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SECONDARY RAIL LINES IN EUROPE

The future of «small», «branch», or secondary rail lines («lines serving small localities» in French administrative jargon) is currently on the agenda in France. A European panorama offers a contribution to the debate.

The report by Jean-Cyril Spinetta, *L'Avenir du transport ferroviaire* (The Future of rail transport), produced for the Prime Minister in February 2018 during preparation of a railway reform bill, envisaged the closure of a high proportion of “small”, that is, branch or secondary lines, amounting to 9 000 km, a third of the French rail network, for economic and budgetary reasons. This issue was however omitted from the June 2018 Act, *Pour un nouveau pacte ferroviaire* (Towards a new railway pact), which was mainly devoted to re-organising the SNCF public rail company and the conditions of service of its staff, as well as opening up certain rail markets to competition. In contrast, the question was dealt with explicitly in the *Loi d'orientation des mobilités* (LOM, Framework law on mobility), of December 2019, which introduced the possibility of transferring the management of lines of local interest having little traffic away from the national manager, SNCF Réseau, to the regions. The report *Devenir des lignes de desserte fine du territoire* (The Future of lines serving small localities) of February 2020, by the Prefect François Philizot, proposes a new method for defining these lines and their relevant modes of operation, that distinguishes, according to the intensity and kind of traffic that they currently serve, between lines to be included in the current maintenance regime operated by SNCF Réseau over the structuring network, lines on which

maintenance funding would be shared between State and regions (6 800 km), within the framework of the State-Region Plan Contracts, and, finally, lines for which complete responsibility would be taken on by the regions and then perhaps closed. About 1 200 km of track would be included in this last category; their closure and their take-over by the regions would be decided after negotiations carried out line by line. The recent government plan of 3 September 2020, *France Relance: une feuille de route pour la refondation économique, sociale et écologique du pays* (Re-launching France: a route map for the economic, social and ecological re-founding of the country), with a budget amounting to about 100 billion euros, emphasises the renewal of rail and mentions a special fund for small lines (of a small size, it must be said), of 300 million euros).

In fact, while the legal principles may now have been set out, **in practice the future of secondary lines is not yet completely sealed. Discussion between State and regions** is still ongoing (a protocol/framework agreement – majorly revolving around the sharing of responsibilities, and devolving the matter of financing to the “Contrat de plan Etat-Région” [CPER] – was signed with two regions in February 2020), negotiations over the financing of the new arrangements inevitably being at the heart of the process. Moreover, if the **regions** take over

responsibility for certain lines, they ought to be able to decide the **technical, organisational and economic ways of managing** them.

To illuminate the decisions that are to be taken, it would seem useful to **know more about the experiences of neighbouring European countries**, to understand their principles and take note of their successes and their difficulties, though without ever losing sight of the question of how transposable they are to the French context.

The comparison of the role and treatment of secondary lines in the countries studied by the experts of OPSTE is structured around four key themes:

- definition
- traffic and network evolution
- management methods
- political resonance of the issue of secondary lines

Definition of secondary lines

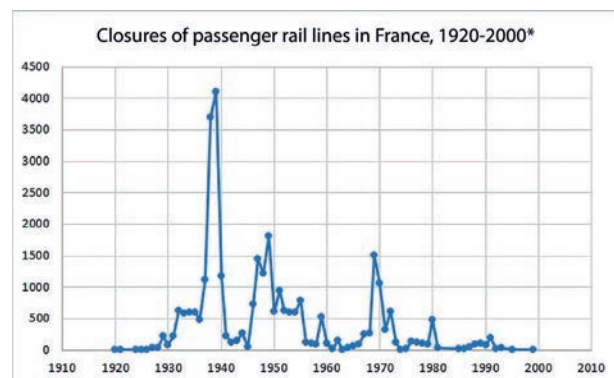
There is **no single way of defining a line as “small” or “secondary”** in Europe. In some countries (Poland, Greece and especially Spain) the physical characteristics of the network are clearly influential, differentiating tracks of standard gauge, and those of a narrower gauge (generally metric). In other places, the distinction depends on other classification criteria : France has added three additional classes (UIC 7 to 9) to the international classification based on accumulated tonnage coupled with the circulation speed (UIC, classes 1 to 6), all based similarly on the volume of traffic; Spain has created its own classification (from A to E). In Italy, the distinction between main lines and secondary lines is made by the infrastructure manager (RFI - Rete Ferroviaria Italiana), notably when allocating resources to maintenance and investment. In Belgium, historically, the main lines were managed by the national company SNCB, and the secondary lines by SNCV (Société nationale des chemins de fer vicinaux), but the latter progressively transferred its traffic to road before being dissolved in 1990. Switzerland classifies its network according to the type of service (long distance, regional or local), and not according to the segment of network used. In Germany, 87% of the total network is managed by DB Netz AG, infrastructure manager. It is within this network that a distinction between main and secondary services is made, and **depends on the network’s technical characteristics**, such as those set out in the Regulation on Railway Construction and Operation, which permits less demanding standards for secondary line services.

