germany, the Netherlands and Slovakia*);
3. recognition of the **universal coverage of satellite broadband**, that is **independent from the**

density of population of the territory; thus, acknowledgment that satellite is an **important means to reach the 100% coverage target** (*Czech Republic, Germany, Luxembourg, Poland, Slovenia, Sweden and the UK*).

Even in countries that do not include satellite in their NBP, the necessity to include this technology is put forward, as for instance in Spain. Indeed, although Spanish NBP does not mention satellite, a Report for Digital Agenda for Spain⁴ from the Spanish Government recommends in its section on “how to improve the deployment of networks” to include satellite solutions in order to reach the 100% coverage objective, especially for areas where deployment of terrestrial technologies is non-profitable for private operators.

3.2.2. Specific features

Besides, the outcomes of the review of the NBPs emphasize specific elements on satellite broadband that some Member States consider essential to pursue the European Digital Agenda Targets. In this case the principles of technology neutrality and the one of the cost effectiveness of the use of public funds are completely respected.

To be more precise, particular attention is given to:

- a) the description of the **satellite broadband architecture and features, that, thanks to its specific and unique features, confirm that “Satellite is a viable option for the most remote users and for those in some other not-spots. It will need to be part of any solution aiming at universal coverage”**;⁵
- b) the Use of satellite Broadband for the outside interconnected areas⁶;

⁴ Informe de recomendaciones del Grupo de Expertos de Alto Nivel para la Agenda Digital para España, Ministerio de industria, energía y turismo, Gobierno de España, 22 de junio de 2012
<http://www.minetur.gob.es/telecomunicaciones/es-ES/Novedades/Documents/informe-recomendaciones-ade.pdf>

⁵ Britain’s Superfast Broadband Future, Department for Business, Innovation & Skills, Department for culture, media and sport, December 2010, p.18

⁶ The Federal Government’s broadband strategy, Federal Ministry of Economics and Technology, February 2009, p. 24. Internet is primarily an option for locations that do not have access to terrestrial broadband, in particular those outside interconnected settlement areas. However, its benefits – widespread, immediate access – are compromised by certain technological restrictions in terms of capacity and by high monthly charges. In particular, the upload rate via satellite Internet is very low and, because it takes a relatively long time for the radio signals to be sent and received (latency period), this broadband technology has limited suitability for real-time-critical applications. Nevertheless, download rates of 1–2 Mb/s and higher ensure access to all core Internet services

- c) the **eligibility of satellite and satellite terminals to public funds⁷**;
- d) the **link between satellite broadband and rural and/or sparsely populated areas where there is no investment from private operators⁸**;
- e) the **cost-efficiency and easy set-up of satellite broadband⁹**.

Apart from those positive elements stated in some NBPs, it has to be noted that those statements were not always and homogeneously ensued in all the EU countries. For instance, in Slovenia satellite broadband is not included as a solution in the call for tenders within ERDF and EASRDF funds; in Poland it struggled to be implemented (see SABER deliverable 3.3, chapter 4.2).

3.2.3. Considerations on Broadband penetration

Even though EU 2013 target of 100% broadband coverage was reached thanks to satellite

(excluding online gaming). Existing capacity restrictions, which currently enable simultaneous usage by just 10,000 users nationwide, are expected to increase significantly as of 2010, once the planned use of spot beam technology to provide satellite broadband services has been implemented.”

⁷ NARODOWY PLAN SZEROKOPASMOWY, Departament Telekomunikacji MI, Ministerstwo Infrastruktury, March 2011, p. 14 “Funds from the implementation of operational programs may also serve as a source of financing for user equipment. This aspect was pointed out by satellite service providers operating within the Satellite Working Group Roundtable. They pointed out the need to develop system solutions that allow the use of the axis 8 of the Group Roundtable. They pointed out the need to develop system solutions that allow the use of the axis 8 of the Operational Programme Innovative Economy to finance subsidies for the purchase and installation of the terminal equipment This technology can effectively help with the elimination of white and grey spots covering broadband telecommunications network and can be an effective tool in the fight against the digital divide. According, satellite service providers, there is a need to:

- Determining the eligibility rules and funding of satellite solutions in the specified location,
- Provide telephone and online application process for financing equipment and installations
- The emergence of satellite distributors that meet the established criteria and offering services in accordance with established criteria.”

⁸ Broadband network development strategy in the Republic of Slovenia, Government of the Republic of Slovenia, July 2008, p. 10

“Satellite broadband connections are becoming interesting due to the powerful way they integrate capacities, in particular for remote and less accessible areas. The idea of capacity integration is based on the fact that the satellite beam non-selectively covers a vast geographical area, and thus a critical concentration of users in a narrow geographical area is not required. With organisational methods, it is possible to virtually integrate individual users who are otherwise geographically dispersed and who, together, represent for the satellite services provider demand sufficient for particular services to generate acceptable prices for such services.”

⁹ Stratégie nationale pour les réseaux à « ultra-haut » débit - L’« ultra-haut » débit pour tous, Ministry of Economics and External Trade, Ministry of Media and Communications, Government of Grand Duchy of Luxembourg, April 2010, p. 11: « 3. Satellite Le satellite est une solution économique, rapidement disponible et qui peut couvrir toute une région en haut débit indépendamment de sa topographie. C’est donc un moyen idéal pour arriver à un taux de couverture de 100 % puisqu’il permet d’atteindre des endroits éloignés ou peu peuplées qui ne justifient pas le déploiement d’un réseau en fibre optique sur le plan économique. Le gouvernement soutient le développement d’offres haut débit par satellite par la mise en place d’un cadre réglementaire adapté. »

broadband, one of the still remaining issues is the very low broadband penetration in the scarcely populated area with low income households.

As analysed by Analysys Mason in the article “Bridging The Digital Divide: Connecting The Unconnected”¹⁰, “The primary barriers to broadband adoption can typically be classified as follows:

- lack of **understanding** of the relevance and benefits of broadband
- lack of **skills** or familiarity with information technologies, or confidence to use them
- **affordability** of connection and access fees, and devices with which to access broadband.

The first two barriers can be addressed through government programmes to implement education and demand stimulation initiatives such as the development of e-government, e-health, e-learning and e-business, aimed at encouraging the development and use of new broadband applications.

There is a clear correlation between the affordability of broadband services and the levels of broadband penetration, therefore presenting greater challenges in achieving the DAE's broadband take-up targets for 100Mbps services.

Addressing affordability requires other types of intervention as demand aggregation.

3.3 Recommendations

To conclude, some recommendations can be offered from these observations:

- a) the mix of technologies should not exclude explicitly any available technology, in compliance with the principle of technological neutrality;
- b) recognising at least satellite among the technologies providing basic broadband access; and as a consequence, explicitly recognising satellite as a complement to the terrestrial technologies;
- c) mentioning the ubiquity of satellite broadband coverage, regardless geographic location nor density of population;
- d) inserting a dedicated section in the NBP on satellite technology to highlight its specificities, from a cost-benefit perspective;
- e) expressing eligibility of satellite for public funds and State aid mechanisms in full compliance

¹⁰<http://www.analysysmason.com/About-Us/News/Insight/Bridging-digital-divide-Jul2013/>

with the EC rules and regulations;

- f) recognising the role of satellite in remote areas, especially rural areas with low population density, that are un-served or suffer from slow speeds because of the cost of terrestrial infrastructure; as a consequence explicitly recognising that in these areas satellite is not a complement but the only solution to provide broadband in a cost-efficient way;
- g) recognising that satellite is a solution that provides immediate connectivity (easy and fast deployment).

The non-inclusion of satellite broadband in NBPs may risk leading to the non-achievement of the DAE 2013 objective of broadband for all and to disregarding the principles of technology neutrality and cost-effectiveness of the use of public funds¹¹.

¹¹DG Connect COMMISSION STAFF WORKING DOCUMENT - SMEs Going Digital - A Blueprint for ICT Innovation Vouchers)

4. EU Case studies

4.1 Implementation models: classification and description

A variety of public schemes were implemented directly or indirectly addressing the provisioning of satellite broadband access; taking into account the specificities of each measure, four main models are identified from the analysis of partners' experiences and external cases:

- direct subsidy to end-users beyond the reach of existing terrestrial networks; open scheme
- qualification of multiple providers of (satellite) broadband; call-off procedure
- selection of a single provider of (satellite) broadband; call for tender
- selection of a single provider for the provisioning of 100% broadband coverage (multi-technologies); call for tender
-

A. DIRECT SUBSIDY to end-users beyond the reach of existing terrestrial networks.

Typical steps of the open scheme:

- the Public Administration ("PA") issues a call for end-users applications, having defined the eligible beneficiaries and areas, minimum data rate requirements, and max subsidy per applicant
- the willing user submits the application enclosing 2 minimum quotations by ISPs of his/her choice
- the Implementing Authority validates the request and issues an Offer Letter to the applicant
- the end-user subscribes the selected ISP
- the ISP installs and activates the agreed broadband solution
- the subscriber pays the ISP
- the subscriber claims back the agreed eligible expenses from the PA, providing the appropriate

evidences

(e.g.: *Welsh Broadband Support Scheme*)

B. QUALIFICATION OF MULTIPLE PROVIDERS of (satellite) broadband

Typical steps of the call-off procedure:

- the PA qualifies multiple providers able to provide the service (having set eligible beneficiaries and areas, minimum data rate, maximum subsidy), signing an appropriate agreement with each ISP
- each ISP puts in place an agreed communication plan (endorsed by the PA)
- the willing user chooses his/her preferred offer from a qualified ISP
- the ISP cooperates with PA to validate eligibility and confirms to user
- the ISP installs and activates the subscribed service
- the ISP (typically) manages the administration process with the PA to recover the subsidy on behalf of the end-user, discounting it with the first invoice

(e.g.: *Auvergne, Galicia*¹²)

C. SELECTION OF A SINGLE PROVIDER of (satellite) broadband

Typical steps of the procedure:

1. the PA issues and assigns a tender for the provisioning of dedicated services (having set eligible beneficiaries and areas, minimum data rate, overall budget)
2. the winning ISP commits to maintain the awarded offer available for subscription for the agreed duration
3. a fix subsidy per installation to cover eligible costs is typically agreed between IA and the ISP, pre-discounted in the offer to subscribers
4. the ISP puts in place an agreed communication plan (endorsed by the PA)

¹² DG Connect COMMISSION STAFF WORKING DOCUMENT - SMEs Going Digital - A Blueprint for ICT Innovation Vouchers)

5. the ISP commercializes the agreed solution, directly managing with the PA any administrative process relevant to the subsidies

(e.g.: Devon & Somerset, RBS Northern Ireland)

D. SELECTION OF A SINGLE PROVIDER FOR THE PROVISIONING OF 100% BROADBAND COVERAGE (multi-technologies)

Typical steps of the procedure:

1. the PA issues and assigns a competitive procedure for the provisioning of dedicated services to 100% of its citizens/businesses (having set eligible beneficiaries and areas, minimum data rate, overall budget)
2. the awarded ISP commits to build/complete the infrastructure and maintain the offer available for subscription for the agreed duration
3. an overall co-financing of the infrastructure/s is typically awarded
4. service provisioning for the Public Administration's own use may be foreseen
5. the ISP puts in place the agreed communication plan (endorsed by the PA)
6. the ISP implements and commercializes the agreed solution

(e.g.: Bolzano Province, Agder, ~Trikala)

4.2 Lessons Learned (Pros/Cons analysis)

4.3

MODEL		PROS	CONS
A	Direct subsidy to end-users in digital divide	Max degree of choice for the recipient	The recipient anticipates the expenditure, as the subsidy is paid in arrears
		Competing offers available	Demanding administrative workload
			Proactive attitude of the recipient is needed
B	Qualification of multiple (sat) broadband providers	Possible aggregation (by ISP) of the administrative procedures	Careful definition of the administrative process shall take place, duly considering funds expenditure rules
		Competing offers available	Slightly demanding administrative workload
		Takes full advantage of offers evolution	
C	Selection of a single provider of satellite broadband	Single administrative interface (the selected ISP)	Lengthy approval process – may account for delays on satellite broadband deployment
		With the appropriate mechanisms, can still benefit of potential service/offer improvements	"frozen" services may quickly become not competitive due to improved offers on the market
D	Selection of a single provider for the provisioning of 100% broadband coverage (multi-technologies)	The ISP is committed to provide broadband access to any citizen / business within the eligible area	Lengthy approval process – may account for delays on overall deployment
			Large scale - complex management - appropriate budget needed
			the solution for the "last x%" is not the priority - this can lead to a lower quality and less cost-effective service
			The selected ISP may have scarce experience in satellite services

Please note that the table doesn't include the state impact of pros and cons being independent from the models analysed.

4.4 Recommendations

With reference to satellite broadband implementation schemes, in recent times the most frequent and effective experiences analyzed were those applying the **Qualification of Multiple ISPs Model**, followed by the Selection of a Single Satellite ISP Model.

This seems justified by favorable pros/cons balances, and represents the main input for the early guidelines¹³.

Additional suggestions

- the setup of a registration portal (possibly geo-referenced) for willing users is becoming a more common practice; it helps to build a valuable database to determine the actual needs of the community and enables targeted communication regarding any plans or measures for the reduction of digital divide
- this registration portal, through a regional database of the households located in white areas, can help to develop a targeted marketing towards specific users
- where appropriate, consider planning for multiple calls for grant application, of limited duration, to overcome the potential indecision of willing users in adopting a non-traditional solution (waiting for the «soon-coming» wireline broadband)
- when dealing with communication on satellite capabilities, there is a strong need for openness and honesty. Citizens confidence in the satellite technology is required for the take-up of satellite broadband.

¹³ SABER – Deliverable 2.2 – Early guidelines on satellite services procurement – Chapter 3: 3. Planning the implementation of the Satellite Broadband Access Scheme

4.5 Case studies – Relevant past and ongoing partner projects

4.5.1. Region of Agder

*Two counties and 30 municipalities
in the south of Norway*



Overview:

The county administration of Agder was the project owner, on behalf of the 30 municipalities and the two counties of Agder. The project was named “The Digital Agder” Bykle og Hovden Vekst AS (BHV) was hired as the project manager.

Timeline:

“The Digital Agder” started in 2001 and is an ongoing project.

The milestones of the project to give broadband to all households:

2006: The main project for guaranteed broadband to all residents started. 2007: The contract was signed.

2008: The delivery was accepted as completed. (Nearly one year delayed)

2012: Contract bringing indoor mobile coverage up to 99.2 % (mobile coverage at least 3G) within 2015.

2013: The guarantee of broadband ended by 2013.02.01. It has now been prolonged to 2015.

Main objective:

The vision: “Everybody always on in Agder”

Objective: Guarantee of broadband to every resident that requested it. The provider was allowed to offer broadband to 160 customers using satellite technology.

Awarded company:

After the evaluation, TDC AS was chosen as broadband provider (lowest price for guaranteeing broadband to all residents.)

Scheme Overview:**Strategic frameworks for broadband development, including legal bases**

In 2001 the project “The Digital Agder” signed a contract that should bring broadband by fibre optic cable to all town halls in the two counties. This contract also secured some more offers of DSL.

At 2005 the Ministry of local government and regional development had established a support scheme for broadband rollout. Applicants could receive up to 40 % of the total costs. Broadband coverage was in 2006 90 % and the aim of the government was to bring this up to 98 %. The definition of broadband was 0,6 Mbit/s download. The total fund was small, compared to the application mass. The scheme was technology independent, and good projects with high results of coverage were given priority.

The counties could use their own financial resources, but in Agder they had no specific budgets for broadband. The municipalities had neither fund that was required to use for broadband rollout.

Specific objective

The ambition of the government was that giving some economic support, the counties and the providers should together make a cost-sharing that should give good results. The expected results was to bring up the coverage of broadband to 98 % at a speed of at least 0,6 Mb/s download.

Target areas

The support scheme that Ministry of local government and regional development established should be used all over the country.

The Digital Agder focused on the 30 municipalities in the two counties of Agder.

