EXECUTIVE SUMMARY

While the world was busy discovering the Internet back in the early 1990s, strategies for rolling out next-generation telecommunications networks and infrastructures were fast becoming a public policy priority in the main OECD countries. The way in which the internet has radically changed the general public's practices and transformed companies' production and consumption models has spawned a growing need for communication and information in all areas of society, in the production and distribution of goods and services as well as in such public services as education, research and health. Data use and exchanges have become the driving force behind this new economy and gained a commanding foothold in all public or private organisations, and in civil society. Renewed calls for telecommunication infrastructures have emerged as the world grapples with the need to ensure ever larger data flows meeting an increasingly stringent set of quality and security criteria.

In an effort to address such challenges, Japan and South Korea quickly decided to forge ahead with their plans for the large-scale roll-out of superfast broadband networks (i.e. speeds over 30 Mbps). Japan's long-standing telecoms operator NTT invested in fibre networks in the early 2000s. By 2009, NTT had nearly 20 million fibre subscribers[1] (compared to 90,000 superfast broadband subscribers in France in Q3 2010). South Korea launched a major fibre roll-out programme that saw all households connected to the fibre network by 2013, representing almost 99% of the population[2]. In Europe, it was not until the early 2010s that the European Community, as part of its Europe 2020 roadmap, set out its ICT strategy with its *Digital Agenda*[3] initiative and its goal of building a digital single market driven by a global improvement in the Member States' connectivity.

During the same period, the French population was also becoming more vocal about its need for greater connectivity, especially in the most rural areas. The digital divide is

[1] "22 million Japanese households will be FTTH subscribers by 2013", *Next Inpact*, 15 December 2008.

[2] "Summary of Arcep's mission to South Korea", *La Fibre info*, 10 November 2011.

[3] European Commission (2010), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, May.

considered to be one of the reasons for the widening chasm between those rural areas and the rest of the country. It is also seen as a form of discrimination and is therefore climbing fast up the political agenda. In 2015, during the first meeting of the Interdepartmental Committee for Rural Affairs (Comité interministériel des ruralités), the findings were compelling: "77.6% of the population is still living in areas without any fixed broadband coverage[1]". In addition, the long-standing copper network was increasingly showing the tell-tale signs of defects (insufficient maintenance, obsolescence, etc.), which justified the need to quickly roll out plans for an upgrade. This was the technological and social backdrop that prompted the authorities to launch a roadmap to provide all French people with superfast connectivity (above 30 Mbps) by 2022. The aim is to encourage private investments and thereby ensure nationwide coverage, while providing public funding for areas where market failures have been identified.

Ever since its inception in 2013, the France Superfast Broadband Plan (Plan France très haut débit - PFTHD) has pursued a number of ambitious goals. First of all, since the plan is an integral part of the country's spatial development policies and determination to stamp out territorial inequalities, it aims to address the population's strong expectations when it comes to eliminating the digital divide. It covers both mainland France and its overseas territories. It also sets out a series of economic objectives, since it endeavours to create a futureproof technological infrastructure capable of powering business and community development. It also strives to support and strengthen access to high-quality public services. Finally, by promoting the development of the country's national infrastructures, it also dovetails with France's sovereignty and cybersecurity policies.

To achieve these objectives, there are plans to earmark €13.3 billion in public funding to equip nearly 43 million households. Therefore, the PFTHD is one of France's largest public investment programmes of the last 20 years. However, it is not the most expensive public policy over this particular period. By way of a comparison, public investments to foster mobility, including rail transport, amounted to approximately €15.3 billion a year over the 2018-2022 period[2].

Evaluating the PFTHD: a wide array of effects to be measured

This report presents the findings of the ex-post assessment into the PFTHD. The scope of the work programme that was defined for the assessment met two specific requirements (refer to the mission statement in the appendix), namely the French government's requirement relating to the obligations set out in the Future Investment Programme[3], from

[1] Interdepartmental Committee for Rural Affairs, March 2015, press kit.

[2] Ministry for the Ecological Transition, responsible for transport (2022), *Review and outlook for investments in mobility and transport*, June.

[3] Government (2022), "Future Investment Programme", September.

which the PFTHD benefited, and the requirement of the European Commission (as defined in its notice no. SA37183) to carry out an evaluation following the state aid scheme supporting the plan[1].

