TAV, TAC, perhaps people ignores that...

The High Speed and High Capacity railway Turin-Lyon

Andrea Allasio – 20 Mar 2006

Preface

In December 2005, the facts and protests against the TAV (in Italy this stands for High Speed Train) in the Susa Valley have finally highlighted at national level the problematic over the Turin-Lyon and the concerns of the population. Events were reported with different cuts, depths and perspectives, but the framework and the information concerning this railway project, which apparently is one the most sponsored in Europe, were passed in general very superficially and most of the time biased.

There is no need to go too far from Susa Valley for understanding the lack of information concerning the project, talking with people leaving in Turin is more than enough. More then a person found is in favour of the railway because gives the opportunity to reach the ski field in about half an hour from Turin or because it allows to go to Paris in few hours, not knowing that the line passes 600 meters under the ground level, not in the centre of the valley and the saving over a long trip as Turin to Paris is just an hour. Someone talks about the freight transportation, however nobody has the idea of the volume of the freight being transported, the future forecast, the other railway lines and tunnels under construction around the Alps and finally, if the project is really mandatory or not.

Alarming is the scenario of so many people found totally unaware of the project and the consequences to be paid in terms of health, taxes and drawbacks of various nature, in favour of the advertised advantages that the new railway line will never be able to produce.

Anyone who wants to know the project, its context, building an own idea, can found in this paper a synthesis of technical data and information taken from official documentation of the project, studies conducted by Universities and independent institutions, report and publications of the European Community, of the “Corte dei Conti”, minute of meetings of the Technical Commission, as well as publications from Italian, regional, provincial and local administrations, newspapers and so on.

Content

On front-sheet a digital processing of a P.Burdizzo picture, from 2001.

1. INRODUCTION

1.1. History and status of the Turin-Lyon

The first rumours about a TAV are dated 1998, when a connection between Grenoble and Turin was envisaged via a tunnel under the Monginevro pass but the first seed of the Turin Lyon and the 50 Km tunnel under the Mont Cenis was put one year later at the Agnelli's foundation in Turin, where Tecnocity association has presented it to a group of expert and politicians.

The idea starts growing in 1990 and contemporary the dissent of the environmentalists began, while at the end of the year the first Italian-French agreement took place, followed by a book containing the EC study for the development of a European compatible railway net with outmost modern means. At that time in Italy there was a very interested train named "Pendolino" able to run faster over the ordinary railway net.

The group Habitats was founded in 1991 and taking advantage of cooperation with very valuable Italian university professors, it began to comment and to technically dismount all ideas maturing on the subject, diffusing the opposition's reasons, locally and in the western Turin surroundings, via two local newspapers "La Valsusa" and "Luna Nuova".

Meanwhile, the leadership of the TAV sponsoring committee passed from Agnelli to Pininfarina, asserting: The new high speed railway line will cost 7,200 billions Lire (about 3.7 billions Euro) and will be necessary in order to carry 7,7 million international passengers and 18,6 Mt (million tons) of freight, forecasted in 2002, against 1 million and of persons and 8 Mt of freight transported today.

Studies were assigned to several institutions and first estimations came available together with a booklet advertising the line. Between alternating of politicians and railroad responsible, the opposition to the project enlarged to several involved commons, CMBVS [(a)], independent research institutes, to all the environmentalist associations, agriculture producers associations and so on.

Alpetunnel Company is created at the end of 1994 with the initial task of defining the modality of the financing and management of the tunnel, while immediately after the conference of Essen has placed the Turin-Lyon railway line among the 14 projects to be submitted to the European Union for approval.

At the end of 1995 a stop appeared imminent even if the ministers of Berlusconi and Mitterand have signed the agreement to finance the feasibility studies. The press asserted that the TAV reached a dead point because of the strong oppositions and local battles "example the motion of the 4 NOT", fully supported by the CMBVS.

Nevertheless the projects continued but only in the year 2000 two draft proposals of the International railway segment, which extend from Bruzolo to Saint Jean de Maurienne, were proposed by Alpetunnel and by the administration of the Province of Turin. The trace passing in the north side of the valley and proposed by Alpetunnel was selected by the administration of Piedmont region.

Accuses of having already spent 200 billions Lire (about 100 millions Euro) and of wanting of others 600 for other studies were formulated in the 2001 by the Turin Province president, Mrs Bresso. Also a counter analysis assigned to Polinomia institute by the CMBVS, completely demolished the terms of feasibility and economic return of the project.

The feasibility comes refutation as well from the French company Setec-Economie to which the CIG, Governmental Inter Commission Italian-French, entrusts one study of economic appraisal, through Alpetunnel.

That's the end of Alpetunnel, but immediately an other French/Italian company, Lyon Turin Ferroviaire (LTF) comes constituted in order to carry the studies, the surveys and the plans to completion. Meanwhile the Italian Parliament approved and launched a new law known as "law objective" for simplifying the procedures for the environment impacts verification and cutting out completely any possibility of intervention and discussion with the local administrations

Under the request of the CIG[(b)] headed by Pininfarina, all the project documentation relevant to the Italian segment and the "Gronda nord di Torino" (northern Turin collector) remained secret until April 2002, when the first preliminary indications of the railway path were presented.

The first preliminary project plan of the national segment appearing from RFI[(c)] in spring 2003, was immediately strongly commented and technically taken apart by all members of the opposition, because of the heavy impacts to the environment and because of the rough forgetfulness and weaknesses. Criticism was so large that RFI withdrawn the project in autumn of the same year.

Meanwhile the CMBVS requested to the European Community the position concerning presumed violations of railway projects against the environmental impact verification procedure.

On 12 Feb 2004 the European Community the returned the response in Italian stating: *"no hypothesis of violation of the directive 85/337/CEE could have been identified concerning the project of the railway line Lyon Turin, in relation to which no authorization to the realization of the work turns out to have been given. This project turns out to be still in the feasibility phase".* This document gives justice of the many, too many

affirmations of politicians and administrators, that the European Union has already decided, has already financed and so on.

In 2004 comes written up the second preliminary plan, with many more details, a given number of valid points, however the technical and economic justification of the work is still non existent, while the impact to the environment remains too high. In the meantime, CIPE [(d)] approved of the International segment, where the preparation of the detailed plans demands long studies, surveys and soundings, including the geognostic gallery of Venaus, near the Italian entrance of the international tunnel.

On 14 Oct 2004, the President of the Regional Administration, E.Ghigo, nominated the monitoring commission for the geognostic surveys. Obviously the commission is composed by members of the Piedmont Region Turin City, Province and of Turin, Ministry of Transportation, RFI, LTF, but no member of the local administrations or experts nominated by them was included. In France the supervisory committee are usually including independent observators, having as well the right to call and convene on call controls.

In August 2005 it comes instituted the Technical Commission Rivalta (named to architect heading it) in which are represented the Ministry of Transportation, Piedmont Region, Turin City, Province of Turin, ARPA [(e)] LTF, RFI, as well as the CMBVS. The commission met on weekly basis since August 29. Several argumentations were pointed out, discussed and debated as the lack of risk analysis of the International segment. It is often made mention to the August 2005 approval of the national segment by CIPE, however neither the deliberation, nor the plan to which refers and nor the modifications eventually approved of contextually to the deliberation are succeeded to obtain. The deliberation, blocked by the Corte dei Conti [(g)], was then published only at the beginning of March 2006.

On 26 October 2005 the commission is pushing discussion on the geognostic gallery and trying forcing agreements and in absence of the CIPE deliberation, the representatives of the CMBVS took distance from the commission. The attempt of pushing for agreements without having the terms of the CIPE approval is judged a severe matter of concern.

The geognostic gallery, 10Km long, of 6.3 meters diameter and with 400-500 thousand cubic meter of extracted material, is a real gallery. It cannot be sold out to the population as a sounding, without environmental impact verification, without analysis of risks, without local hydro geological verifications, without planning how to treat extraction of eventual dangerous material (asbestos-uranium) and without a basic agreement with the local administrations. This created a strong protest of the local population, the presidium of the sites, the blocking of the access areas, railway, motorway and the events of the beginning of December 2005, reported by most of the European media.

Thanks to these events the opposition to the TAV has got the national level and European levels, problems and the reasons of the opposition become difficult to be hidden by the national press. All commons of the low Susa Valley are continuing the opposition, all together while opening of a discussion among the government and all involved entities is envisaged, while the starting of the work of the geognostic gallery are postponed after the conclusion of the Olympic games of Turin 2006, might be even after the elections of April 2006.

The design of the international segment is more advanced and the start of the sounding works is the LTF current primary objective so to be able to produce the final design within 2007, while the works of recognition will continue until 2009. **Italy and France will have to declare the reciprocal public interest to the project within the 2007,** only after this event the selected general contractors will apportion and sassing the works to subcontractors and providing the availability of financing, works will start. The final design of the national segment is expected in spring of 2006.

At the beginning of 2006, ISPA (f) has started advertising in television the importance of the company in realising the big infrastructures, promising prosperity, wealth and comfort to the population as well as an indirect message of economical return to private investors.

Nothing is so far decided and frozen concerning the Turin-Lyon TAV line and the financing for realising the project might not come available.

The bottom line is that after years and years of requests, nobody has been able to demonstrate the necessity of a so heavy impacting project.

(a) CMBVS: "Comunita Bassa Val Susa e Val Cenischia" is a local administration grouping all commons of the low side of the Valley.
(b) CIG, Commission Inter-Governative
(c) RFI, Rete Ferroviaria Italiana, is the Italian company in charge of the railway network.
(d) CIPE, Comitato Interministeriale Per lo sviluppo Economico, Interministerial Committeee for the Economical Development, in charge as well to approve the economical plan and financing of such projects.
(e) ARPA, Agenzia Regionale Per l'Ambiente, regional institution for the environment
(f) ISPA – Infrastrutture S.p.A, is the company in charge of managing the realisation of the Italian's infrastructures
(g) Corte dei Conti is the ultimate institution endorsing the financing plans.

1.2. Geographical framework

The Susa Valley is a glacial alpine valley, one of the largest of the west Piedmont area, extending for more then 100 Km, from the French border until the flat area of the Turin western surroundings. Known for the various winter 2006 Olympics game sites, the Susa Valley has been a passing place since millennia, thanks to its two major natural passes, the Moncenisio e Monginevro, at 2000 and 1800 meters of altitude respectively.

The Moncenisio pass opens over the French narrow valley of the Arc River, descending to Modane and Aiton, few tens of kilometres before Chambery. On the south-western side, Monginevro pass bring down to Briançon and to the south of France.

From the Roman emperor until the 1861 when Italy became a state, almost all population of the north-western Europe has crossed or attempted to cross the valley, Celtics, Barbarians, Normans, French (famous id the Rivoli battle), including Hannibal who descent toward Susa with his elephants.

Frequents invasion of foreign population and the fog extending for long periods from the flat, have contributed to move the population to the mountains. Several villages developed on the mountain slopes are today still permanently populated and sites of summer vacations. Today agriculture, industries and commercial activities has grown along the river, while the mountains deserve a variety of sites of a rare beautifulness, together with hundreds place where the sacrifices of the mountain population and the effects of the wars is still alive, in an environment where only the noise of the trains brake the sound of the wind.

Some numbers of the Susa valley, just to get familiar with it.

- Population: about 76,500 residents, 63,500 in lower valley and 13,000 in upward valley.
- Surface: 1047 squared Km, 468 in lower valley and 579 upward.
- Communes: 23 in low valley side and 1 in upward valley, grouped in the respective two Communities, “Comunità Montana Bassa Val Susa e Val Cenischia” and “Comunità Montana Alta Val Susa”
- Railways (existing): Turin – Bussoleno – Modane – State border and Bussoleno Susa, for a total of 89Km, excluding the segment pertaining to the Turin city and surroundings.
- Highways: A32 – Rivoli-Bardonecchia-State border, 82 Km
- National Roads: SS24 of Monginevro (82 Km) and SS25 of Moncenisio (60Km), SS23 Cesana-Sestriere (11Km) and SS 335 Oulx-Bardonecchia (14Km). 167 Km in total, excluding Turin city and surroundings segments.
- Main River: Dora Riparia, 105 Km long from its spring to confluence inside Po river.
- Artificial Water Basins: Moncenisio lake with 40 million with a volume of 40 million of cubic meters and supplying several power plats in France as well tone in Italy (Venuas). The Pont Ventoux barrage and its power plants in the Dora Riparia River rapids over Susa. The Rochemolles Lake and the power plant of Bardonecchia.
- International passes: There are 5 international crosses points: Frejus motorway tunnel (T4), Monginevro pass, Moncenisio pass (May to October), “Colle della Scala” (touristic – June to September), Frejus railway tunnel.
- Population density: 22 people/Km^2 in upward valley and 135 people/Km^2 in low valley side, against a national average of 192, but considering the 85% of the valley is composed by mountains and very narrow side valleys.
- Railway density: 7.9 Km every 100 Km^2, against a national average of 5.3. The railway density of the valley is already 50% higher of the Italian average.
- Highway density: 7.8Km of highway ever 100 Km^2, while the Italian average is 2.2 Km/100 Km^2only. The Susa valley density is three times higher, despite the mountains.
- National road density: 15.9 Km of national roads every 100 Km^2, about the same of the national average of 15.2 Km/100 Km^2.

The Susa Valley is as a consequence a quite occupied natural area, considering the very limited flat area across the river, already taken by national roads, highway railway, other local roads and so on. A large infrastructure as a high speed/high capacity railway line, inevitably creates impacts to the population and to the environment. An impact difficult to be accepted, even in presence of a real technical and economical justification (so far non existing) for building a so impacting infrastructure.

2. THE HIGH SPEED RAILWAY LINE TURIN-LYON

2.1. Main data and a bit of clarification concerning the tunnels.

- Despite the name, the Turin-Lyon doesn't pass to Turin town. Exiting from Gravio Musine tunnel, it takes the direction of Settimo Torinese where it connects with the ordinary and high-speed lines, Turin–Milan.
- The Turin-Lyon TAV length amounts to 254 Km, 33 Km shorter than the historical line which is 287 Km long (RFI data) and passing through the Frejus railway tunnel. The TAV fleeting train connection Turin to Lyon is only 247 Km long, as the historical line is used till Bruzolo, then the new line until Lyon.
- The well advertised 53 Km long tunnel, known as well as basic tunnel, is not the only one. There are other 4 tunnels in Italy for a total amount of other 41 Km. All tunnels are double tube, meaning that there is one gallery for each direction. In addition there are other 50Km of tunnel for priority-passing rails, inspections and service tunnels, descents, ventilations, refuges for people, and so on.
- The Turin-Lyon is composed by three segments, Italian and assigned to RFI as general contractor, International and assigned to LTF (Lyon Turin Ferroviaire) and a French segment, not yet assigned.
- The Italian segment is (see red track in Fig. 2.1-1) is 43 km long. Starts from San Didero, includes the tunnel Gravio-Musine tunnel (21.3 Km) and the northern Turin surrounding part, also called Gronda Nord of Turin, which is implemented as series of artificial tunnels, embankment, trench, viaducts, until Settimo. It includes as well two natural tunnels at Venaria (5 Km) and Settimo (2Km). The Gravio Musine tunnel has 4 service accesses, one in proximity of Condove two at Caprie and one at Almese.