Scheme description:**Scheme design**

The municipalities in Agder were eager to get better broadband to the residents and the Digitale Agder/BHV was hired for the project. At that time about 20 000 residents had no offer of broadband. After some workshops the project formulated the vision “Everybody always on in Agder” First the project ordered an analysis from “Teleplan Globe AS” that should consider the possibility of extending broadband to all residents. This was considered possible, by using WiMax technology, but at high costs. The fund that the government had established encouraged working with development of broadband. Possibility of connection to broadband was seen as an important strategy for the development and growth in the region, and the municipalities and the two counties gave promise of financial support to accomplish the vision.

The steering committee for the project decided to try to achieve economic cost-sharing and procure broadband for all residents, and broadband capacity and telephony for all municipalities and the two counties. The large cash flow from broadband and telephony should give better price for the rollout of broadband to all residents.

The Digitale Agder outlined a large procurement project. Here the different deliveries were outlined. There was set milestones for each of the deliveries. The provider desirable to select should do all the broadband rollout and be the contract partner to the resident end user.

The plan was that all deliveries should be ready by the end of 2007.

Beneficiaries:

The project made all the applications and agreements with the contributors. All the contributors transferred the money to the county of Aust-Agder, which paid contributions to the selected supplier.

The residents got no payment, but got a guarantee that they should never pay more than the best prices of DSL in the region, and the establishment charge should never be more than € 130. These conditions should apply to both DSL and broadband given by satellite.

Procurement:

The project used a competitive dialogue procurement approach.

After advertising, interested providers got a descriptive document for the procurement. When a review of all companies that had expressed interest was carried out, the project selected three providers for the dialog process.

Through the dialogue process with the three providers, the details of delivery were designed.

The providers competed to receive a construction contribution, to complete delivery specification.

Selection criteria:

The project outlined a detailed description of the criteria that the provider had to meet. There were fixed specifications for telephony and broadband to the municipalities. For broadband to the residents everybody had to guarantee offering broadband to all that ordered. After discussions in the dialogue process, the providers were allowed to use broadband via satellite for up to 160 households. With this exception there were no limits in technology to the private market.

The main competition was about the level of the contribution from the project. There were also criteria about the speed of broadband to residents. Everybody had to offer at least 1 Mb/s, but they were awarded if they could guarantee higher speed.

Budget and financing instruments:

The project raised a total budget at € 6.800.000. In addition it was stipulated that the provider would use at least € 3.000.000.

By the support scheme that the Ministry of local government and regional development had established, the project got € 2.700.000. This was the largest grant from the scheme. The Ministry also added on about € 700.000 to the procurement.

The competition for the contract was hard, and the contribution to the provider became € 3.700.000. This was far less than expected, and the project used about € 5.200.000

prepaying the costs for broadband to the municipalities for the next four years. In addition the provider got a daily penalty for late delivery of ca. € 270.000.

The contract with TDC AS had duration of four years, after the delivery was completed.

Awarded value

Evaluation of the project shows high value. Feedback from the municipalities, government, residents and external company that evaluated the results is positive. Public sector got broadband at very good prices, and no other region in Norway had a guarantee of broadband to all residents. The plan to create a large and demanding customer gave good results.

The support scheme from the ministry made it much easier to get the municipalities engaged in the project and increased willingness to contribute financially.

Most of the complaints are caused by those that have broadband via satellite. The fair use policy and problems by getting the promised speed has been the most common complaints. Both the project and the supplier had little knowledge about broadband via satellite, and this caused probably some of the problems. (01.04.2013 a new supplier takes over the delivery of broadband by satellite).

Monitoring:

The delivery phase was more difficult than anticipated, and there had to be allocated more resources to this field.

During the implementation the project had one person monitoring the progress. Every month there was a meeting in a group with representatives from the project and the supplier. The delivery process was carefully monitored and deviations were promptly responded to. This had a good effect, because the contract had rather severe penalties for not maintaining the progress.

Project communication and promotional activities

During the project phase there were regular information letters to the municipalities, presentations in meetings and coverage in newspapers. The project also had a homepage and produced leaflets. The contract said that the supplier had to use about € 600.000 advertising the offer of broadband to every resident.

Because of the guarantee of broadband and the large scale of the project, it has been

presented to many different groups in the ministry and in different conferences.

Ex-post results

The results from the project made it much easier to start a new project, based on an economic cost-sharing model. This has especially shown in the project for building up mobile coverage, and a new project with the ambition of building broadband coverage with fibre optic cables for about € 7.000.000.

4.5.2. Trikala (Greece)

Overview: Satellite internet infrastructure in the mountainous region of the Prefecture of Trikala

Public Administration in charge of the scheme:

Municipality of Trikala

Timeline:

2008 - 2010

Main objective:

Broadband access to the remote areas of the Prefecture of Trikala

Awarded company:

e – Trikala in cooperation with the Hellenic Aerospace Industry

Scheme Overview:

Strategic frameworks for broadband development, including legal bases:

The framework was defined by the need to provide broadband connection to the citizens for several reasons and to make people more familiar with ICT. The first step towards this objective was to cover urban regions through the development of the Wi-Fi hotspots through which citizens are connected with their free-of-charge credentials. Along with the urban regions, internet connectivity had to be given to suburban and mountainous regions of the Prefecture. At that time, Satellite internet was the one and only solution in order to provide internet coverage to remote areas and to decrease in this way the Digital gap.

Specific objective

Trikala is situated in the centre of Greece and is mainly a mountainous region with a population of 150938 spread in an area of 3389km². Accordingly, the mountainous region spans 2236km² which sets the 66%. 5 spots of the mountainous and semi mountainous part

of Trikala benefited from the deployment of Satellite Broadband among them the village of Gardiki and the well-known ski resort of Seli. The satellite equipment was first deployed 5 years ago in 2008 and the Contention Ratio was defined at 30 to 50 while the Download/Upload speed was 2048/256kbps. The main equipment was provided by the Hellenic Aerospace Industry.

Target areas

	Place	Altitude	Geo-information
Scheme	<i>Gardiki</i>	<i>1100 metres</i>	
	<i>Summer resort Elati</i>	<i>950 metres</i>	
	<i>Mountainous village Pertouli</i>	<i>1150 metres</i>	
	<i>Snow sport</i>	<i>1500 metres</i>	

description:

Scheme design

As it was previously mentioned the main objective of this initiative was to offer broadband services to the citizens of the Prefecture of Trikala. Apart from recreation, internet access was also needed in order to use several e – government and telecare and telemedicine services. For the mountainous region that offers many natural landmarks which attract many tourists but the lack of the Internet access discouraged people from visiting these places.

At this point e-Trikala, the development company of the Municipality of Trikala in cooperation with the Hellenic Aerospace Company deployed satellite infrastructure in this mountainous region. Hellenic Aerospace Company provides the satellite equipment and internet access. e-Trikala deployed satellite internet through the use of Wi-Fi antennas in order to decrease the cost as each satellite antenna was too expensive.

Beneficiaries:

- 1.1 final recipient: Citizens of the Mountainous regions and the Public administration as well in the case of semi – mountainous village Xiloparoiko and

2.1 final beneficiary: the entity responsible for carrying out the co-financed operations, in the technical point of view was e-Trikala SA and the payment of the corresponding expense was the Public administration (Municipality).

Procurement:

E-Trikala is a Development company of the Municipality of Trikala and as it is defined in the internal operation of the company can cooperate with other Municipalities with the use of a contractual agreement without an open tender.

Selection criteria:

E-Trikala had to deploy the satellite infrastructure in the predefined places being also responsible for the maintenance of the equipment.

Budget and financing instruments:

2300 € per satellite antenna * 7 places / 25000 € Wi-Fi hotspots / 2220 € total price for the 7 places interconnection speed cost

The financing model was structured by local and regional funds of the Municipalities.

Duration of the scheme – 3 years

Monitoring:

The project was reviewed by the Planning and Programming department of the Municipality. More specifically, there are two committees, the Monitoring committee, which monitors the construction and deployment of the project and the Finalisation Committee which inspects the proper delivery of the project. The contractual agreement was split into two phases, a pre-financing and the final payoff of the project. Additionally, these payments are monitored and approved/rejected by a Finance Commissioner which is defined by the Independent Authority “Supreme Council for Personnel Selection (ASEP)”.

Project communication and promotional activities

The project was primarily promoted through a major conference “Digital cities 2008” that was organized by e-Trikala and took place in Trikala. Additionally, an advertisement campaign was set up to promote the project through the media.

Ex-post results

The service ran successfully for approximately 3 years at the mountainous region of Trikala. Citizens used the Municipal internet access in order to check their emails, use the

Municipal services for telecare and e – Government. There were several connectivity problems especially during bad weather conditions which deteriorated the quality of the connection.

4.5.3. Auvergne (FRANCE)



Overview:

Région Auvergne is composed of 4 départements and six urban areas. 1.3 million inhabitants live in this predominantly mountainous region, mainly composed of rural and sparsely populated areas (around 60% of the region).

Région Auvergne decided to intervene to deploy broadband access, as a means to strengthen the competitiveness and the attractiveness of its territory. The regional broadband programme is based on a mix of technologies.

Public Administration in charge of the scheme:

Auvergne Regional Council in partnership with 4 local authorities (départements).

Timeline:

- ☐ December 2nd 2005: Agreement for the reduction of the white areas unserved by broadband (“Convention en vue de la résorption des zones blanches non desservies en haut débit”)
- ☐ 2007: Public-private Partnership *Auvergne haut debit* for 10 years (first PPP related to broadband infrastructures in Europe and in France)

Main objective:

100% basic broadband coverage (512 kbps)

Budget and financing instruments:

The total budget for the basic broadband was €38.5 million to fund the provision of 338 cities located in white areas.

Distribution of the origin of the funds:

French Government (Fonds National pour l'Aménagement et de la Développement du Territoire): €4.8 million

EU (ERDF): €10 million

Region Auvergne: €11.85 million

Départements (Allier, Cantal, Haute-Loire, Puy-de-Dôme): €11.85 million.

Main solution: Deployment of fibre backhaul infrastructure:

The Auvergne project qualified for state aid as its main aim was to provide at least 512kbit/s internet access in white areas (4% of the territory and 353 communes) in which an affordable and efficient internet access service was unavailable.

Auvergne is an example of the public outsourcing model. This model leverages the expertise of the private sector, while ownership remains in the public sector.

The chosen financial model is a Partnership Public-Private (PPP) between Région Auvergne and the private operator, France Telecom, selected in the frame of a competitive public tender.

Région Auvergne provides the funding for the required infrastructure paying the operator for a 10-year contractual period. France Telecom has designed the network and now operates and commercialises it on behalf of Région Auvergne. This scheme allows the sharing of risks since France Telecom takes some of the risk and responsibility, especially in terms of technical implementation.

The passive infrastructure is provided by France Telecom which also provides active wholesale bitstream services. Local loop unbundling passive access is also available. However, competition is respected since citizens can choose their operator/ provider.

Figure 1: Broadband - Delivering next generation access through PPP, European PPP Expertise Center for the EIB, April 2012, p.35

The project was identified as meeting the requirements of Service of General Economic Interest (SGEI).

The intervention of Région Auvergne falls within its general mission of developing and opening-up its territories. Indeed, the French law entrusts the regions with a “mission of general interest” to make high-speed broadband internet accessible to the largest possible number of end users¹⁴. The regions are authorised to cover and organise, under supervisory control, the building and operation of electronic communication infrastructure and networks.

Network architecture:

The winning technology was NRA-ZO (“new subscriber node in a shadow zone”), where a ‘shadow zone’ is an area with no DSL service.

The technology uses the France Telecom’s existing copper network, but reduces the length of the copper loops by running fibre to a cabinet or small building nearer to subscribers, known as a very small technical site. This decreases copper loop length and enables higher speed DSL services.

Results:

The project resulted in 14 400 new lines eligible for DSL, 860 km of fibre optics that will

¹⁴ article L 1425-1 du Code Général des collectivités territoriales

be re-used for VHS broadband and 36 000 lines that benefited from an increase in broadband.

99.6% of the households from Region Auvergne get at least a 512 Kb/s offer in 2009, 85% a 2Mb/s offer, 47% an 8 Mb/s offer and 30% a 20 Mb/s offer.

Complementary solution: financing satellite user access to bridge the Digital Divide

Despite the excellent regional broadband deployment with terrestrial technologies, 0.4% of the population (a couple of thousands households) was not served by basic broadband. To complete the broadband coverage and to reach the 100%, a measure to favour satellite solution was considered in the general regional scheme.

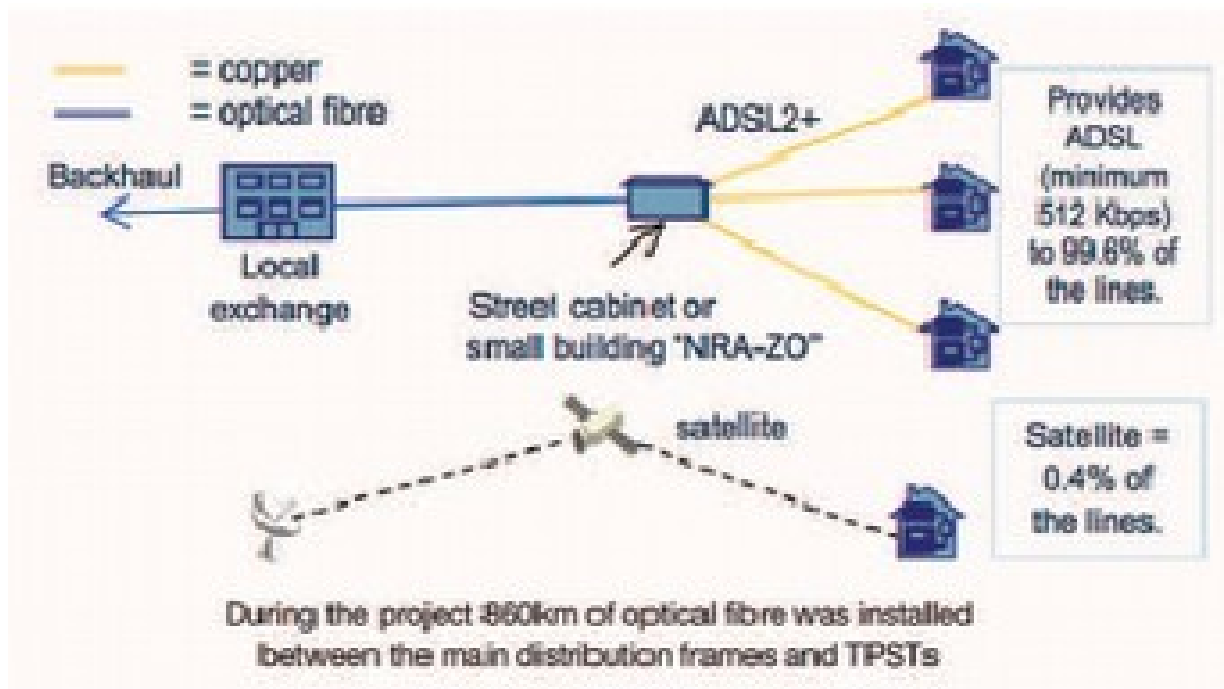


Figure 2: Broadband - Delivering next generation access through PPP, European PPP Expertise Center for the EIB, April 2012, p.3

Target areas

The measure focuses on white areas, where private operators are unable or unwilling to

invest in broadband infrastructures. The target is the 3000 households ineligible for any terrestrial technologies.

Scheme description

Scheme design:

Demand-side mechanism was implemented to favour satellite broadband provision and penetration.

Thus, Region Auvergne granted €600 in vouchers to subsidise the acquisition and installation of the satellite equipment: one €400 voucher for the purchase and another one of €200 for the installation.

Beneficiaries:

- ☐ final recipient: citizens ineligible to DSL
- ☐ final beneficiaries: ISP. They are the intermediaries between citizens and administrative bodies

Selected companies:

Five satellite broadband providers (connexion verte¹⁵, sat2way¹, alsatis¹, nordnet¹⁶, viveole²). Competition is guaranteed, citizens can choose among these companies, the relevant satellite operators and services.

Procurement:

As, only households that are ineligible to DSL received subsidies, the Auvergne Regional Council provides a test of eligibility on the regional broadband PPP website, just by entering a phone line number.

Once citizens know if they are eligible for satellite broadband vouchers, they can ask for the subsidies online. Then, they will receive the 2 vouchers with a declaration of honour to fulfill. In addition to the declaration of ineligibility to DSL, citizens must declare that they did not benefit already in the past from a subsidy for satellite broadband and that the satellite equipment will be for a personal use, not a professional one.