Given the scope of the Plan's objectives and the technical complexity of the chosen roll-out methods, such an evaluation could not be restricted to a cost-benefit analysis, which is unrealistic in this particular case and inadequate for painting an accurate picture of the diversity and magnitude of the Plan's effects. To respond to all the questions that need to be considered, a multi-criteria and multi-dimensional approach was adopted, which featured methods from econometric, quantitative and qualitative analyses (see box below).

The assessment initially focused on the direct effects of the Plan to determine whether the objectives of providing nationwide coverage had been fulfilled (Chapters 1 and 2).

Subsequently, we examined whether the Plan's technology choices and roll-out methods or operational implementation methods were appropriate for its social and economic ambitions. In other words, we wanted to ascertain the Plan's effects, how it has benefited the different stakeholders and the extent to which it has satisfied the expectations of citizens and stakeholders alike. How has the Plan contributed to creating wealth and jobs? Was the decision to promote fibre consistent with the current and future uses of households and businesses? The scope of the assessment was adjusted during the study to reflect the global health crisis and the way in which the pandemic highlighted the need for reliable connections and robust infrastructures, which led to a major change in practices and uses in just a few months (30% more traffic over France's telecommunications networks, five million people working from home, over 500,000 remote consultations per week, and so on). This situation strongly affected the definition of the assessment programme, which was adjusted and supplemented to include this unprecedented observation period (Chapter 3).

Finally, we examined the effectiveness and efficiency of the Plan's implementation. Did the amounts spent match the original estimates? Did roll-out costs overrun? Were public investments sufficient, insufficient or even excessive? In some parts of the country, did public investments replace the investments that could have been granted by the market? Was the project governance structure effective, especially since the process of implementing the nationally defined objectives was decentralised (Chapter 4)?

The main findings of this multi-dimensional assessment are presented hereinafter.

[1] European Commission (2016), *State Aid SA.37183 (2015/NN) France - PFTHD.* Refer to paragraphs 89 to 92 of the notice.

Coverage objectives achieved despite inequalities between regions and persistent difficulties in connecting end users

To adapt the roll-out methods as effectively as possible, the PFTHD distinguishes between three main categories of roll-out areas according to their density and the origin of their investments. The first two categories are covered by strictly private investments and represent the areas with the highest densities (57% of the population and close to 25 million premises) where investments are intended to be economically sustainable. The first category includes highly dense areas, i.e. major cities. Due to their size and density, an infrastructure-based competition model was adopted, where each operator is prompted to develop its own network. The second category of roll-out area is dense enough to ensure that investments in a network are economically profitable, but not dense enough for each operator to roll out its own network; these areas are therefore intended to be covered through private co-investments (so-called AMII and AMEL areas[1]). Finally, the third category corresponds to 90% of the least densely populated areas, representing 43% of the population, i.e. approximately 18 million premises: connections are intended to be provided by *public initiative networks* (PINs) financed through public and private investments (public/private partnerships in the form of public service outsourcing or partnership agreements).

Irrespective of the areas, the objectives of the PFTHD were essentially defined in terms of the level of coverage, i.e. depending on whether or not there is a superfast broadband infrastructure, regardless of its technology.

What do we mean by superfast broadband coverage?

A business or household will be considered to be "covered" as part of the superfast broadband plan as soon as an infrastructure is available that provides the people who work or live there with a service (subscription-based or other) that gives them access to the Internet and other online services at a speed greater than or equal to 30 Mbps. This definition applies regardless of the technology involved in providing access: copper superfast broadband, optical fibre, coaxial cable, wireless superfast broadband (dedicated radio network for fixed connections), fixed 4G (superfast broadband connectivity provided via the 4G LTE mobile network) or satellite-based solutions.

[1] These terms refer to areas set by the regulator according to calls for expressions of interest to invest (AMII) and calls for expressions of a commitment to roll out local FTTH (AMEL).