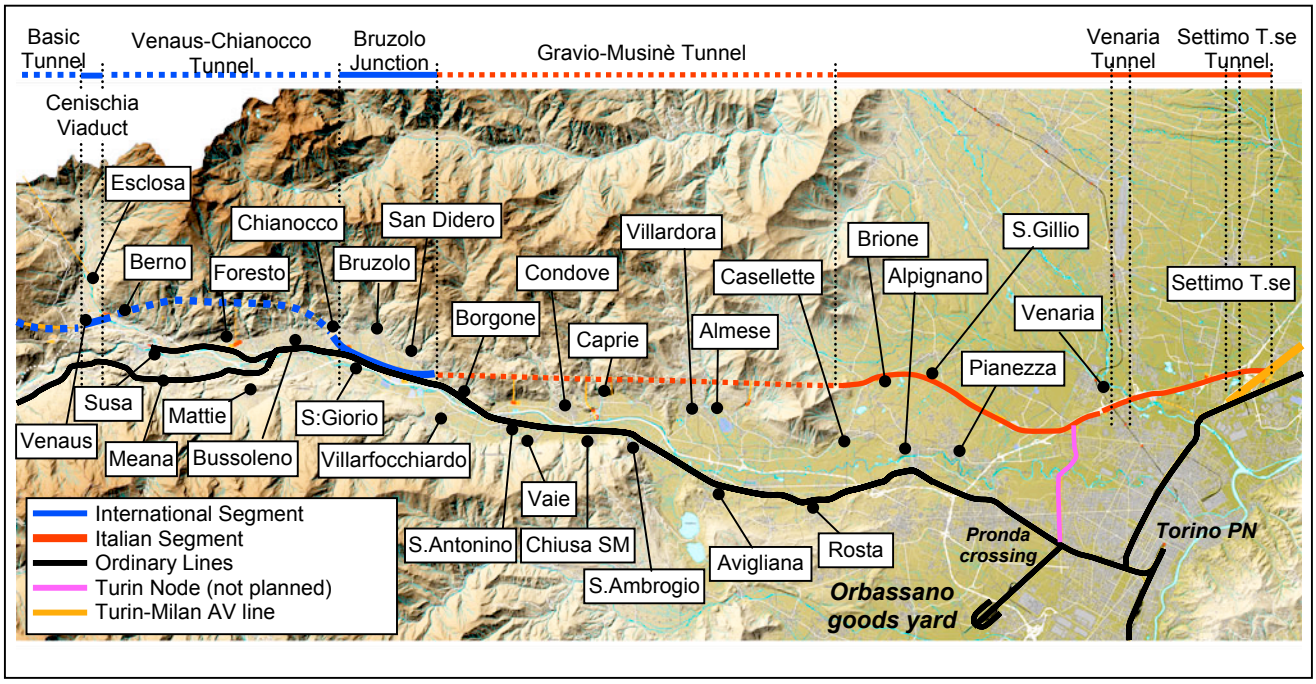

Fig 2.1-1 The Italian segment and the junctions with the existing lines

- The International segment starts from Saint Jean Maurienne (France) and ends at San Didero (Italy), after 72 Km. It is composed by the basic tunnel 53.1 Km long, until Venaus, a viaduct of about 1 Km crossing the Cenischia Valley and the subsequent 12.5Km tunnel until Bruzolo and the train temporary parking area of San Didero. The segment includes the Modane station at 360 meters under the ground level, reachable through a 4Km descent tunnel and equipped with priority-passing rails, crossing rails, a large refuge, tunnel control means and safety equipments. 35% of the international segment pertains to Italy and 65% to France.

  Four forced air ventilation stations inside the tunnel and connected externally, are providing the cooling system which together with the piston effect of the trains are removing the large quantity of heat dissipated by the trains passing inside the tunnels. The tunnel mid way temperature is predicted around 45-50 degC.
- The France segment is 137 Km long of which 40Km are made of 3 tunnels, respectively Belledonne, Beron-Chartreuse, Dullin-l'Epine. Belledonne tunnel is the only one in the line having a single tube. The design of the France segment is mostly unknown.
- The complete project (see Tab 2.1-1) can be split in about, 119 Km of external line and 135 Km inside tunnels, equivalent to 254 Km tunnels single tube or 300 Km including as well the about 50Km of tunnel equivalent for services, refuges etc.

Turin-Lyon Official data Piedmont Region	Italiana Segment Km	International Segment in Italy Km	 in France Km	 Sum Km	French Segment Km	Total Km	 %
At ground level	2.4		2.8	2.8	97.0	119.2	47%
Embankment	5.0	4.4		4.4			
Trench	6.0						
Viaduct	0.6	0.9		0.9			
Artificial tunnel	5.9				16.0	134.8	53%
Natural Tunnel - single tube							
Natural Tunnel - double tube	23.6	20.2	45.1	65.3	24.0		
Total	**43.5**	**25.5**	**47.9**	**73.5**	**137.0**	**254.0**	**100%**
% per Nation	100%	35%	65%	100%	100%		

Tab 2.1-1 Composition of Railway segment per typology

- The traffic of the line will be mixed, i.e. fleeting and freight trains. This choice makes the line less efficient as the freight trains travel at a speed lower then the fleeting trains (around 100Kmh). As a consequence it will be an **High Capacity** line rather then **High Speed**, as advertised. Other countries have chosen to build high speed lines between big towns, 300-500 Km apart and to let passing the freight trains over the ordinary lines.
- The material extracted from the tunnels will amount to about 26 million of cubic meters, of which 16 in the Italian territory, equivalent to block of 1Km times 1Km and 16 meters tall. About the volume of the houses of a city of 250,000 people.
- Millions of cubit meters of sand and gravel, partly obtained by milling and fragmenting the excavated material and partly from local sites, will be needed for preparing the necessary concrete for the inner revetment of the tunnels, viaducts, trench walls and so on. The volume of the concrete needed for the International segment only is 3.8 million of cubic meters.
- The electrical power to supply the line which will operate at 25KV, will be provided by two new power sub-stations at Casellette and Bruzolo, supplied respectively with a new 380KV power line from Leini and a twin 132KV. The precise track of the power lines has not been defined yet.

2.2. The historical line Turin-Modane

- Since more than 30 years express trains runs at 155 Km/h between Bussoleno and Alpignano (30Km).
- France TGV and Italian TAV are running since several years on the historical line, managed by Artesia, which is joint venture of Trenitalia and SNCF. Due to 6 M€ losses at the closure of 2004, Artesia has cancelled all trains based on TGV/TAV material, scheduled between Milan and Lyon Part Dieu (Lyon centre) and passing on the historical line, because of the negative economical results. Now Artesia has redirected the business toward a Milan-Paris connection via the Simplon tunnel.
- Now it takes 4 or 5 hours to reach Lyon from Turin, of which 3:35 of real travel and the rest as waiting time at Chambery (direct trains no longer exist). Turin to Paris journey takes only 5:21 (official Trenitalia-SNCF schedule– e.g. train 9241) because they are not passing at Lyon and there is no intermediate change.
- The average number of trains running daily is 123 (87 transporting freight and 36 passengers) for the Bardonecchia-Bussoleno segment and 141 for the Bussoleno-Turin segment, where the numbers of fleeting trains increase to 54. The line is now used only for the 38% of its capacity.
- The weaknesses of the line are the steepness of its mountain track, Bussoleno -Bardonecchia - Saint Jean de Maurienne and the Frejus tunnel profile, constraining the high of the trucks to be transported.
- A “ferroutage” service (transport of trucks over railcar) between Aiton and Orbassano is in place with 4 daily trains for each direction since 2003. Each train can accommodate 18 trucks with high not exceeding 3.7 m due to Frejus tunnel limitation. Cutting from the 2004 Italian financial plan, the 360 M€ for granting and improving the ferroutage in the triennium 2005-2007, has forced the company managing the service to increase the ticket. Immediately the trucks have abandoned the service because of its cost and the waiting time for at both ends. The trip in the motorway is more expensive but it takes only about 2 hours.

2.3. The connections of the new High Speed line with the historical line

- Two connections are planned between the new Turin-Lyon and the ordinary line, at San Didero-Bruzolo (40Km west of Turin) and at Settimo, where rumours indicates a possible built up of a new goods yard.
- A train stabling area, where trains transporting freight will temporary stop for being passed by the TGV/TAV, will be build at Bruzolo, supporting train length up to 750m, longer train will have to be split.
- The Turin node and its crossing of the city at Corso Marche (close to western city border) will not be implemented due to its high cost (RFI data), even though the administration of the Piedmont Region and

Province of Turin has asked several times RFI to reconsider it. People believes that one of the hidden reason of not doing it, is because of it impact on the city and the consequent dramatic increase of the opposition to the project.

- The absence of the Corso Marche interconnection together with a new goods yard at Settimo, will mark the death of the Orbassano site, which has been recently completed with significant amount of public founds and where several related commercial activities (e.g. agro-alimentary market) have been transferred from the town.

2.4. Traffic model of the Turin-Lyon

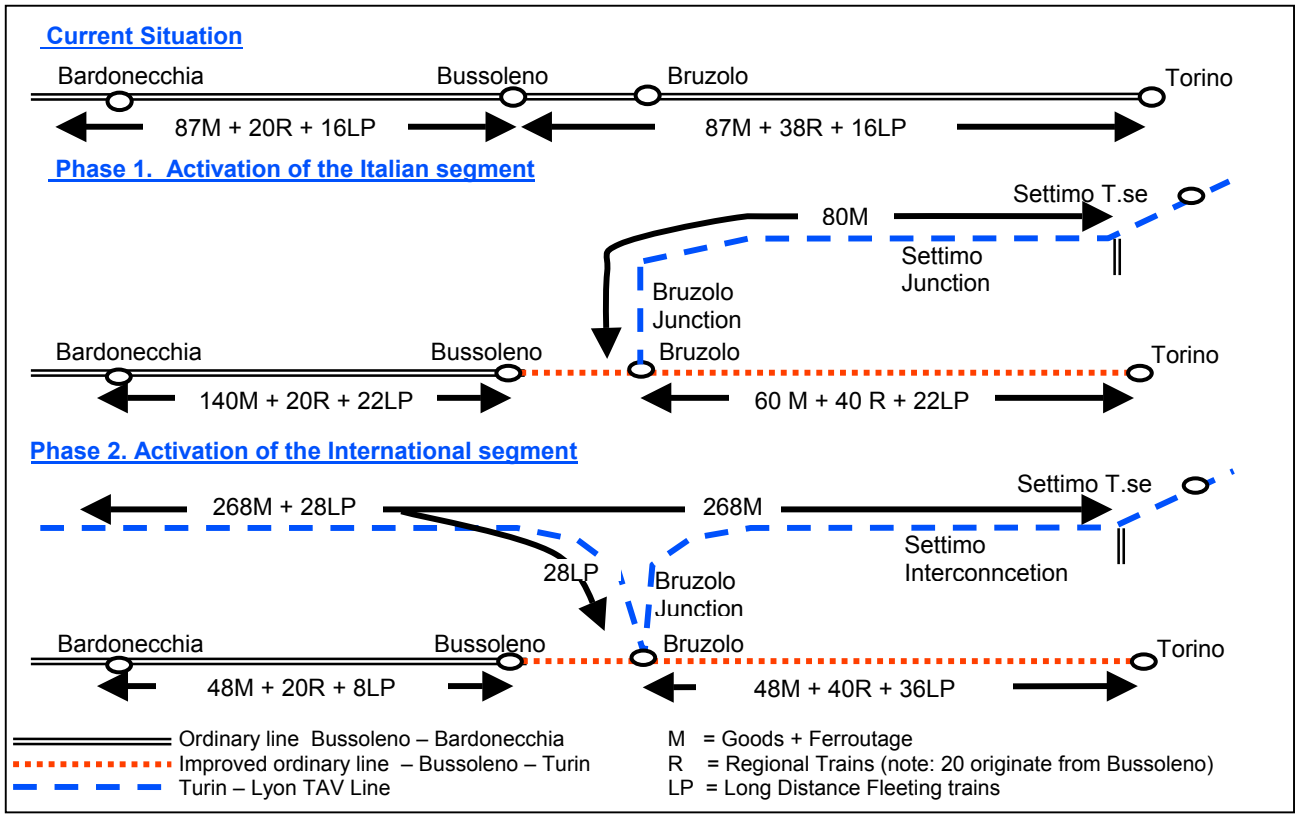

Fig 2.4-1 The traffic model of the Turin-Lyon and the actuation.

The model of the traffic is depicted in Fig. 2.4-1, where trains between Bussoleno and Bruzolo have been omitted for simplifying the scheme. Such number is however equal to the trains between Bussoleno and Bardonecchia, plus about 20 daily regional trains originating of ending at Bussoleno.

The actuation of the high speed and high capacity is performed into two phases, the former starting at the availability of the Italian segment and the latter once International segment will be operative.

The historical line is currently used at 38% of its capacity; 123 trains are travelling daily in the upper part and 141are running between Bussoleno and Turin, or more correctly between Bussoleno and Pronda crossing, where a number of train prosecute to Orbassano goods yard or vice versa.

In the first phase, the Bardonecchia-Bruzolo segment will experience 182 daily trains, of which 100 are carrying goods, 40 are devoted to “ferroutage” and 42 are fleeting trains. Eighty of the 100 freight trains will take the junction at Bruzolo, continuing on the Italian segment until Settimo, then only 30 of these will proceed to Milan. The freight trains will be the only one running on the Italian segment while all the other trains passing at Bruzolo will continue to Turin or Orbassano over the historical line, including the 20 regional originating/ending at Bussoleno and the 40 “ferroutage” trains. This means that the number of trains running daily in the Bruzolo to Turin segment will decrease from 141 of today, to 122.

The AV/AC project will be completed in the second phase. The number of train running between Bardonecchia-Bussoleno will decrease from 182 of the previous phase to 76, in particular 40 for freight, 8 for “ferroutage”, 8 long distance fleeting trains and 20 regional. The utilization of the historical line will drop to 22%, while 296 trains will transit daily in the International segment, 28 long distance fleeting trains, 148 for freight and 120 for “ferroutage” service. At the Bruzolo junction all fleeting trains from France will take the historical line (vice-versa for the fleeting trans arriving from Turin and directed in France), while all freight and ferroutage trains will continue be the sole users of the Italian segment.

The Bruzolo-Turin segment of the historical line will experience as well a daily traffic decrease from 141 of today to 124 trains, including 76 also running in the upper part, 20 regional trains originating/ending at Bussoleno and 28 long distance fleeting trains arriving or coming from the International segment. This daily

traffic brings the line utilization to 33% of its capacity and it is to be noted that the number of daily "ferroutage" trains to/from Orbassano site remains 8 as it is today, which is definitely not a good planning for the future.

All this is a paradox because fast fleeting trains are constrained on ordinary lines and slow freight trains are running slowly on new lines. The results is that all trains will run slowly and the **Italian segment is built just for freight trains!!!.** See later the implications of this.

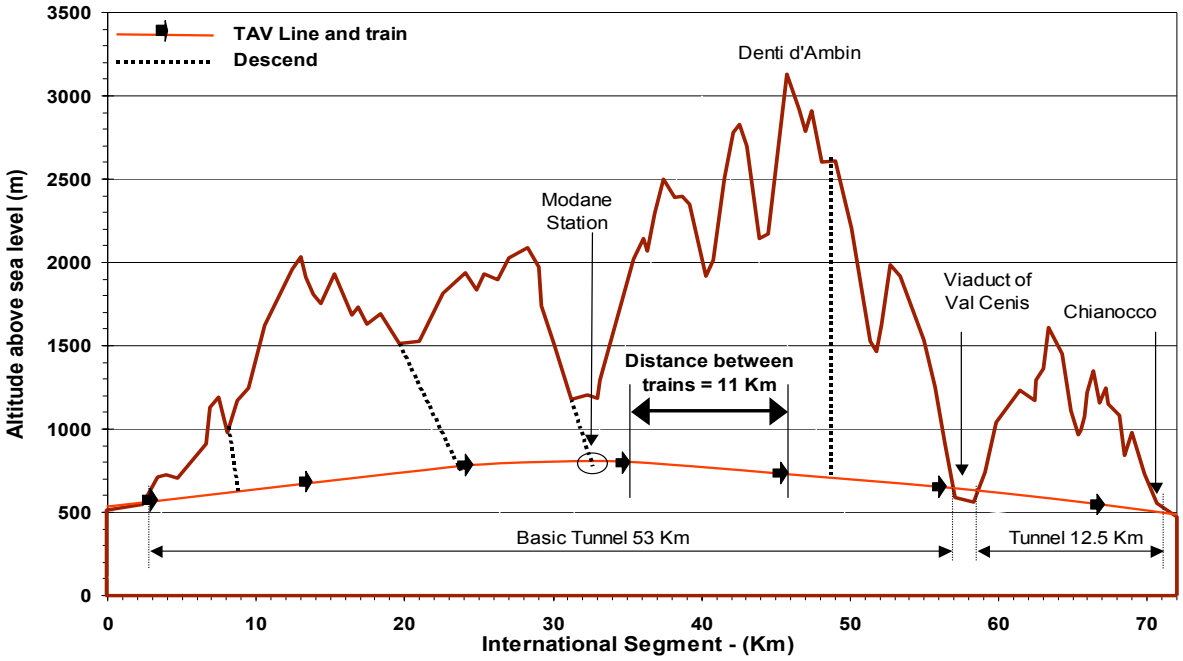

Fig 2.4-2 International Segments and trains running in one direction

The management of the traffic into the International segment is not yet clear and there is more then one hypothesis. 180 daily tracks distributed over 20 hours (the other 4 hours are for maintenance) will be enough to let all trains passing in both directions at about the same speed of 100 Km/h, in particular the 134 freight trains and 14 long distance trains for each of the two directions plus a 20% margin for absorbing traffic unbalancing. In such a way, inside the International segment the trains will transit every 6.5 minutes with a distance of 11Km as shown in Fig 2.4-2, but the fleeting train speed would be penalized.

The line designer are looking forward to a synchronised management of the traffic so that the freight trains in front to a fleeting one are passed at the priority rails of Modane station or are already under the Italian segment once the fleeting train exits from the tunnel for tacking the Bruzolo junction. This technique would allow the fleeting trains to run at speed double of the freight trains, thanks to mid way location of the Modane station. This technique has the drawback of wasting several tracks (up to 5 or 6) for each fleeting train and to require 240 daily tracks over 20 hours for running the same traffic. This corresponds to a freight train running at 100Kmh, every 5 minutes, spaced by 8 Km, interleaved with fleeting trains running at 200Km/h. In practice this technique is just theoretical as the overall safety aspects will have to be accounted for the determining the maximum allowable speed to which the line will be certified, considering as well that a few tens of seconds delay will produce as a minimum a dis-synchronisation of the traffic. A study conducted by Polinomia Institute for the CMBVS shows a fleeting trains speed in the order of 120Kmh.