Citizens just need to contact a satellite ISP, chosen between the 5 partners mentioned above, to buy the satellite equipment (modem and antenna). Once purchased with the €400

¹⁵ Eutelsat

¹⁶ SES

voucher, the equipment can be installed by the citizens themselves or they can decide to call on an installer. In that case, users of satellite broadband will give to the partner company the €200 voucher that will be deducted from the bill.

Selection criteria:

ISP able to provide services of minimum 512 kbps.

Awarded value

From 2009 to 2012, more than 1000 households (around 38% of the ineligible to DSL lines) got equipped with satellite broadband equipment through vouchers, i.e. a budget €600 000 dedicated to satellite into 3 years.

Project communication and promotional activities:

- ☐ information from the PPP to local authorities
- ☐ information and assistance from the PPP to citizens:
 - ☐ hotline on the process, agenda, project details, providers available
 - ☐ website to present the project, informing the inhabitants on progress, the commercial opening dates and the internet providers available:
www.auvergnehautdebit.fr
- ☐ information from ISP websites on the available subsidies by Departments, the conditions and process to get them

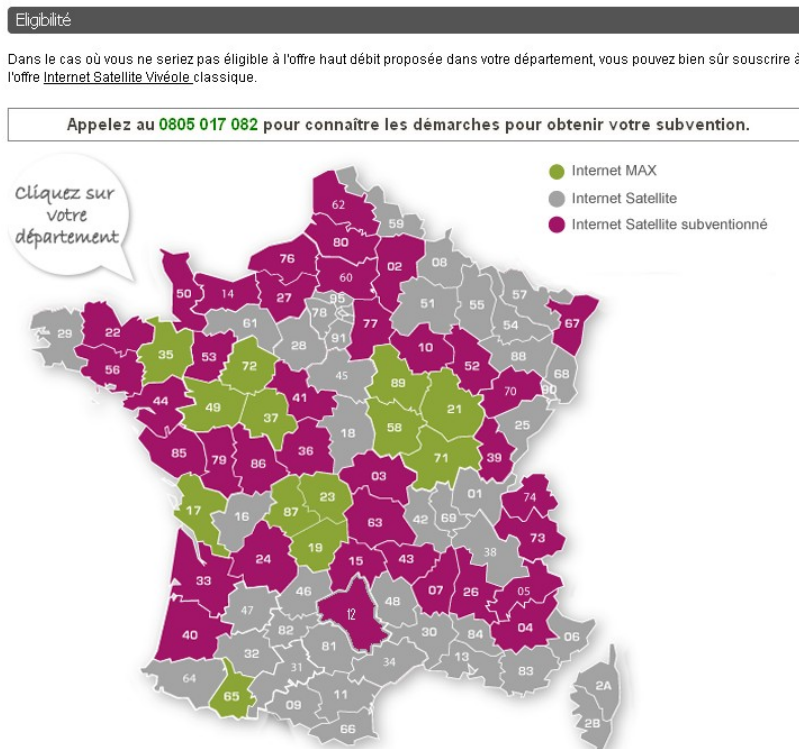


Figure 4: Source: <http://www.viveole.fr/eligibilite-subventions-internet-satellite-wimax>

Ex-post results

Since 2009, 100% of the Auvergne population can have access to basic broadband (512 kbps): 99.6% by terrestrial technologies and 0.4% by satellite.

For reaching the target of 100% high broadband coverage of the households, the region received in 2010 the Regio Star Awards from DG REGIO of the European Commission.

4.5.4. Devon County Council (working with Somerset County Council)

Overview:

Public Administration in charge of the scheme:

Devon County Council

Timeline:

2011 – end 2013

Main objective:

37/99

To provide improved connectivity speeds in very rural upland areas of Devon and Somerset that currently receive speeds less than 2 Mbp/s

Awarded company:

Satellite Solutions Worldwide (using toowaydirect service /Eutelsat satellite).

Scheme Overview:**Strategic frameworks for broadband development, including legal bases:**

The scheme supports the UK Government target of providing the Universal Service Commitment of at least 2 Mbp/s for every user and ‘best broadband networks in Europe by 2015’ aim.

Specific

The original scheme aimed to provide a 5 Mbp/s synchronous upload/download speed to beneficiaries. Due to improved speeds now possible through Eutelsat, this has been exceeded (20 Mbps download and 8 Mbps upload).

Target areas

The scheme operates in 4 defined areas of Devon and Somerset:

1. Axminster – Dunkeswell area
2. Rural Tiverton
3. Rural South Molton
4. Wheddon Cross, Exmoor National Park.

Scheme description:**Scheme design**

The scheme provides grant funding to fund the purchase of the satellite dish/antenna and installation fees in 4 defined areas of Devon and Somerset. In addition, beneficiaries can receive up to 8 hours training and support on ICT/using broadband more efficiently via a ‘Digital Mentor’ operator which Devon County Council has contracted alongside the service operator.

Beneficiaries:

- ☐ final recipient (the end beneficiary of the assistance e.g. Citizen, SME, Public Administration, NGO, others) and

- ☐ final beneficiary (the entity responsible for carrying out the co-financed operations and the payment of the corresponding expense e.g. Public Administration, ISP, others) The final recipients are anyone or any business/SME located within a specific post code range. These have been pre-defined as areas that were receiving very poor broadband service.

Procurement:

A fully open tender procedure was adopted; compliant with OJEU standards and procedures for a service operator who could provide an end to end service – sales ordering, customer management, billing, installation and maintenance.

Selection criteria:

- ☐ Minimum upload and download speeds of 5 Mbps
- ☐ 99.95% service availability
- ☐ Business hours and weekend maintenance/fault handling service
- ☐ Full customer service management
- ☐ Private sector match funding and marketing contributions
- ☐ Willingness to work with the County Councils and Digital Mentor agent to promote the use of broadband service use throughout the project.

Budget and financing instruments:

550,000 GBP from EU RDPE funding.

Duration of the scheme: November 2011 – December 2013.

Awarded value

Maximum of 350,000 GBP for equipment subsidy and service operation – payment is based on actual take-up.

Monitoring

Targets were agreed for support of SMEs – so far, 70 out of 75 target SMEs have received the training and support service.

Over 100 satellite hardware equipment sets have been deployed; however no targets were agreed for actual deployment.

Project communication and promotional activities

A range of activities have been undertaken to promote the service and to increase residents and SMEs' use of ICT in their everyday lives/business operations:

- Workshops delivered in very rural locations such as Village Halls and Community Centres with different audience groups (e.g. Parish Councils, Women's groups, local community organisations) to promote the use of social media, digital photography, website search optimisation.
- Work with the DEFRA Rural Payment Agency to encourage farmers to complete their Single Payment Application online.
- 1 to 1 diagnostic sessions and follow up support to SMEs on any aspect of ICT or using broadband to tackle any problems encountered.
- A range of case studies on people who have taken up the service have been produced. These have recently been used by DEFRA to produce a technology neutral video to promote the benefits of using broadband and online services: <http://www.youtube.com/watch?v=lQE-DOZnTY8>
- A range of promotional materials such as banners, flyers, posters and brochures on the service have been produced to promote the service and IT support.

Ex-post results

The full results of the scheme will be written up as an evaluation report post December 2013. These will be disseminated through our funder, DEFRA and used as best practice to inform further Programmes.

4.5.5. Wales (UK), Broadband Support Scheme ¹⁷



Overview:

Public Administration in charge of the scheme:

the Welsh Assembly Government

Timeline:

launched July 2010 - ongoing

Main objective:

to cover the upfront costs of purchasing a broadband solution where existing providers have been unable to provide a service

Awarded company:

direct subsidy to end-users

Scheme Overview:

Specific objective: “The Broadband Support Scheme is aimed at those individuals, businesses and 3rd sector organisations in rural communities that do not have access to broadband, these are known as broadband notspots (*ed: extended to slowspots from 2011, see definitions hereunder*). The scheme will provide funding to cover the upfront costs of purchasing a broadband solution where existing providers have been unable to provide a

¹⁷ <http://wales.gov.uk/topics/businessandeconomy/broadbandandict/broadband/bbss/?lang=en>

service.

The scheme is technology neutral.

The scheme will allow individuals and businesses to discuss options with a range of service providers to provide a solution that works best for your needs.”

Target areas: any Broadband notspot or slowspot in Wales

“A Broadband Notspot is defined as any premises occupied as a single residential dwelling house or a single business/3rd sector organisation premises in Wales which cannot receive a broadband connection via any fixed line technology – ADSL or cable or;
any premises in Wales which can only receive a broadband connection with a consistent download speed of less than 512Kbps.”

In case the download broadband connection is consistently more than 512Kbps but less than 2Mbps, the premises are defined as Broadband Slowspots.

A web-based registration tool has been made available to notify Notspot and Slowspot premises¹⁸; the provided information will help to shape future broadband initiatives with the UK Government and ensure everyone in the UK has access to a minimum connection speed of 2Mbps, which is the Universal Service Commitment.

Scheme description

Scheme design:

The beneficiary is requested to submit 2 quotes from his/her chosen ISP.

The reimbursement of eligible costs (customer premises equipment, survey and installation fees, shared infrastructure equipment where applicable, and alike) to the subscriber is made by the Welsh Assembly Government after completion of the installation and activation of the broadband service in accordance with the Offer Letter for funding, and submission of appropriate evidences and Claim Form.

Beneficiaries:

Individual Households, Communities, Small & Medium Businesses SMEs, 3rd Sector Organisations

Procurement:

¹⁸ <http://wales.gov.uk/topics/businessandeconomy/broadbandandict/broadband/?lang=en>

direct subsidy to end-users, paid in arrears.

Selection criteria:

The beneficiary is requested to submit 2 quotes from his/her chosen ISP for the implementation of broadband connections consistently equal or higher than 2Mbps.

Budget and financing instruments: “Initial funding of around £2 million has been allocated, with the support of Welsh Assembly Government funding.”

Duration of the scheme:

ongoing, currently open to new applications until 30th September 2013.

Awarded value:

“Funding will be made available to you directly and will cover the upfront costs for the installation of a broadband solution for your premise or your contribution to a community scheme. This will be limited to a maximum up to £1,000 per applicant or 100% of the total eligible cost, whichever is lower.”

Ex-post results:

“To date (02.02.2012) **2,038** applications have been approved, which includes funding for sixteen community schemes covering 918 homes, representing a financial commitment of £1,662,709.

A further 232 applications are currently being assessed with interest from another ten community schemes (covering **1,055** potential applicants).”¹⁹

¹⁹ « Edwina Hart (*Ed. : Minister for Business, Enterprise, Technology & Science*) announces extension to Broadband Support Scheme. »
<http://wales.gov.uk/newsroom/businessandeconomy/2012/120202bss/?lang=en>

4.5.6. Northern Ireland (UK), Remote Broadband Services Northern Ireland



Overview:

Public Administration in charge of the scheme:

the Department of Enterprise, Trade and Investment of Northern Ireland (DETI)

Timeline:

tender launched October 2011, awarded February 2012

Main objective:

to provide at least three broadband Retail Service Offerings in all remote areas of Northern Ireland

Awarded company:

Onwave Ltd

Scheme Overview:

Strategic frameworks for broadband development, including legal bases

In September 2010, the European Digital Agenda outlined a target to bring internet connections of “30 Mbps or above for all Europeans by 2020 with half European households subscribing to connections of 100 Mbps or higher”.

Britain’s Superfast Broadband Future (or ‘Broadband UK’) published in December 2010 outlined the Coalition Government’s objectives for next steps in broadband provision across the UK. Broadband UK has a vision for the UK to have the ‘best superfast

broadband network in Europe by 2015', with the ultimate aim of achieving broadband speeds of 2MB (i.e. 4 times the minimum speed of 512kbps) to the entire population and ensuring high-quality broadband to mobile devices.

The 2011-15 Northern Ireland Budget and the DETI and Invest NI strategies all highlight the requirement to develop the telecoms infrastructure within NI i.e. the implementation of PSA 1: Objective 3 - Ensure a modern sustainable economic infrastructure to support business.

Two keys proposals within the DETI TPU Telecommunications Action Plan 2011-2015 are to work with industry to “ensure the continuing provision of access to a broadband service in Northern Ireland, regardless of where you live or do business” and “increase superfast broadband coverage in Northern Ireland in line with the UK Coalition Government’s commitment to deliver the best superfast broadband network in Europe by 2015.”

Specific objective:

“The Department is seeking to put in place a contract with a suitable broadband service provider to provide at least three broadband Retail Service Offerings – a Consumer Service, a Small Business Service and a Small & Medium Business Service. These offerings are to be made available to all Eligible Retail Customers in Northern Ireland.”

Target areas:

“These offerings are to be made available in all remote areas of Northern Ireland, where there are difficulties in obtaining access to broadband services of 512Kbps or more via wireline technology.”

For information purposes only, a list of 765 Post Codes believed to be particularly problematic to deliver wire-line based services was provided by DETI; each Tenderer being requested to make its own determination as to where services will be required.



Figure 6: Areas served only by satellite (Q2 2011, for information purposes only)

7Scheme description

Scheme design:

The Irish Government, through DETI, grants since 2005 broadband access to any users throughout Northern Ireland, subsidising coverage in remote areas. A previous tender (2009) was awarded to Avanti Telecommunications, providing the service to 1101 end-users at summer 2011.

Beneficiaries:

Consumers, Small Businesses and SMEs throughout Northern Ireland out of reach of 512 kbps wire-line broadband

Procurement:

competitive open tender

Selection criteria:

The most economically advantageous offer; evaluated against seven main award criteria as follows (in descending order of importance/weight:

a) Pricing; b) Risk Management, Business Continuity Planning and Marketing; c) Technical d) Retail Customer Support Services e) Service Specifications of the Retail Service Offerings f) Cost to Department (Retail Customer Fee)

Minimum Service requirements:

- Consumer: 2/0.5 Mbps, CR 55:1, 4W volume allowance 3 GB
- Small Business: 4/1 Mbps, CR 55:1, 4W volume allowance 6 GB
- SME: 8/1 Mbps, CR 20:1, 4W volume allowance 12 GB, intelligent Gateway package, advanced high security firewall.
- All: Volume Booster, Internet access, ability to send and receive email, upload and download files, 99.5% yearly availability

Services actually offered by the awarded proposal²⁰:

- Consumer: 6/1 Mbps, 4GB/month, max 34.95 GBP/month, installation max 99.95 GBP
- Small Business: 8/2 Mbps, 6GB/month, max 44.95 GBP/month, installation max 99.95 GBP
- SMEs: 10/4 Mbps, 16GB/month, max 109.95 GBP/month, free installation

Budget and financing instruments:

“The Department intends to use funding of up to £250,000 (exclusive of VAT) to contract for the delivery of the broadband services in remote areas of Northern Ireland.”

Duration of the scheme:

3 years

Awarded value:

the value of the subsidy per installation (where agreed) is not available

Ex-post results:

Ongoing scheme, current results not available. An early notice (April 2012, only 2 months after the tender award) mentioned 44 subsidies granted.

²⁰ <http://www.niassembly.gov.uk/Documents/RaISe/Deposited-Papers/2012/dp947.pdf>

4.5.7. Galicia (ES), “nuevas conexiones a internet de banda ancha a través de tecnología satélite bidireccional en medio rural” ²¹



Overview:

Public Administration in charge of the scheme:

Axencia Galega de Desenvolvemento Rural (AGADER).

Timeline:

ISPs selection launched July 2012, completed September 2012.

Main objective:

the purpose of the call is to enable quality internet access to 3% of the population, which due to its high dispersion or its location, cannot have access to quality broadband of at least 2Mbps through other technology.

Selected ISPs:

Duo Telecomunicaciones, Eurona Wireless Telecom, Intermax Technology, Mira Novas Tecnoloxías, Operadora Tripla, Quantis Global ²²

Scheme Overview:

After the selection of the appropriate ISPs and the signature of the relevant agreements, a public call was open from late September until November 2012 for citizens and businesses

²¹ http://www.xunta.es/dog/Publicados/2012/20120704/AnuncioO90-280612-0001_es.html

²² http://www.xunta.es/dog/Publicados/2012/20120919/AnuncioO90-120912-0001_es.html

in Galicia out of reach of terrestrial broadband, to apply for a subsidy for satellite bidirectional internet access. The subsidy covers installation expenses and the cost of user equipment, up to a maximum amount of 500 euros.