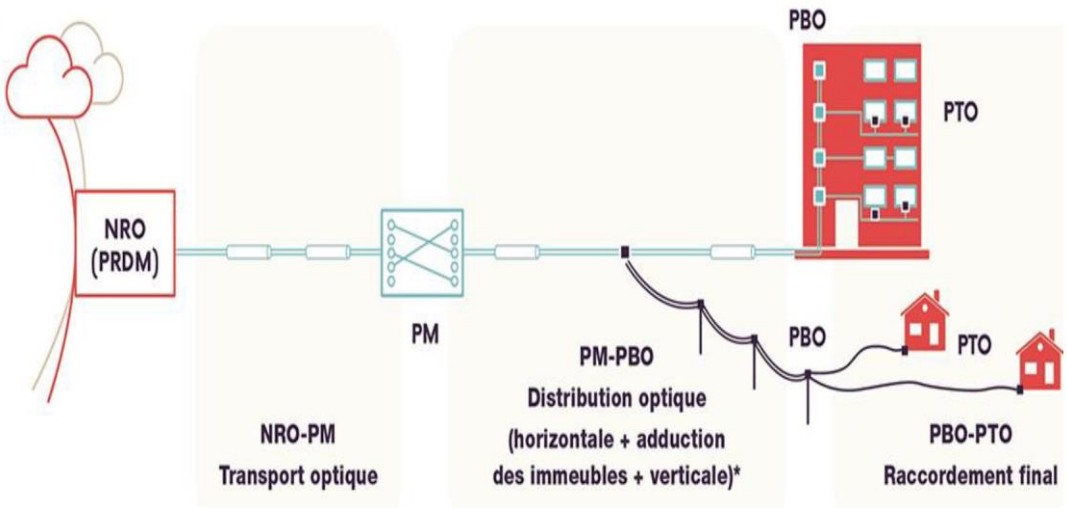
In the case of fibre broadband, a distinction must be made between two different concepts. Homes or business premises are considered to be:

– *Passed*: if there is optical continuity between a shared access point and an optical connection point near the premises or home

– *Eligible*: passed homes or business premises for which at least one operator has connected the shared access point (or the shared remote connection point) to its backhaul network.

In other words, if a home is only passed, the technology is available but there is no commercial operator capable of providing end users with a subscription package. If the premises are eligible, there is at least one commercial operator capable of providing a link between the optical connection point and an optical termination point in the premises, and capable of offering a subscription package: users can sign up to install fibre in their home or premises.

Architecture of a fibre network



	OCN (SRCP)
	SAP
	OCP
	OTP
	OCN-SAP **Optical transport**
	SAP-OCP **Optical distribution** **(horizontal + building supply + vertical)***
	OCP-OTP **End connection**

SRCP = shared remote connection point (only in less dense areas); OCN = optical connection node; SAP = shared access point; OCP = optical connection point; OTP = optical termination point.

Source: Arcep (2022), press release, 1 December

99.2% nationwide coverage by a superfast broadband technology (the target was achieved late 2021 by the PFTHD) concerns all homes and business premises passed by the fibre network or which have access to internet services using one of

the other technical methods mentioned above. Satellite or fixed 4G solutions contribute to this very high percentage, since they cover almost the entire country with speeds now exceeding 30 Mbps.

Despite these high percentages, a number of professionals and households consider that they do not have access to superfast broadband, even in areas that are regarded as being covered. There are several reasons for this claim. On the one hand, users expect to have access to fibre without thinking about all the other technologies that can be used (e.g. satellite, wireless superfast broadband and fixed 4G), and on the other hand, the premises are "passed" and connected to the fibre network but not "eligible" if no operators are currently offering commercial solutions.

Specifically concerning fibre broadband, the percentage of eligible premises during Q3 2022 was 77% (70% during Q4 2021), i.e. over 33.1 million out of the 42.9 million premises in the country.

Note that the PFTHD aims to *mainstream* fibre broadband by 2025, meaning that it will be available in the vast majority of cases. However, for some premises that are remote or subject to specific technical difficulties (which have yet to be defined), coverage can only be ensured using the radio or satellite technologies available.

In the report, we have also used the uptake indicator that measures the number of users who have taken out a superfast broadband package. It provides an insight into the actual level of availability and users' interest in the networks rolled out. In other words, infrastructures may have been rolled out (coverage level), but users might not yet have signed up for or wished to sign up for a superfast broadband package (take-up level).