In France, the question has been raised of the value of **introducing specific procedures for local**

management, thereby reversing a long tradition of having unified infrastructure and operation (which has not, in practice, hampered substantial heterogeneity).

Traffic and network evolution

The 21st century has seen a **contraction of networks** in most of the countries examined. These reductions have applied particularly to secondary networks, 7 000 km in Spain, 5 000 km in Italy, 1 000 km in Switzerland, a high proportion of the metric network in Poland. In Greece, there is now left only the standard gauge track between Athens and Thessalonica, its northern extension and a poorly used metric network in the Peloponnese. In Germany the contraction of the network was implemented in two stages (5% of lines were closed in the 1960s and 1970s, another 14% with the railway reform of 1994). Over the last few years certain local and regional services have been reactivated on the initiative of the Länder (regions). In France, most line closures took place before the Second World War and the network used for passenger traffic has remained more or less stable since the 1980s.



Source: Christophe Mimeur, *Les traces de la vitesse entre réseau et territoire: approche géo-historique de la croissance du réseau ferroviaire français*, 2016. (* Number of km closed each year).

What happens to closed lines differs from country to country: Spain and Italy have transformed some into cycle tracks; Belgian rail services and a proportion of Spanish rail services have been replaced by buses. In France and Switzerland, competition with cars led purely and simply to closures. In several countries, interest in secondary lines is currently increasing but has variable political support, whether it is from some particular section of the local population (such as in Italy or Spain), or from local or regional bodies. Some real technical and managerial innovations (light rail, multi-tasking rail staff) can reduce costs and help keep a service in being, or even allow rail lines to be reopened. Conversely, further closures could still



The French rail network in 1921 and 2018



occur in the absence of a viable economic model. In France, the Cerema (Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement) report of July 2020, **Quel avenir pour les petites lignes? Potentiel, technique, gouvernance** (What future for local lines? Potential, techniques, governance), explored the substantial areas where progress could be made towards a "lean and mean" service capable of winning back a significant proportion of local mobility.

Methods of management

In most countries, infrastructure management is typified by the **principle of no differentiation in maintenance between the main network and the "small" lines**. This principle is not applied strictly, and the network is therefore in practice heterogeneous when it comes to its state and therefore its use (for example, track in a poor state can translate into lower maximum train speeds). Although there are specific technical rules adapted to the different types of lines (small lines are not maintained based on the same standards as LGVs), the need to soften existing reference frameworks for the maintenance of small lines gradually seems to be making its way.

On **management**, rail infrastructure falls within the competence of national governments, except in Poland, where agreements have been made to delegate track maintenance to the regions. French law has opened the way to that possibility since the publication of the implementation decree of LOM's article 172. In each country examined the State has retained ownership of the infrastructure. The regions have been gaining a bigger role in operating services in France, Spain, Poland, Italy as well as Germany. In Germany, the greater part of the network is in national ownership, but responsibility for regional passenger services falls within the competence of the Länder. As part of their role as local public service providers (Daseinsfürsorge), they commission passenger transport provision from the market for regional transport services open to competition. From a political angle, the State in France and Poland is encouraging regions to take charge of secondary lines, while in Italy and Spain it is the regions that are identifying lines they hope to take over.

Political resonance of the secondary lines issue

The future of secondary rail lines does not give rise to political debate in all countries. In Greece, though there is some weak local demand for renovating lines in the Peloponnese exists, it is principally the public works industry that promotes renovation projects. In several countries, the inhabitants are putting forward demands for maintaining and developing the secondary lines (Spain, Germany, Switzerland and Italy); however, each country responds in a different way. In Spain, the Ministry of Transport has been re-baptised the Ministry of Transport, Mobility and Urban Programmes, signalling in this way political attention to service provision across the whole territory. In Switzerland, the closure of secondary lines, often managed by cantonal public companies, is not on the agenda, but the Confederation encourages the achievement of a minimal level of economic return

before grants are awarded. In Italy, on the contrary, while a demand exists among mayors and citizens for the development of these lines, the regions that exercise that competence are reluctant to increase significantly the related expenditure. In Poland, where the mobility system has been characterised in recent decades by a massive access to motorcars, secondary lines are not the subjects of strong demand. In France, the desire to support secondary lines comes mainly from the regions.