All the administrative processes related to the subsidy are directly managed by the ISP in place of the subscriber, so allowing to the Managing Authority to simplify the measure management and control.

It is worthwhile mentioning that the Xunta de Galicia has implemented a specific web tool to register requests for broadband service from users in digital divide ²³, so gathering a valuable database to dimension the actual needs of its community and allowing targeted communication for any measure for the reduction of such digital divide.

Strategic frameworks for broadband development, including legal bases:

“This action corresponds to the sixth and last line of the Broadband Plan and the Board is bound to areas of the community more isolated, scattered and complicated terrain, where Internet access is possible only via satellite. This assistance will be summoned again in 2013 and 2014.”

Target areas:

the whole of Galicia, except areas included in urban perimeters defined as such in the current urban planning of the city of Ferrol, Lugo, Ourense, Pontevedra, Santiago de Compostela, A Coruña and Vigo.

Scheme description

Beneficiaries: Final recipients: these grants are aimed at those families and businesses with address in Galicia who may not have access to broadband of at least 2Mbps, using other technology.

Final beneficiary: the selected ISPs

Procurement:

selection of multiple providers

Selection criteria:

min. 2 Mbps download, min. 2GB/month, always-on service

²³ <http://cobertura-pdbl.xunta.es/>

Budget and financing instruments:

“The investment this year (2012) exceeded 335,000 euros and the total budget up to 2014 is 1.077 million euros. This aid program is possible thanks to the agreement signed last April between the Agency for Technological Modernisation of Galicia (Amtega) and the Ministry for Rural Affairs and the Sea, which through Agadir, will bring the total amount of euros in aid period 2012 to 2014.”

This investment is 57.56% co-financed by the European Agricultural Fund for Rural Development (EAFRD) under measure 321 Axis 3 “Improving the quality of life in rural areas and diversification of the rural economy”, of the Rural Development Program of Galicia 2007-2013.

Duration of the scheme:

the scheme is planned in three calls for applications from final recipients, once per year from 2012 to 2014

Awarded value:

The subsidy covers installation expenses and the cost of user equipment, up to a maximum amount of 500 euros, conditioned upon remaining in service for a year. The first month of service was free of charge.

The eligible subscriber is not requested to anticipate the expenses for installation and activation of the service, providing he/she concedes the ISP the rights of recovery as a recipient of the aid.

Ex-post results:

A total of 676 households and businesses applied within one month to aid the Board to hire the service of internet connection via satellite.

Most applicants, 87%, hired internet service 8 Mbps downstream, 8% chose for a 2 Mbps service and the remaining 5% opted connections 4Mbps speed. In addition, 71% of recipients also contracted phone service.

Of the 676 requests made, the majority (305) correspond to the municipalities of Corunna, were held from 264 municipalities in Lugo and Pontevedra and Ourense concentrated to lower demand with high 67 and 65 respectively.

The areas with the greatest demand is concentrated in the regions of Lugo, the Earth and

Tea Sarria in Lugo, Orders, and Arzúa Walls in Corunna, Castro Caldelas in Ourense and A Estrada, Lalin and Forcarei in Pontevedra.²⁴

4.5.8. Bolzano Province (IT), "Messa a disposizione di connessioni a banda larga in Alto Adige"



Overview

Public Administration in charge of the scheme:

Radiotelevisione Azienda Speciale

Timeline:

ISP selection launched in August 2007 (44 municipalities), further extended in 2009 (46 communities in 21 municipalities)

Main objective:

the purpose of the call was to enable broadband internet access to businesses and households in digital divided areas of the Province.

Selected ISP:

Broadband 44+²⁵

Scheme Overview:

The development of broadband connectivity in the territory of Alto Adige (autonomous province of Bolzano) was uneven. The territory is mainly Alpine: 85.9% is above 1 000 meters. Although around 80% of the population of Alto Adige had access to ADSL

²⁴ http://imit.xunta.es/portal/actualidade/novas/2012_12_21_internet_via_satelite.html

²⁵ <http://www.broadband44.net/>

connections, the service was less available (*before scheme implementation*) in mountainous areas where investment costs are higher than in densely populated areas. Therefore, the Provincial Council set out the objective to have broadband connections available for 90% of the population, 95% of enterprises with three workers or less and all enterprises with more than three workers by 2009.

The scheme foresees the selection of an operator to build, own and operate the broadband infrastructure. The financial incentive intends to bring the break-even point of the investment made by the network operator within allegedly sustainable terms so that, in practice, the break-even is reached within 36 months from the supply of the service.²⁶

Strategic frameworks for broadband development, including legal bases:

The measure is based on the Legislative Decree of 1 August 2003 n.259: “Codice delle comunicazioni elettroniche”, law L.P. 33/1982 “Provvedimenti in materia di informatica nella Provincia di Bolzano”, the Deliberation n° 646 of 7 March 2005 of the Provincial Council: “Programma operativo per lo sviluppo della Società per l’Informazione in Alto Adige e-Südtirol 2004 - 2008 con particolare riferimento agli obiettivi per la messa a disposizione di una offerta di banda larga a copertura dell’Alto Adige”

Target areas: “The project is aimed at 44 communes of Alto Adige, in which the infrastructure shall ensure fulfilment of the coverage objectives above. In 40 of these, there is no broadband service at all at present. None of the communes or areas in question is populated in excess of 3 600 households.”

Scheme description:

Scheme design The measure supports primarily regional development objectives. The objectives are pursued through support to a procurement contract for the construction and operation of infrastructure to provide access to broadband services in determined communes of Alto Adige. Such services shall be supplied to business and residential customers.

Beneficiary: the selected ISP

Procurement: call for tender (selection of a single provider)

²⁶http://ec.europa.eu/eu_law/state_aids/comp-2007/n473-07.pdf

Selection criteria: The most economically advantageous tender; the selection criteria included the public co-financing value, service fees to end users, and a detailed technical evaluation.

Minimum requisites (main): “basic” profile: 640/256 kbps, CR 10:1 ; “plus” profile: 1/1 Mbps, CR 5:1

Budget and financing instruments:

Up to EUR 7.000.000, payable to the selected operator from funds from the Autonomous Province of Bolzano.

Duration of the scheme: The contract with the successful bidder has ten years duration.

Awarded value

The 2007 measure was awarded € 6.069.930; the 2009 extension additional € 1.957.422.

Ex-post results: *“7,000 households and businesses now use the internet services of Broadband 44 +. Four out of five BB44 subscriptions are taken by households, companies account for about 20 per cent of the connections”*. (03.12.2012)²⁷

A breakdown among the different technologies exploited (specifically satellite, introduced among others with the 2009 extension) is not available.

²⁷ http://www.broadband44.net/news/single-view/article/7000-surfen-mit-bb44.html?tx_ttnews%5BbackPid%5D=1&cHash=edd6c81dc5

5. Identification of satellite broadband implementations internationally

5.1 In the USA

5.1.1. Introduction

A differentiating factor in the US context is the early inclusion of satellite technology in broadband policies. Unlike in Europe, satellite broadband has been directly promoted by US institutions, particularly to provide broadband to rural or remote areas. This has led to a de facto more favourable situation than in Europe.

Another major difference with the European market is the fact that the US market is an integrated market, with therefore benefits from a homogenous and single demand.

Moreover, contrary to the EU satellite broadband market, in the U.S., broadband satellite operators and Internet service providers are vertically integrated.

Satellite broadband in the US is such a commercial success that new generations of more powerful Ka-band satellites, entirely dedicated to broadband, have already been ordered by the major operators: ViaSat 2 by ViaSat and Jupiter 2 by EchoStar.

5.1.2. USA Satellite Broadband market: a commercial success

A single market, with a limited number of actors

The USA satellite broadband market is dominated by two major actors: ViaSat, with its service Exede provided on the HTS (High Throughput Satellite) ViaSat 1 and EchoStar, with its service operated by Hughes Network Corporation based on EchoStar 17 satellite.

ViaSat 1 was launched on October 2011 and offers download speeds up to 12 Mbps. EchoStar 17

was launched on July 2012 and offers speeds up to 15 Mbps. These two satellites address specifically the market of USA citizens who are not served by cables or DSL: according to Dish Network officials, this market is substantial with almost 8-10 million, mostly unconnected rural American households. Recent data from ViaSat show an increasing demand for satellite broadband connections with almost 50,000 subscribers in three months between January and March 2012²⁸. ViaSat even predicted that “the take-up rate would climb to more than 30,000 per month by the end of the year”²⁹. By the end of September 2013, ViaSat 1 supported 591,000 subscribers; EchoStar with its HughesNet consumer broadband service 807,000 subscribers.³⁰

In addition to the market of traditional satellite broadband market target, satellite operators are looking for new customers among citizens with slow DSL service that could consider switching thanks to satellite broadband recent improvements.

A different value chain because of a different strategy of the satellite operators is different from Europe

There are two substantive differences between the U.S. and EU satellite broadband markets - US (e.g. the USA market is a single market, with a homogeneous demand and two major actors on the market) result into a different value chain. American satellite operators' strategy is to reach a substantial size, purchasing distributors or developing partnerships with internet service providers, to promote vertical integration. Indeed, Via-Sat purchased the ISP WildBlue in 2009 and EchoStar purchased Hughes Network Corporation in 2011 in order to directly access the satellite broadband market.

Ultimately, US satellite operators build the ground system, design the satellites and operate them, so they can completely integrate and optimize the system.

²⁸ Installation Bottlenecks Slow Start of New ViaSat Service, Space News, Peter B.de Selding, 18/05/2012 (http://www.spacenews.com/satellite_telecom/120518-installation-bottlenecks-slow-start-new-viasat-service.html)

²⁹ idem

³⁰ EchoStar Reports Quarterly Gain of 72,000 Subscribers, Teases about TerreStar-2, Space News, 15/11/2013, Peter B.de Selding (<http://www.spacenews.com/article/satellite-telecom/38170echostar-reports-quarterly-gain-of-72000-subscribers-teases-about>)

Good quality of services

Satellite broadband in the US is considered, at a Federal level, a valuable, effective and viable technology to connect citizens in unserved areas. Indeed, satellite broadband distributors were included in the 2009 American Recovery and Reinvestment Act, and more recently, the Federal Communications Commission (FCC) ranked Via-Sat Exede service at the top of its annual benchmarking study of broadband speeds.

This benchmarking study is the result of a public-private partnership between the FCC, its contractor and ISPs representing 80 % of the residential market. The result of the study highlights the progress of satellite broadband with new HTSs and reveals a good quality of services not just in terms of performance but also against service promises: "In our testing, we found that during peak periods 90 percent of ViaSat consumers received 140 percent or better of the advertised speed of 12 Mbps (download speeds). In addition, there was very little difference between peak and non-peak performance" (p.7).

This commercial success has led to the announcement of two new satellites with even greater performance (ViaSat 2 and Jupiter 2), and as a consequence further improvements in satellite broadband commercial offers.

Via-Sat's next planned Ka-Band satellite, entirely dedicated to broadband, is expected to nearly double the data-delivery capacity of the on-orbit Via-Sat 1 spacecraft, whose 135 Gbps throughput rate has already set records, by reaching around 350 Gbps. The coverage of Via-Sat 2 will be seven times wider (North and Central America, the Caribbean and Europe, including the Atlantic Ocean). The launch of ViaSat 2 is planned for mid-2016. For this new higher-throughput ViaSat-2 satellite, the company is spending around \$625 million.

Jupiter 2 / Echostar 19 satellite will have more than 150 Gbps throughput (50% greater than Jupiter 1 / Echostar 17), with more than 120 spot beams to provide wide coverage across the US and parts of Canada. The launch of Jupiter 2 is planned for mid-2016.

The orders of two new and more powerful broadband satellites highlight the correlation between the growth of the market and technical progresses. The US satellite market is attractive and strong enough to purchase companies all along the value chain, to make profitable investments in HTS and to order new and more powerful HTSs

5.1.3. Institutional support: the subsidy scheme from the Broadband Initiatives Program:

In order to promote satellite broadband solutions to citizens in rural or remote areas that are not served by terrestrial networks, the US Federal Authorities have developed specific funds and mechanisms with different selection criteria. This US subsidy scheme is very different to that in Europe.

One example of the institutional support for satellite broadband in the US is the Broadband Technology Opportunities Program, which is part of the US National Broadband Plan. The aim of the program is to extend broadband access to unserved areas, and to improve access to underserved areas, so that they are able to benefit from the education, health care and public safety benefits of broadband available to other areas of the country.

The following paragraphs describe the process of institutional support in the US through the basis 2010 Broadband Initiatives Program (BIP) Satellite Grant Program from the Department of Agriculture – Rural Development, which set out the administrative and procedural details on specific grants for satellite broadband.

In the U.S., subsidies are allocated directly to the internet service providers to serve the end-users. Once the subsidies are received, ISPs grant a discount to the end-users in return for one-year commitments. In the case of the BIP satellite grant programme, the following are eligible to receive the subsidies:

- A satellite Internet Service Provider (ISP);
- A reseller of satellite ISP services;
- A distributor or dealer of satellite ISP services;
- A consortium of more than one of the above eligible entities, except for a consortium of more than one satellite ISPs.

Before allocating subsidies, mapping is completed to define where the satellite is the most cost-effective technology to deploy broadband, and consequently to define in which area a satellite ISP can receive subsidies. This definition is very strict, subsidies are limited to unserved rural areas:

“applicants must propose to serve only unserved rural premises in any of the eight satellite regions listed”.³¹ These eight regions do not follow a pre-existing administrative zoning, but gather different states together.³² In other words, the mapping leads to an aggregation of demand across different states.

Eligibility criteria are:³³

- Application must be complete;
- Application must demonstrate timely completion with all award funds being drawn down within 3 years;
- The project must offer service meeting the definition of broadband as defined in the Second Round NOFA and the RFP ;
- The project must propose to serve an eligible Satellite Region as listed in Section IV.C.1(a) of the RFP;
- The project must demonstrate the extent to which unserved rural premises will benefit under their proposals; and
- The Project must be financially and technically feasible and demonstrate sustainability.

Specific evaluation criteria are also applied, to ensure an efficient use of public funds. The evaluation criteria for the BIP Satellite Grant Program are:

³¹ DEPARTMENT OF AGRICULTURE, Rural Utilities Service, Broadband Initiatives Program, 2010 Federal Register /Vol. 75, No. 88 / Friday, May 7, 2010 /Notices 25187

³² Region 1: Washington, Oregon, California, Nevada, Idaho, Utah, Arizona;
Region 2: Montana, Wyoming, North Dakota, South Dakota, Nebraska, Minnesota, Iowa, Wisconsin, and Illinois;
Region 3: Colorado, New Mexico, Kansas, Oklahoma, Texas, Missouri, Arkansas, and Louisiana;
Region 4: Michigan, Indiana, Ohio, Kentucky, West Virginia, Pennsylvania, and Virginia;
Region 5: Tennessee, Mississippi, Alabama, Georgia, Florida, South Carolina, and North Carolina;
Region 6: Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, and Maine;
Region 7: Alaska;
Region 8: Hawaii.

³³ Extracts from Broadband Initiatives Program (BIP) Satellite Grant Program, Department of Agriculture – Rural Development, 2010

- the price of the service to the end-user;
- the proposed amount per subscriber that is being requested;
- The length of any proposed discounted service;
- The quality and transmission speed of the proposed services, especially the Basic Service Package;
- How potential requests for service will be handled; and
- The amount of outside investment in the project.

US case analysis shows a real correlation between institutional support and number of subscribers. For instance, satellite broadband service provider Hughes Communications has recognised that the US government's broadband-stimulus program generated more business than expected in 2011.³⁴ Wildblue President Tom Moore expressed support to these public initiatives saying "We believe the R.U.S. program showcases one of the quickest and most cost effective ways to spur broadband adoption in rural areas. This is a great opportunity to connect our rural and unserved citizens with the WildBlue service."³⁵

In August 2010, Hughes was awarded a \$58.7 million contract under the US government's broadband-stimulus program. The company began delivering the service in October 2010, offering subscribers a \$551 discount in return for one-year commitments. The result, Pradman Kaul (President of Hughes Network Systems) said, "has far exceeded our expectations" and is a big factor in the subscriber additions HughesNet has booked since last fall.³⁶

The following chart is an overview of differences between institutional support in Europe and in the U.S.