By the end of 2022[1], the PFTHD had achieved its initial coverage targets by offering eligibility for superfast broadband (equal to or greater than 30 Mbps) to almost 100% of premises (99.2%) across the country[2]. Based on the principle of technology neutrality, the Plan has supported the uptake of wired and wireless technologies, depending on whether they are best suited to local constraints and circumstances. By steadily giving greater focus to the FTTH architecture (fibre to the home) where technical conditions allow, the Plan has helped ramp up the technology's roll-out. By the end of 2021, over 70% of premises were eligible for FTTH and over 8% were eligible for the other wired technologies

[1] To ensure that the results are both consistent and easy to appreciate, the following data (coverage, financial estimate, research results, etc.) are aligned with their progress during Q4 2021.

[2] According to the definition provided by Arcep, eligible premises are passed homes or business premises for which at least one operator has connected the shared access point (or the shared remote connection point) to its backhaul network.

(VDSL and cable), but for 22% of the country's premises, wireless or satellite solutions are still the best technologies for accessing the superfast broadband network.

Although the Plan has attained its formal objectives, a detailed examination into the level of coverage reveals a few inequalities in roll-out between the private and public investment areas, but also within areas covered by the same regulatory framework.

In private investment areas (dense and very dense zones), 88% of premises (as of Q4 2021) were eligible for FTTH, but the latest roll-out programmes are struggling to cross the finishing line in some sectors (especially on the outskirts of certain major cities where less than 75% of the premises are currently passed). Even though market conditions have proven to be highly favourable for the sector's manufacturers, operators are putting the brakes on roll-out in these areas, which they believe to be less attractive. This reveals that when operators are not guaranteed to see a return on their investment in some parts of these areas, full FTTH coverage may be hard to achieve through private initiatives alone unless the regulator turns coverage into an obligation. In contrast, public initiatives appear to be widely essential in rural or sparsely populated areas, which are less economically attractive.

However, public investment areas were slower out of the starting blocks, so by the same date in Q4 2021, only 60% of premises had access to superfast broadband via wired technologies (FTTH, VDSL and cable) and 51% of premises were eligible for FTTH. However, this figure is higher than the European average of 30% for rural areas. But once again, there are significant differences, since some public initiative networks (PINs) have already reached FTTH eligibility levels of close to 100%, while others feature a coverage rate of less than 10%.

It should also be pointed out that public investment areas or public initiative network areas are currently undergoing the most dynamic levels of growth, since the vast majority of new fibre roll-outs are now being spearheaded in these areas, i.e. more than 90% of new FTTH outlets are being rolled out in these areas. Public investment areas are guaranteed complete coverage, insofar as this is a regulatory requirement. Based on the current rate of roll-out (over five million outlets a year), the ambition of mainstreaming fibre broadband by 2025 therefore appears to be within reach.

These good results are consistent with the objectives that were announced at the start of the Plan, but they must not divert attention away from the lack of satisfaction that end users have voiced about the recurring quality problems and long connection times. 58% of consumers claim to have experienced a problem with their internet service provider in the

last 12 months[1]. A poor user experience could jeopardise the rate at which fibre broadband is being adopted, especially in organisations and businesses.

Wide uptake of fibre among households, but still too low in the business community

Looking beyond the coverage and connectivity issues, we have seen that the take-up trend varies tremendously when examining both the residential and business markets. Fibre is clearly gaining traction among the general public. Residential users account for 79% of all superfast broadband subscriptions: out of 31.5 million Internet subscribers, 18.4 million French people have taken out a superfast broadband package, 14.5 million of which are fibre plans (i.e. 46% of the total number of Internet subscribers). At the other end of the scale, uptake among businesses remains low, although the number of fibre subscriptions is trending upwards[2] (32% of businesses had a superfast broadband package by the end of 2020). Several explanations can be put forward to explain why companies are reluctant to embrace superfast broadband, such as the fear and cost of switching over to another technology, the lack of in-house skills in electronic communications, the lack of transparency in the commercial plans available, and the dominant position still held by the long-standing operator in this market segment, all technologies included. This situation can also be attributed to the lack of headway achieved among French companies when it comes to integrating digital technologies, as evidenced by the European Commission's statistics[3] (20th place in Europe). In this respect, the prospect of a copper switch-off by 2030 is likely to be a game-changer by prompting businesses to accelerate their migration to fibre.