From this panorama the great **diversity among transport organisations in Europe** is once again clearly confirmed. This diversity is particularly marked in rail matters, railway networks having a highly symbolic place in the economic, social and political history of countries, often much more so than roads. The diversity is multiplied when one looks at the local level, that of the secondary lines. For France, where the image of the railways in public opinion remains closely tied to that of the central State and its physical presence in the land, a move to a railway system managed in a decentralised way, as far as its regional component is concerned – perhaps going as far as leaving the national network where some terminal sections of the infrastructure are concerned – is a profound change and still to be completed. The rich experience of neighbouring countries should be made the most of by French regions when working out how to adapt their rail system “**closely to their territory**”.

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TRANSPORT POLICIES AND STRATEGIES IN EUROPE

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SECONDARY RAIL LINES IN EUROPE

GERMANY

In Germany, 87% of the total network (38 500 km of track) is organised and managed by **DB Netz AG**. This infrastructure management company is part of the Deutsche Bahn holding company set up in 1998 as part of the railway reform (Bahnreform). The remaining 13% is managed by companies, either private or public (about 452 enterprises, of which 386 also transport passengers and/or goods).

Mainline services (Hauptbahnen) are distinguished from secondary line services (Nebenbahnen). The distinction is made **according to the network's technical characteristics**, set out in the Regulation on Railway Construction and Operation (EBO, Eisenbahn Bau- und Betriebsordnung). Standards are less demanding for secondary line services, whether on track gauge, curve radius, longitudinal baseplate, axle type, levels of security for level crossings and platforms, signalling and points, traffic control and, finally, maximum train speed (fixed at 100 km/h for secondary line services).

In Germany the first significant segment of **network contraction** happened during the 1960s and 1970s, because of the unprofitability of the German Bundesbahn (with a reduction of about 5% in the length of tracks carrying services). The second segment came with the 1994 reform of Deutsche Bahn (Bahnreform) that turned the enterprise into a public limited company with the State as sole shareholder, and led to the closure of 14% of its network (5 400 km out of a total 38 500 km). Line closures affected passenger traffic as much as freight traffic. In the last few years some revival of certain local and regional services has occurred. In terms of public decision-making, while the line closures were decided at national level – that is, by Deutsche Bahn – the revival comes in response to demands from the Länder. Deutsche Bahn announced in 2019 that it was no longer envisaging line closures. Henceforth, a national plan aggregates Länder's studies in selecting the lines that are to be reopened.

Within the context of railway reform, responsibility for regional passenger services was transferred to the Länder. The Länder organise the regional provision of transport as an essential component of the public services in their competence (Daseinsfürsorge). They are given resources from the national budget in order that they can commission rail services (for passenger transport only) on the market for regional transport services open to competition, in which the DB Regio AG section of Deutsche Bahn is one service provider competing for this market.

BELGIUM

The **concept** of “secondary line” does not formally exist in Belgium. The regular provision by the Société Nationale des Chemins de Fer Belges (SNCB) is classified according to the type of train service: IC (Inter-city) for the main long-distance links; S (Suburban) for local trains within a radius of 30 km around and within Antwerp, Brussels, Charleroi, Liège and Ghent; L (Local) for trains that stop at all stations. This classification refers to the trains and not to the lines, even though some “secondary” lines are served only by “L” trains.

The regional operators of public transport run bus and tram services in dedicated lanes that are part of the “railways of local interest” owned by the Société nationale des chemins de fer vicinaux (SNCV).

Historically, the Act of 28 May 1884 set up the Société nationale des chemins de fer vicinaux (SNCV) to construct and operate railways of local interest in regions that did not yet have rail services. Because of the decline in demand, from 1950 most rail lines were progressively converted to bus operation. Some still survive in the form of tramways (such as “seaside trams”) or local tourist railways.

The decline of goods traffic over the SNCV network started from 1938, at which time it still represented 15.9 % of revenue. In 1960, goods transport came to a halt on the metric network (operated by SNCV).

As part of Belgium's **regionalisation** process, SNCV was dissolved in 1990 and control of urban and regional transport transferred to the regions. The legal distinction between urban and local transport was abolished and replaced by the concept of regional transport, for which the region is responsible. A few rail lines inherited from SNCV still exist.

The suburban and local lines of the national network are **operated by SNCB**. Tramways in dedicated lanes and Charleroi's light metro are operated by regional public transport companies.

Infrabel, the manager of the national infrastructure network, thinks its budget is not adequate to maintain the whole of the network and it has threatened the **closure** of certain “small” lines, but the Minister for Mobility reminded Infrabel that such action is not legally possible. In addition, the renovation of tram services on dedicated tracks is taking place around Brussels, Ghent and Antwerp.