³⁴ Hughes Credits Broadband Stimulus for Subscriber Boost
[SpaceNews, Peter B. de Selding, 06-05-2011]
http://www.spacenews.com/satellite_telecom/110506-stimulus-help-hughes.html

³⁵ <http://investors.viasat.com/releasedetail.cfm?ReleaseID=584930>

³⁶ Hughes Credits Broadband Stimulus for Subscriber Boost, Space News, 2011

Summary of the difference in the management of public funds for broadband between the U.S. and the EU

	Europe (2009-13)	USA (2010)
Funds for broadband infrastructure in recovery plans	European Economic Recovery Plan: €344 m through the European Agricultural Fund for Rural Development (EAFRD) to develop broadband in rural areas. €2 200 m through the European Fund for Regional Development to develop broadband in less developed areas + national co-financing available	American Recovery and Reinvestment Act.: U.S. Department of Agriculture - Rural Utilities Service (RUS) - Broadband Initiatives Program (BIP): \$ 7 200 m
Funds to which satellite services are potentially eligible	Technological neutrality: no specific subsidy for satellite broadband. Subsidies available for satellite-terminals among the agreed options.	Specific subsidy for satellite services: \$ 100 m (1.39% out of the total fund)
Management and allocation of the funds	Funding available for regions and/or states. Award procedures at a regional/state level. The EC has no role in the call-for-tender or selection procedure. It only approves the programming documents.	The Department of Agriculture centralises the allocation of the fund, in particular the Rural Utilities Service. In order to access the fund, satellite connection has to be the only connection available. The fund is used to subsidise equipment and installation costs and to reduce monthly fees.
Beneficiaries	Public administrations, firms and households for which CPEs will be subsidised. Indirect beneficiaries are CPE resellers and ISPs which will sign new subscriptions.	Satellite ISP or a reseller of satellite broadband services. Pan-American distributors. Hughes Network Systems (\$58.7 m), WildBlue (\$19.5 m), EchoStar Satellite Services (\$14 m).

5.1.4. Governmental support: recognition of the efficiency of the satellite solution

Federal government can also provide directly (by federal calls for tender) or indirectly (by the recognition of the efficiency of satellite solution) support to satellite operators.

In terms of direct support, US Federal Government services use satellite broadband. Hughes Networks System was awarded a task order in 2011 from the US Department of Agriculture Food Safety and Inspection Service to deliver managed broadband services to 300 offices and inspection sites, and replace the existing mix of infrastructures comprising multiple technologies, such as DSL, cable, mobile or satellite.

In terms of the indirect support, the 2013 Measuring Broadband America report from the Federal Communications Commission (FCC) represents a valuable and significant recognition of satellite broadband efficiency and reliability, with a satellite provider included in this ranking for the first time. This annual study recognises **the specificity of satellite broadband**: “Satellite-based broadband Internet services differ from terrestrial-based technologies in several key ways” (p.13). Satellite is also implicitly **recognised as an existing infrastructure** that does not require any civil works and that allows **immediate broadband coverage**: “because satellites broadcast wirelessly directly to the consumer, no actual terrestrial infrastructure has to be deployed” (p.13). Finally, the **cost-effectiveness** of satellite technology is **indirectly mentioned** through “its more uniform cost structure”, acknowledged as “unique among the technologies under study” (p.13).

The report repeats the drawbacks of satellite broadband: limited bandwidth, low speeds and latency, but highlights that a **new generation of satellites** “has greatly improved overall performance as much as **100-times superior to the previous generation**, leading to the entry of new satellite-based broadband providers” (p.7).

One of the main conclusions of the report is that **satellite broadband has made significant improvements in service quality**: with decreased latency and performance that is actually significantly higher than advertised rates. However, despite these many improvements, the report highlights the fact that **latency remains “20 times that for terrestrial average”** (p.11). ViaSat had a measured latency of 638 ms whereas the maximum average latency for terrestrial technologies is less than 70 ms (p.30). Nevertheless, the report acknowledges that **satellite**

broadband is able to support common consumer applications: “While latency for satellites necessarily remains much higher than for terrestrial services, with the improvements afforded by the new technology we find that it will support many types of popular broadband services and applications” (p.7).

5.2 International Case: Australia

The Australian financing scheme has been used to bring broadband connectivity to all using a combination of technical solutions. The current situation in this continent will be evaluated and in particular how satellite internet connectivity has been proposed as the technology to bring data connection in remote and very remote areas.

The National Broadband Network (NBN) is a national wholesale-only, open-access data network under development in Australia. Fibre broadband connections are sold to retail service providers (RSP), who then sell Internet access and other services to consumers. The NBN was subject to political and industry debate for a number of years, before construction actually commenced.

The network build is estimated to cost AU\$37.4 billion and take 10 years to complete. The build cost has been a key point of debate. NBN Co, a government-owned corporation, was established to design, build and operate the NBN, and construction began with a trial rollout in Tasmania in July 2010.

The network is based on a fibre to the premises (FTTP) rollout, planned to reach approximately 93% of premises in Australia by June 2021 and to gradually replace the copper network, owned by the incumbent Telstra and currently used for most telephony and data services. As part of an agreement with NBN Co, Telstra will move its customers to the NBN, and lease access to its exchange space and extensive network ducting to assist in the rollout. A similar agreement with another operator, Optus is in place.

To cover the rest of the territory, the Australian NBN (National Broadband Network) is investing in satellite connectivity, especially for a long-term program able to bring broadband connectivity also in those remote areas not served by the terrestrial infrastructures. NBN Co is planning to launch two KA band satellites by 2015, each offering 80 Gbps, compared to four to six gigabits per second capacity available from current satellites servicing Australia. In the interim, NBN Co will use existing satellite to provide six megabit per second to a limited number of premises,

which currently do not have access to broadband speeds. The satellites will be used to bounce signals from a satellite dish on the premises to an earth station, known as a "gateway"; the gateway is then connected to a PoI via a fibre backhaul. The satellite design was challenging, because the required coverage is about "5% of the world's land mass" containing "at least 200,000 premises" spread across "over 7,000 kilometres" of area between Cocos Islands and Norfolk Island.

Thanks to these investments NBN will provide, by 2015 with the launch of the new generation Ka-Band satellites, a service with a peak speed of 12 Mbps in download.

Also, NBN Co's Corporate Plan demonstrates that the network can be built with a Government investment of \$27.1 billion that will ultimately be repaid by the company plus a return on that investment. NBN Co will fund the rest of the satellite network construction through its own revenue or by raising private debt. The Government investment will be staggered over many years as the network is rolled out, as is typical for large national infrastructure projects. Broadband Solution for Remote Areas and Australian Broadband Guarantee customers

On 11 April 2008, the Minister for the Digital Economy called for submissions on policy and funding initiatives to provide high speed broadband to the estimated 2% of premises that are unlikely to receive a service under the National Broadband Network. On 15 July 2008, the Minister announced the publication of submissions received.

Submissions considered by the Regional Telecommunications Independent Review Committee, led by Dr Glasson AO, and by the Government in determining appropriate options to improve telecommunications in rural and remote areas of Australia.

This consultation process was in parallel to the Request for Proposals for the National Broadband Network and seeks to explore options for those remote areas outside the coverage of the network.

The Government had also committed \$270.7 million for the Australian Broadband Guarantee initiative for the four financial years from 2008 to 2012 in order to help consumers and small business offices to access high-quality broadband services regardless of where they were located. The program targeted those customers unable to access commercial metro-comparable services, in particular for those living in remote areas of Australia.

NBN Co Ltd provided an Interim Satellite Service through its retail service providers from 1 July 2011. Under the ABG, a Metro-Comparable Service means a service in the following features:

- access to the internet at a peak data speed of at least 512/128 kbps and 3GB per month usage allowance (with no restrictions within these limits on downloads or uploads or usage time);
- a price to the end user over three years of no more than \$2500 (included GST) including equipment, installation, connection, account establishment, travel costs and ongoing provision of the service; and
- The internet service provider offering the broadband service can install the service within a reasonable period of time.
- For illustrative purposes, commercial broadband services that fall within the Metro-Comparable Service definition include:
 - Traditional broadband services such as ADSL or ADSL 2+; 3G or 4G wireless in „hand held “ areas; Even if the program is now ended, the rights of existing ABG customers are not affected, including the right to a three-year offer of service without any increase in the monthly price of the service supplied.

5.2.1. Australian National Broadband Network: Interim Service and Long Term Service

On 1 July 2011, NBN (National Broadband Network) Co Limited launched the Interim Satellite Service able to provide with an immediate and enhanced broadband services with a peak speed of 6 Mbps in download and 1 Mbps in upload remote and rural areas over Australian continent. This service is realised in particular for residences, small businesses, indigenous communities and not-for-profit organisations that do not have access to a metro-comparable broadband service.

The Interim Satellite Service provides a transition from the Australian Broadband Guarantee (ABG) program to NBN Co's Long Term Satellite Service, which will become operational in 2015. As showed in figure 5, the Interim service is available in mainland Australia and Tasmania but not Australia's external territories like oceanic island. There are about ten major ISPs (Activ8me, Bluemaxx Communications, BorderNet, Clear Networks, Harbour IT, iiNet, IPSTAR Australia, Reachnet and SkyMesh) are now offering commercial services that use the Interim Satellite Service but this is not available to educational or health institutions

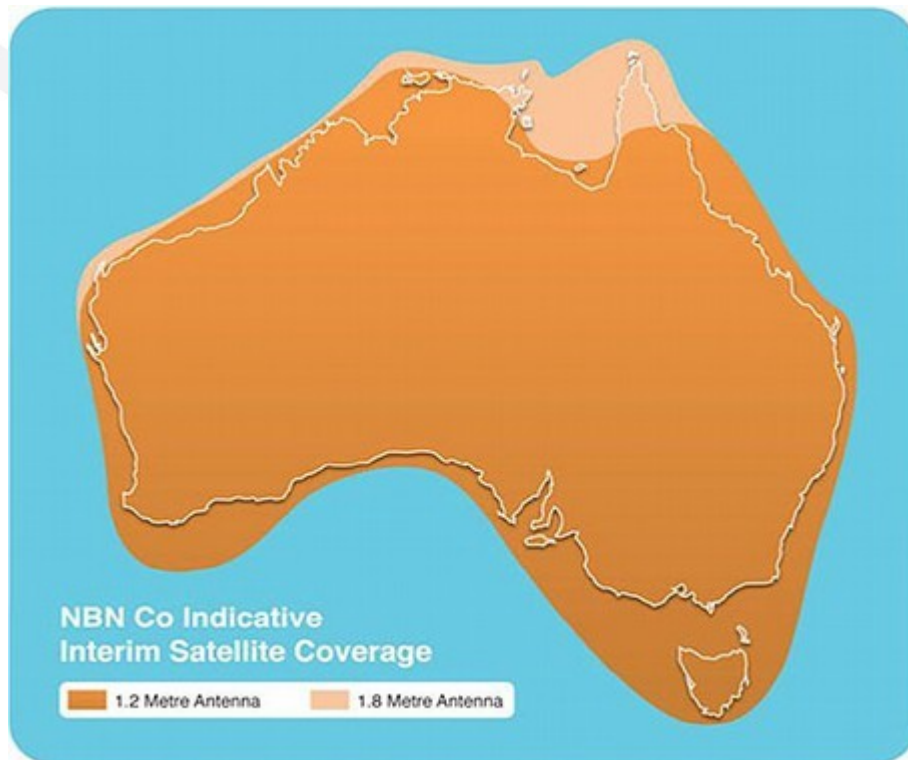


Figure 8: Interim Satellite Coverage

The NBN long-term satellite service will provide all users with access to speeds greater than those many people experience on ADSL today and offer a more stable and reliable broadband service.

The NBN long-term satellite service is expected to be available in 2015, when NBN Co will launch two next-generation satellites. This means many Australians in rural and regional areas will receive satellite broadband services well before some metropolitan areas receive fibre services. Also, the new service will be available for external territories such as Norfolk Island, Christmas Island, Macquarie Island and the Cocos Islands.

With the new satellites, using the Ka band, NBN Co will be offering the 25/5 Mbps services for both fixed wireless and satellite at a wholesale access price of \$27 per month – the same wholesale price charged for the 25/5 Mbps fibre service.

NBN Co's wholesale prices are already translating into retail prices which are both competitive and affordable, starting at around \$30 per month for a basic 12/1 Mbps, and \$40 per month for a 25/5 Mbps, so it will expect that retail prices for 25/5 Mbps on fixed wireless will be within the current price range for wired services. NBN Co is an open-access wholesale provider and provides the network upon which ISPs are able to deliver services to customers. Interim satellite services can be purchased directly from registered retail service providers.

For the new Long Term Service, it may be necessary to replace the existing Interim Satellite Service equipment with new equipment.

5.2.2. Eligibility Criteria

Eligibility criteria³⁷ have been established to enable NBN Co to manage the demand for the Interim Satellite Service. They allow NBN Co to reasonably manage wholesale customer orders and activations (the End User Eligibility Criteria). These criteria are based on the program guidelines that applied to the ABG (Australian Broadband Guarantee) programme, including the concept and definition of metro-comparability as the primary test for determining eligibility. These criteria are also consistent with the Government's expectation of NBN Co to provide a level of transition from the ABG program to the Long Term Satellite Service.

An end user may be eligible if, according to the NBN Co Broadband Service Locator (NBN Co BSL), they do not have access to a metro-comparable broadband service, as defined below (Metro-Comparable Service), and they fall within one of the following categories:

- A residential end user;
- A small business;
- An Indigenous community organisation;
- A not-for-profit organisation;
- An education facility;
- A health facility; or

³⁷

http://www.nbnco.com.au/content/dam/nbnco/documents/eligibility-criteria-interim-satellite-service.pdf?bcsi_scan_B807F83D805DA17C=1Vack1hJxtFaidMab6yAizFffX4KAAAAaDQ8Ag==&bcsi_scan_filename=eligibility-criteria-interim-satellite-service.pdf

- A local government facility. In the following, we give an overview of the eligibility of the different types of end users.

5.2.3.

Residential End Users

A residential end user is considered eligible if, according to the NBN Co BSL, the premises cannot access a Metro-Comparable Service and the following criteria are met:

- the premises being connected is the end user's principal place of residence;
- an end user intends to reside at the eligible premises for the next consecutive twelve month period; and the end user does not have an existing NBN Co service at the eligible premises or an ABG service which was connected less than three years ago.

Small Business End User

A small business is considered eligible if, according to the NBN Co BSL, the premises cannot access a metro-comparable service and the following criteria are met:

- the business does not have more than 20 fulltime equivalent employees;
- the business has a unique and clearly identifiable work location set up in such a manner that represents a distinct place of operation for the business;
- the business does not have an existing NBN Co service or an ABG service that was connected less than three years ago at that place of business; and Only one connection will be provided at each eligible premise. This could be a small business or residential end user.

Indigenous Community Organisations

An indigenous community organisation may apply if it meets the following criteria:

- if it has a work location set up in such a manner that represents a distinct place of operation for the organisation; the premises do not have an existing NBN Co service or ABG service that was connected less than three years ago.

Not-For-Profit Organisations

A not-for-profit organisation is considered eligible if the following criteria are met:

- it is formed for social, recreational, educational, charitable, philanthropic or other lawful purposes, where any profit earned can only be applied for the purposes of the organisation as a whole and not distributed to individual members;
- it has no more than the equivalent of 20 full-time employees;
- it has a unique Australian Business Number;
- it has a unique work location set up in a manner that represents a distinct place of operation for the not-for-profit organisation; the premises do not have an existing NBN Co service or ABG service that was connected less than three years ago.

Education facilities

An education facility may be considered eligible if, according to the NBN Co BSL, it is unable to access a Metro-Comparable Broadband service. Eligible schools may be publicly or privately funded, and include preschool or kindergarten facilities, primary schools and secondary schools. Adult registered training and education facilities which provide on-going services may also be considered eligible on a case by case basis.

Health facilities

A health facility may be considered eligible if according to the NBN Co BSL, it cannot access a Metro-Comparable Service. Health facilities include, but not are limited to, a general practice, specialist medical service, dental practice, and community health centres. Other health facilities may be considered eligible on a case by case basis.

