

EUROPEAN BROADBAND NETWORKS

THE NEW INFRASTRUCTURE OPPORTUNITY

October 2017

Broadband lies at the core the sustainable development

In September 2015, UN Member States and the UN General Assembly agreed the '2030 Agenda for Sustainable Development', setting out a global agenda for development based on economic prosperity, social inclusion and environmental sustainability. The Agenda identifies 17 Sustainable Development Goals (SDG). Member States acknowledged that the spread of Information and Communication Technology (ICT) and global interconnectedness has great potential to achieve more inclusive and sustainable development. Indeed, the power of broadband to bolster development roadblocks and bring access to education, healthcare and employment opportunities has put high-speed ICT network rollout at the top of every country's SDG strategy. Equally, Mirova is convinced that broadband, and ICT more broadly, can play a key enabling role in helping achieve the SDGs and committed to contribute to the investment levels required for the rollout of global broadband infrastructure that connects everyone, everywhere.

Broadband technology has become an essential part of modern life. As any other utility the presence of a quality broadband network has an impact on businesses, residential users but also governments as it transforms how we communicate, shop and how services, including public services are provided.

Policy makers across Europe have therefore a strong interest in ensuring that quality broadband is rolled out in all territories, including in rural areas. In its Digital Agenda for Europe the European Commission (EC) has also set ambitious targets for the roll out of fast broadband by 2020 as EC considers broadband as an important contributor to economic growth throughout the European Union. EC has two targets: target 2 aims at broadband connection speeds of 30 Mbps or higher available to all Europeans by 2022 and target 3 aims at 50% of the population having access to 100 Mbps to broadband connection speeds of 100 Mbps or higher by 2020 too. Capex investments needed to meet these targets are high and will need to be split between private investors and public subsidies; EIB estimated that the around 93bn euros of investments would be needed across Europe on the top of estimated privates investments.

Incumbent operators have already started roll out some of the networks in areas where such investments are profitable; there are upgrading their existing networks or building new ones in high density areas and have announced around 46bn euros of investments between 2016 and 2020. However, in rural areas where incumbent operators are not planning to invest as such a roll out is not profitable, governments need to support broadband roll out. For example, in France, it is estimated that 43% of the population lives in areas where the incumbents operators have not planned to invest in the medium term. Public subsidies will be necessary to attract private investments to this infrastructure sector in low density areas.

Public policy matters: the "French connection" example

In France, given the high capex investments needed to meet targets which is estimated to be over 20bn euros, the French government has launched a specific plan called Plan France Très Haut Débit. This plan is aiming at reaching full very high speed broadband coverage in France, by 2022, with priority given to fiber networks. In order to avoid a new digital divide, as previously observed in the generalization of the ADSL technology usage in France, French politics and the French Telecom Regulator (the "ARCEP") have put in place a regulatory framework in which they have split the national territory between very dense area and less dense density areas (Zone Moins Dense). In the very dense area, the principle of several very high speed broadband networks competing with each other's has been hold. So, each internet service provider or private operator rolls out its own broadband network at its own cost. The cost of rolling out their own broadband network is not high as there are many end users which allow them to reach profitability (without being granted subsidies). This area represents 106 cities in France accounting for 20% of the French population. In the remaining part of the territory, the less dense area, the regulator has considered that it would not be profitable for private operators to roll out several broadband networks in parallel. In this area, the regulator has distinguished on the one hand, areas in which the rolling out of a broadband network is profitable for a private operator at its own cost and on the other hand areas in which it

would not be. In order to set up these areas, in June 2010, the French government appealed to investment intentions in direction of private operators. Two of the main French retail operators, Orange (the incumbent) and SFR have declared to be interested in rolling out very high speed broadband networks at their own cost in 3400 cities in France accounting for 37% of the French population. The remaining part of the less dense area accounting for 43% of the French Population is the Public Initiative Network (the "PIN") area where Internet Service Providers and other private actors did not manifested the interest to invest and will then be the scope of subsidized investments.

Broadband as an infrastructure asset

The concept of PIN was established, in 2003, by the French government in order to reduce the digital divide which is the inequality mainly between urban and rural areas in the access to information and communication technologies: in 2004, more than half of the French population did not have access to triple play offers. Indeed, in the early 2000's, national operators focused their networks' investment for DSL services on dense and very dense areas where profitability was achievable without being granted subsidies. The cost of rolling out a broadband network (Capex per subscriber) in rural areas is higher than the one in densely populated areas and subsidies are then required to attract operators. So, in 2004, the law "article L 1425-1" of the "Code Général des Collectivités Territoriales" was passed and gave the opportunity to local authorities to be a telecom operator and ensure broadband coverage of their area. As local authorities generally do not have the know – how required to Design, Build and Operate broadband infrastructures, they use the mechanism of the French "Délégation de Service Public" (the "PSD Agreement") to entrust the realization and operation of their broadband projects to specialized private wholesale operators as the SPVs that are combined into Axione Infrastructures company into which Mirova has invested from 2009. Since 2004, more than €3 billion of investment (about half from public sector) has been deployed for alternative broadband networks under this framework which reveals the success of this scheme. The PIN area is currently the one the funds managed by Mirova

are looking at in France, Ireland and Italy and the PSD Agreement is the legal tool used by all the local authorities that launch a project in the PIN area.