SPAIN

In Spain, two **classifications** can be used to categorise secondary lines on the State network of general interest. On the one hand, they are the lines classified as E (in an order going from A to E), which are those intended for passenger transport, excluding suburban trains, but on which trains are not permitted to travel at more than 160 km/h over more than two-thirds of their length and which, finally, provide fewer than 10 daily services. They represented 25% of network length in 2019. On the other hand, they are passenger services that are “highly loss-making”, a category created by the historic operator, RENFE, to enable it to apply to them the principle of “expenditure rationalisation” desired by the government.

It is important to underline that in such a heavily decentralized country, rail services are nonetheless organized by the central State, and autonomous communities are not transport organization authorities over the national network (except for those that own a part of said network). Additionally, in accordance with European regulations, the management of transportation services (ensured by the RENFE) is separated from the management of infrastructure (ensured by the ADIF – Administrador de infraestructuras ferroviarias).

The Spanish network contains tracks of **different gauges**: “Iberic” gauge (1688 mm), metric gauge (1000 mm) and finally the UIC gauge (1435 mm), used in particular on the high-speed line. Closure of the highly loss-making lines (13% of the network) was planned in 1985, but about 40% of their length was maintained, the Autonomous Communities (regions) undertaking to fund them. In 1993 more than 7 600 km of abandoned or incomplete rail lines were identified, of which 2 800 km had been turned into cycle tracks. RENFE has **organised rail transport provision** for medium distance services that are subject to a public service obligation into three categories, depending on the gauge of track used. Only the Autonomous Communities of Aragon and Extremadura have agreed concessions for the provision of services. The management of the infrastructure as well as the services provided through concessions remains the responsibility of the State and its operator, RENFE. RENFE’s railway management is very conservative. A “low cost” type operation that would reduce expenditure is only possible on lines that have left the general interest network, as in the case of a line operated since 2005 by the Catalanian FGC (Ferrocarrils de la Generalitat de Catalunya).

In 2012, a report by the consultancy INECO, on behalf of the ministry, recommended the **abolition** of passenger train services that had an occupancy

rate of less than 15% capacity, which would affect 23% of medium-distance traffic on classic gauge track. However, political concern for **zones of low population density** has been growing for several years, in particular since a big demonstration in Madrid in March 2019. Among the demands made were those calling for better rail services in rural areas, with especially loud demands in Extremadura, Andalusia and Catalonia.

The Transport Minister in the current PSOE-Podemos coalition government intends to implement a more sustainable mobility but is not giving any particular attention to lines with low customer use. RENFE’s Strategic Plan of 2019-2023 proclaimed a willingness to improve these lines, notably by renewing their rolling stock, but without giving any precise commitments.

Decentralisation does not appear to be an effective solution, if the transfer does not cover the tracks, the rolling stock or the possibility of changing the operator. That is the experience in Catalonia, where the Autonomous government in 2010 became the authority responsible for organising mobility.

FRANCE

In France, SNCF classifies “small lines” as **UIC 7 to 9**, a method of classification particular to France, as the standard UIC classification only goes to 6. These lines represent about 40% of the national network (12 000 km out of 28 300 km). They are used for passenger transport over about 9 000 km of track, of which a quarter is also used by freight. The remaining 3 000 km are branch lines for freight of which only 2 200 km are in active use.

The French railway network was at its **peak in the 1930s**, with a total track length of more than 62 000 km if lines of both general and local interest are combined. This huge network has now reduced to 28 000 km, and secondary lines are threatened with closure because of their maintenance and regeneration costs. The first line closures started at the beginning of the 20th century, in the face of strongly increasing operating losses, and continued until the 1980s. Moreover, the network as a whole, but in particular the secondary lines, has long suffered from inadequate maintenance, and despite efforts to catch up on maintenance over several years now, this goal has not been achieved.

At its creation in 1938, SNCF was a **vertically integrated enterprise**, the management and operation of the network entirely under its control. This situation lasted until 1997, when **infrastructure management was removed from the SNCF** and entrusted to a separate public body, RFF (Réseau ferré de France). Following the Acts of 2014 and



2018 reforming the railway, there is now a distinction between the holding company, SNCF group, and the companies responsible for the infrastructure (SNCF Réseau), passenger transport (SNCF Voyageurs), and freight transport (Fret SNCF).

From the 1980s, the **regions** were given powers to intervene in regional transport, buy rolling stock and even maintain infrastructure. In their role as **authorities for organising mobility** (AOM), they negotiate contracts with the railway company, defining the regional train services (TER, trains express régionaux) to be provided, and the economic parameters of that provision. From 2023, the market for regional transport is supposed to be opened to competition (competition for the market, through a process of tendering for the award of public service concessions). Transport has become a primary element in regional budgets, alongside education.