It would be curious knowing what the passengers will feel once under 2500 meters of mountains and with 2 or 3 freight trains in front and the same number of trains afterward.

The last observation comes from France, where the maintenance of the high speed line Paris-Lyon is such that no trains are passing overnight because rectifying of the rails take place every two nights. This is necessary to reduce the noise while the TGV are running at 270 Km/h. This is tells that the idea of the Turin-Lyon promoters of concentrating the freight train overnight is in conflict with the maintenance, except if the real number of freight trains is much, much lower than the advertisement.

2.5. Leaving Turin …..

- People will taste the flavour of the high speed only in France, as the lack of Turin interconnection will force all TGV/TAV to pass over the historical line until San Didero, then continuing into the International segment and part of the France segment at 120-130Kmh.
- There won't be any station in the Susa Valley, not even near to the ski stations of the 2006 winter Olympics games, because the line is hundreds of meter under the ground level. The only service and safety station will be at Modane, 360 meter underground. Perhaps French might open it in the future, if they see the business of shortening the distance between Milan - Turin and the chip France ski stations.

- Passengers will arrive at Lyon in not less than 2 hours and 10 minutes. This because the speed will be limited by the freight trains into the International segment and partly by the historical line. The saving of 1:25 over the current travel duration of 3:35 (Artesia data) is due to several factors as: the faster speed of the line (-45 min), the fact that the new line is shorter (-30 min), there is no stop at Modane for changing the operating personnel (-5 min) and at Chambery (-5 min). The LTF advertisement of tacking 1:45 is just not credible because the average speed would be 145 Km/h, which is too high.
- Arriving at Paris in 4:20 minimum (typically 4:30) as the faster TGV, over the Lyon-Paris segment takes 1:55 minutes minimum and 2:15 typically (SNCF data). On this journey the saving will be limited to 1 hour.

2.6. *The transportation of the passengers*

The current cost of a two ways 2nd class ticket Turin to Paris over the TAV/TGV amounts to 220€ or 330€ for a first class ticket (SNCF and Trenitalia official fares). Once the line will be operating the cost of the tickets will have to be aligned according to western Europe fares, including amortization of the project, so that the cost of a two ways 2nd class ticket will be around 400-450 €.

Compatible airline fares or even lower than the railway ones can be easily found even today. Most likely peoples in hurry will continue to travel by plane, because now it takes 3:30 from Turin centre to Paris centre and most of the people travelling on his own or with the family will continue to take ordinary trains or the car.

LTF and RFI admit that the passenger transportation by itself will not be enough to economically justify the project and to sustain its cost, which means that tickets will be sold out under cost and there will be the need of other sources to compensate the loss, in principle the freight transportation. It is as well to be demonstrated that there will be enough people for 18 daily long distance trains for each direction, 14 TAV/TGV trains 350 m long plus 4 long distance ordinary trains 250 m long, for a total of more than 10,000 people per day, each way.

2.7. *The freight transportation*

LTF estimates that the historical line saturation will occur in 2015 and in 2020 about 3 millions of trucks will cross the Alps, while the new line will permit:

- To transfer to rail about 1 million trucks per year, which correspond to null the traffic at the Frejus motorway tunnel.
- To meet the freight transportation demand increase from 10Mt of today to 40Mt into the 2030 (see Fig 2.7-2)
- Transporting of 4000 passengers per day

One of the crucial questions is the capacity of the historical line, which has been estimated by different parties and methods. In fact, there is in no universal method to compute a railway capacity.

- The joint SNCF-RFF-FS study of March 2000 March 2000 estimated via a conservative formula a capacity of 20Mt/year, corresponding to 185 freight plus 66 passengers trains daily.
- The study performed by Polinomia on May 2004, shown a capacity of 27Mt/year, corresponding to 150 freight plus 70 passengers trains daily, assuming improvement of the line and the electrical power stations.

Two interesting facts can be observed from the transportation forecast shown in Fig 2.7-1.

- According to TAV promoters, the construction of the line has to start in 2006 (!!), i.e. the year of line saturation minus the 9 years of works (see also para. 2.14).
- The forecast of the promoters conducted in 1991 was envisaging a freight increase from the 8Mt of the 1991 to 13.5Mt into 2002 and to 20Mt into 2015 (saturation). Unfortunately in the 2002, which was in the middle of the forecast interval, the transported freight where only 9.6Mt. A current increase of 1.6Mt over and estimation of 4.5, is an overestimation by a factor near to 3.

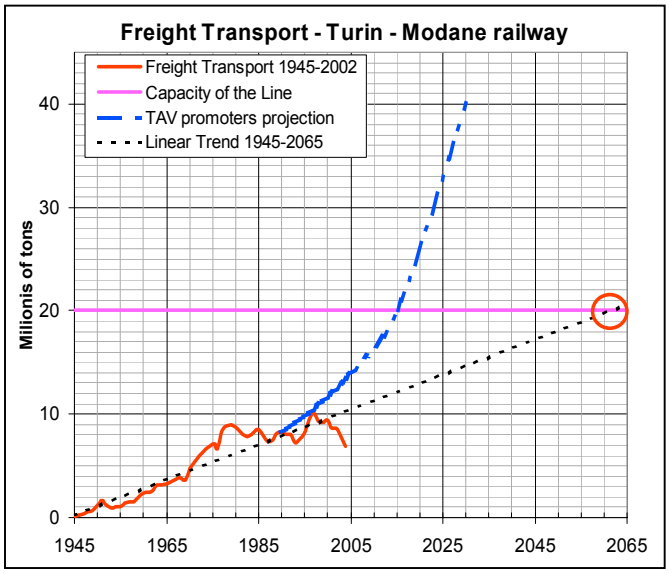

Fig. 2.7-1 Goods traffic & TAV promoters hipothesis

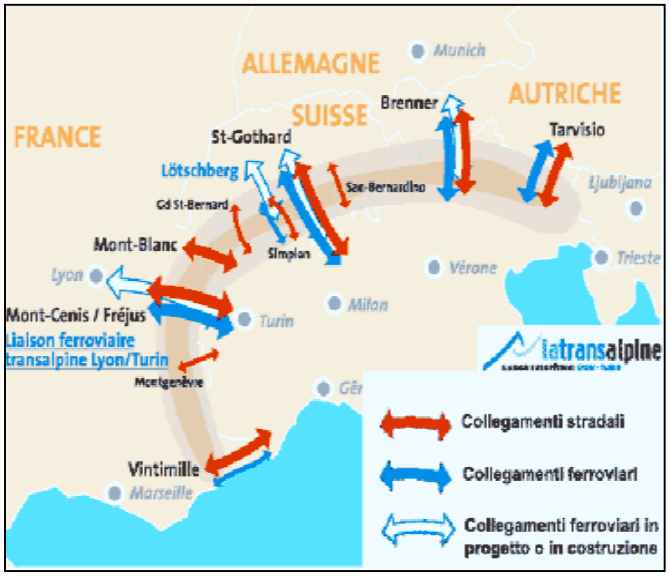

Fig. 2.7-1 Freight transport across the Alps

- After the 2002 the situation has worsened and in the 2004 the amount of freight transported was only 6.9 Mt, which is even less that the amount at the time the promoters made the estimation.
- This allows saying that the model of the freight traffic development used by the promoters was such that the estimation of the demand evolution of the freight traffic was 3 times higher than the reality. The used model was simply not realistic and totally uncorrelated with the population demand.
- The saturation of the line by projecting the past trend into the future, even with the conservative maximum capacity value estimated by the joint study mentioned before, would occur only in 2055, leading to a quite a long time, at least up to 2040, to improve the current line, observing the traffic evolution so to make decision whether to built or not the new line. There is no such a hurry has the promoters try to convince.

A certain percentage of the freights currently transported over the historical line are directed or are coming from the Northern Europe (North of France, The Netherlands, Belgium, England) or to/from the Southern France, even if the Frejus is not the shortest path.

- **Can we exclude that someone has attempted to deviate traffic over Frejus for justifying the need of a new high capacity line?**
- **Would this remain so in the future ?**

International transportation matrix year 2004 (tons x 1000)	*Austria - Switzerland*	*Belgio Luxembourg*	*East Europe*	*France*	*Germany*	*Italy*	*North East Europe*	*Netherland*	*Scandinavia*	*South East Europe*	*Spain Portugal*	*Total*
Austria - Switzerland	656	429	2,007	558	7,307	5,510	995	425	204	2,223	44	20,358
Belgio Luxembourg	767	1,937	39	5,617	4,699	3,249	131	1,764	267	24	192	18,686
East Europe	3,146	88	3,169	22	926	600	26,017	13	20	1,077	15	35,093
France	247	5,914	9	0	2,399	5,746	170	361	351	130	386	15,713
Germany	8,834	3,741	1,338	4,698	0	11,326	5,707	2,257	2,290	421	756	41,368
Italy	1,141	2,007	225	1,813	4,576	0	394	728	467	239	31	11,621
North East Europe	11,610	277	3,184	556	14,522	822	22,641	352	326	1,008	59	55,357
Netherland	246	1,261	131	1,044	13,484	1,318	587	0	94	2	9	18,176
Scandinavia	243	260	4	367	2,175	862	148	62	17,310	9	3	21,443
South East Europe	3,283	166	1,384	108	105	1,222	379	3	19	823	8	7,500
Spain Portugal	15	199	13	433	676	35	33	9	2	6	1,126	2,547
Total	30,188	16,279	11,503	15,216	50,869	30,690	57,202	5,974	21,350	5,962	2,629	247,862

Legenda

North East Europe	*Poland, Czech Rep, Slovakia, Latvia, Lithuania, Estonia*
East Europe	*Hungaria, Romania, Ukraine*
South East Europe	*Croatia, Serbia-Montenegro, Macedonia, Bosnia-Hzergovina, Bulgaria, Albania, Greece*
Scandinavia	*Denmark, Finland, Norway, Sveeden*

Tab 2.7-1. International transportation matrix – year 2004 – (processing of Eurostat data)

To understand the transportation fluxes among the states, Eurostat has available transportation matrices. Tab 2.7-1 is the matrix of the year 2004, which has been simplified by grouping states pertaining to the same geographical area. Traffic data of 1995, 2001 and 2002 are estimated because matrices do not report Italian data. The rows represent the goods quantity in thousand of tons loaded into a country (export), the columns are those unloaded (import).

The goods transiting across Italy and France border are from two groups: 1) Italian import export with France, Spain and Portugal, 2) goods just transiting across Italy. Tab 2.7.1 reports these data in green and yellow cells respectively. The matrices allow as well identifying freights which should not pass in the Frejus/Ventimille tunnels, because it is not the shorter path (e.g. France - Switzerland); these data are in white cells.

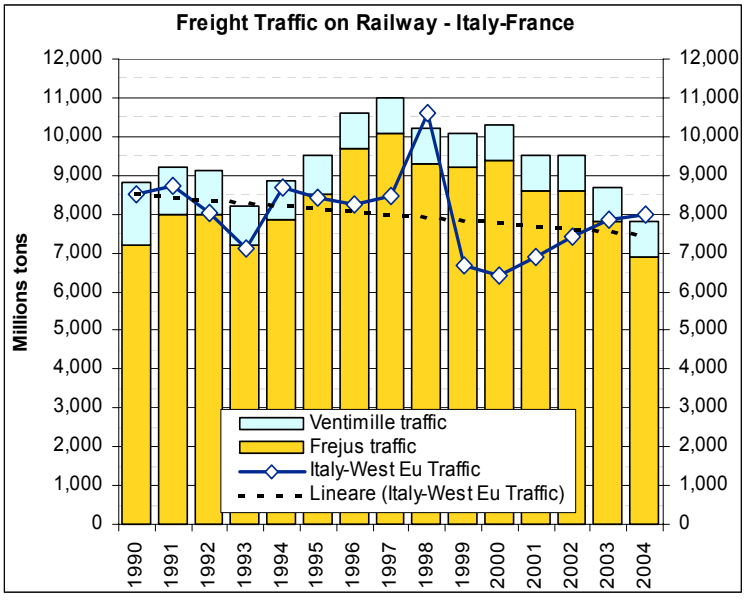

Fig 2.7-3 Freight traffic at Italy-France border

The last category is the goods definitely not passing across Italy-France border, which are identified in grey cells (e.g. Scandinavia to North Eastern Europe). The total of the freight that would have passing at Ventimiglia and Frejus is 7.964 million of ton. The historical behaviour, obtained by repeating this exercise for the past years, can be compared with the traffic measured at the Frejus railway tunnel, which should have been always lower. Unfortunately the Frejus traffic was almost always higher that the geographical natural traffic, in particular in the 2004 it was almost 3 million tons higher. This proves that at Frejus has taken care of goods normally addressed to other tunnels. This will be later on confirmed as well by an institutional report.

The answer to the second question is more complex and it has to be approached considering the contribution of the Frejus to the overall freight railway transportation across the Alps. In the past about 25% of all goods transiting across the Alps were passing through the Frejus tunnel (see Fig. 2.7-4). The Frejus sharing has started to decrease in 2000 because of shift of part of the traffic to other passes and because of the decrease of the goods and trains density (see para 4.1), so that it went down to 16% in 2004. Even not mentioned and accounted by the Turin-Lyon promoters, the amount of traffic in an alpine pass depends on traffic and events on all other passes.

In the Alps (see Fig 2.7-2) there are other 3 railway tunnels under construction or improvement: Lötschberg (completed in 2007) connected to Simplon tunnel, Gottardo (completed in 2014) and Brennero. In 10 years, Simplon/ Lötschberg and Gottardo will take away from Frejus all the freight traffic toward the North-West of Europe.

Unfortunately the single-track railways Genoa-Savona-Ventimiglia and Nice-Cuneo-Turin, will not help to alleviate the traffic over the Frejus, until properly enhanced. The rails doubling of the Genoa-Ventimille line is on going, with a forecast of completion on the Italian side by 2010 and on France side by 2015. This also means that starting the 2015 all traffic between Spain/Portugal and centre/south Italy will move from Frejus to Ventimille.

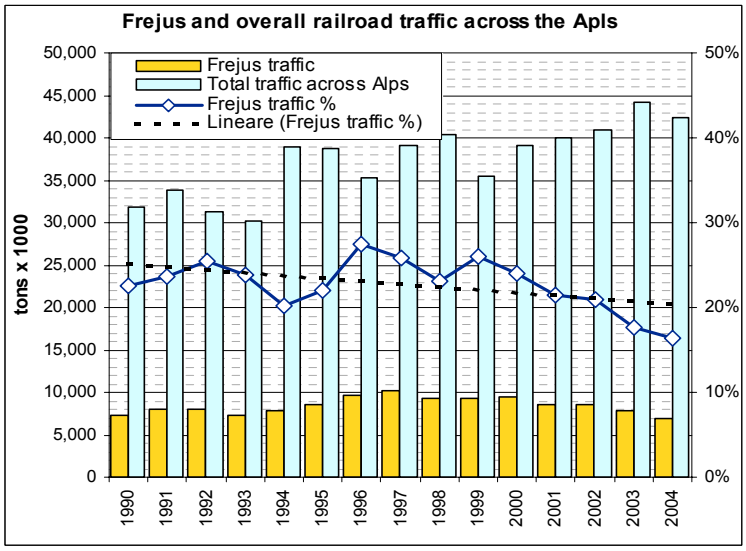

Fig 2.7-4 Frejus and Alps railway traffic and ratio

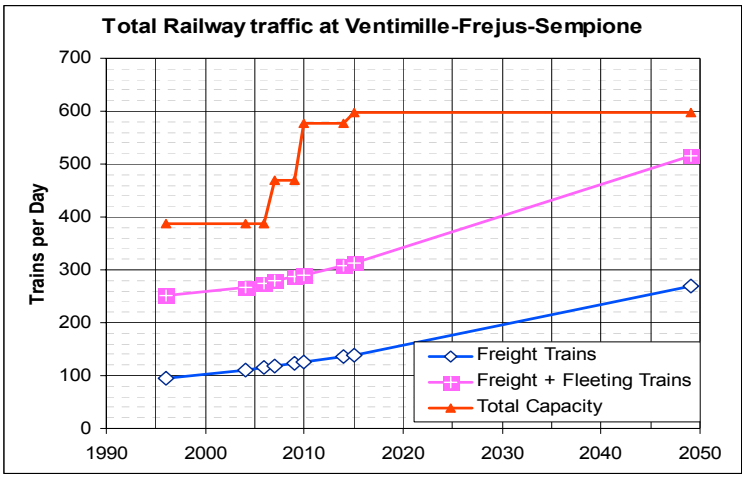

Fig 2.7-5 Freight + fleeting traffic at Ventimille - Frejus - Simplon

No improvement is so far planned for the Turin - Cuneo -Nice, which would provide an other connection between Turin and southern France, also in view of the intention to have three rails between Marseille and Ventimille.

