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**National
Trolleybus
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The initial minutes of log-in and introductions will be edited out of the final recording.

Nancy (France) From Horse tram to Super-trolleybus 150 years history

TROLLEYZOOM 10 Januar 2023

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pdebano@laposte.net



<https://nationaltrolleybusassociation.org>

Nancy in France

The city itself :
105 000 inhabitants

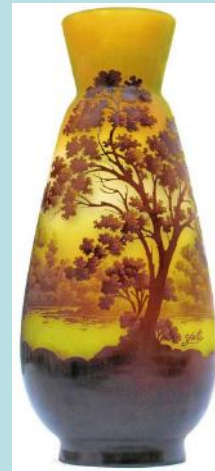
The Grand Nancy :
Nancy + 19 cities
258 000 inhabitants



Nancy is worldwide known by Stanislas place



L'Ecole de Nancy

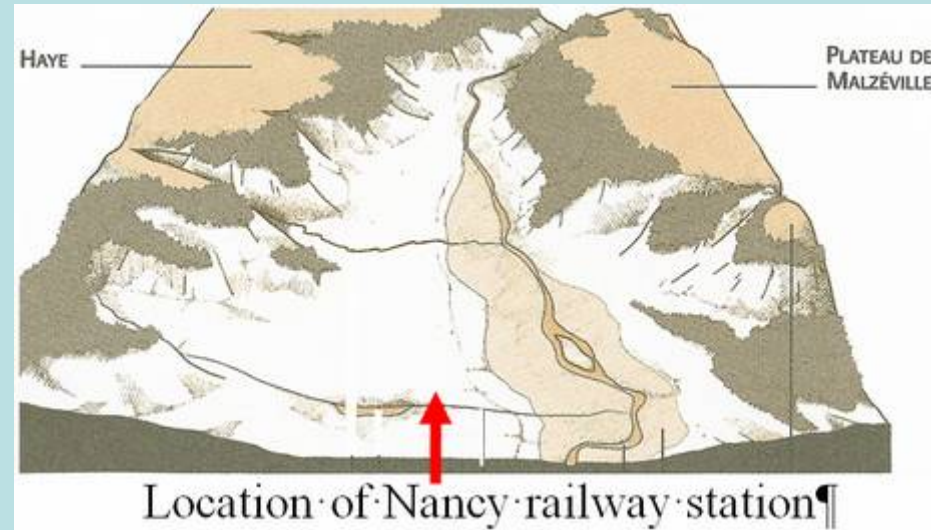
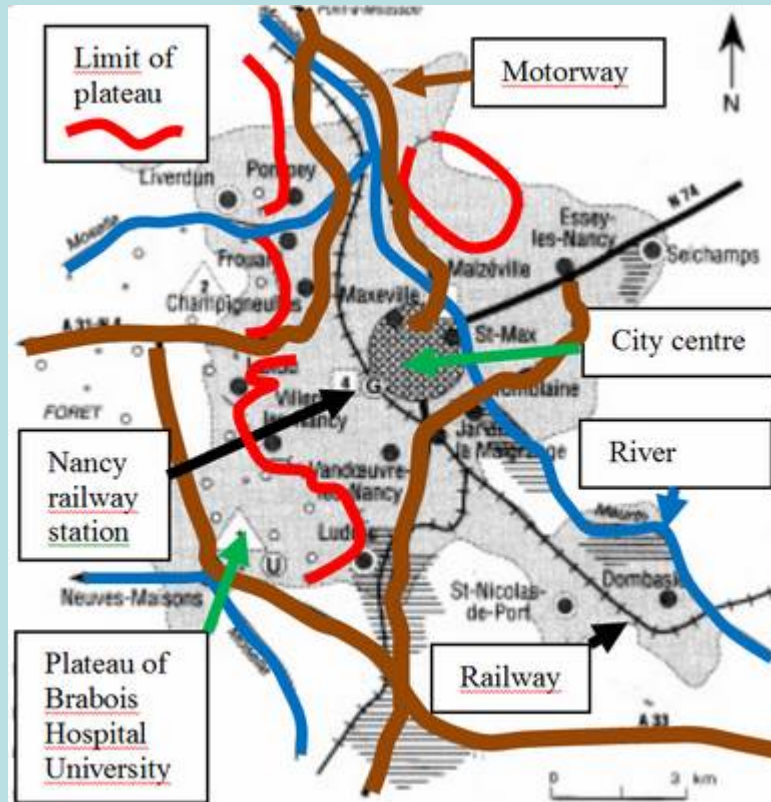