However, competition in the retail and wholesale fibre market was ratcheted up a notch between 2013 and 2022 as new companies broke into the market, especially in public initiative networks. The jump in quality that fibre brought to the networks did not lead to any substantial price increases for users during the period under review. However, the pace of change in the business market was slower since demands from industry were less standardised and the business retail market was still overly dependent on the services of the same operator.

[1] Arcep (2022),*Customer satisfaction survey (2022 edition)*, May.

[2] Ifop/InfraNum/Covage (2022), *Survey of optical fibre uses and perceptions among decision-makers*, September.

[3] European Commission (2022), *Integration of Digital Technologies by Enterprises in the Digital Economy and Society Index*, July.

Proven positive effects of superfast broadband for local communities, companies and employment in public investment areas

It is especially hard to gauge the indirect effects that superfast broadband and fibre had in 2022 due to the amount of time that may elapse between the local authority's decision to launch a public network, the date of the agreement to grant a subsidy and the first series of roll-outs. Since the roll-out is still only partially moving forward, measuring the effects continues to be a tricky exercise, but they do exist.

As part of the evaluation mission, several research teams were commissioned to carry out studies aimed at estimating the impacts of rolling out superfast broadband and fibre in the communities concerned. Their studies involved econometric methods and used data with the aim of estimating the "causal" effects wherever possible, based on a comparison between the communities concerned and control communities that were as close as possible ex ante. However, there is never any way to exclude any bias from this type of estimate, since the choice of roll-out areas may have been based on certain unobservable criteria that are potentially linked to the area's anticipated dynamic growth. Therefore, the results should always be viewed with a certain degree of caution. Subject to this disclaimer, all the studies carried out suggest that superfast broadband has had a positive effect, and that fibre has had an additional effect on the level of dynamic growth in the local communities and companies. But these effects vary according to the type of community and company. In most cases, the first effects of connectivity can only be seen after a certain period of time, and at the earliest three years after superfast broadband has been introduced and rolled out.

When a town or city upgrades to a fibre network, i.e. an increase from 0% to 100% coverage, the number of establishments in the area rises by 2%. In the more rural areas covered by PINs, the estimated effect is less pronounced (+1%). In sectors of activity with a high level of digital intensity (information, communication, financial activities, insurance, real estate, knowledge work, etc.), fibre has a larger impact on the number of establishments created (+4%).

In local communities with access to the fibre network, a certain level of dynamic growth has been reported in the property market (increase in the number of transfers and the average value of those transfers), but the causal link with fibre could not be clearly established. However, other indicators of a community's attractiveness turn positive when fibre is introduced into the local area. Real-estate transactions increase in number and value (+2.5%) in the areas covered, and the number of tax households rises (+0.3% in PIN areas). The availability of fibre broadband could also attract a younger population to the area.

Installing superfast broadband would appear to increase the added value of the commercial sector in PIN areas by 7% after three years and 18% after five years, although these estimates are probably the upper limits and should be used with caution. Research findings tend to show that fibre broadband produces an additional effect. As far as businesses are concerned, it apparently increases the added value of the private sector by 8% within three years of roll-out. Researchers also found that companies experienced a positive manpower effect with an increase of up to 8% in their headcount some five years after superfast broadband had been rolled out.

The results also tend to show that the favourable effect on local activity levels could be attributed to those companies that were already present before the Plan was implemented, rather than the new companies setting up operations in the local area. Superfast broadband has a positive impact on all companies irrespective of size, but the effects are stronger when it comes to employment in SMEs.

Fibre helped soften the blow of the health crisis

If we take a closer look at the 2019-2020 period, research suggests that communities and businesses with fibre broadband access were more capable of weathering the storm caused by the successive wave of lockdowns. The labour market proved to be more resilient in areas benefiting from superfast broadband coverage, with a smaller drop in the number of job vacancies (+10 percentage points) and a higher recruitment rate (+8 points), as well as fewer companies implementing reduced working hours and more widespread use of homeworking. The property market in these areas was also more dynamic, with an 18% rise in the number of transfers between 2019 and 2020. These trends can also be seen in the business world. Companies with access to the fibre network resorted less to the reduced working hours model and in some cases even saw an increase in their workforce (the probability is 1.3 times higher than companies without fibre). Fibre also reduced the likelihood of a fall in business (strong or moderate) and raised the probability of stable or higher activity levels. Finally, fibre could play a significant role in improving future economic prospects.