Coming back to the second question, for understanding the influence of the other passes the exercise can be limited to adjacent ones, Ventimille and Simplon, by considering their average freight and passenger daily traffic (over 365 days), the capacity of the lines and estimating the global traffic trend by an increasing of 1% yearly for the Fleeting trains (optimistic) and 2% yearly for freight trains, European average.

No change of transportation policies (e.g. ferroutage improvement are considered here because of the unknown of their implementation and results. This will be discussed in para 4.3.

The capacity of the three passes together increases from the current value of 388 trains/day to 598 in 2015 (Fig 2.7-5). The first increment is in 2007 at the completion of the Lötschberg, which brings the capacity of Simplon from 140 trains/day to 220. The second is at the completion of the Genoa Ventimille rails doubling on 2010, which will increase the capacity from 90 trains/day to 200 and further to 220 trains/day on the 2015, once also the French side enhancement will be completed. The capacity of the Frejus tunnel is considered unchanged to 158 trains/day. Fig 2.7-5 shows that about 200 traces will result free in the 2030.

Now before understanding what is the effect at the Frejus, there is a need of defining the criterion of traffic rearrangement. The criterion of the traffic geographical optimisation is complex and in practical terms impossible to be implemented, while an intuitive criterion as the equal repartition is more suitable and logical for adjacent passes. An example can be the Ventimille line, saturated now by a lot of fleeting trains and with only a tens of freight trains. From the point in time in which the rails doubling will be completed the freight trains will increase might be to 50, reducing 40 trains from Frejus, which in turns will be able to take might be 20 trains from Simplon and in turn 5 or 6 from Luino and Chiasso line. It is just a question of a bit of time, but the traffic at the end will rearrange. The fact of having limited the study to the Frejus adjacent lines is not so important as the influence of the passes after the Simplon, i.e. Luino and Chiasso has no influence on Ventimille and Frejus.

Fig 2.7-6 shows finally the effect at the traffic evolution at the Frejus due the improvement of the Genoa Ventimille line and Lötschberg tunnel The computation is not so precise, the evolution change will not be so sudden, however it must be accounted that long term projection are never exact because of the dependence on economical and political status of the states.

The real important element is that in a close system as the Alpine railway crossings, the increase of a capacity of one of the passes reflects beneficial effect to all others.

As a consequence it is incorrect making a projection over a single pass and ignoring, as done by the Turin-Lyon promoters, all railway enhancements performed around the Alps.

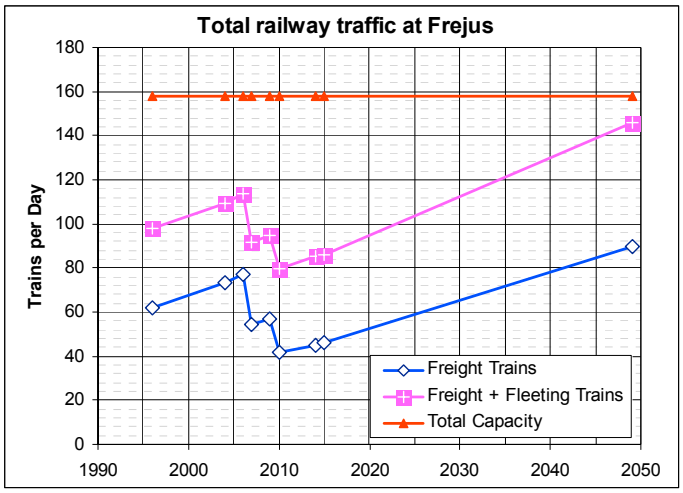

Fig. 2.7-6 Evolution of Frejus railway traffic

As stated into the **UE white book**, the very low speed of the international freight, which was 18Km/h in 2001, and 30Km/h in 1972, **is not so much affected by the speed of the trains**. The major role is played by the logistics needed for composing the trains, for moving/dispatching railcars, for changing locomotive, for custom operations, for technical verification of the wagons, for the dead time spent by the railcars while waiting for the next trains with the proper destination. The logistics for moving big railcars and composing/decomposing trains is the same since a century and the increase of goods amount and train lengths has just made it worse.

In such a condition, it is evident that a global recovery of the freight transportation speed and therefore the chance of the railway transportation to become competitive, neither depends from the increase of speed nor from the reduction of the distance, as 100Km difference has less than 2% influence over the overall time.

An independent source, as the Primola project, realized in the frame of the Interreg II Programme and in particular the synthesis published on December 2001 issue of "Ingeneria Ferroviaria" states literally:

> *The Simplon railway tunnel has not seen a traffic increase as the other adjacent alpine railway crossings, this was due to the spatial evolution of the transportation demands as well as to the* ***preference given to the Modane path****, even if for some traffic* ***the transit to the Simplon tunnel would have been shorter****"*

The study presented in 2001 by Alpetunnel, the company to which the CIG had assigned the tunnel design, states (translated from Italian with author comment in brackets):

> *The Turin Lyon railway line is definitely non-competitive and forcing trucks to use it would require a fare of 100-200 € applied to* ***all trucks crossing the Alps****, which would be much more difficult that making the tunnel. The Europe traffic forecast is not encouraging: according to the presented report, the freight transportation by rail is decreased by 23% in the last 30 years and projections are even worse for the 2025.*
>
> *In the privileged passing point of Frejus tunnel, the freight has reached 10Mt (in 2000)which corresponds to an* ***increment of 18%*** *in the period 1990-2000,* ***against a projection of + 118% made by the Promoters in 1991, on which the decision to built a new line has been taken****. Worsen and worsen is the passengers transportation, decreased by 15% into the decennium 1990-2000, against the forecasted growth of 500%. The TGV will allow only 50 minutes saving over the Turin-Lyon paht, not 1.5 hours as advertised, and the ferroutage will attract about 2 or 3 thousand TIR.*
>
> *The same report establishes that the line Turin-Lyon will move only 0.8% of the freight from the road to the rail* ***(Which is very different from a 1 million trucks reduction per year advertised by promoters!)***

A question arise spontaneously concerning the reason of so much insistence to build up this line even if since 2001 the Promoters had in their hands studies reporting the usefulness of the project. Beyond sentences of circumstance like "it 's necessary, it's unavoidable, it's strategic", a true answer does not exist so far, as does not exist a consolidated study showing that it is a good investment.

2.8. Is the freight transportation by road really increasing?

At the motorway Frejus tunnel a constant decrease of the freight traffic is being experienced since 1999, except in the period mid 1999 to 2003 in which the Mont Blanc tunnel stayed closed. The number of trucks was 1,38 millions in 1999 and 1,18 in 2004 (SITAF data), while for the 2005 the data reported by SITAF of 784,000 trucks, equivalent to 12.6Mt, has to be corrected to account for the absence of traffic in the period June 6th to August 31st, when the tunnel remained closed for an accident. By correcting the about figures with the traffic data of the same period of the 2004, the number of trucks becomes 953,000, for 15.3Mt of goods.

Freight traffic at Frejus motorway tunnel is still today affected by truck limitations at Mont Blanc, but the total freight traffic (road + rail) by removing the Mont Blanc effect, is about constant around 21-22 Mt, (Tab 28-1).

Tunnel Frejus	Millions of tons per year												
Mode	*1985*	*1990*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*
Highway A32	4.3	8.9	12.4	12.4	12.6	12.8	22.8	25.8	25.7	24.1	20.7	18.6	15.3 (a)
Railway	7.5	7.2	8.5	9.7	10.1	9.3	9.2	9.4	8.6	8.6	7.8	6.9	6.9 (b)
Total	11.8	16.1	20.9	22.1	22.7	22.1	32	35.2	34.3	32.7	28.5	25.5	22.2
Note	*(a) The figure is computed as Frejus tunnel would have not been closed from Jun 6 to Aug 31 2005 (SITAF data)* *(b) Value not yet available - data equal to 2004 is assumed*												

Tab 2.8-1 Freight traffic at motorway and railway Frejus tunnels (CT Rivalta + SITAF elaborated data)

The statement that the freight traffic inside the Frejus motorway tunnel is in continuous growth is not true. Accidents and other factors as, fares increasing and forbidding dangerous freight transit in other tunnels have influenced the natural traffic trend at Frejus, which by the way, is decreasing.

2.9. The construction sites in the Italian territory

Eleven building sites are planned for constructing the national segment, they are at Consolata, Cabianca, Viadotto Stura, Brentatore, Pianezza, Brione, Rivera, Rocca Bianca, Caprie, Grangetta and Chiampano, while 8 sites will be in place for the international segment: Esclosa (Novalesa), Venaus, Berno, Foresto, Val Clarea and Chianocco (3 sites).

- Each site would be equipped with a stock of gravel and sand of 600 or 700 thousand tons, which would require between 4 and 7 hectares of ground field.
- At some site as at Esclosa a stock of gravel and sand of 1.5Mt would be needed for the production of 210,000 cubic meters of concrete parts. As well from Esclosa a cable conveyor will be built for transporting the 4-5 million of cubic meters of extracted rocks up to the Carriere du Paradis, near to the Mont Cenis pass in France.
- Management and transportation of the hoggin will require the installation of about 15.4Km of tubular transportation and a total of 110 Km of conventional tape conveyors, in use at Chianocco, Berno, Venaus, Esclosa for either the extracted and the treated materials.
- An other 5 Km tape conveyor will connect Borgone site with San Giorio disposal, by crossing historical railway, national road, Dora Riparia River and the A32 highway.
- The sites of Venaus, Berno, Foresto, Chianocco should be as well equipped with mills for fragmenting and smashing the extracted rocks, external station for concrete preparation, gravel pits, hoppers for concrete and tape conveyors. Everything will be installed externally close to villages of the Valley.

2.10. The tunnel extracted material, utilisation, transportation and disposal.

The material extracted from then tunnels of the Italian side will be about 16 million cubic meters, 7 of them for half of the basic tunnel, 3 for the Venaus-Chianocco one and 6 for the Gravio-Musine tunnel. Study of the Polytechnic of Turin has assessed that 25% of the extracted material can be reused for the railway parts passing over embankment, for concrete preparation and for flatting the parking area of San Didero. The remaining 75% (about 12 million cubic meters) will be disposed as follows:

- 2.3 millions of cubic meters in the northern Turin surroundings, as Castiglione Torinese, San Mauro, Pianezza, Basse di Stura, Borgaro, Collegno laghetto and Cave Druento.
- 8.3 million will be shared in mid-low Susa Valley disposals at Almese, Sant'Ambrogio, Caprie, Borgone, San Didero, San Giorio, Villar Focchiardo, Chianocco, Bussoleno, Mattie, Meana, Susa, Giaglione and Chiomonte
- 4 millions at the Carriere du Paradis, which is a French Susa Valley place near to Mont Cenis artificial lake, where in the past several millions of cubic meters of material was extracted for building the dam. Absence of French authority permission will turn in additional 4 millions cubic meters to be disposed in Italy.

All material extracted from the tunnel will be mainly transported by road to the stocking areas, the re-utilisation and treatment sites and/or to the disposal. The only exception is the material designated for the Carriere du Paradis which will be transported by cable and tape conveyors.

About 2 million travels of the biggest trucks are estimated necessary to move all such material, while 100 to 160 travels are forecast daily in most of the construction sites, 24 hours a day, about one every 5-7 minutes. In addition there will be all travels needed for the transportation of the construction material as, cement, formed concrete parts, gravel, sand, pipes, railway material and so on, everything on the ordinary roads.

- About 1150 daily one way travels are foreseen in the area of low Susa Valley and Turin surroundings; this every days, for 10 or more years.

The need of gravel and sand for the preparation of the concrete is satisfied by a number of hoggin excavation sites. For the construction of the Italian segment, 11 sites are identified at Castiglione T.se, Torino (Basse di Stura), Pianezza (2 sites), Caprie (2 sites), Villarfocchiardo, San Didero/Bruzolo (2 sites).

2.11. The costs

Cost of the International Segment				
Data in € millions	**Italy**	**France**	**Total**	Cost criteria
Basic Tunnel 53.1 Km	432	2448	2880	Proportional to 7.97Km in Italy and 45.13 Km in France
Tunnel Venaus-Chianocco 12.5 Km	960		960	Cost totally under Italy
External works (trench-viaduct..)	236	123	359	Proportionally to lenght of part not in tunnel
Railway system	255	480	735	Proportional to 25.5Km in Italy and 47.7 Km in France
Non railway systems	40	224	264	Proportional to 7.97Km in Italy and 45.13 Km in France
Imprevisti	273	466	739	Proportional to Italian and France sharing costs
Other (non declared)	282	481	763	as above
Total for International Segment	**2479**	**4221**	**6700**	*Data from LTF (Jan 2005)*
	37%	63%	100%	
Italy-French agreement	**4221**	**2479**	**6700**	MoU - Lunardi-Robien May 2004
	63%	37%	100%	

Tab 2.11-1 Geographical sharing of International segment cost (Official data from LTF- apportioned by the author)

The 2003 cost estimation was 6700 M€ (6695 for correctness) for the International segment, 2300 M€ for the Italian segment and about 4.1 for the French, thus the total project cost was 13100 M€ (M€ = € million).

On Dec 23rd 2004 CIPE has approved the Italian part of the International segment at a cost of 6957 M€ (+3.8%), while for the Italian segment there is just a reference to the 2003 estimate. It will be approved on August 2005 (but published only in March 2006) for an amount of 2375 M€, correspondent to about 2300 M€ at economic conditions.

The definition of the segment made at para 2.1 allows to compute the geographic cost sharing of the International segment as 2479 M€ (37%) in Italy and 4221 M€ in France, as highlighted in Tb 2.11-1. Totals and percentages are exact, while the author estimates the sharing of each individual element.

The geographical cost sharing of the entire Turin-Lyon is again in the same ratio, 37% for Italy and 63% for France as shown in Tab 2.11-2. This is not to be confused with the sharing of the financing.

The average cost of the International segment is of 91 M€ /Km, while the cost for the various typology of the line is varying from 70M€/Km for the external parts over embankment to a maximum of 114 M€/Km for the Chianocco-Venaus tunnel.

The cost of the national segment seems underestimated being the average cost of 51M€, not even sufficient for the simpler external parts and for sure not enough for tunnels. This seem confirmed by the fact that a 23Km external segment of the high speed railway Turin-Milan has cost 1426 M€ (EC 2003), equivalent to 62 M€/Km. By using such data the cost of the national segment would increase to 3800 M€, instead of 2300, which is +65% of the RFI estimation.

A very import point concerning cost is the trend of the consolidated cost of the on going Italian TAV projects (see Tab 2.11-3), which shows an increase of a 4.4 time (+314%) in a 10 year period, from the initial estimates. Even by removing the effect of the inflation by escalating the price from 1991 to EC 2002, which equates to +42%, the remaining net cost increase is still 292% in 11 years, i.e. 10.2% cumulative per year on top of the inflation. Not bad!

Applying the above typical cost increase for project of the same nature, over a 15 years construction period, than the overall cost of the Turin-Lyon would range around 64000 M€, starting from an initial estimates of 16000 M€.

This is not all, because to this cost most likely will sum up all so far neglected costs elements, including the disposal of eventual dangerous material, for difficulties encountered due to water and gas inside tunnels, archaeological findings and for all actions implemented for mitigating the impact on the environment.

Geographical Cost Distribution	**Italy**	**France**	**Total**
Italian Segment	2300		2300
International Segment	2479	4221	6700
French Segment		4085	4085
Total € millions	**4779**	**8306**	**13085**
	37%	63%	100%

Tab 2.11-2 Geographical cost sharing of entire Turin-Lyon

High Speed Cost-Italy (€ millions)	**August 1991**	**August 2001**	**May 2002**
Naple-Rome	2014	4984	6559
Roma-Florence	207	351	775
Florence-Bologna	1085	4209	5113
Bologna-Milan	1498	5733	6921
Milan-Turin	1085	2789	4803
Milan-Verona	1136		4700
Verona- Venezia	878		4235
Genoa – Milan	1601		6249
Total (€ millions)	**9503**	**18066**	**39354**
% Increase	**0%**	**90%**	**314%**
(source:GUASCO - Services to Industries - Bologna)			

Tab 2-11-3 Italian TAV cost evolution

2.12. Who is financing the Turin- Lyon ?

Despite the 65% of the line is into Franch territory and 35% in Italy, the representatives of the Italian government as agreed with the French counterpart to equally share the cost of the project. The MOU (Memorandum of Understanding), signed in May 2004 between the Italian former transportation minister Mr Lunardi and the French Robien, states:

- *The cost of the international segment are split as 37% for France and 63% for Italy, over a reference amount of 6700 M€ at January 2003 EC, (i.e. ~2600 M€ for France and ~ 4220 M€ for Italy).*
- *The costs of the French and Italian segment are in charge of the respective countries.*
- *The eventual additional costs are equally shared, providing that the total increase remains within 15% of the initial reference amount of 6700 M€. Sharing of costs in addition to 15% is subject to case by case agreement. French are conscious of the typical cost increase on running Italian TAV projects.*

The CEE law (2236/95) allows a 10% financing of the total cost of the sole infrastructure segments across borders of the states. Extension to 20% is allowed in case, priority projects mentioned into the CEE decision 1692/96/CE (Turin-Lyon is part of those), are initiated within 2010.