The report by Jean-Cyril Spinetta (*L'Avenir du transport ferroviaire*, The Future of rail transport, February 2018) envisaged the closure of the least used lines. This issue, avoided by the 2018 Act on railway reform, was taken up in the 2019 Framework law on Mobility (LOM), via its article 172, which opened the possibility of transferring management of parts of the national network to an authority organising rail mobility (the regions). The report by the Prefect François Philizot, *Devenir des lignes de desserte fine du territoire* (The Future of lines serving small localities), of February 2020, therefore envisages a hierarchisation of the secondary line's maintenance financing into three groups: one part to be taken back

by SNCF-Réseau, one part to be financed jointly by the regions and the State and, finally, one part taken back by the regions alone.

It is evident that the network manager, RFF then SNCF Réseau, tends, for economic reasons, to concentrate its efforts on the main lines. The future role of the secondary lines is in the process of being transferred to regional authorities. They will be obliged to take on responsibility for operating and financing their possible refurbishment. In a traditionally centralised system, the best defence for the railways seems to be at local level, a devolution strategy followed recently for other modes of transport too (ports and airports).

GREECE

There is no official definition of a secondary line in Greece. The most obvious distinguishing feature is technical, between **standard gauge track** and **metric track**; or one could contrast lines currently in operation with those currently unused; or the several local lines used just for tourism with the high-speed line between Athens and Thessalonica, extended up to the northern border.

The first line built in the country in the 19th century, between Athens and Piraeus, has become Line no. 1 of the Athens metro. At the beginning of the 20th century (1909), Greece had a total network of 1 606 km of track, notably a main line (1 435 mm gauge) between Athens and Larissa, near the country's northern border at that time, and a network in the Peloponnese of 417 km (1 000 mm gauge). In 1918, the extension

The different categories of national rail networks

Country	Area	Network length *			Identification criteria for «small» or secondary lines	Differentiation according to rail gauge			National nomenclature	
		Total	High-speed	Dont réseau secondaire		Standard	Metric	Other	Main category	Secondary category
Germany	357 386 km ²	38 416 km	2 635 km (ES)	4 000 km	- Self-contained lines, with no direct connection to the main network - Network characteristics				Traditional standards for infrastructure and operation	Less demanding standards and reduced speeds
Belgium	30 688 km ²	3 602 km			SNCB lines vs ex-SNCV lines				SNCB	Ex. SNCV
Spain	505 911 km ²	15 939 km	3 456 km	3 094 km (3 007 km classed E by Adif + 87 km FGC)	Infrastructural Economic	2 727 km	1595 km	Iberic : 11 381 km Mixed : 227 km	Categories A to D	Category E: 3 000 km, passenger transport outside the suburbs, speeds lower than 160 km/h, less than 10 services a day. Lines greatly loss-making: under 50 passengers per service and under 40% full
France	543 940 km ²	28 364 km	2 548 km	12 047 km	Infrastructural				UIC 1 to 6: 16 317 km	UIC 7 to 9: 12 047 km of which 2 900 km freight only
Greece	131 957 km ²	2 500 km	578 km	1 922 km	- Gauge - In reserve vs operational - Rackrail vs standard	1925 km	575 km			
Italy	301 336 km ²	16 779 km (RFI) + 3 190 km (non RFI) = 19969 km	709 km	12 551 km	- FS lines vs non-FS lines - Fundamental vs complementary - Lines electrified or not				Fundamental: 6 500 km Electrified: 11 179 km	Complementary: 9 400 km + 3 000 km non-FS Non-electrified: 4 763 km
Poland	312 679 km ²	19 600 km	0 km	1 027 km	Gauge	19 200 km	1 000 km of which 400 km operational			
Switzerland	41 285 km ²	5 200 km			Proportion of total traffic provision (road + rail)	3 800 km	1 300 km	< 800mm & various : 100 km	Long distance rail 20%	Proportion of total all-modes provision in kilometres Tourist rail 4% Regional rail 11% Local rail 1%

The aim of this table is two-fold: show whether or not a secondary rail network similar to French «small lines» exists in these European countries and to explain the criteria that enable these networks to be identified in the various countries.

Commentary: To aid comparison, this table separates out a main category and a secondary category, close to the French «small lines», within the rail networks of the different countries. However, each country has its own way of characterising them, generally through a national nomenclature specified by the network managers; such is the case in Germany, Spain, France and Italy. In Greece and Poland, the rail gauge is the selection criterion. Belgium bases it on an historic criterion, the «small lines» being comparable with those that belonged to a former manager of the secondary network. Finally, Switzerland bases it on a more functional criterion, the proportion of total provision represented by this traffic.

Definitions

Rail gauge	Standard UIC: 1 435 mm
	Metric: 1 000 mm
	Iberic: 1 668 mm
	Mixed: triple-rail tracks supporting trains of both standard and iberic gauge

UIC 7 to 9: The UIC nomenclature was introduced by the Union Internationale des Chemins de fer (UIC) in order to evaluate the maintenance needs of a line. Going initially from 1 to 6, the French network manager added three categories 7, 8 and 9 to specify the characteristics of less-frequented lines.
*The figures given for network length are those provided by the experts. These may vary from the figures published by bodies such as the UIC.
The definition of high-speed rail, notably, can vary from one country to another.