Uses and practices fail to change as quickly and profoundly as expected

Rolling out fibre in a given area leads to a long-term change in its companies' practices. In PINs, a positive correlation has been established between fibre broadband and the overall use of digital technologies, with an increase of +8 percentage points in the number of employees using a computer and +11 percentage points in the number of employees using the internet for their jobs). These trends also apply to the use of advanced services, such as the cloud, customer care solutions, CRM systems, and partnership arrangements within companies. However, fibre does not seem to have any impact on the development of e-commerce activities or the extent to which social media are used.

These benefits have been best harnessed by small businesses, especially those in outlying areas. On the other hand, companies in rural areas have ultimately taken little or no advantage of the possibilities inherent in superfast broadband for transforming their business. Lastly, we could not find any evidence that superfast broadband or fibre networks have any positive impact on companies' productivity levels or their ability to innovate.

The situation has evolved more favourably in the residential market. There has been a significant increase in the bandwidth needs associated with the use of superfast broadband. Such needs are not so much caused by the emergence of new practices, but by the tendency to step up the use of digital technologies and use several different applications at the same time. We have identified a number of especially innovative use cases that have emerged in certain areas with the advent of fibre networks. However, the scope of such examples is essentially representational (such as telemedicine). As such, general-purpose lessons cannot be learned, meaning that such cases cannot be put into widespread use. Nevertheless, in addition to the mere presence of a high-quality telecommunications network, we have seen in every case that a conducive ecosystem (suppliers, service intermediaries, training structures, etc.) plays a decisive role in developing and transforming practices, particularly for companies. This finding is especially important for PIN projects. Public initiative network projects have benefited as local authorities have improved their internal skills, as well as from the cooperative and collaborative relationships that have developed across the community... basically, all the things that can be used to build a conducive environment.

The comparative environmental advantage of fibre

Our work has also enabled us to identify and highlight that fibre roll-out programmes offer significant comparative advantages in terms of the environmental footprint. In addition to their superior technological performance, fibre networks are particularly energy-efficient. On average, copper networks used approximately 35 kWh per subscription in 2020, compared to less than 10 kWh for fibre networks, which represents a ratio of almost one to four[1]. However, despite delivering good energy performance, it should not be forgotten that improved connectivity and data speeds also increase the amount of people using those services, which consequently creates a rebound effect in consumption. Finally, based on the current roll-out situation, fibre networks are potentially designed to operate for several decades. Nevertheless, they also have weaknesses that undermine their resilience to certain risks caused by climate change.

[1] Arcep (2022),*Annual survey for achieving digital sustainability*, April.

The development and originality of the governance structure have been instrumental in the Plan's overall effectiveness

When it comes to the effectiveness, knock-on effect and timeliness of the aid scheme, we have seen that the financial commitments from the State and local authorities have been key to achieving a more ambitious set of coverage objectives (100% of superfast broadband coverage and widespread fibre availability by 2025) than those that were originally planned, while generally maintaining alignment with the initial forecasts.

In the public investment areas, total roll-out costs have amounted to €22.4 billion with coverage for 18 million premises. This figure of €22.4 billion includes a total public investment of €12.9 billion, which is in line with the €13.3 billion envelope notified to the European Commission in 2016. The public investment is divided between the State, local authorities and the European Union. The State's investments were consistent with the initial forecasts of approximately €3.5 billion, while investments from the local authorities amounted to €8.84 billion. EU funding is relatively limited at €0.55 billion (2% of committed public funds). The share of private funding in PINs amounts to €9.52 billion. More specifically, the amount of financing in PINs from infrastructure operators (total of 42%) acting through concessions, partnership agreements and other global contracts is higher than the respective funding from the State (16%) and local authorities (39%).

Faced with growing calls for connectivity in every region, the Plan's ambitions have been adjusted and expanded by aiming to deliver mainstream access to fibre by 2025. This achievement can be credited to the increase in public and private investments in PIN areas.