Local government facilities

A local government facility may be considered eligible if according to the NBN Co BSL, it cannot access a Metro-Comparable Broadband service and is open to the public. Eligible local government facilities may include but are not limited to:

- local government-owned childcare centres (privately owned childcare centres may be eligible as a small business);
- libraries;
- council offices;
- indigenous community facilities operated by local government;
- aged care and accommodation facilities; other local government-owned community facilities that are used on a regular basis to deliver services to the community, such as a community centre.

Requests for a broadband service must be authorised by a local government body and this body will be responsible for all end user obligations relating to the broadband service.

Eligible candidates for an NBN Co Interim Satellite Service, will be assigned a priority one or priority two category status:

1. Requests for a broadband service must be authorised by a local government body and this body will be responsible for all end user obligations relating to the broadband service.

Eligible candidates for an NBN Co Interim Satellite Service, will be assigned a priority one or priority two category status. Priority one eligible customers are those who have never had an ABG service and according to the Broadband Ser

vices Locator (BSL), do not have access to a metro-comparable broadband service.

2. Priority two eligible customers, according to the Broadband Services Locator (BSL), do not have access to a metro-comparable broadband service, but have a working ABG service that was connected more than three years ago or have lost their ABG service through no fault of their own.

Australian Broadband Market: Status and Forecasts
According to a NSR (Northern Sky Research) study, it is estimated that over 70% of the 2011 base of 154,000 satellite broadband access subscribers in Asia could be found in the Australian market alone.

During 2011 and 2012, NBN Co. has made very big progress thanks to the development of new satellite broadband services in order to meet the government's policy objectives with the main target to bring city equivalent broadband services to all households and small business offices in

the country.

Partners in this project were Gilat (with the customers' equipment) and Thaicom's Thaicom-4 satellite along with supplemental capacity from Optus.³⁸ Last year NBN Co. awarded Space Systems/Loral a satellite manufacturing deal worth AU\$620 million and signed a AU\$ 240 million agreement with ViaSat for a ground network.

In term of new subscribers, an interim programme was put in place and it is very probable that some of the former ABG subscribers will elect to migrate to the Interim Service in the coming years as well as some real growth in new subscribers (see later the details of this program). This migration will be improved by the new Long-Term satellite service available from 2015 not only from ABG subscribers but also to the Interim Service to the new Long Term service based on the Ka band.

NSR forecasts that the real net growth will be slow in 2015, and a stronger growth during 2016 and beyond. The addressable market size in Australia is between 200,000 and 300,000 households, and this effectively caps the long-term growth for satellite broadband services in the country. At end of December 2012 34,500 users had connected to the NBN. That number is up considerably from June 2012, when the figure was 13,600. The vast majority of those users to date (23,100) are on satellite, which has the advantage of being instantly available to qualified users if they install suitable receivers. By June 2013, NBN Co predicted those scales will have tipped, with 54,000 fibre connections against 47,700 satellite and wireless broadband connections³⁹.

5.3 International Case: Canada

This section is intended to present an analysis of the Canadian scheme to support the deployment of satellite internet connectivity to all. The objective is to gather intelligence about the current situation in a country where satellite internet connectivity is often the only way to bring data connection in remote and rural areas.

³⁸

To provide these services NBN Co bought managed satellite services and satellite capacity from Optus for \$200 million and additional satellite capacity from IPstar for A\$100 million.

³⁹

<http://www.lifehacker.com.au/2013/01/understanding-nbn-takeup-and-the-coalition-real-solutions-broadband-statement/>

5.3.1. Governmental recognition of the efficiency of the satellite solution to provide broadband

Canada is a gigantic and sparsely populated country which faces extreme conditions (climate, terrains). The population distribution could be compared to the Australian one: a very low average density (3.4 persons/km²) that hides huge discrepancies. In fact, the five largest Census Metropolitan Areas (CMAs) represent 0.3% of the Canada's land mass but 41% of its population (with a density of 547.9 persons/km²) whereas the North (including Yukon, the Northwest Territories and Nunavut) has 41% of the country's land mass but only 0.3% of its population (giving a density of 0.026 persons/km²)⁴⁰. In Canada as in other countries, the most rural and remote citizens suffered right from the beginning of the implementation of high speed internet from the effect of remoteness from the most populated areas where terrestrial broadband networks could easily cover their costs and make profit.

A National Broadband Task Force was established in January 2001 by the Canadian ministry of Industry (hereinafter Industry Canada). The principle mandate of the Task Force was to map out a strategy for achieving the 2000 Federal Government of Canada's goal of ensuring that broadband services are available to businesses and residents in every Canadian community by 2004. The main order of business was to identify communities that were unlikely to obtain broadband access as a result of market forces alone by 2004, and to recommend strategies involving collaborative action among all stakeholders to ensure that businesses and residents in these communities have an opportunity to participate in, and benefit from the broadband revolution.

The National Broadband Task Force issued in 2001 a very detailed report with series of principles and recommendations for solving by 2004 the need for high-speed internet access in rural Canada that was seen then as a pressing problem.⁴¹

The central ideas in the report included a commitment to the technological neutrality (even if the Task Force recognised that fibre was more expensive to deploy in unserved areas than wireless

⁴⁰ Figures in 2011 according to the Publication No. 2011-57-E June 2011, Rural Broadband Deployment, Dillian Theckedath and Terrence J. Thomas, Industry Infrastructure and resources Division Parliamentary Information and Research Service to be found under: <http://www.parl.gc.ca/content/lop/researchpublications/2011-57-e.pdf>

⁴¹ See under this link the National Broadband Task Force Report issued in 2001 <http://publications.gc.ca/collections/Collection/C2-574-2001E.pdf>

and satellite technologies)⁴² a strong role for the government in shaping, influencing (and sometimes participating to⁴³) the rollout of services between the private sector and communities “through the use of the supply-oriented infrastructure support model and the demand-oriented community aggregator model”

This Report was followed by governmental initiatives to fill the digital divide. It started in 2002 with the “Rural and Remote Broadband Access program” whose goal was to support research and development of cost-effective technologies for bringing broadband services to Canada’s rural and remote communities and the cost-matching program “Broadband for Rural and Northern Development”). Then a specific plan was set up to provide broadband access to the most remote Canadians.

In fact, a specific plan for satellite broadband was initiated by the Federal Government of Canada - that worked alongside partners within territories, provinces, communities and with the private sector to implement this initiative - to deploy internet access in poorly served or unserved areas (2003, the “National Satellite Initiative⁴⁴”), a \$155-million program (\$85 million from the “National Priority Project Envelope” of the Canada Strategic Infrastructure Fund, \$50 million from the Canadian Space Agency for satellite capacity and from another \$20 million managed by Industry Canada⁴⁵) to lower the cost of bringing broadband to the Far and mid-North by purchasing the needed satellite capacity, a plan that is now in its Round 2. Thanks to this initiative, approximately 400 Communities were reached by a satellite broadband communication provider. It allowed essential services notably in health, education and e-government.

At this occasion the Government of Canada (GoC) de facto recognised the effectiveness and cost-effectiveness of the satellite broadband solution to bring broadband access to the most rural and most remote Canadians.

⁴² “Transport to unserved communities: Estimates of total investment range from \$1.3 billion at the lower end to \$1.9 billion at the upper end. The latter would involve a higher proportion of fibre as compared to wireless and satellite technologies” (Task Force Report, Page 6)

<http://publications.gc.ca/collections/Collection/C2-574-2001E.pdf>

⁴³ Recommendations 2.1: “Governments should accelerate broadband deployment in those communities where without government involvement the private sector is unlikely to deliver such service”

<http://publications.gc.ca/collections/Collection/C2-574-2001E.pdf>

⁴⁴ Further to be read under NSI

⁴⁵ <http://www.spaceref.com/news/viewpr.html?pid=13187>

Broadband Canada, a program of the Canadian's recovery plan

As the digital divide in Canada was still to be filled, Industry Canada conducted in 2009 a study to identify areas where high speed internet was poorly available or unavailable and was allotted \$225 million over three years (part of the Canadian recovery plan, “Broadband Canada: Connecting Rural Canadians” was the primary tool for meeting this goal) to develop public-private initiatives for extending broadband to these areas⁴⁶.

This program ended (except for the Kativik Regional Government⁴⁷: 2016) in March 2012. A total of 84 projects were funded in five provinces and two territories, bringing broadband access to a total of 218,000 (awaiting the results for KRG) previously unserved and underserved households⁴⁸.

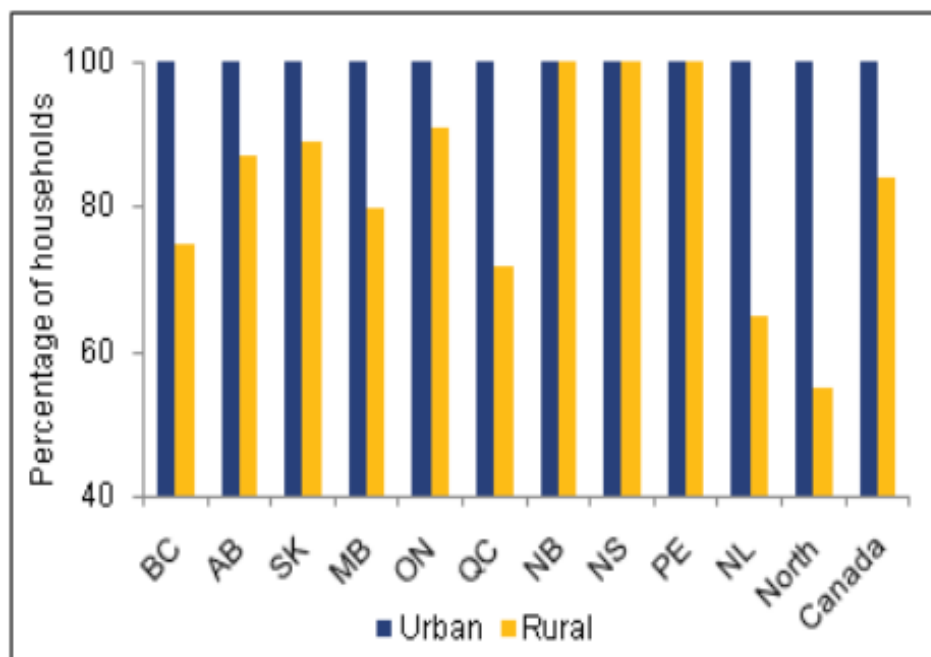


Figure 9: Broadband Availability in Canada: Urban Versus Rural, 2009

⁴⁶ Industry Canada, “Government of Canada Announces Third Round of Broadband Canada Funding”, News release, 6 November 2010

<http://www.ic.gc.ca/eic/site/064.nsf/eng/06045.html>

⁴⁷ Further KRG

⁴⁸ See a list of projects by Province (updated March 31, 2012)

<http://www.ic.gc.ca/eic/site/719.nsf/eng/00050.html>

The Broadband Program was an application-based program intended to make broadband service available to as many previously unserved and underserved households as possible. For the purposes of the program, broadband was - there - defined as a minimum 1.5 Mbps (in download speed) and 384 kbps (upload speed).

Industry Canada undertook an extensive mapping exercise in order to understand the extent to which Canadians remain unserved or underserved⁴⁹. Based on the mapping data, Geographic Service Areas (GSAs) were defined⁵⁰ and a competitive call for applications was open from September 1, 2009 to October 23, 2009, to fund projects in the GSAs.

The Government of Canada did not promote any particular service provider⁵¹ and stated that the provision of broadband Internet service (was) a “private enterprise, driven by market forces”. However it recognized that “sometimes market forces are not sufficient, particularly in rural and remote areas” and declared that the purpose of the program was to “provide a one-time, on-repayable contribution to support the expansion of broadband infrastructure in areas where there is currently no business case for the private sector moving forward on its own”

Eligible recipients were the private sector or companies, not-for-profit organisations, cooperatives and consortium, provincial territories and municipalities, county governments, crown corporations, First Nations Internet Service Providers and band councils entities that build and operate broadband infrastructure.

Applicants to the program could receive up to 50% of eligible project costs (First Nations communities were allowed to exceed the 50% federal funding limit by seeking complementary funding from other federal government departments and agencies).

Total government funding (federal, provincial/territorial and municipal) could not exceed 100% of eligible costs and the program was exclusively targeted for those areas that, by September 2010, had no broadband internet connectivity through other public or private programs.

Canada's Economic Action Plan provided \$225 million for the development and implementation of a strategy to extend broadband coverage: as of today a total of 84 projects were funded in five

⁴⁹ <http://www.ic.gc.ca/app/sitt/bbmap/hm.html?lng=eng>

“Is there Broadband Coverage in my Area?”

⁵⁰ http://www.ic.gc.ca/eic/site/720.nsf/eng/h_50010.html

List of Canada's unserved areas before the program.

⁵¹ http://www.ic.gc.ca/eic/site/719.nsf/eng/h_00071.html

provinces and two territories, bringing broadband access to a total of 218,000 previously unserved and underserved households.⁵²

Broadband Canada: Connecting Rural Canadians was a three-year program that finished on March 31, 2012. No further broadband program was envisioned at this time.

Among these 84 projects the satellite technology (whether it be Satellite, Fixed Wireless over Satellite or Mobile Wireless over Satellite) was chosen 13 times (1 satellite project in British-Columbia among 24 active projects, 1 in Northwest Territories among 2, the unique project in Nunavut used the satellite technology, 2 among 13 in Ontario, 8 among 25 in Quebec).

The pursuit of programs aiming at the access of extremely remote communities to broadband

As we said previously, Broadband Canada: Connecting Rural Canadians is still operant within the area of the Kativik Regional Government where it will end in 2016. Also, after the success of the National Satellite Initiative's first round, a round 2 started (with application between 2006 and 2008) that will end in 2019 for all partners.

This NSI round 2 was the proof of the success and effectiveness of the satellite technology in bringing broadband access for those who had been left out by terrestrial providers.

5.3.2. Actual status and market forecasts for Satcom Operators in Canada

The arrival of the satellite technology in the broadband market consisted in a real change of perception on the implementation of broadband services for all. Satellite technology was early declared by the International Telecommunication Union (ITU) to be the most effective, affordable and reliable technology to allow the most rural and remote Canadians to have access to high speed services and doing so to close gap with metropolitan areas in rural and remote areas⁵³.

⁵² <http://www.ic.gc.ca/eic/site/719.nsf/eng/00050.html>

See a list of projects by Province (updated March 31, 2012)

⁵³ Workshop on the promotion of broadband at the ITU. The case of Canada was studied in 2003
"Residential two-way high-speed satellite services (were) a relatively new entry (in 2003, Editor's note) into the high-speed market in Canada. They have filled a niche in residential market by serving homes in remote communities where broadband infrastructure of any sort has not been deployed.

<http://www.itu.int/osg/spu/ni/promotebroadband/casestudies/canada.pdf>

A recent analysis of the Canadian Parliament⁵⁴ (based on a previous study of Australian NBN Co.⁵⁵) restated that it is possible to analyse how the cost-effectiveness of various broadband technologies (terrestrial and satellite) are highly influenced by the population densities in specific regions. It is demonstrated that declining population densities lead to the high capital costs per end user served with terrestrial connectivity and, on the contrary, satellite, because of its vast coverage and technology advantages do not show the same behaviour and is demonstrated to be the best choice for rural and remote areas. As 97% of the Canadian population has access to non-satellite broadband services⁵⁶, satellite operators notably have good market forecasts for the 3% Canadians left behind by terrestrial operators.

There are a lot of entities delivering satellite services in Canada, not only private companies but also not for profit organisations (NGOs) and local governments that thanks to the NSI can co-operate (in public-private partnerships) satellites and deploy satellite broadband access.

The most important satellite internet service providers in Canada are currently the Canadian Xplornet Communications Inc. (that operates thanks to Telesat and leads the Canadian market especially for rural areas and households) and the US American Spacenet. Both offer a hybrid terrestrial wireless and satellite connectivity.

Xplornet provides high speed internet services thanks to ViaSat-1 and Jupiter-1 (also known as EchoStar 17).