The above leads to some considerations:

a) The importance of the project must not be confused with the necessity of realising it regardless the implications. In other words, **no European directive supersedes the environmental impacts**.
b) The condition of starting the works within 2010 for accessing to EU financing up to 20% can be interpreted in several ways, as for instance for facilitating the availability of short term financing, but also for discouraging long term projects which by that time are not able to justify their necessity. Despite the interpretation, this constitutes a stimulus for the various construction companies, for start working before 2010, with the risk that some of this project is abandoned after few years. It is difficult to say if this will be the case of the Turin-Lyon, however it is sure that as stated literally into the MOU: *The two States commit to **put in place all possible means to maximise** the contribution given by the UE*.
c) The UE contributions do not fall from the sky, sooner or later will be paid back by the population of the member states, directly (e.g. taxes) or indirectly (e.g. reduction of local productions).

As a consequence of the agreement, the forecasted cost of the project is financed 50% each (about 6500 M€) as shown in Tab 2.12-1, but Italy is contributing with 1800 M€ higher than the cost under its territory (4779 M€) and for the France this represent an appealing discount.

Supposing a 10% contribution from UE, then the sharing established by Lunardi Robien agreement changes as shown in the right side of Tab 2.12-1. The France will finance only 6316 M€ of the 8306 M€ under its territory (Tab 2.11-2) which is a discount of about 2000 M€ , covered by Italy and UE, while the sharing of the International segment remains 37% and 63% for France and Italy respectively.

Sharing of National Financing	**Without UE contribution**			**With UE contribution (10%)**			
	Italy	**France**	**Sum**	**Italy**	**UE**	**France**	**Sum**
Italian Segment	2300		2300	2300			2300
International Segment (agreement)	4221	2479	6700	3799	670	2231	6700
France Segment		4085	4085			4085	4085
Total € millions	**6521**	**6564**	**13085**	**6099**	**670**	**6316**	**13085**
(%)	50%	50%	100%	47%	5%	48%	100%
Note: These are initial estimated costs (EC 2003) and the figures provide the overview.							

Tab 2.12-1 France-Italy cost sharing with and without UE contribution

It is important to recall a part of the deliberation 5/2004/g of the central control section of the "Corte dei Conti", concerning the management of the state administration:

> *The Italian state financing law for the year 2003 (art 75), has substantially exceeded the aspect related to the percentage of the investment in charge to the State, giving disposition for a deep modification of the entire financing scheme of the TAV/TAC System, on which ISP is tacking the place of the State for financing the entire System. The logic of the above mentioned law is that the State does no longer finance the construction of the railway infrastructure (the AV/AC network), the company managing such infrastructure (ISPA) will have to access to credits for building the network but the revenues will not be sufficient to reimburse the debit and therefore the State will have to intervene to reimburse ISPA.*
>
> *Particular relevance has the new accounting of the financing system for the AV/AC project, established by art. 75 of the law 289/2002, which for sure will have repercussion over the public finance starting from 2009, the year in which it is foreseen that the State starts intervene with considerable amount of money for integrating the coverage of the ISPA debit.*

Accordingly, the deliberation of the Corte dei Conti does not mention the Turin-Lyon among the projects to be financed within 2009. As a consequence the works subcontracted from ISPA before the 2009 will be covered

by the banks, which will receive guarantees from the State, through Patrimonio S.p.A, by mortgaging state properties (beaches, monuments, roads..) and reimbursing them with interests, after 20-30 years.
This is a bright trick of the "creative finance magicians" for not degrading further the deficit of the State public balance, avoiding the violation of the European agreed parameters, pushing onerous costs to the future generations. A trick for getting immediate profit to private companies, financers and constructors, by investing public money of the future ant leaving the debts to our sons. The same scheme will be applied to several other infrastructure projects initiated by the government in these years.

- Eurostat, which has the duty of validating the public balances of the member States, has highlighted in May 2005 that the 3% maximum increase of the ratio between the Italian public deficit and the internal gross product was indeed violated by Italy during both 2003 and 2004, because some cost elements, including ISPA for the AV/AC projects, were not considered in the balance.
- The wish of the Turin-Lyon promoter's is to access and collect private financing (see also PPP) but severe doubts arise because of the low forecasted economic results and because of the recent bad example of the Eurotunnel (France-British) where investors have lost 95%. The absence of private investors will have to be covered by the State, subtracting founds from the budget of the welfare, sanity, school and so on.
- Fortunately since Jan 2006 it wont be possible for the States to skip from their balances the public financing for European priority projects.

2.13. The operative costs

LTF declares that the operative cost of the international segment only, will globally amount to 65 M€ per year, including the infrastructure usage, personnel, maintenance, renewing of equipments and so on.

An independent study made by Polinomia for the CMBVS shows that 40 Mt of freight per year, corresponding to 350 daily freight trains, 1500-2000 meters long, one every 4-5 minutes, running at 150 KM/h and interleaved with fleeting trains travelling at 300Km/H, would be required to balance revenue with the above operative cost. The maintenance for granting safety and minimising noise would have a significant cost.

There is a strong doubt concerning the possibility to concentrate over a single tunnel the freight fluxes crossing the Alps in different locations as Ventimille, Bardonecchia, Domodossola, Chiasso and Brennero. Forcing truck to pass over rail is not that simple. The traffic adapts to the situation, taking other routes o continuing on motorway simply because for many products the effect of a motorway tunnel fare increase give a contribution on the product price within the daily fluctuation of the market, so the consumers will simply pay it. This is why the Turin-Lyon line will never be able to transfer significant freight traffic from road to rails.

2.14. The Turin-Lyon work planning

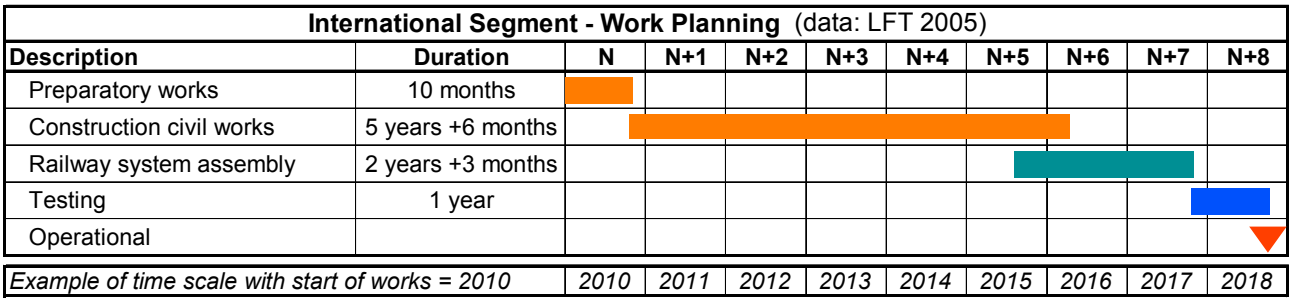

Fig 2.14-1 Work planning for the international segment

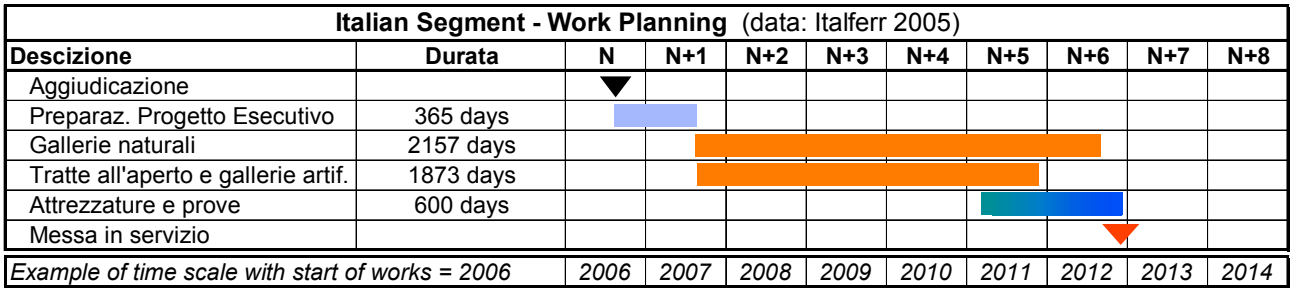

Fig 2.14-2 Work planning for the international segment

The construction of the international segment tunnels will take about 6 years and 4 months, initiating the excavation from different 17 places, then other 2.5 years will be necessary to put in place rails, electrical stuff, aerial power line, all the equipments and to perform testing of the line, which lasts about 1 year. The time necessary to build and to get the line operational is about 9 years, leading to start the work within the 2009 should the line be functioning by 2018, as requested by LTF.

On the basis of data from Italferr, prime contractor of the Italian segment, the Italian portion should be approved by mid 2006 and the winning subcontractors will have 1 year time to present the final detailed designs (which by the way might differ from the Italferr overall design) and to complete all the constructions and the railway in a bit less than 6 years, so to have the line operational by 2012.

The time declared to build the Turin-Lyon seems not in line with trends of other AV/AC projects in Italy and a minimum of 15 years duration can be envisaged, going well beyond the 2020 target and providing that the works are not suspended for unavailability of founds. A considerable delay affects already the preparatory activities and the consequent approval of the national segment, however there's no real hurry to start.

The duration of the works will depend on the availability of financing for covering the nominal payments of the projects as well as the additional money, which will be needed in case of changes or in case of serious and unforeseen events. The LTF risk management pot, consisting of the 12% of the cost of the international segment, can be exhausted very quickly, in case of problem occurrence or in case of neglecting estimations.

Thirty years ago, the work for doubling the rails of the historical line between Bussoleno – Bardonecchia were blocked for some year due to the difficulties encountered from the contractor while building the tunnels in the area of Exilles and Salabertrand, because the presence of significant sources and infiltration of water. Another example is a tunnel recently made in the same area of the basic tunnel, but not that deep, for the construction of the Pont Ventoux power plant. The construction took 7 years against an initial estimation of 3.

2.15. What about France ?

- Several different commissions of experts, appointed by the French Government, have risen serious doubts over the Turin-Lyon project, which from the France audit of the 2003 resulted **as not a priority** for the France and **problematic for the cost, benefit ratio**. The report of the France super-experts was suggesting directing the near term effort toward the improvement of the historical line, as its saturation by the 2015 would be very improbable and because it was **too early to predict when it will be saturated**. This concept is reinforced by the fact that from 2003 until now, the freight transportation has decreased.
- The agreement for financing the project is appealing for France, which is now pushing for the construction of the Turin-Lyon line. The project is welcomed by several local administrations of the Maurienne, but a part of them is against, because of negative past evaluations and bad marks given by environmentalist and economical institutes (Setec Economie).

2.16. The Europen Comunity and the High Speed Railway projects

- The law L245/296 published on the European Community Official Gazette on 12 Sept 2002 defines the technical specifications and characteristics of the high speed railway lines, splitting them in 3 categories:
  1. specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h,
  2. specially upgraded high-speed lines equipped for speeds of the order of 200 km/h,
  3. specially upgraded high-speed lines which have special features as a result of topographical, relief or town-planning constraints, on which the speed must be adapted to each case;

  The upgrading enhancement of the historical line Turin-Modane can fit the criteria of the 3rd category,
- Concerning the environment, the CEE directive (2002/733/CE) defines 5 essential requirements for the implementing the European railway network: 1) **Safety**, 2) reliability and availability, **3) health, 4) preservation of the environment** and 5) the technical compatibility.
- The corridor number 5, frequently mentioned in the recent appearance of the Italian Prime Ministers and other politicians, is no longer existing as Lisbon-Kiev. It was defined in 1997at the Helsinki conference, conceived as Trieste-Lubjiana- Budapest-Leopoli railway connection and in the subsequent years it was extended toward West of Italy. Since the end of 2002 the European Community has start defining **axes** and TEN-T (Trans European Network – Transport) projects, for railway, motorway and navigation lines, where the Turin to Lyon line is collocated within the Project Number 6.
- The last updating (*final report from the High Level Group chaired by Loyola de Palacio, November 2005*), defines 30 priority axes, including the number 6 as Lyon-Turin-Milan-Trieste-LubJiana-Budapest-Ukrainian border and the number 3 Lisbon-Lyon. The connection between the Ukrainian border and Kiev (about 800 Km) is not mentioned by the TEN-T and it is so far not committed by the Ukraine.
- Despite Italian politicians repeat that precise agreement are in place for the corridor 5, there is only the evidence of some signed bilateral agreement/understanding, while there is absolutely no trace that the European Community has never requested to implement an highly impacting project as the one currently proposed. The selection of the 30 priority axes has been made to cover the entire Europe with a flexible network and therefore it is possible to define long distance path as a series of different alternatives obtained by combining shorter traces together.

- According to the above official document, none of these priority axes is privileged over the others and for instance it is possible to create a path between Lisbon and Budapest by joining the project 3 and 6 through Turin-Milan or joining the projects 3, 24, 17 and 22 transiting in southern Germany, the resulting distances are about the same. This tells that the European Community has given the same importance of passing at north or at south of the Alps.
- Spain and Ukraine track gauges, respectively 1676 mm and 1524 mm, are different than the gauge of France, Italy, Slovenia and Hungaria, which measure 1434 mm. A corridor cannot be defined as such before having implemented the interoperability between the systems used in the different countries.
- One of the interesting highlights of the above final report is the connection between navigation lines and railways axes and the importance of the Mediterranean harbours for the connection with the far east countries (China, Japan..) through the Suez channel. The disposition of the navigation lines and harbours are such that the south-north axes will mainly support intercontinental traffic from/to Asia/Africa, while the east-west axes are supporting the over Atlantic destinations as well as the European intrastate transportations, this to say that the end to end Lisbon-Ukrainian traffic will be very limited.
- The directive 85/337/CEE (para 4.2.3.2) requests evaluation of specific design data concerning the environmental impacts, the plans for impact reduction and for mitigating the risks for damaging the ambient and the population, together with the commitment of the member states to survey the application of the regulations and to grant the diffusion of the information. Unfortunately in Italy a law known as “Objective Law” limits the environment impact verification to the preliminary design, skipping agreement with local administrations so that nothing else is due when the selected subcontractors produce the detailed designs.
- Infraction procedures have been opened by UE in 2004 against the Italian state because of the direct negotiation assignment of the General Contractor, which is in violation with the competition regulations and for the simplified VIA (Ambient Impact Verification) applied according to law n.190/2002, “Objective Law” (L. n. 443/2001), which is again in contrast with the European regulation.

2.17. Benefits and comfort for the Susa Valley residents

Excluding the awarding of small contracts to local firms, all the other construction and equipping works will be performed by specialized company and by their personnel coming from other region of Italy or even from other European states. This is the typical scenario of big infrastructure construction over all states. Everybody in the valley remembers the years 70th where a company from Como area was doubling the rails of the mountain part of the historical line and the same happened during the construction of the Turin - Bardonecchia A32 motorway. The personnel recruited locally have been always insignificant.

During the operational phase some resource will be employed for managing the line, the basic tunnel and the train parking area of Bruzolo, however part of the tunnel personnel will be French. About fifty people in total, a fraction of what was the personnel of the glorious Bussoleno railroad depot and workshop, where locomotives maintenance and repair was performed, but then dismantled at the beginning of the years 90.

The beneficial effects advertised by the sponsors will be limited to small business for dealers, restaurants, bars and economical operators for the duration of construction works. No positive effects are envisaged once the line operates, but several negative implications and damages to the ambient and to the inhabitants of the valley are envisaged, as it will be described in the next paragraph.

3. AMBIENT IMPACTS AND IMPLICATIONS

Introduction

A lot of people believe that building something, which allows decreasing the freight traffic on the motorway corresponds to a reduction of the pollution. This is a very questionable statement as in reality the matter is complex, trucks and vehicles pollute because of their number but also because the engines, specially those built outside Europe, do not fulfil regulation for combustion, gas and particulate emissions.

	CO	NOx	HC	Particolato
Euro 0	11,20	14,40	2,40	0,60
Euro 1	4,50	8,00	1,10	0,36
Euro 2	4,00	7,00	1,10	0,15
Euro 3	2,10	5,00	0,66	0,10
Euro 4	1,50	3,50	0,46	0,02
Euro 5	1,50	2,00	0,46	0,02
Δ% (da Euro 0 a Euro 5)	-87%	-86%	-81%	-97%

Tab 3-1 – Truck Emissions versus engine energy [g/kWh]

Too often vehicles spreading suffocating gases and particles, circulates on our highways, some of them are coming from the European east, but in many case they are simply old and out of maintenance. Forbidding the transit of such trucks to some of the alpine passes does not correspond to a solution as if they are allowed to enter into a state then some place has to let them go out. The local block of access to polluting vehicles does not resolves the problem of the pollution, simply transfers it elsewhere.