When looking at the total public and private investments required to roll out fibre in the public investment areas for the 2015-2021 period, it could be argued that public investments did not suppress private investments, since every €1 of public investment was matched by a private investment of €0.73.

By modelling the entry strategy for operators on a municipal scale, an econometric study suggests that public aid has been effective, since between 2014 and 2019 the entry threshold always appeared to be higher than the implicit costs evaluated by operators for more than 93% of communities located in areas eligible for aid.

An ex-post cost study of the roll-out process confirmed that there were no budget overruns when implementing the projects. No particular increase in the costs of implementing PIN projects has been recorded. The price ranges remained in line with the cost estimates in the regulator's market analyses.

We also saw that there have been changes to the way in which local authorities contract with private operators within PINs. During the period, the various parties were capable of

adapting their contractual arrangements to raise the project efficiency bar even higher. Priority has been given to contracts such as lease agreements and concessions[1], which has not only empowered private operators to play a more involved role in the projects but also reduced the risks taken by local authorities. However, not all projects move forward at the same rate due to a variety of reasons, such as uneven learning effects and governance difficulties. This explains why the earliest projects were not necessarily the fastest.

More generally, the original governance of the Plan, which is shared between the local authorities and governmental services, and tied into different forms of private partnerships, has injected a significant level of flexibility into the system. An adaptation to the change in market configurations has been seen in both the national regulatory framework (certain public areas have been opened up to private financing by implementing AMELs) and in the process of examining each project (competitive bidding systematically used at the local level).

Unprecedented results: a few details about the methods used

When it came to developing this report, the assessment committee appointed four university research teams following a call for research projects[2]. The teams' unprecedented results are presented in this report, and their studies are available online on the France Stratégie website. We have supplemented the results with a number of workshops to address specific topics. We have also drilled down into certain aspects of the assessment through ad hoc studies (ex-post cost observation and usage study).

All the works were carried out between 2019 and 2022. They are original in more ways than one. As emphasised in our preliminary reports, academic work focusing on the effects of superfast broadband is still thin on the ground, and even less so on the effects of fibre. This is also true of the environmental aspects at a time when Europe is continuing to reinforce environmental legislation.

Where research is available on superfast broadband, it rarely concerns France. The teams working on our mission were given access to data that had not yet been widely used or studied, and which were made available by the sector's regulator, governmental services and national statistics institutions. The research work was discussed and endorsed by the mission's scientific board. The report's findings were

[1] In case of a leasing arrangement, the infrastructure is built by the local authority through public works and/or service contracts, but it is operated and marketed by the lessee at its own risk. In case of a concession, the infrastructure is built, operated and marketed by the concession holder at its own risk.

[2] France Stratégie (2019), "Call for research projects: assessing the socio-economic impacts of the PFTHD and superfast broadband networks in France", October.

submitted to the Stakeholders' Committee for feedback (the committee was set up at the beginning of the assessment).

More specifically, the results are based on the following work:

- "Impact of the PFTHD on businesses: what are the effects on digital uses, performance and innovation?"supervised by Chloé Duvivier, National Research Institute for Agriculture, Food and the Environment, Territories joint research unit (econometric analysis).
- "Micro-economic evaluation of the PFTHD", supervised by Clément Malgouyre, report no. 35, Institute for Public Policy, Paris School of Economics (econometric analysis).
- "The roll-out of public initiative networks. What are the methods for implementation and operation? To achieve what level of performance?"supervised by Stéphane Saussier, Chair of Economics of Public-Private Partnerships (EPPP), IAE Paris-Sorbonne (econometric and qualitative analysis).
- "Impact of fibre on firm creation: Evidence from France" and " Entry into fibre and state aid for the roll-out of high-speed internet: Evidence from France", two studies supervised by Marc Bourreau, Institut Mines-Télécom (econometric analysis).
- "Ex-post review of investments in public initiative networks supported as part of the PFTHD", by research consultancy Cap Hornier.
- "Study into the assessment of the effects of superfast connectivity", by research consultancies Tactis & Pluricité.
- International seminar - Ultra-fast broadband in Europe: state of play and trends (September 2020).
- Superfast broadband seminar - Connectivity of the overseas territories and the PFTHD: technological, economic and social challenges (October 2021).
- Superfast broadband seminar: what are the applications in companies after fibre (October 2022).