Different ways of managing and operating rail networks

Country	Network manager		Railway operator	
	Main	Secondary	Main	Secondary
Germany	Deutsche Bahn Netz AG (DB Netz)	Deutsche Bahn Netz AG (DB Netz) and others	Deutsche Bahn (DB)	Länder (Regions)
Belgium	Infrabel		SNCB	SNCV (until 1990) Regional operators
Spain	Administrador de infraestructuras ferroviarias (ADIF)		Red nacional de los ferrocarriles españoles (RENFE)	Autonomous Communities (regions): - Ferrocarrils de la Generalitat de Catalunya (Catalonia) - Ferrocarriles Vascos (Basque country) - Serveis Ferroviaris de Mallorca (Majorca)
France	SNCF réseau	SNCF-Réseau In prospect: implementation of Art. 172 of the Mobility Act that will enable the management of certain small rail lines to be transferred to those Regions which ask for it	SNCF TGV: Eurostar, Thalys, Liria Thelo (Marseille - Milan)	Fret: VFLI, Naviland Cargo Europorte Regional
Greece	Organismós Sidirodrómou Elládos (OSE)		TrainOSE	Goldair (fret) Pearl (fret)
Italy	Rete ferroviaria italiana (RFI)		Ferrovie dello stato (FS) since 1905; LGV: Trenitalia (FS) + NTV (Nuovo Trasporto Viaggiatori)	
Poland	PKP Polskie Linie Kolejowe (PKP PLK)	For narrow gauge: lines are in the hands of regional administrations and various operators	Polskie Koleje Państwowe (PKP)	For narrow gauge: cities, communes, limited companies, local road managers, foundations, associations, special bureaux, public transport enterprises, museums, forestry administrations, the army.
Switzerland	CFF Infrastructure (Division of Swiss Federal Railways (CFF), 3011 km)	BLS Netz AG (420 km), RhB Infrastruktur (384 km), etc. total of 2185 km	Chemins de fer fédéraux (CFF): CFF Voyageurs and CFF Cargo divisions BLS AG	114 private passenger and freight companies (BLS AG, Rhätische Bahn AG, etc.) + BLS Cargo AG (specifically goods)

Commentary: In most countries, management of the main and secondary networks is in the hands of a single national manager; such is the case in Germany, Belgium, Greece and Italy. In Poland, the management of the secondary network is delegated to regional administrations and local operators. In France, the system is in transition because Article 172 of the LOM will permit the management of small lines to be transferred from the national manager to the Regions. In Switzerland, the management is delegated to multiple operators that can belong to local authorities or private companies. In most countries there is a dedicated operator for the secondary network. Quite often it is local authorities that have the responsibility: in Germany it is the Länder, in Belgium the regional operators, in Spain the Autonomous Communities and in France the Regions are associated with it. In Greece, they are private companies, but manage freight only. In Switzerland there are also private companies that operate on these lines, but some of these companies belong to local authorities. In Poland the secondary network is operated by a multitude of different actors, whether public, private, companies or associations. Last, only Italy has left the management of these lines to the main national operator, *Ferrovie dello stato*.

of the Athens-Larissa north to Thessalonica was completed (507 km), following the expansion of the country's territory northwards after the Balkan wars. After that there was very little development of the network (notably because of the mountainous geography of a large part of the country). Its operation was largely financed by debt and in 1970 the whole network was unified and became a State monopoly with the creation of the "Greek Railway Organisation" (OSE).

Major modernisation work on the infrastructure took place in the 1990s and 2000s, financed in great part by European Union Cohesion Funds. Emphasis was placed on electrifying the main Patras-Athens-Thessalonica-Northern border track (PATHE), and on building a second track where dual sections were missing.

The application of the European rail reform to separate infrastructure from services led to the fragmentation of the OSE monopoly. The "new" OSE has become the owner and manager of the infrastructure, responsible for maintaining and regulating the network. **Three operators** run trains on these lines: TrainOSE (separated from the ex-monopoly OSE and now controlled by the historic Italian operator, Trenitalia); and two companies specialising in freight transport: Goldair and Pearl. The sole passenger transport operator, TrainOSE, decides which track sections on which it will provide services, with the result that certain parts of the network (notably in the Peloponnese) are not in use because they are considered unprofitable.