Tab 3-1, defining the emission of truck engines as function of the European regulation, allows to simply compute that 7 trucks of Euro 5 class give the same quantity of polluting elements than 1 class 0 truck. Obviously this is not an excuse to allow any quantity of traffic because the regulation takes care of pollution. It is a disillusion means for whoever promise or believes that with the implementation of mastodontic projects as the AV/AC, the pollution can be drastically reduced because of the significant (30-50%) freight traffic reduction, which by the way for the Turin-Lyon will be only 0.8%, so the pollution reduction will be negligible. In a 10 years period most of the circulating trucks will be renewed and a pollution reduction obtained anyhow.

The ferroutage is as well a local, not very efficient compromise, because a train of 1185t, absorbing 6MW is needed for transporting 18 trucks with a total of 288t of freight. The efficiency is 25% against a 53% by road.

To correctly compare the environment pollution in the case of railway and road transportation a complex thermo-energetic analysis has to be performed. Such analysis, performed by the University of Siena for the Milan-Naples TAV line starts as follows: *The TAV has environmental impacts comparable to the individual transportation in car and absolutely superior to the freight transportation by road. The* ***emission impact is not better*** *and the* ***quality of the ambient is worse because of the presence of the infrastructure****……..Even the comparison between global level emissions are not comfortable: With respect to cars, the TAV emits more* SO_x *(Sulphur oxides), more particulate and comparable quantity of CO2 (Carbon dioxide)*

The above is because the energy is not just needed for moving trains (up to 8.8 MW for each ETR and up to 9.6 MW for the France TGV) but also for supplying the entire infrastructure, for the safety equipments, services, illumination, ventilation and so on including the energy lost in the iron rails and wires copper. Particles, gases, and oxides are released where the energy is produced, including radioactive waste whenever the energy is produced by thermo-nuclear power plants.

The advantage of the train to concentrate the pollution at the power plants, so in principle in a more controllable way, is acknowledged but in addition there is all the pollution generated during the infrastructure construction as, particles, powders, chemical elements, gases, liquids and so on, for 10-15 years.

Cleaner transportation means are necessary for the future, however this will not be sufficient without adoption of a suitable policy for containing the transportation increase, avoiding mastodontic and economically unmanageable infrastructure, just because the industry found more profitable buying materials and freight elsewhere instead of procuring or producing them locally.

3.1. Is there asbestos or not ?

- The asbestos, in the Lanzo and Susa Valleys is present in form of Serpentinized Peridotite (commonly called Serpentine) and in Tremolite, white or grey minerals of the amphibole group, that is a silicate of calcium and magnesium, in form of friable or compact matrix, generally as filling of cracks.
- The presence of such ores, in Susa Valley and the side valleys of Lanzo and Chisone, is traced in the Italian Mineralogical Maps. The Asbestos quarries are well visible and the Balangero one was the most productive in Europe.
- The documentation of Italferr estimates about 1,15 million cubic meters of serpentine in the sole Gravio-Musinè tunnel (23 Km long) equivalent to approximately 15% of all the extracted material from such tunnel. Italferr had commissioned the study to the university of Siena, which has taken ground and rocks samples in 29 points of the zone. The result is that 34 cutting fractures have been traced, mineralised to asbestos, but the study supports that in work course sensitive variations regarding the estimation could occur.

- Two recent Susa Valley events bring in mind that forgiving the asbestos aspects, treatments and its disposal could have been intentional to keep down the initial project cost estimate.
    1. The Frejus tunnel is currently subjected to works for enlarging the profile (gabarit) of the Frejus tunnel so to allow the ferroutage to board also taller trucks. The removed material rich of asbestos is temporary disposed at Salabertrand, treated with gluing liquids and then transported to Germany.
    2. During the works for the preparation of the free style site for the 2006 winter Olympic games, Dr. Guariniello, has open a procedure for the presence of the asbestos, measured by ARPA (Agency of Piedmont Region for the Ambient) in percentage 16 times higher then the law allowance. The result is that the construction of the site has been moved.
- Last event is the ovation of politicians and promoters because no asbestos was found at the Seghino soundings. The truth is that LTF design documentation defines the objective of that sounding (identified as S42) for hydrologic research and not for searching asbestos. Unfortunately politicians and mass media didn't say that to the Italians.

3.2. About uranium

- The presence of uranium pitchblende in the zone of the basic tunnel was pointed out in the years 60 by spectrographic analysis executed by the French Minatome and the Italian Agip companies. Superficial rocks with radioactive emission have been localised in 16 points of the geographic trapezium connecting Novalesa, Chiomonte, Oulx, Bardonecchia, as well as in the French territory neighbour.
- The LTF project neither contemplates the radiation monitoring during excavation works for determining the presence of radioactive material, nor plans for handling and disposing such material, if found. In absence of such plan, rocks and debris containing radioactive material would be transported in open trucks without knowledge of workers and inhabitants, disposed in open dumps, spread by winds, rains and ultimately entering into the human feeding cycle, through the water, the meats, the vegetables, etc. The specialists of the Polytechnic of Turin have defined a real nightmare.
- Being the presence of uranium documented, the fact of not having identified such risk, estimating the eventual cost for the handling and disposal, constitutes again a trick to keep down the initial project costs.
- Prof Zucchetti of the Polytechnic of Turin, made a clear point concerning the severity of the Italian legislation, in particular the law 241/2000 which is today very restrictive about radon, gas derived by decay of radioactive material, toxic for inhalation and potential source of the pulmonary cancer. In case the excavation works fall into area with dangerous concentration of uranium or radon, then the workers of the tunnel would become immediately professionally exposed to radiations, with all health and cost implication. LTF mentions the monitoring of the Radon and the Grisou, sadly known to coal miners, but does not identify any plan and counter measurements.

3.3. Powders, particulate, other polluting elements and their transportation

The meteorologist did comments the inadequacy of the Italferr project of the Italian segment because it was not including any environmental analysis for assessing the dissemination of the particles, mainly asbestos. In particular, the weaknesses of not considering the Val Susa peculiar climate and the risk of spreading asbestos in a wider town area were pointed out. The small asbestos fibres with a diameter of some microns, present in the zones of excavation, over the trucks loading and in the open dumps, will be then carried toward Turin and surroundings by the breeze that in morning flows from the valley towards the city, or by strong western wind blowing again toward the city. Vice-versa, in the sunny afternoons the large air masses, warmed by the mountains slopes exposed to the sun, will such cold air through the valley entrance dragging asbestos fibres upwards, toward the tip of the mountains, at altitude much higher than the working sites.

Gliders flying into the Susa valley know and use such large ascending air columns for gaining altitude up to 3000-4000 meters by spiralling inside them.

Same journey will occur to all particles, smoke and harmful gases generated during the construction, risen by the trucks and operating machines at the construction sites, generated by smashing the extracted rocks and by distributing the resulted gravel, by handling cement and other powders as well as by the thousand daily truck travels. All of them will deposit particles and chemicals over a large area, from the grasslands in high mountains to city of Turin, day by day, for 10 – 15 years.

It has been computed that the pollution effect would be equivalent of having 1000 -1100 daily heavy vehicles in addition to the traffic already circulating in the A32 highway, which correspond to a 35% daily increase, for the whole duration of the works.

The design data of Italferr mentions a 3% increase of the particulate, which would make the atmosphere of the valley equivalent to the one of a big town. The question of the people is how it will become the atmosphere in 10-15 years if today it is already close to the limits. A whole generation of infants will born and grow until the adolescence in such environment.

3.4. The acoustic noise

For 15 years the noise coming from the construction yards, the transportation vehicles, the augers, the mines, the equipment running days and nights, will propagate along the valley and in the Turin northern surroundings.

LTF states that during the construction phase, provision to absorb of limit the noise to the population will be taken if necessary, such to bring the noise lever under the law (L447 26/10/95) prescription. The noise estimated by the designers for the sites of the Italian segment, ranges between 100 and 123 dBA (acoustic decibel-see Tab 3.4-1). The construction sites of the Turin surrounding are plan to work from 6 AM to 10 PM, while in the Susa valley all sites will work 24 hours around the clock.

Level	Qualitative ambient
0 dBA	Reference level = human hear sensitivity = pressure wave of 20 microPascal
20 dBA	Very silent ambient: bed rooms at night, windows with double glass and closed
30 dBA	Silent ambient: some fable background noise in a room during the day, closed windows.
40 dBA	Some noise distant noise can be perceived: a room during the day with open windows, in a quite area.
50 dBA	External noise in quite areas during the day
60 dBA	External noise in areas with some traffic.
70 dBA	Crowd road
75 dBA	Threshold for the working areas

Tab 3.4-1 Qualitative noise levels

Max admissible external noise Vs area typology Law 447 of 26/10/95	**Level dBA LEq** Daytime 6:00-22:00	Night time 22:00-6:0
Residential areas	55	45
Mixed areas	60	50
Area with intense human activity	65	55
Areas mainly industrial	70	60
Areas exclusively industrial	70	70

Tab 3.4-2. Regulation for external noise - Italy

The risk is that the provisions mentioned by LTF remains just good proposition and in case of problems during the works the people has to proceed legally, hoping that in the meantime the legislation shortens the times when remedy must be set.

Once the line will be operative fleeting and freight trains will produce the noise. LTF and RFI declare that barriers made of aluminium, PMMA and wood, as well as ground dunes will be arranged to meet the noise requirements imposed by the law.

The objectives of LTF, respectively 58 dBAs at night (10 PM to 7 AM) and 63 dBAs in the daytime 63 dBAs, are not in line with Italian law because of both levels and the night time period (see Tab 3.4-2).

The RFI objective is not to exceed 50dBA LEaq wherever, which is good but very optimistic as measures taken around operating lines give noise figures much higher that RFI expectation. The dimension of the bands of respect around the line will play a certain role for noise reduction.

Even if the European normative has imposed design limits to railcars and locomotives emitted noise, the first results are just coming but the way to get silent trains is still long, as the noise produced by the passage of the TGV is around 93 dBAs at 100 meters. This leads to the necessity of planning and building protections, absorbent barriers, large respect bands around the line, so to get the noise level within the applicable government regulations. Just to make an example, the attenuation required to reduce the noise from 93dBA at 100 meters to 50 dBAs to 150 m, is of around 40dB, which are equivalent to reduce the wave pressure wave by a factor 100.

The Department of Aeronautical and Space Engineering of the Polytechnic of Turin has conducted specific studies confirming that the propagation of the sound in an alpine valley is very different from the propagation in a flatland. This is due to the reflections of the mountains and of the slopes that create for diffraction zones where noise results amplified and others in which it is attenuated. Then considerations have to be made to the effects of the wind, the breeze and in general to the dis-homogeneity of the atmosphere of a valley.

- The designers of the line have not taken these effects into account; noise estimation has been performed with flatland models getting misleading results also in the evaluation of the noise absorbing provisions. This means that most of the noise absorbing or protecting provisions defined into the project will not be enough to meet the regulation, leading to new protest of the people followed by legal actions and finally additional cost to be withstood by the government.
- Under request of the commons and environmentalist association, RFI-Trenitalia have several legal procedures opened for exceeding the noise limits. Unfortunately the Italian law gives 15 years of time to bring remedy and solution to the noise.

In the Dec 13th 2005 meeting, the technical commission of the Turin-Lyon has approved a series of studies over different design and environmental aspects relevant to the noise, but unknown are the planning of the activities and the timescale of the results, as the minute does report neither actions nor due dates.

3.5. The effects on the human health

Some month after of the presentation of the preliminary projects, physicians and oncologists begun to denounce the human risks associated to the accomplishment of the TAV, particularly to the tunnel and to dangerous materials like the asbestos and uranium, which could be extracted during the works. In May 2004, more than 100 physician operating in Susa valley denounced the worry for the TAV construction works and the risks of severe damages to the public health. The envisaged health problems are the following:

- **Asbestosis**. It is a respiratory chronic illness awkward to the property of the asbestos fibres to provoke a cicatrisation (fibrosis) of the woven pulmonary with the consequent stiffening and loss of the functional capacity. The illness rises up after a long period of latency and begins in gradual manner, 10–15 years after the exposition to the asbestos. It is a typical professional illness occurring at mid-high expositions.
- **Pulmonary Carcinoma.** The pulmonary carcinoma is in general the most frequent malicious tumour. As for the asbestosis also for the pulmonary carcinomas a tight connection with the total quantity of inhaled asbestos was verified and with the habit of smocking tobacco. The risk to contract this tumour in presence of asbestos is about 1 over 2000 people (not smokers) and 1 over 200 people (smokers). It is characterized from a progressive deterioration of the health conditions and worsened at the end by troubles due to metastasis formation in other organs. For some smaller tumours at the initial phase a surgical removal can be attempted, but the results are often unsatisfying.
- **Pleura Mesothelioma.** The mesothelioma is a malignant tumour of the pleura; it is for sure the most serious consequence of the exposure to the asbestos, also for modest levels of exposure. It manifest after 15-20, also 40, years from the asbestos particle inhalation, but it has 100% mortality and the death come usually within nine months from the diagnosis.
- **Lymphomas**. The lymphomas can generate following contamination due to inhalation of uranium. The Superior Institute of Health recently emphasized a development (+236%) of lymphomas of Hodgkin in the soldiers employed in peace mission in the Balkans, because the exposition to the impoverished uranium. To equality of volume, the uranium present in the pitchblende is considerable more radioactive.

It is emerging with increasing obviousness the importance of the ultra fine particulate; 5 causes of death in exceeded to the average are due to tumours of the breathing apparatus. To strengthen this observation there are consideration related to the presence into the urban environment particulate of a lot carcinogenic targeting the pulmonary: the isopropyl alcohol and various nitrite developed during combustion processes, but also the heavy metals, chrome, arsenic, nickel, etc.

Meanwhile an epidemiological study lead from ARPA emphasized that 12 cases of Mesothelioma have been found in the last years in upward Susa valley, one of highest level of the Piedmont.

Then there are all the effects due to the noise if this is not reduced to suitable levels, that are: troubles of the sleep, hypertension, effects on the mental health, besides the annoyance which is more or less known by everybody. However there is an extra series of auditory effects which might become important: changes in the electroencephalogram (EGG), pot-seemed arterial, increase intercranial pressure, headache, cronassia reduction, aggressiveness, depression, conflicting syndromes, activation of the encephalic-hypofisis system, increase thyroidism and of adrenal activity.

Besides the above there will be as well the risk of tumours and childlike leukaemia because of the presence of the new high voltage electrical power lines at 380KV and 132KV, as well as at 25kv for supplying the aerial above rails.

3.6. Hydrological risks

About 30 superficial water springs have been identified by RFI along the track of the national segment rail line, in the communes of Borgone di Susa, Caprie, Casellette, Condove, Rubiana, Almese, Val della Torre and Villardora. The number of springs is bigger and several of them are for drinkable water and therefore two problems rise:

- The intense activities can drain or deviate the springs leaving population without water
- The sources can be polluted, becoming undrinkable and unusable.

The excavation of the Musinè and basic tunnels brings potential impacts to the underground waters, typically interception of high pressure springs, or deviation of the normal flow of the underground waters produced due to obstacles and sections of the line. In presence of such very deep tunnel, the surveys soundings are not so practicable because in many cases the line is even more than 1000 meters under the ground level (see Fig.1.4-2) and because of the difficulty to reach the sounding sites situated upwards in mountain.

During the activities for the construction of the Pont Ventoux hydroelectric power plant, which is in the same zone of the basic tunnel, innumerable high pressure water jets have been found together with an underground lake of hundred thousands of meters cubes. The artificial lake of the Mont Cenis, a 40 millions cubic meters water reservoir at 2000 meter of altitude, supplying power plants in France and in Italy, is only 5-6 Km from the basic tunnel. Interception of very high-pressure jets cannot be excluded a priori during excavations.

In the national segment part surrounding Turin, several risks exist for the crossing of the water course, channels for irrigation and some of these are of serious concern where the lines runs in artificial tunnels under the ground level or in deep trench (from 7 to 12 meters) and in the country around Venaria and Settimo Torinese. It will be necessary to account for the hydraulic works necessary to restore trenches and irrigation channels and for the possible interferences with points of water withdrawal, waterworks and wells.