Under these PSD Agreements, local authorities can organize the open access to the broadband network for all commercial operators and provides a mechanism for exclusively subsidizing the networks covering these areas. In these PIN areas, as the private wholesale operators or concessionaires have been granted exclusivity of the public subsidy and of the PSD Agreement for the design, build, finance maintain and operate of the very high speed broadband networks, these infrastructure networks have a de facto monopoly once all the end-users have migrated from the ADSL to the FttH . This infrastructure is indeed the only one that let the retail operators sell their services to end-users providing them with an internet access that can meet the growing bandwidth in France and elsewhere due to their new usages (development of cloud services, increasing use of IPTV and nonlinear videos consumption triggered by internet video platform, multiple screening, etc.). The copper loop based DSL internet access has become insufficient to meet this already existing demand and needs to be replaced by another technology with a priority usually given to optic fiber (as it is the case in France but also in many other European countries) as FttH is the fastest technology and brings symmetric bandwidths and high capacity regardless of the distance between the Incumbent operator's locale exchange and bit rates of end users FttH services can be a hundred times higher than those of DSL ones.

As a consequence, the final infrastructure network operator in the PIN area have the obligation to open their networks in a non-discriminatory and transparent way to all commercial operators who need to reach end users and access to this kind of infrastructure is regulated by ARCEP.

A total of 3.3bn euros of subsidies will be allocated by Fonds pour le Solidarité Numérique (French State) to projects that developed very high speed broadband infrastructures in the PIN area in France in addition to long term financing provided by Caisse des Dépôts et Consignations, European Union and European Investment Bank. This framework increases the financing capacity of private players to invest in broadband and to cover the financing needs expected in the rural area broadband networks. Thanks to the French

regulatory and legal framework of the PINs, all the local governments have launched Public Private Partnership contracts for the financing, design, construction and technical and commercial operations of very high-speed telecommunications networks in their geographical area. As subsidies improve the robustness of the project, they leverage further investments from the private sector in broadband projects structured as Public Private Partnership and PIN projects have attracted investors.

These projects are greenfield operations that do not generally generate yield for investors during the construction period (generally ranging between 3 and 6 years from the entry into force of the PSD agreement depending on the size of the broadband network roll out). Moody's defines infrastructure assets as being strategically important, capital intensive assets, utilities, services and primary industries, fulfilling major economic and social needs ; the infrastructure sector being characterized by inelastic demand for outputs or services, potentially underpinned by natural monopoly assets, which support predictable and resilient long term revenue.

Broadband projects procured under PPP schemes such as concessions or availability based payment structures meet these criteria, and therefore can definitely be considered as a new type of infrastructure asset. Depending on the local regulatory framework applied for these types of projects in a given country, these projects can be monopoly like and be regulated. Risks for these projects typically depend on the specific regulatory framework, the underlying contract signed with the procuring public entity and how fast the already existing subscriber's base will migrate from the ADSL to the FttH technology. At Mirova, we manage several infrastructure equity funds that have invested in broadband infrastructure, in France, since the inception of this market. We are sponsor of a number of broadband projects, in France, including the Nord Pas de Calais THD Broadband Project, which aims at bringing fibre to over 600,000 households, upgrade ADSL sites with fibre connectivity and provide fibre access to public and business sites, all located in areas not covered by the commercial operators. We are also sponsor of a number of similar projects in France and won this projects with our partners Axione and Caisse des Dépôts et Consignation. Mirova has developed a strong expertise in structuring broadband PPP Projects as

our knowledge of the broadband sector has been built over years as we started to invest in the sector almost 8 years ago when we invested into Axione Infrastructures, a holding company that owns 13 PIN projects that are in charge of the financing of the roll out and operation of very high speed (providing FttH services) and high speed (providing ADSL services) broadband networks.

Europe: The promised land of broadband

Our experience is that under a regulatory framework that provides long-term visibility and stability ensuring the economic equilibrium of the PIN, over the long term, private investors can actively contribute to the roll out of broadband networks across Europe. The regulatory framework set up by ARCEP, in France, is a good example of how regulating the price of access to very high-speed fiber optic networks deployed by under public initiative helps bringing investors to this sector. Private investors can contribute to finance the capex requirements, particularly in countries where the coverage gap is high such as France, Germany, Ireland and Italy for example.

Mirova is actively looking at current developments in Europe. In Ireland, the goal of the government is to have 100% coverage with 30Mbps and 100Mbps for 50% of households by 2020. The Irish Department of Communication, Energy and Natural Resources committed to facilitate investments in broadband networks with legislative and regulatory support as well as grants. It has launched a procurement process to award one contract to finance, build and operate the broadband infrastructure covering the Northern and Southern rural areas in Ireland and that won't be covered by the private operators on a commercial basis without being granted public subsidies (approximately 900,000 addresses, represents the target for the proposed State intervention). With only c.67 people per km, Ireland has one of the lowest population densities in Europe. Some counties in Ireland have a population density as low as 19 people per km. This low population density, coupled with a thinly distributed rural population makes the deployment of a high speed broadband network infrastructure difficult and costly on a commercial basis. Italy has also adopted a national broadband plan with an aid scheme composed of

national and regional funds to support roll out in market failure areas; the plan is to bring connectivity with a minimum of 100Mbps for up to 85% of the population and coverage of at least 30 Mbps for all. Two tenders have already been published and one was awarded this year, covering the Abruzzo, Molise, Emilia Romagna, Lombardia, Toscana and Venetia regions.

At Mirova, we are convinced that the rollout of broadband networks will have a great deal of

impact on the economic competitiveness, social cohesion and quality of life of local communities across Europe, nevertheless these projects have to gather the very key features of infrastructure in order to qualify as such and for that reason we will only invest in broadband networks in rural areas under long term concession schemes in order to invest in sustainable projects serving the general interest.

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