The **outlook for the rail freight market** seems to interest operators, with a plan for a "sea-to-sea" freight line joining the Mediterranean to the Black Sea without going through the straits, leaving from the port of Alexandroupolis. Another current project is the building of the new Athens-Patras line (of 1 435 mm gauge) in the Peloponnese to connect with the eastern coast of the Adriatic. The construction of a 14 km section between the Port de Piraeus container terminal and the major intermodal platform "Thriassion" in Attica (the Athens region), which was a missing link in a rail route towards northern Europe to compete with the sea route via Gibraltar, is now complete.

Secondary lines are not topics of intense national discussion, but a question is being raised at the local level in the **Peloponnese** about modernising the metric network and connecting it to the "vertebral column" of the Greek network, the Athens-Thessalonica-Northern border line. Local and regional authorities in the Peloponnese, as well as the public works sector, which is short of projects, support this plan.

ITALY

In Italy it is the "secondary" lines (9 400 km out of a total of 18 900 km), with **low traffic density**, that are closest to the concept of "small lines". They sustain the provision of services in regional areas and link together the main axes.

This secondary network falls within the competence of the **national infrastructure manager RFI** (Rete Ferroviaria Italiana) and accounts for 9 361 km. The track gauge is the same as on the main network (1 435 mm). The 4 763 km of non-electrified lines form one category of secondary lines. Non-electrified secondary lines are equipped with the SSC safety system (Drivers' Support System), which allows speeds up to a maximum of 150 km/h; the electrified secondary lines are equipped with the European Train Control System; finally, 77 km of secondary lines are equipped with a dual ETCS/SCC system.

The Ferrovie Norte Milano network, in Lombardia, should also be accounted for. With a standard gauge of approximately 300 kms of tracks, the latter is strongly connected to the RFI. A separation exists between the exploitation of infrastructure and passenger (Ferrovie Nord Milano Trasporti) as well as freight (Ferrovie Nord Cargo) transportation services.

Before the unification of Italy (1861), railway lines were constructed within the borders of each State and there were no inter-connections between the States. In 1864, the national system comprised 22 enterprises. In 1865, an Act grouped them into four large companies. **Under the Act of 22 April 1905, the whole system was taken over by the State.** The length of the network at that time totalled 13 074 km. During the two World Wars many lines were destroyed. At the end of 1993, the network had 15 942 km (10 030 km electrified).

The Italian rail transport market includes about 18% freight traffic (in terms of train-km). Over the secondary lines as over the main lines, passenger trains are in the majority. Only 10% of freight traffic moves by the secondary network. Between 2010 and 2017, the number of passengers using the high-speed trains (alta velocità) increased by 114%, whereas passengers on the traditional interurban trains decreased by 42%.

The secondary line network is an integral part of the whole network and RFI provides both its maintenance and management. The rail transport **market** is open and competitive (notably on the high-speed lines). The revenues deriving from transporting goods or passengers go to the rail companies providing the service. The companies are clients of RFI as far as track access is concerned and regulated by ART (*Autorità di Regolazione dei Trasporti*).

The **passenger transport services subsidised** by the State are of two types: a) for long-distance, the **Inter-Cities**, which serve destinations, in different regions, decided by the State; b) **local** journeys, at regional level, for which the definition and scheduling are decided by the regions. Track management (traffic control, maintenance and investment) does not vary according to the type of traffic (freight/passenger/mixed traffic). Freight, passenger and mixed traffic tracks respect the same safety norms, which are slowly being standardised and extended to lines not connected to the main network, and to lines that used to be concessions. Transport policies, and especially those which involve rail transport, have encouraged the development of a market, to reduce the resources needed to subsidise inter-regional mobility. The result has been increasing disparity between the northern and southern parts of the country. The network and service provision have improved in the higher-income zones, which have an already-developed market and strong demand, while they have remained static or deteriorated in the weaker zones.

In some regions, citizens and mayors are stimulating **debate about the re-opening of abandoned secondary lines**. RFI is open to reviving lines, though the sustainability of the economic and operational model of the forecast traffic would have to be verified. The decision to reactivate or suspend a regional passenger transport service is in the hands of the relevant territorial region, the customer for local transport services, which finances the major part of operating costs and shares investment costs with the State and RFI. In Italy, there are more than 5 000 kilometres of abandoned rail track. The FIAB (Italian federation of the environment and the bicycle) aims to recuperate this substantial inheritance by trying to restore its original function or, if impossible, to integrate it into a national network of cycle paths.

RFI makes its investments in the network in accord with **European policies** (notably in the context of the Trans-European Transport Network, TEN-T) and **national policies** (the Easy and Smart Station policy, etc.). Projects funded by the relevant programmes concern certain secondary lines. RFI defines its plans for developing the rail infrastructure with the regions, through the drawing-up of framework agreements, agreed protocols, conventions, etc. There are no specific formal tools for secondary lines.