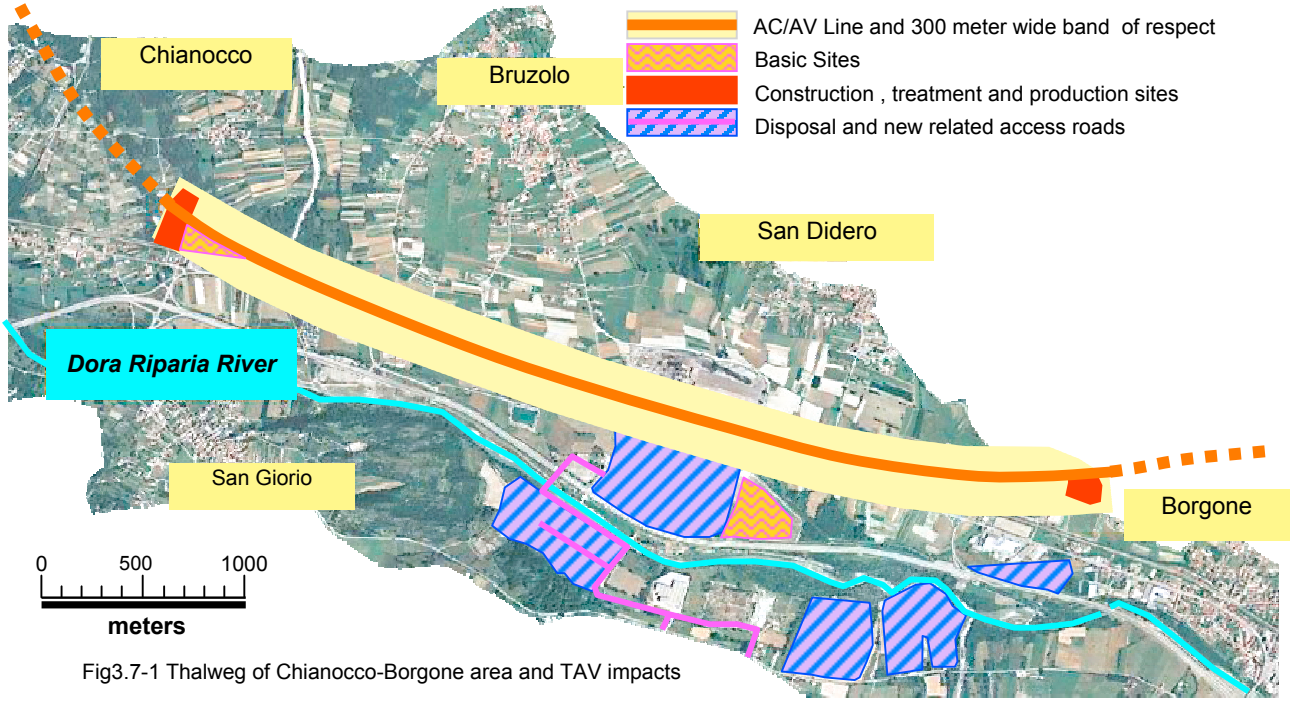

Fig3.7-1 Thalweg of Chianocco-Borgone area and TAV impacts

Proper precautions have to be taken to avoid the fall again in a Mugello's like situation, where due the intense activities of the Bologna-Rome TAV, a lot of villages and small cities waterworks remained dried because the underground water flow was deviated or lowered. It is necessary to account in advance for the water decrease risk and build in advance redundant water provisions, which unfortunately will increase again the cost.

The last point concern the dumps sites, the construction and basic sites positioned in the natural flooding relief areas along the Dora Riparia River. For such natural areas, whose are permitting flooding without endangering the villages on the border, there is so far no evidence that the utilisation permission has been provided by the Po river authority, who has territorial jurisdiction.

3.7. Impact on residential, industrial and agriculture areas

The impacts to the residential, industrial and agricultural areas are substantially due to the presence of a large, visible, shadowing and noisy infrastructure and to the means necessary to build it, as:

- 19 sites that will occupy about 120 hectares of ground for a variable duration between the 7 and 15 years
- 20 depot sites of for about 10 millions of cubes meters of extracted rocks, will occupy not less that 100, without accounting for 4 millions deposited at the Carriere du Paradis, in France.
- 20 kilometres of external railway over embankment, viaduct and trench, for a total of about 50 hectares.
- The train parking area of Bruzolo with its the intersection, the station, the power transformation plant will occupy more than 30 hectares, all together.
- A 1500 meter wide band of respect, along each external track of the line, for a total of about 600 hectares

Neglecting the access roads to the sites, cableways and tape conveyors, the overall occupied area is about 900 hectares, equivalent to an area 200 meters wide and 45 Kilometres long, more or less long as the distance between Bussoleno and Turin. Crucial are the areas at north of Turin, in particular Venaria and San Gillio, but also Venaus and Chianocco-Bruzolo-San Didero-Borgone areas, which will be devastated (Fig 3.7-1).

The effects are obvious in the Italferr technical documentation, justifying fields and lands compulsory purchase as well as destruction of houses and commercial buildings, even if the photographic documentation covers only the part of the line between Settimo Torinese and the entrance of the Musinè tunnel.

The same will be in the Italian part of the international segment where demolition of houses, commercial buildings and a gas station will take place between Chianocco and San Didero, as briefly identified into the LTF design documentation.

The consequence of the above can be synthesizes as:

- Occupancy, use and compulsory purchase of wide agriculture fields and mountain lands for the duration of works
- Destruction of a number of houses, cottages and industrial structures.
- People forced to move in other places
- Industrial activities relocation
- Decrease of the terrains economical values around the construction sites and close to the line
- Years and years of trucks running on ordinary roads and the consequent unavoidable accidents
- Recovery of the areas used by construction sites at the completion of the project. Usually late and painful.
- Recovery of the areas designated to temporary disposal. The trend is to transform them as permanent.

Moreover the external part of the line, with its trench and embankment acts as a cut in the territory and constitutes a discouraging element for the small farmers who are assuring today the maintenance of the areas, limiting the brutal propagation of urban and industrial establishments.

The aspect of the band of respect on the side of the line is curious. In France such band has been agreed as 150 meters on both sides of the railway, which makes the overall line areas 320 wider. For the TGV Mediterraneo such band is increased to 200 meters. The preliminary design of the Turin-Lyon foresaw only 30 meters on both side. To the comment raised by CMBVS, the administration of Piedmont Region answered that, the French band size was just an agreement with the people (i.e not a law) and it was a penalty for the people.

To the formal enquire made by the CMBVS concerning different treatment of European people, the European Union has answered: "*no hypothesis of violation of the directive 85/337/CEE has been identified concerning the project of the Turin-Lyon railway line, in which relation no authorisation to the construction of the line has been given. Such project appears still in the feasibility study phase. (**so far nothing changed**)*

In spite of the above, in Italy the compensation of the damages could only be obtained for houses, building and properties within 30 meters from the lines while the Italian law 459 of November 18th 1998, defines the pertinence of the line as a 250 meters band on both side.

France citizen having properties within the bands of respect are protected by an agreement allowing them to eventually sold out the property at the market price of before the construction, within 3 years from the completion of the works. They can decide to sell properties before the construction or wait and checking for the impacts of the lines once it operates.

The TAV promoters has sponsored an advertisement inside Turin Porta Nuova railway station, in which it is possible to see posters, prints and a video showing the train running along trees and grassland of the valley. Houses, industrial and agriculture structures have been removed with the modern techniques of digital images processing, almost to prove that a mouse click is enough for cancelling culture, tradition, effort and history.

The crossing of the Val Cenischia is particularly critic because of historical reasons and the beauty of the ambient already impacted by the long viaduct of the A32 motorway. The entire infrastructure within the Bruzolo-San Didero area will have particular visual impact due to complex insertion of the railway works within a dense mixed residential and industrial area. The intersection of the new line should be at the same level of the historical line instead of jumping on it from a side viaduct, which implies complex and tall merging viaducts, right in the middle of the valley. Such area as shown in Fig 3.7-1 will be totally compromised.

In the Turin northern surroundings other valuable places exist, particularly the countryside between San Gillio and Brione, between the Venaria tunnel entrance and Pianezza, including a residential area with several cottages.

3.8. Archaeological impacts

All of the area of the line, where there are the sites, windows and the dumps of extracted material is rich of archaeological items, rocky engravings, restive of prehistoric installations, carved bowls, bas-reliefs, walls that can be temporally placed from the prehistory to the high medieval age. In the design documents Italferr cites the inquiries and archaeological searches carried out in the Piedmont's files, carrying out a classification of archaeological series of sites potentially at risk during the intense activities of the Turin – Lyons.

151 archaeological sites are identified and 146 of them are defined as high risk, due to interference with the works of the line. Two are the categories of risks envisaged:

- Destruction or alteration of existing archaeological sites
- Concealment of archaeological items eventually discovered during the excavations, this to not block the continuation of the works.

The second risk is without doubt the more likely due the considerable archaeological density of sites along the route of the railway and in the places designated to site, openings, service tunnels, windows etc, etc. Unfortunately this risk is also the less controllable.

4. THE ALTERNATE PROPOSAL TO THE TURIN-LYON

The necessity of preparing for a progressive increasing of the East ⇔ West freights traffic is recognised as a valid objective for the axis passing at the Frejus, the disagreement is on the enormous freight volume increase estimated by the promoters.

There is reason to attempt to oblige all East-West freight traffic to pass in a single valley, creating a bottleneck in case of accidents, while for the northern directions the traffic is shared among several axes as Simplon, Gottardo and Brennero.

The alternate proposal leads to distribute the traffic over more than one direction, as it will be happen for the North-West axis (see para 2.7) and to enhance the historical line so to take profit of its full capacity.

Several European states grudged the Italian train named “Pendolino” for it peculiarity of adapting its inclination to the turns e running faster; the pity is that its development has been limited to the lines between big cities.

4.1. The enhancement of the historical line *(not to be confused with the CIPE approved)*

About 5 years ago, SNCF, FS and RFF have executed a joint study for improving the historical line, envisaging the possibility to get 250 daily tracks through the Frejus tunnel, equivalent to about 27 Mt per year. This does not seem unfeasible being 182 the numbers of daily tracks that according to RFI-LTF should pass through the Frejus tunnel at the completion of the first operating phase (see para 2.4).

The enlarging of the Frejus tunnel gabarit is in progress and it will be finished by 2009, with the consequence that the only remaining weak point of the line is the inclination of the upward segment Bussoleno-Frejus-Saint Jean de Maurienne. A series of minor problems of the historical line, never solved because the lack of founds, will have to be fixed anyhow for achieving a proper fluidity of the line. Such main necessary fixing are:

- Suppression of road crossing with barriers, by building over/under passes.
- Increase of the available power by improving the power conversion and distribution plants, which are currently limiting the number or running train.
- Enhancement of the aerial electrical line, for carrying more current.
- Implementation of automatic block between Bussoleno and Borgone.
- Enhancing the Railway stations equipments and systems
- Improvement of the sensing, monitoring and signalling system.

Some of the current limitations of the historical line are due to the different operating voltage in France (1.5 KV) and in Italy (3 KV), to the organisation of the logistic, to custom operations and to a non-optimal synchronisation of the maintenance period between Italy and France. These are common problems to be solved as well for the new line Turin-Lyon and the solutions are the same:

- Making use of interoperating locomotives on all freight and fleeting trains.
- Simplifies the custom operation at Modane
- Giving reciprocal training to Italian and French locomotive drivers avoiding change of personnel at the border.
- Synchronising maintenance period avoiding wasting of useful tracks.

Particularly important is the use of interoperating locomotives, which today are limited to fleeting trains as TGV and ETR and to few freight trains. Without them, also the new line will have the same limitation of the historical one. Such locomotive are one of the outmost mean for easing the Modane station traffic, for increasing globally the use of the line, for saving about 10 minutes for fleeting trains and up to 1 hour for freight trains adopting conventional locomotive. Note that Italian old locomotives could run in France but developing just half of the power, while France locomotive cannot circulate in Italy, except the new ones.

The synchronisation of the maintenance intervals is very important to avoid waste of tracks, but for sure much more difficult to be implemented in the new line because of the long tunnels, without stations or recovery rails.

The problem of the inclination, requiring multiple locomotives (typically 2 or 3), can be solved and in any case the inclination is not the only element limiting the traction, as also the safety load limit of the car-hooks (1600 t) plays a major role. The long 1600t freight trains that the line promoters are advertising on the line, would require also a double locomotive, one pulling the head of the train and the other pushing the tail. This would also cause the necessity of locomotives re-entering (standalone or grouped), occupying tracks as on the old line.

The fact that on the new line, the 1100 t trains can be pulled by a single locomotive while in the historical line the traction limit for one locomotive is around 600-650t, creates the necessity of returning locomotives from one side to the other, whenever there is a traffic flux unbalance between the two direction. The return of locomotives cannot be used as one element for justifying the project because this problem is solvable through a correct organisation and logistics of the trains, with an optimised management of the line and with interoperating locomotives on all trains.

There is no need to upgrade the historical line to 4 rails. The upward segment can support up to 200 trains per day and the Turin-Lyon is using the upward segment with 182 trains/days between 1st and 2nd implementation phases.

Freight Transportation at Frejus						
This table is from Rivalta Technical Commission - Model of Exercise document, 13 Dec 05, annex 1						
		2000	**2001**	**2002**	**2003**	**2004**
Italy-France	**Freight trains n°**	8,500	9.529	9,632	8,471	8,654
France-Italy	**Freight trains n°**	8,555	9,638	9.577	9,140	9,038
difference		55	109	55	669	384
total	**Freight trains n°**	17,055	19,167	19,209	17,611	17,692
freight from Frejus	**millions of tons**	10.41	9.68	9.35	8.83	8.21
freight load per train	**tons/train**	610	505	487	501	464
load variation from 2000	**%**	100.00%	*82.79%*	*79.84%*	*82.13%*	*76.07%*
load increment from 2000	**%**	0.00%	*-17.21%*	*-20.16%*	*-17.87%*	*-23.93%*
looad increment from prev year	**%**		*-17.21%*	*-2.95%*	*2.30%*	*-6.07%*
average increment since 2000	**%**		*-17.21%*	*-10.08%*	*-5.96%*	*-5.98%*
Note: Figures does not include the trains returning the empty cars						
A progressive reduction of the average load is observable from 20000 to 2004, evidently due to the good typology (reduction of basic raw material and increase of semi-finished)						
Figures in red-italiaus have been corrected by the autor						

Fig 4.1-1. Freight traffic over the historical line (source: Rivalta Tech Commission).

A small increase from 17055 to 17692 of the number of freight trains transited at the Frejus between 2000 and 2004 is evident from the RFI data in Fig 4.1-1, but limited to 0.7% per year and curious is the fact the freight mass has decreased from 10.41t to 8.21t, leading to a decrease of the goods density per train. This phenomenon can be explained by an increase of finished or semi-finished products transportation and a reduction of the raw materials or elementary products, but also the ferroutage contributes to decrease the density (see para. 3).

On the motorway the freight density per vehicle is more or less constant around 16t while on the railway the density of 610t/train of the 2004 has decreased to 464t/train into the 2004. The 2004 daily average number of freight trains was only 48 but in some day there has been up to 100 trains per day. These data prove that there is no enough demand, the historical line is under-utilised and the management of the line is not optimised.

4.2. Improvement of other lines

The other piedmont candidate line for both alleviating the future Frejus traffic and for creating an alternate connection with the France is the Nice-Cuneo-Turin.

This line constitute the first priority as it will be a very positive fleeting connection with the France and will remove from the Frejus the freight traffic coming from the southern France and part of the Spanish traffic, might be the low priority. The simple electrification of line will allow 5Mt freight traffic per year.

G. Manfredi and the architect S.Nicola has presented in 2001 a very innovative project, going opposite to the Turin-Lyon and sponsoring an high speed connection between Turin and Nice, via Cuneo. This was as well motivated by solving the intrinsic mobility problem of the area, not yet served by any motorway and for containing traffic over the roads, pushing the Piedmont region role outside the French border.

Resuming of the project is envisaged by several parties, as it can be implemented with minimal ambient impact, works duration much shorter than the Turin-Lyon, low cost and with a genuine vocation of an international connection. Perhaps many people ignores that Nice-Turin-Lyon is shorter than Nice-Marseille-Lyon.

There is no need of realising a Turin-Nice TAV infrastructure. A modern ordinary line, with modern and properly maintained locomotives and railcars will make an efficient service for the Piedmont, allowing the goods exchanges respecting the ambient and population, providing furthermore cultural exchanges between two cities, tied by a common history until world war one.

A last general point cannot be forgotten on the status of the Italian railways, to which the AV/AC projects subtracts founds for the ordinary and extraordinary maintenance to lines, cars and locomotives.

In Italian railway network extends over 16,146 Km but only 5,603 are double rail and electrified, while the French double rail network is almost extended as the entire Italian network (14,135 Km and 44% of the entire French network). The German double rail network is a bit inferior of the French (12,267 Km and 43% of the entire German railway). This means that 84% of the Italian traffic is passing over 35.7% of total railways.

The other alternate priority is the enhancement of the single-track railway Casale-Mortara-Novara allowing a good connection of the north-west axis Simplon-Genoa harbour, without transiting to Turin and Frejus.