ViaSat-1 was launched in October 2011, is positioned at 115.1 degrees West longitude, with 72 Ka-band spot beams; 63 over the U.S, and nine over Canada use for broadband services to consumers in rural Canada. ViaSat-1 claims to support customer download speeds of up to 25 Mbps.

Jupiter-1 was launched in July 2012 is positioned at 107.1 degrees West longitude. Xplornet declared that it aims at quadrupling the total amount of its subscribers within 2016.

⁵⁴ Ibidem

⁵⁵ Adapted from Australia, « Introduction of Implementation Study », NBN Co. 6 May 2010

⁵⁶ Canadian Radio-television and Telecommunications Commission, *Communications Monitoring Report*, September 2013, 6.1 Broadband availability and capacity requirements, p173
<http://www.crtc.gc.ca/eng/publications/reports/policyMonitoring/2013/cmr2013.pdf>

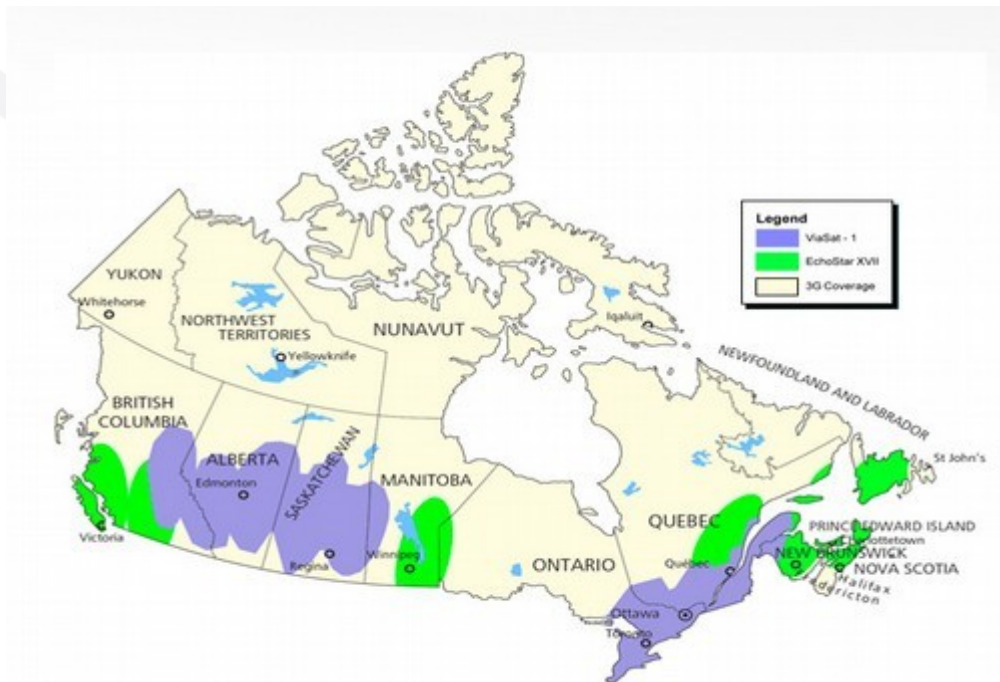


Figure 10: Canada Coverage map

The US American Spacenet (which covers North America) is another example of satellite providers in Canada that gives a significant service (it provides a Ku-band provisioned service) with its StarBand product. However, the last forecasts see that Spacenet, based on Gilat platform will focus on little and small niches part of the US market that is not served by major satellite broadband access services.

It is to be witnessed that the broadband access market will most likely be dominated by Hughes (with EchoStar XVII) and ViaSat with their hundreds of millions of dollar investments in new infrastructures.

5.3.3. Canadian Regions Government Plans, Case study: Northwest Territories

To have an example on how the Canadian Government and private companies realized a strategic plan to bring broadband connectivity in a rural area it is useful to focus on the case of the Northwest Territories in which the satellite technology was early identified as the most effective and cost-effective solution to provide broadband access to its most remote communities.

The Government initiatives were to deploy under the National Broadband Plan (BRAND) a Federal program (2008) to enhance satellite access in 31 Northwest Territories communities and 25 Nunavut Communities.

For this purpose was committed a total of \$36,500,000CAD by federal government to project through National Satellite Initiative. This initiative builds upon an earlier Infrastructure Canada program to connect Northern communities to broadband access. Of this total funding, around \$15,000,000 CAD was allotted to the Northwest Territories.

During this initiative, a ICT stakeholder group was formed out of Northwest Territories Association of Communities and eight other local associations in order to promote ICT growth in the Northwest Territories, develop ICT Strategy, identify barriers to the ICT development and to develop infrastructures necessary to bring an affordable access to broadband services and support essential services for the communities like educational projects.

The private sector involved in this project with ISPs like NorthwTel and Telsat Canada or SSI Micro deployed broadband services via satellite and related equipment over 60 communities.

Thanks to the initiative, at the end of February 2012, public schools across Nunavut had access to dedicated bandwidth for improved connectivity to the Internet, enhancing online learning opportunities. This new broadband service was made possible thanks to a partnership that includes the governments of Canada and Nunavut, the Nunavut Broadband Development Corporation (NBDC), and the operator of the QINIQ network, SSI Micro Ltd. The classroom connection service constitutes an investment by the Government of Canada of up to \$2.1 million. The Government of Nunavut will also allocate 12.5 megabits per second (Mbps) of satellite bandwidth to classroom connectivity.

5.3.4. Topical situation of broadband policies in Canada

CRTC report and the reaction of the GoC to provide broadband access to unserved areas

The Canadian Radio-television and Telecommunications Commission - which has set broadband targets to be met for all Canadians by 2015, suggesting “a combination of private investments, targeted government funding and public-private partnerships”⁵⁷ to reach these targets - issued its

⁵⁷ Canadian Radio-Television and Telecommunications Commission (CRTC), News release, 3 May 2011
<http://www.crtc.gc.ca/eng/com100/2011/r110503.htm>

annual report on the state of communications in Canada on 26 September 2013⁵⁸. It focused stark attention on the have-nots in Canadian society, reminding the still existent digital divide in Canada between the most urban and the most rural citizens.

According to this report, of Canada's 13.9 million total households, 21 per cent, or 2.9 million homes are completely disconnected from the digital economy (have no internet subscription, whether they cannot afford it, or they cannot have access to broadband). Among the most rural and remote Canadian citizens, there are still inhabitants with poorly or unserved broadband access⁵⁹.

Following this report, the government of Canada (GoC) launched in November 2013 an ad campaign indicating that pricing of wireless services was a nation-wide issue originating with the incumbents' current market position⁶⁰. While this campaign was not exclusively about broadband services, wireless services are still often heralded as the solution to broadband connectivity challenges in rural regions.

The GoC indicates that "99% of Canadians have access to high speed broadband⁶¹". It also adds that there are a significant number of citizens in rural and remote areas of Canada which still have limited or no access to higher speed broadband services as envisioned by the CRTC's broadband Internet access target⁶².

This announcement of the GoC was followed by a statement of Industry Canada Minister James Moore (14 November 2013⁶³).

In its statement Industry Canada Minister declared he "believe(s) that the private sector has been effective and will continue to be effective at addressing the broadband gap"⁶⁴, noted that the

⁵⁸ <http://www.crtc.gc.ca/eng/publications/reports/policyMonitoring/2013/cmr2013.pdf>

⁵⁹ Two programs which are planned to end in 2016 (Broadband Canada in the KRG) and 2019 (National Satellite Initiative Round 2) will reduce the existing gap between those who have access to broadband and those who currently do not.

⁶⁰ Canada's largest wireless companies hold more than 85% of Canada's wireless airwaves and hold more than 90% of the Canadian market. Canada's Wireless Policy: More Choice, Lower Prices, Better Services
<http://www.ic.gc.ca/eic/site/icgc.nsf/eng/07389.html>

⁶¹ High speed broadband being here defined as 1.5 Mbps or greater. Reference: Study of Future Demand for Radio Spectrum in Canada 2011-2015 Industry Canada
<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10279.html#s65>

⁶² In Telecom Regulatory Policy 2011-209, the Commission established a universal broadband Internet access target download speed of 5 Mbps (1 Mbps upload speed). Reference:
<http://www.crtc.gc.ca/eng/publications/reports/broadband/bbreport1111.htm#n2.0>

⁶³ Statement to read under <http://news.gc.ca/web/article-en.do?nid=791439>

⁶⁴ "Our approach is that we don't want to crowd out the private sector. We want to have private-sector-led

(Canadian) government “took the next step (...) to defend Canadian consumers by ensuring Canadians living in rural areas benefit from greater access to high-speed Internet services⁶⁵.

Minister James Moore concluded by saying that “Canadians will benefit from additional quality spectrum being deployed across the country, which will lead to dependable high-speed Internet services on the latest technologies at the best prices”. And that the “government will continue to enhance rural access to high-speed broadband networks and will continue to put consumer interests at the core of our decisions.”

5.3.5. Canada’s satellite broadband policy as an example for the European Union

Canada is a good example of a country where satellite broadband is fully included in the government’s schemes to achieve a 100% broadband connected objective, that is to say a correct development of the society from social and economic points of view. Satellite broadband not only provides connectivity in areas that are not reached by terrestrial infrastructures and de facto boost the economic potential of end-users and SMEs, but it also brings revenues to companies such as satellite operators, ISPs or antennas installers that are ready to invest in the satellite broadband technologies since subscribers forecasts makes it possible to achieve a Return on Investment.

The GoC recognised the substantial help that is given by satellite connectivity where terrestrial technologies are unavailable both for technical and economic reasons (i.e. too high roll-out costs) and authorities developed different plans in order to allow the provision for all Canadians by 2015 of high speed internet connectivity (aid to private investments according special and focused government policies; public-private partnerships).

Within the EU, more than 13 million of households still have not access to a comparable ADSL broadband service and 17 million users have internet access with a speed below 2Mbps, quite far from the range defined in the Digital Agenda. Also a big portion of the rural population of Europe has no access to standard terrestrial broadband as the infrastructures costs of the last mile

investment. Some other countries have taken a more direct investment approach, which is very costly. We are relying on the private sector, and it is certainly delivering in terms of getting the higher-speed capacity” Pamela Miller, Director General, Telecommunications Policy Branch, Department of Industry

<http://openparliament.ca/committees/industry/41-1/61/helene-leblanc-1/>

⁶⁵ <http://news.gc.ca/web/article-en.do?nid=791439>

connection requires big investments and a lot of time for the construction.

Unlike Canada in which satellite broadband technologies are fully and explicitly included in governmental plans to provide broadband connectivity to rural and remote areas, the EU is still far to promote policies, initiatives and programs in order to support the development of broadband internet connectivity within the whole European territory, especially to support the development of satellite broadband technologies in rural and remote regions where terrestrial technologies are not and will not be available and where satellite technologies are elsewhere (e.g. Canada, USA, Australia) recognised as the most effective and cost-effective solutions to provide broadband to the most remote inhabitants.

However, as Mrs Kroes (DG CNECT Commissioner) declared: "For those in the most isolated areas, satellite is a good option to stay connected; and it's likely to remain so"⁶⁶.

But, because of the net neutrality, she cannot publicly admit and formally states - as it has been the case in Canada, in the USA or in Australia - that satellite solutions are the most effective and cost effective ones to deploy internet broadband in the most rural or remote areas. That is an obstacle to the implementation within the European Union of such a Canadian scheme to enhance satellite internet access.

The Canadian approach, with the public-private partnership between Public Authority and private companies would represent an interesting way to face the digital divide and try to ensure the 100% coverage of the European territory, but the lack of strategic intent with converging private and public interests at European level demonstrated the difficulties to reach those results.

It would be a positive advancement to reach at European Union and European Commission levels a strategic view in order to help the European satellite telecommunications industry to deploy projects and remain competitive on the global market.

Therefore we would encourage the European Commission to look at the valuable and remarkable Canadian broadband policies addressed to deploy internet in the most remote and rural areas and to find instruments at political level that allow to continue to invest in facilitating broadband access by bringing commercial, social and technological benefits to the population.

⁶⁶ http://europa.eu/rapid/press-release_IP-13-968_en.htm

5.4 Conclusion

The Australian and Canadian cases with related markets are good examples about how satellite broadband is fully included in the Government schemes in order to achieve a correct development of the society from a social and economic point of view.

Thanks to the investment in the satellite broadband it is not only possible to bring connectivity in those areas not reached by terrestrial infrastructures and de facto boost the economic potential of the end-users and SMEs, but also to bring revenues to companies such as satellite operators, ISPs or antennas installers that are ready to invest in the satellite broadband technologies since subscribers forecasts make it possible to achieve quick return on investment.

The Government of these countries believed that, in order to cover the 100% of the entire territory with the high speed internet connection, the satellite connectivity can give a substantial help where the terrestrial technologies cannot be available both for technical reason and economical reason (i.e. too high roll out costs).

In Canada, for example, the Canadian Authorities had developed plans in order to give to all Canadian, by 2015, a high speed internet connectivity between aid to private investments, with special and focused government policy and also with public private partnership in the high technological internet broadband services.

In European Union, more than 13 million of households have not access to a comparable ADSL broadband service and 17 million users have internet access with a speed below 2Mbps, quite far from the range defined in the Digital Agenda and not enough to achieve the minimum performances in order to access to many media-rich applications⁶⁷.

Also a big portion of the rural population of Europe has no access to standard terrestrial broadband as the infrastructures costs of the last mile connection requires big investments and a lot of time for the construction.

Unlike the Canada and Australia in which the satellite broadband technologies are fully included in the Government plans to provide broadband connectivity to rural communities and remote areas, the European Union is still far to promote policies, initiatives and programs in order to support the development of broadband internet connectivity in the whole European territory also

⁶⁷ <http://www.dailywireless.org/2011/05/31/high-throughput-satellite-goes-live/>

with the satellite connectivity that represent an immediate and affordable solution to deploy high speed internet connection.

An approach like in the Australian case, with the public-private partnership between public authority and private companies, represents an interesting way to face the digital divide and to try to ensure the 100% of coverage of the European territory but the lack of strategic intent with converging private and public interests at European level demonstrated the difficulties to reach those results.

For these reasons it is very important to reach at European Union and European Commission level a strategic view in order to help the European satellite telecommunications industry to deploy projects and to remain competitive on the global market especially in a period of financial crisis.

We would also encourage the Commission to find instruments at political level that allow to continue to invest in facilitating access to broadband by bringing commercial, social and technological benefits to the population.

At market level, one of the major differences between the European market and the Australian or Canadian markets is that the satellite internet connectivity market still remains a “niche” market both for a different perception of this technology by the customers and by the Public Authority both for a different strategy of the satellite “actors” (operators and ISPs) that contribute to a not perfect integration of the satellite internet connectivity into the market itself.

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Annex I: Validation

A.1 Introduction

In addition to relying on input from its 24 partner organisations, SABER has built into its methodology a validation process whereby the project seeks input from external sources to validate the findings of SABER's research and the usefulness of the deliverables created for their target audience. European Commission services were widely engaged; representatives from DG CNECT, DG AGRI and DG REGIO provided feedback on SABER deliverables through bilateral meetings, in writing and through participation on panels in SABER workshops.

Other network organisations such as NEREUS and Eurisy, the European Space Agency and the European Investment Bank have also been engaged through workshops and bilateral meetings.

Additionally a validation panel was created drawing from key contacts of the consortium partners who were well placed to offer a perspective on the deliverables and organisations that expressed an interest in SABER's activities were engaged. The following sections outline the validation methodology, a summary of the validation findings and how SABER has responded or will respond to the validation findings.

A.2 Validation Methodology

A wide range of representatives from the European Commission were engaged in the validation process; feedback on deliverables was provided by individuals from DG CNECT, DG AGRI and DG REGIO which served to ensure that the deliverable content and guidance provided was aligned with European policies and regulations. Feedback from the various DG's was provided through bilateral meetings and discussions, through written submissions and through participation in the four SABER workshops held to date.

Representatives from NEREUS, Eurisy and the European Investment Bank were invited to participate on panel discussions throughout the four SABER workshops held to date to provide input and various perspectives to the debates and discussions which have helped to form the content of SABER's deliverables.

A validation panel was created by issuing an invitation to key individuals identified by the partners who have an interest in exploring satellite as an option for broadband. Individuals who had requested copies of the first SABER deliverables were also invited to participate on the validation panel. Efforts were made to ensure the panel was representative of both public authorities and industry players.