POLAND

The Polish railway system is made up of three elements: transport of **national and international importance** provided by about 130 passenger and freight transport operators on the infrastructure

network managed by PKP PLK (about 19 000 km of standard gauge track); transport of **regional** and local interest produced by 9 regional and municipal operators; finally, transport on **narrow-gauge lines** managed by 29 operators of various status. The French concept of “small lines” seems to fit most closely to the narrow-gauge lines. Traffic volume does not constitute a criterion for creating a specific category of line.

After achieving its independence again in 1918, Poland re-integrated the railway network inherited from the three occupying powers (15 947 km in total), with a goal of creating a network using the standard gauge of 1 435 mm. The narrow-gauge network (about 2 500 km) was too varied to be able to carry out a complete technical unification. From 1930 to 1990, the network of normal gauge tracks covered about 24 000 km. By 2020, that had been reduced to 19 200 km, following the closure of loss-making and poorly used lines. Of the 4 000 km of narrow-gauge track in the mid-20th century, there remain today just 1 030 km, of which only 443 km are in operation. These tracks are made up of short sections (4 to 50 km), in a mediocre technical state, but their maintenance costs are low.

The **lines of regional and local importance**, operated all year round, are managed by public limited companies. The **narrow gauge lines** are operated by a variety of bodies: municipalities, public limited companies, local road managers, foundations, associations, special agencies, public transport enterprises, museums, forestry administrations, the army. Their operations are in most cases limited to the summer season. They do not receive State subsidies. Some Polish narrow-gauge railways are maintained in service by volunteers, under the aegis of the FPKW, the Foundation for Polish Narrow-Gauge Railways. These lines often offer tourist activities (picnics, visits to museums and exhibitions, historical re-enactments, etc.) that help reduce operating deficits, though not enabling investment in the infrastructure without public subsidy.

The national railways programme to 2023 (KPK) includes more than 230 **investment projects** amounting almost to 76 billion zlotys (18 billion euros). This funding ought to allow the refurbishment of about 9 000 km of lines, including 8 500 km of lines suitable for high-speed services. In 2018 a supplementary map of 20 local projects was published, but not given official status. The budget for this programme is 6.6 billion zlotys (about 1.5 billion euros), of which 5.5 billion zlotys is included for the recapitalisation of the PKP PLK company.

SWITZERLAND

In Switzerland, rail lines are categorised according to the **type of transport provision** they offer. The “small lines” could thus be equated to those whose traffic is described as local or regional. These secondary rail lines were built to complement the main lines after 1870, essentially using the metric gauge, less costly. In 2015, the complete Swiss railway network comprised 5 196 km of lines with 1 735 stations and halts.

Taking all modes together (essentially road and rail), **long distance** passenger traffic (20% of provision in km) in Switzerland is distinguished from **regional** passenger traffic (11%). Long distance traffic operates on the infrastructure linking major cities, but similar infrastructure is also used for part of the regional traffic, as well as for goods traffic (8%). Regional passenger transport by road represents 31% of the provision in km, local (urban) traffic 26% and tourism 4%. Some transport companies are quoted on the Stock Exchange. Demand on the regional network increased by 34% between 2008 and 2018 and the railways responded, providing 80% of this increase. Freight transport is possible on the secondary network but rare.

There are **114 public transport companies** in Switzerland, of which almost **70 operate regional trains**. The majority have one legal entity for the infrastructure and a separate one for running the service. The companies operating the “**small**” or **secondary railway lines** in Switzerland depend financially on a canton and the Confederation to **balance their expenditure**. They have to demonstrate the interest for the canton for the latter to compensate

half the deficit, and for the Confederation to intervene with the other half, and then only if at least 20% of operating costs are covered by the line’s revenues (this minimum is reduced to 10% in rural areas). The Confederation and the cantons spend about 1.9 billion francs covering the operating deficits of regional public transport companies. The infrastructure itself is essentially financed by the rail infrastructure fund and amounts to 4.3 billion francs. The income from track access charges, 1.2 billion francs, can be added to that.

In 2015, the Confederation launched a consultation on raising from 20% to 50% the minimum proportion of costs to be covered by commercial revenues as a condition of federal grants. In this scenario, out of the 300 regional rail lines, 175 would die! In the event, this consultative process stimulated a programme of **re-energising regional passenger transport** through significant investment, benefiting from low interest rates. Infrastructure has been renewed, new rolling stock has been bought, lines have been widened to link directly a region and its main town by providing a regional service on the principal rail axes used by long-distance traffic.

The **technological** element ought to play a role in improving the efficiency of services and reducing the need to subsidise the regional lines. Among the techniques and technologies to be mobilised, can be listed the construction of lighter equipment, automated manufacture, automated operation of vehicles, predictive maintenance methods, and more generally the development of innovative products and complex systems that have a strong economic impact. ■