4.3. *The results of the proposal*

The full picture can now be obtained by combining the effects of the on going enhancements presented at paragraph 2.7 with the alternate proposals to the Turin-Lyon line, namely:

- the improvement alternating the Turin-Modane, allowing a capacity increase to 200 trains/day on the Bussoleno-Modane segment
- the electrification of the Cuneo-Nice line, allowing at least a capacity of 70 daily trains.

The combined effect can be seen in Fig 4.3-1 for the overall traffic of Ventimille-Cune/Nice-Frejus and Simplon, as well as in Figf 4.3-2 for the evolution of the railway traffic at Frejus. For not making the plots too complex, the enhancement of the Turin-Modane and Cuneo-Nice are both assumed completed by the 2015, which by the way might not be a bad target.

The overall effect is visible in comparison with the correspondent figures of para 2.7, the total capacity after the 2015 increase from 598 to 710 trains/day and in 2030 there are still 300 free traces.

The situation improves as well at the Frejus and the end effect is that the same traffic load scenario of today will occur again only after 30 years, around 2036 but the utilised capacity of the upward line will be only 55%. In low side of the valley the can increase to 220 trains/days due the existence of priority and waiting rails in many stations of the low side valley.

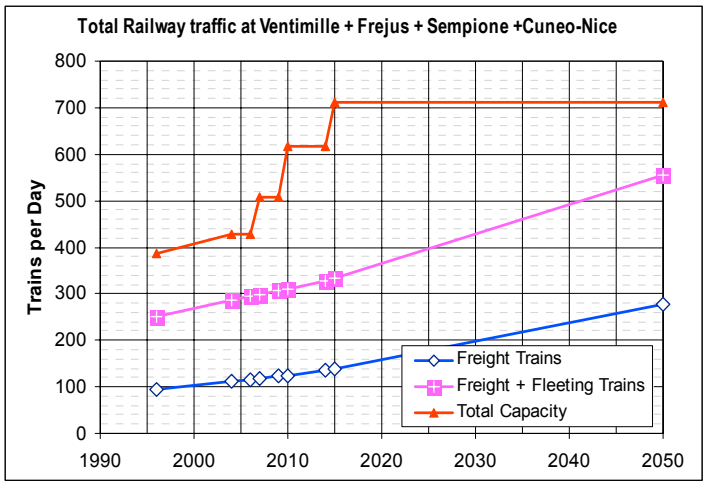

Fig. 4.3-1 Enhancement of Turin-Modane and Cuneo-Nice

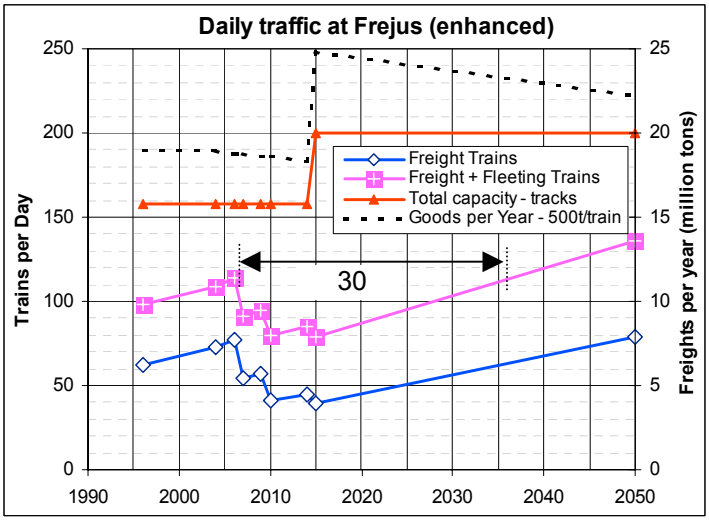

Fig 4.3-2 Enhancements effect over Frejus traffic

The projection is optimistic because at para 2.7 a freight growth of 2% per year was assumed, while according to the official data of the Rivalta Technical Commission (Tab 4.1-) the freight trains growth has been only 0.7% per year. After the 2015 the net capacity of the line varies between 24 Mt and 21.5 Mt per year, considering 500t per train and 300 days per year. Trains with 650t of freights will make a yearly capacity above 30Mt.

Now also the question of the ferroutage can be simply addressed in terms of allowance of all free traces, but:

How many ferroutage trains can run daily? how much goods volume can be transported ?

Concerning the Frejus, about seventy of Modalhor trains can be added since 2010 to the eight already running between Aiton and Orbassano, achieving as a consequence about 80 ferroutage trains per day, similarly to the wish of the Turin-Lyon promoters, but with the following advantages:

- the service can available 10 years before, right at the conclusion of the gabarit enlargement at Frejus.
- without making a huge and impacting infrastructure
- simply by distributing the railway capacity enhancement over the existing infrastructure across the Alps, **without limiting the vision only to the Piedmont backyard**.

The quantity of goods transportable by 80 daily Modalhor of the same type of the currently used between Aiton and Orbassano, will be just a bit below 7 Mt per year (80 trains, 288 t /train, 300 days), more or less 50% of the goods transiting over the Frejus motorway tunnel. The problem remains a proper mechanism to force goods from roads to rails, which has not easy solution as stated by "*Prevision de Trafic d'un service de ferroutage entre la France et l'Italie dans un cadre du projet Lyon-Turin – Rapport Final Novembre 2000*". For now the 8 daily Modalhor remains poorly used and the important verification will be in 2009 at the completion of the Frejus gabarit enlargement.

As stated at para 3, the ferroutage is an inefficient and expensive compromise, drawing a lot of energy, while **freights should travel as long as possible over trains, not just for crossing the Alps. This is the true challenging objective for the future. Transportation growing should be limited as well.**

5. THE REASONS OF THE OPPOSITION

The opposition to the TAV in Val Susa, risen in 1989 with the committee Habitat, then has extended to all local public institutions, CMBVS, Commons, Legambiente, Pro Nature, Agriculture association and so on. By getting motivation from university, independent institutes of research, the consensus has increased and expanded to most population, which now recognise themselves through the guards and anti-TAV committees.

Since years and years the opposition reasons are always the same, **because**:

1. It will bring beneficial effects neither to the valley nor to Piedmont, but only to the constructors.
2. It is not true that the Piedmont would remain cut outside from exchanges with the foreign countries. The truth is the opposite, as the huge cost will deviate founds which would be beneficial for the other regional scopes, moreover wealth for the region will not come from the transit of freights.
3. It concentrates the traffic towards the west in a single corridor, it is not far-sighted and it does not take advantage of the works recently executed for the Orbassano goods site.
4. The project, initially born as high speed line for fleeting trains (AV), it was not and it is still not justified, as emphasized from studies executed by institutes for the same TAV promoters.
5. The speed for the fleeting trains will not be as advertised but much lower (around 100 Km/h).
6. The current justification of the project as high capacity (AC) cannot be even supported by freight transport.
7. The estimation of the freight traffic trend prepared by promoter, does not account for the traffic decrease once the new North-western Switzerland passing will be operational and it has been exaggerated for the scope of justifying the project.
8. The existing line can support all the traffic of next the 50 years and together with the enhancement of the Nizza-Cuneo-Turin it is possible to get a better result respecting people and ambient.
9. Although the European Union asks for an engagement over the project 6 (Turin-Lyon), it is not true they are requiring a so costly and invasive work.
10. International institutes have established that it will not be able to decrease the number of trucks that daily are crossing the Frejus motorway tunnel.
11. The European Union has not yet approved the project which is still in the feasibility study and several specific investigation have to be performed prior to arrive to its the final definition.
12. The impact during its construction is highest for both health and the living conditions of the inhabitants of the Susa valley as well as of the Turin northern surroundings.
13. An entire generation of children will grow until the adolescence in a atmosphere polluted by powders, gas, asbestos, noise, etc, etc, with the risk of having later on a generation of sick people.
14. Our sons will inherit an area degraded by a mastodontic and useless infrastructure.
15. Unless the adoption of very wide bands of respect, it will be almost impossible reduce the noise of the fast trains to a level allowing a comfortable life but on the other way around wide bands are not compatible with the residential and industrial territories crossed by the line.
16. Its cost will be of 3 or 4 times higher than the initial estimate and it will be entirely paid by the Italians through taxes or via reduction of the welfare, social services, instruction and anything the magician of the creative finance will be able to find out, selling and mortgaging.
17. Even the amount of founds of the initial estimation are not sure to be got with an high risk that it will be abandoned as many other projects, while such founds could have been used and invested in a better way.
18. It will not be economically profitable and it would require continuous financing from the government through mechanisms similar to the ones used to cover the gap during its construction.
19. The status of the Italian railroads and fleeting railcar in a normal period (i.e. not during popular events as the Olympic games) is merciful, in terms of availability of the service, capability of maintain the train scheduling, cleaning and car and locomotives maintenance, avoiding breakdowns. The money sucked in the future by such TAV projects will just make them worse.
20. In contrast with the objective of transferring freight traffic from the Frejus motorway tunnel over the new railway, the government and the Region are in these days proposing to double the motorway tunnel.
21. The work is useless under all points of view and will create only damages, to the ambient and economical.

The message of the Susa valley people is not limited to the environmental aspects, has nothing to do with NIMBY syndrome “a political way for escaping problems resolution” and can be very clearly stated as follows:

The Susa valley population is simply not available to accept the huge impacts deriving from a useless TAV line, creating just damages to the local environment and economical damages to whole Nation.

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28. *Integrazioni alla DGR 26-12997 del 21 luglio 2004 relativa al parere regionale sul "Nodo Urbano di Torino, potenziamento linea Bussoleno - Torino e Cintura Merci" con annesso elettrodotto a 132 KV*
29. *D.G.R. n. 40-9816 OGGETTO: Art. 3 comma 9 D.lg. 190/2002 espressione dell'intesa di competenza Regionale per l'autorizzazione Ministeriale relativa al Progetto prot. n. 2682/26-26.5 presentato in data 06/03/2003 "Cunicolo esplorativo di Venaus"*
30. *D.G.R. n.67-10050 e D.G.R. n.68-10051 Torino, 21 Luglio 2003 Parere facorevole progetti LTF e RFI*
31. *D.G.R. n. 69-1011 OGGETTO: Istituzione di Commissione Tecnica a supporto degli Enti Locali piemontesi interessati dalla linea AC/AV Torino-Lione, 3 Ottobre 2005.*
32. *Decreto del Presidente della Giunta Regionale 14 ottobre 2004, n. 110 Nomina dei componenti il Comitato di Monitoraggio relativo ai Sondaggi Geognostici per la caratterizzazione del sottosuolo attraversato dalla infrastruttura ferroviaria Torino-Lion.*
33. *In data 10.12.2003 la Società ITALFERR S.p.A. con sede legale in Via Marsala 53/67 - 00195 Roma, in nome e per conto di RFI S.p.A., ha presentato alla Regione Piemonte le variazioni/integrazioni al..*
34. *Reg Piemonte Prot 14431/26.5 Risposta puntuale alle osservazioni della Comunità Montana…1/12/2004*
35. *D.Lgs. Governo del 13 gennaio 1999 n° 41. Attuazione delle direttive 96/49/CE e 96/87/CE relative al trasporto di merci pericolose per ferrovia.*

Italian Governement official documentation and deliberations

36. *Memorandum di intesa tra l'Italia e la Francia sulla realizzazione del nuovo collegamento ferroviario Torino-Lione, 5 Mag 2005*
37. *Legge 27 marzo 1992 n. 257. Norme relative alla cessazione dell'impiego dell'amianto. E successive modificazioni.*
38. *DECRETO LEGISLATIVO 20 agosto 2002, n. 190 (in G.U. n. 199 del 26 agosto 2002- Suppl. Ordinario n. 174 - in vigore dal 10 settembre 2002) - Attuazione della legge 21 dicembre 2001, n. 443, per la realizzazione delle infrastrutture e degli insediamenti produttivi strategici e di interesse nazionale.*

39. *DECRETO LEGISLATIVO 24 maggio 2001, n.299 Attuazione della direttiva 96/48/CE relativa all'interoperabilità del sistema ferroviario transeuropeo ad alta velocità.*
40. *DECRETO DEL PRESIDENTE DELLA REPUBBLICA 18 novembre 1998, n. 459. Regolamento recante norme di esecuzione dell'articolo 11 della legge 26 ottobre 1995, n. 447, in materia di inquinamento acustico derivante da traffico ferroviario.*
41. *LEGGE 27 settembre 2002, n.228 Ratifica ed esecuzione dell'Accordo tra il Governo della Repubblica italiana ed il Governo della Repubblica francese per la realizzazione di una nuova linea ferroviaria Torino-Lione, fatto a Torino il 29 gennaio 2001*
42. *LEGGE 21 dicembre 2001, n. 443 Delega al Governo in materia di infrastrutture ed insediamenti produttivi strategici ed altri interventi per il rilancio delle attività produttive (G.U. n. 299, 27 dicembre 2001, Supplemento Ordinario)*
43. *PRIMO PROGRAMMA DELLE OPERE STRATEGICHE (LEGGE N. 443/2001):*
44. *CIPE - Nuovo Collegamento Ferroviario Transalpino Torino-Lione, Approvazione Tratta Internazionale, Roma, 5 dicembre 2003*
45. *CIPE – Nuovo collegamento ferroviario nodo urbano di Torino: Potenziamento linea ferroviaria Torino Bussoleno, 05/08/2005.*
46. *Corte dei conti - delibera n. 5/2004/g della sezione centrale di controllo della corte dei conti sulla gestione delle amministrazioni dello Stato, 21 Gennaio 2004*

European Community documentation (can be easily found in different languages on UE and TEN-T internet sites)
47. *TRANS-EUROPEAN TRANSPORT NETWORK European Commission TEN-T priority projects ISBN 92-894-3963-7*
48. *TEN-T Report from the High Level Group chaired by Loyola de Palacio, November 2005.*
49. *LIBRO BIANCO La politica europea dei trasporti fino al 2010: il momento delle scelte ISBN 92-894-0343-8 –ed 2001*
50. *Direttiva del Consiglio 85/337/CEE del 27 giugno 1985 concernente la valutazione dell'impatto ambientale di determinati progetti pubblici e privati*
51. *Parere del Comitato economico e sociale europeo in merito al Libro verde sui partenariati pubblico/privato e sul diritto comunitario degli appalti pubblici e delle concessioni COM(2004) 327 def. (2005/C 120/18).*
52. *Parere del Comitato delle regioni in merito al Libro verde sull'approccio dell'Unione europea alla gestione della migrazione economica (2006/C 31/09)*
53. *REGOLAMENTO (CE) n. 1159/2005 DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 6 luglio 2005 che modifica il regolamento (CE) n. 2236/95 del Consiglio, che stabilisce i principi generali per la concessione di un contributo finanziario della Comunità nel settore delle reti transeuropee*
54. *REGOLAMENTO (CE) N. 807/2004 DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 21 aprile 2004 recante modifica del regolamento (CE) n. 2236/95 del Consiglio, che stabilisce i principi generali per la concessione di un contributo finanziario della Comunità nel settore delle reti transeuropee*
55. *DECISIONE N. 1692/96/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 23 luglio 1996 sugli orientamenti comunitari per lo sviluppo della rete transeuropea dei trasporti*
56. *DECISIONE DELLA COMMISSIONE del 30 maggio 2002 relativa alle specifiche tecniche d'interoperabilità per il sottosistema energia del sistema ferroviario transeuropeo ad alta velocità di cui all'articolo 6, paragrafo 1, della direttiva 96/48/CE [notificata con il numero C(2002) 1949]*
57. *DIRETTIVA 2001/14/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 26 febbraio 2001 relativa alla ripartizione della capacità di infrastruttura ferroviaria, all'imposizione dei diritti per l'utilizzo dell'infrastruttura ferroviaria e alla certificazione di sicurezza*
58. *DIRETTIVA 96/48/CE DEL CONSIGLIO del 23 luglio 1996 relativa all'interoperabilità del sistema ferroviario transeuropeo ad alta velocità*
59. *DIRETTIVA 95/19/CE DEL CONSIGLIO del 19 giugno 1995 riguardante la ripartizione delle capacità di infrastruttura ferroviaria e la riscossione dei diritti per l'utilizzo dell'infrastruttura*
60. *COMMISSION DECISION of 30 May 2002 concerning the technical specification for interoperability relating to the rolling stock subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Directive 96/48/EC (notified under document number C(2002) 1952)*
61. *Oggetto: Aiuti di Stato N 810/2002 – Italia Piano di incentivazione per il trasporto di merci per ferrovia -articolo 38 della legge 1° agosto 2002, n. 166 - C(2003)4538fin*

Local Administration and Associations documentation:
In addition, all comments, observations and petitions prepared from 2002 until now and sent to Institutions, by:
- *Local administrations as Comunità Bassa Val Susa e Val Cenischia (CMBVS), Communs,*
- *Environmentalists associations, e.g. Legambiente, WWF, Habitat, Pro Natura Torino,…*
- *Spontaneous committees against the Turin-Lyon*
- *Letters of solidarity of associations and institutions*