The following table provides details of the members of the validation panel:

Validation Panel		
Name	Role	Organisation
Christian Alfred	Managing Director	Satellite & Digital Services Ltd
Jon Wakeling	Head of Alternative Technologies, Group Strategy	BT
Ken Stockil	Director (formerly a member of the Ireland National Broadband Advisory Group and Manager of Shannon Broadband)	Central Solutions
Colin McKenna	Development Manager	Irish Central and Borders Area Network (ICBAN)
Frank Zeppenfeldt	Future Programmes	European Space Agency

Once the validation panel members were confirmed each member was forwarded a copy of the deliverables for validation along with a review template for each deliverable. The review template requested feedback on the following four aspects:

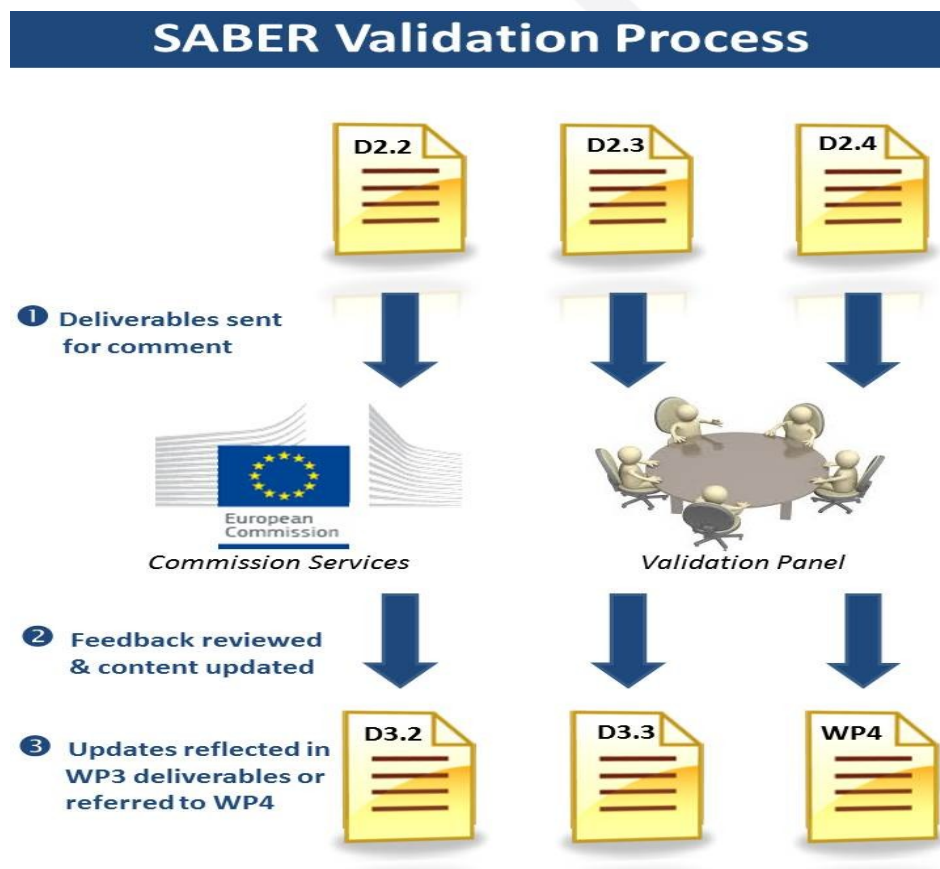
- General comments or observations on the deliverable(s).
- Omissions that need to be addressed.
- Areas that require more clarification or information.
- Additional aspects that could add value to the deliverable(s).

The review of deliverables was undertaken remotely and the review templates were returned by email by the requested due date. The panel members were invited to attend the 4th SABER

workshop held in Brussels on the 11th of October to participate in the validation panel discussion. Each panel member was given the opportunity to summarise their feedback which was followed by a questions and answers session that facilitated seeking clarification or elaboration on their feedback. DG CNECT was also represented on the workshop panel.

The validation feedback received was reviewed by the SABER partners; where appropriate updates to content were reflected in D3.2 and D3.3 of WP3 which will supersede the WP2 deliverables. Where feedback provided related to future activities it was referred to WP4.

The following figure summarises the validation process:



A.3 Validation Findings

The feedback received on D2.4 Early Report on Satellite Broadband as an Option for Regions can be classified under the following headings:

- General Comments
- Language & Style
- Additional Information Required

The following feedback was received from the Validation Panel:

General Comments

- The document was considered very useful overall.
- Some concerns that offerings from current satellite broadband providers would be diluted by aggregating demand were expressed; this appears to be a local supplier concern.
- More widespread awareness raising of the benefits of satellite broadband is needed; the deliverable might benefit from additional higher, non-technical level descriptions of satellite broadband more suitable for the intended audience of Public Administrations; e.g. “one satellite can serve a million users”.
- The non-technological roadblocks section was well received; this could be worthy of a stand-alone document.
- The analysis of the Satellite ISP offer might be better presented in a separate document or database; concern over maintaining the currency of this information was expressed.
- Some of the tools mentioned in section 4.2 could be transferred to D2.2 Early Guidelines on Satellite Services Procurement to provide guidance to Public Administrations.
- The ‘green’ nature of satellite installations could be highlighted.

Language/Style

- Care needs to be taken in the use of language throughout the deliverable; one reviewer felt that the document read like a sales brochure for satellite broadband services; highlighting the perceived unfair treatment of satellite by Public Administrations could be perceived negatively; particularly for the target audience.

Additional Information Required

- A suggestion for providing more rules of thumb for the non-satellite aware Public Authority was proposed; e.g. “one installer can install 2 terminals per day”.
- Public Administrations generally define their requirements on the basis of the required end user service; this will form the basis of any procurement; a perceived overselling satellite could be counter-productive for satellite providers.
- Equally, making broad claims about where terrestrial broadband can or cannot deliver can have a negative effect on how satellite providers are perceived.
- The quality of experience for end users should be the main focus for presenting the benefits of satellite broadband.
- An analysis of satellite broadband compared to other broadband offers could be useful.
- More in-depth treatment of topics such as demand aggregation would be useful; a step by step guideline would be useful for Public Administrations that could highlight the practical actions and issues that need to be addressed in a demand aggregation initiative.

Copies of the completed validation templates are included in next chapter.

Responding to Feedback on D2.4 Early Report on Satellite Broadband as an Option for Regions

General Comments

The benefits of satellite broadband are presented from the user perspective in chapter 4 of this deliverable following a study of 15 end user scenarios.

The non-technological roadblocks section is further developed in chapter 5 of this deliverable. Demand aggregation is further addressed in chapter 6 of this deliverable.

A drive towards greater awareness raising of satellite broadband and the use of clear, user-friendly language and terminology is being considered very seriously by the SABER partners; in the next phase of the project the focus shifts to providing very practical toolkits and guidance for regional organisations. The presentation of information will be framed to suit the context and

needs of policy makers and investment decision makers at the regional level.

Language / Style

Concern over the use of overly commercial or non-biased language has been expressed. This is taken very seriously by the SABER consortium. Every effort is being made to present useful information and guidance to regions that can be used to inform and expand their knowledge and understanding of satellite broadband and its capabilities. As part of this effort dispelling some of the myths that surrounds some regions existing knowledge and understanding of satellite broadband is also a focus.

Additional Information Required

As indicated under ‘General Comments’ above D3.3 presents an analysis of end users experience of satellite broadband.

The requests made for more information and guidance on topics such as demand aggregation are addressed in section 6.2 of this deliverable (D3.3). Further guidance on engaging in a demand aggregation exercise will be provided in the regional guidelines to be developed in WP4.

The positioning of satellite broadband alongside other broadband offers will be explored in more detail in the preparation of regional guidance in WP4 along with some ‘rules of thumb’ guidance to assist regions in assessing the scope of satellite broadband in specifying services levels required in their territories.

A.4 Validation Templates

Deliverable:	D2.4 Early report on Satellite Broadband as an option for Regions		
Validation Panel Member Name:	Jon Wakeling		
Organisation:	BT		
Category:	Regional Organisation	Broadband Advisor	Broadband Provider
<i>Please tick relevant category:</i>			☐

General comments

This document reads like a sales brochure for satellite broadband services. While it is not unreasonable for the document to advocate the benefits of satellite, it is something else to try to position satellite as a victim of biased Public Administration policies. The simple fact of the matter is that the current generation of satellite broadband services suffer from high deployment costs. This will result in satellite capacity being highly contended across the user base when systems achieve the take-up required to deliver the business case. This in turn will result in individual users receiving relatively low throughput during the busy period. Fixed line technologies deliver dedicated capacity to the end user, so it is quite likely that a lower rate assured fixed line service will deliver a better quality user experience than a highly contended 20Mbit/s satellite (or terrestrial wireless) service. Governments understand this and define their requirements on the basis of the end user service they want to have provided. Talking-up satellite in the way that it is done in this document is inappropriate and could backfire if the reader thinks that the satellite offering is being over sold.

The document is littered with comments that suggest governments are ignoring satellite in their broadband deployments 'even when it is the best option'. Such comments require substantiation otherwise they read as throw away lines intended to make satellite look as if it is being disadvant-

aged in some way while glossing over the underlying issues, e.g. Page 6. “So far, most European governments have been extensively investing in fibre optic broadband, even where in some cases satellite broadband might better serve broadband not-spots” and “Current State aid guidelines tend to favour wired solutions, which partly explains why governments have focused on fibre, even though this is sometimes a more expensive or less effective option.” State Aid rules are technology neutral for delivery of the same service definition. Where differentiation is made it is typically because some technologies cannot deliver the same level of service. The comments about the “effectiveness” of satellite need to put into some context to explain what point is being made.

Section 3.1 makes broad claims about areas where terrestrial technology will “never” be able to deliver broadband – this comments needs careful thought: on-going developments in copper technology mean that the proportion of lines that will remain un-addressable by fixed lines is falling and it is a brave assertion that a solution will “never” be found for the remainder.

The recommendations are actually reasonable, as far as they go. However, the worst thing about this document is that it avoids the most important questions for Public Authorities when procuring / facilitating broadband deployment: what quality of experience will the user get? I note that there is no recommendation about standardising a common basic broadband definition in terms of technical parameters, application consumption performance or quality of experience. Why is this?

Omission

Clarification or elaboration

Added value

Deliverable:	D2.4 Early report on Satellite Broadband as an option for Regions		
Validation Panel Member Name:	Frank Zeppenfeldt		
Organisation:	ESA		
Category:	Regional Organisation	Broadband Advisor	Broadband Provider
<i>Please tick relevant category:</i>			

General comments

The first part of this document is rather general explanation of DAE and satellite broadband: no comments but perhaps ill-placed in this deliverable. For the intended audience this might be better rephrased at even higher non-technical level. It should contain then more statements alike “one satellite can do a million users”, etc.

The non-technological roadblocks are well described and would be worth a self-standing document

Omission

Good analysis of the demand aggregation – but no link to the public entity that is struggling to have his BB demand fulfilled.

More rules of thumb for the non-satellite aware public entity to be listed: e.g. one installer will be able to install 2 terminals per day, or similar statements.

4.3 here some tools are mentioned that would help for the public entity ☐ move to D2.2

3.4.4

This section could possibly add also:

- that satellite installations are very “green
- nowadays very aesthetically and non-obtrusive satellite antenna are available
- related to the TCP issues:

1. future transport protocols (e.g. SPDY as active in Google) are mitigating such effects
 2. it is in general rather negative – why not indicate that this is mitigated for 90% by certain measures?
- Can well guarantee a high degree of net-neutrality, as passing only through limited number of ISP autonomous systems

p.26 For certain rural areas the need for connectivity seems to be driven to agricultural applications – it needs to be checked at high level whether satellite can serve such applications. (I.e. can a milk-machine be remotely maintained over satellite, etc.)?

Clarification or elaboration

Added value

Deliverable:	D2.4 Early report on Satellite Broadband as an option for Regions		
Validation Panel Member Name:	Colin Mc Kenna		
Organisation:	Irish Central Border Area Network (ICBAN)		
Category:	Regional Organisation	Broadband Advisor	Broadband Provider
<i>Please tick relevant category:</i>	✓		

General comments

There still remains in my opinion a general lack of awareness amongst the public sector regarding satellite broadband. This has a negative economic impact. I agree that authorities need to find how to deploy satellite broadband in the most efficient and effective way possible.

Omission

There wasn't anything that I didn't agree with but we need to get the message to key stakeholders in the region that Satellite is a viable option.

Clarification or elaboration

none

Added value

I think that a stronger way of getting the message about Satellite needs to found. I have friends in Uganda who work in education and the Satellite broadband is their only choice and which they are quite happy with.

Deliverable:	D2.4 Early report on Satellite Broadband as an option for Regions		
Validation Panel Member Name:	Ken Stockil		
Organisation:	CSL		
Category:	Regional Organisation	Broadband Advisor	Broadband Provider
<i>Please tick relevant category:</i>		x	

General comments

Overall this is an excellent document, written from a more objective perspective than the other two and a useful resource in this discussion.

Omission

In places the document is too general. For example it deals with the concept of demand aggregation at quite a high level whereas a step by step guideline would be useful, or at a minimum a list of practical actions and issues that need to be addressed in any demand aggregation initiative.

Clarification or elaboration

Added value

Deliverable:	D2.4 Early report on Satellite Broadband as an option for Regions		
Validation Panel Member Name:	Christian Aldred		
Organisation:	Satellite & Digital Services Ltd – West Country Broadband Ltd		
Category:	Regional Organisation	Broadband Advisor	Broadband Provider
Please relevant category: <i>tick</i>		Y	Y

General comments

Demand Aggregation. Is there really a need to dilute down the offering from the current satellite broadband providers, and more importantly their wholesalers by setting up yet another channel? Currently in Devon, the chosen SPA is the most expensive of the three Tooway providers in the UK, by a mile with equipment costs of £349 compared to as little as £50 from another provider, and the same SPA is £5 per month more expensive than the same alternative. Who is the Demand Aggregation going to help, certainly neither of the two current providers, one too expensive, the other too cheap. Our website www.westcountrybroadband.com sells on behalf of the cheaper provider, Bentley Walker, yet we don't get a look in when it comes to being promoted by our Local Authorities, so this is not money best spent. Will Demand Aggregation work? It may actually stop us and Bentley Walker from subsidising a product to promote its appeal when our local authority chooses to promote others. Demand Aggregation, will this serve the local ISP / Provider of satellite broadband services or further alienate them? Without subsidy, and through Bentley Walker and SES – BeyondSL, we have installed over a thousand terminals in the South & Southwest UK and South Wales. With subsidies, we could have managed 10 times that amount, and best of all we are based in this area with our own employed workforce.

Omission

Can I add that satellite broadband is always viewed as the last resort or final solution. This is not always the case. Quite often Clients of ours require line security and guaranteed uptime without a reliance on a cabled solution to the premises especially in remoter locations, even though their ADSL broadband speeds were actually not too bad on a good day. Satellite broadband is fairly consistent, especially the SES offering.

Clarification or elaboration**Added value**

The real value has to be the “Seeing is believing” attitude we are adopting at SDS by setting up a showroom dedicated to SES and Tooway, alongside a Wireless Service and also Mobile 3G all under one roof. The plan is to invite Local Authorities from across the region, and further afield if demand dictates, and to ask them to bring their iPads, Laptops and Mobile devices to try the available services and have a demonstration on how these are delivered. Until satellite broadband has been tried, it is hard to appreciate how it differs from lower latency options, but still has a very enjoyable user experience so long as Customer Expectations have been understood before delivery of product to home or business. We also have VoIP running on SES Broadband, with a UK local number of 01271 828773, try it, experience VoIP over satellite broadband. The added value of this as a service is in the cost comparable to a terrestrial telco with fixed telephone line rental in addition to other charges. Compare this to an SES basic satellite broadband package of £15.95 per month plus £7 VoIP bolt-on, and this is then cheaper than the terrestrial telco offerings as no telephone line rental is required with satellite, and yet you can still get a local regional number from a VoIP provider like ours above. The latency incidentally of VoIP over satellite broadband we have roughly measured as 750ms full round trip, which takes a little getting used to but nevertheless compared to a latency of 400ms on many mobile operator platforms anyway isn’t so bad.