E. Galle

Imagorells



Nancy : a hilly city



Streets on the West with 8% to 13% gradient

View from Plateau de Brabois to the North





Carnot place

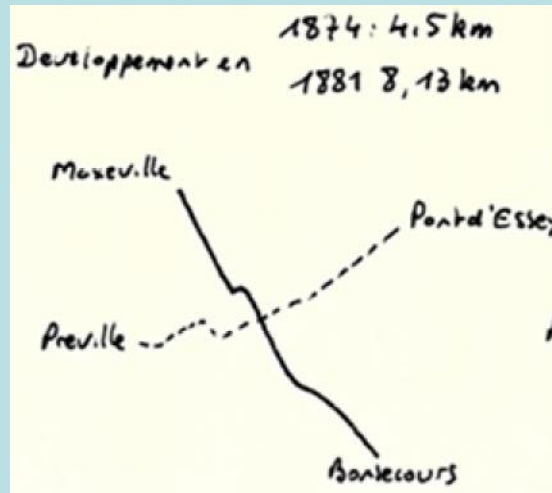
1874

**M. De La HAUT
gets the concession
for a horse tram
between
Maxéville (north of Nancy)
and Bonsecours
in Jarville (south of Nancy).**

**The line is 4,5 km long
and is put in operation
in 1878.**

1880

The concession is transferred in 1880
to the **Compagnie Générale Française de Tramways (CGFT)**.
The network is extended with new horse tram lines



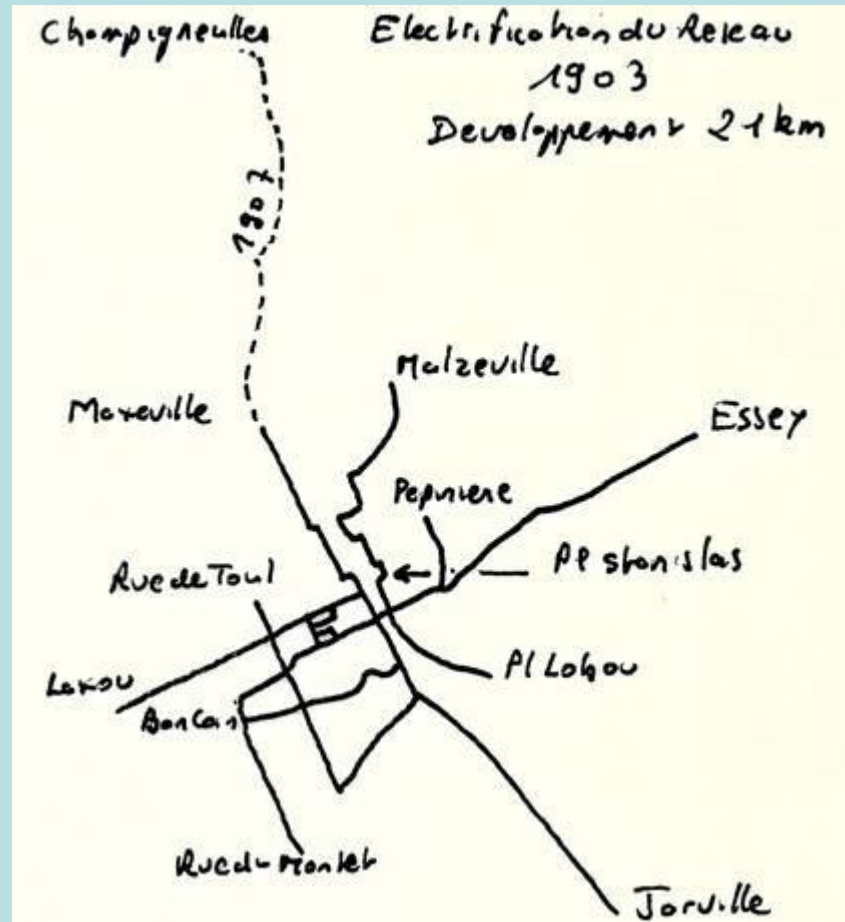
Stanislas place



**St Jean
Place 1887
Today
Maginot
place**

1898

All the horse tramways replaced by electric tramways



1903 The electrified 21 km tramway network



St Jean street



St Jean place Today Maginot place

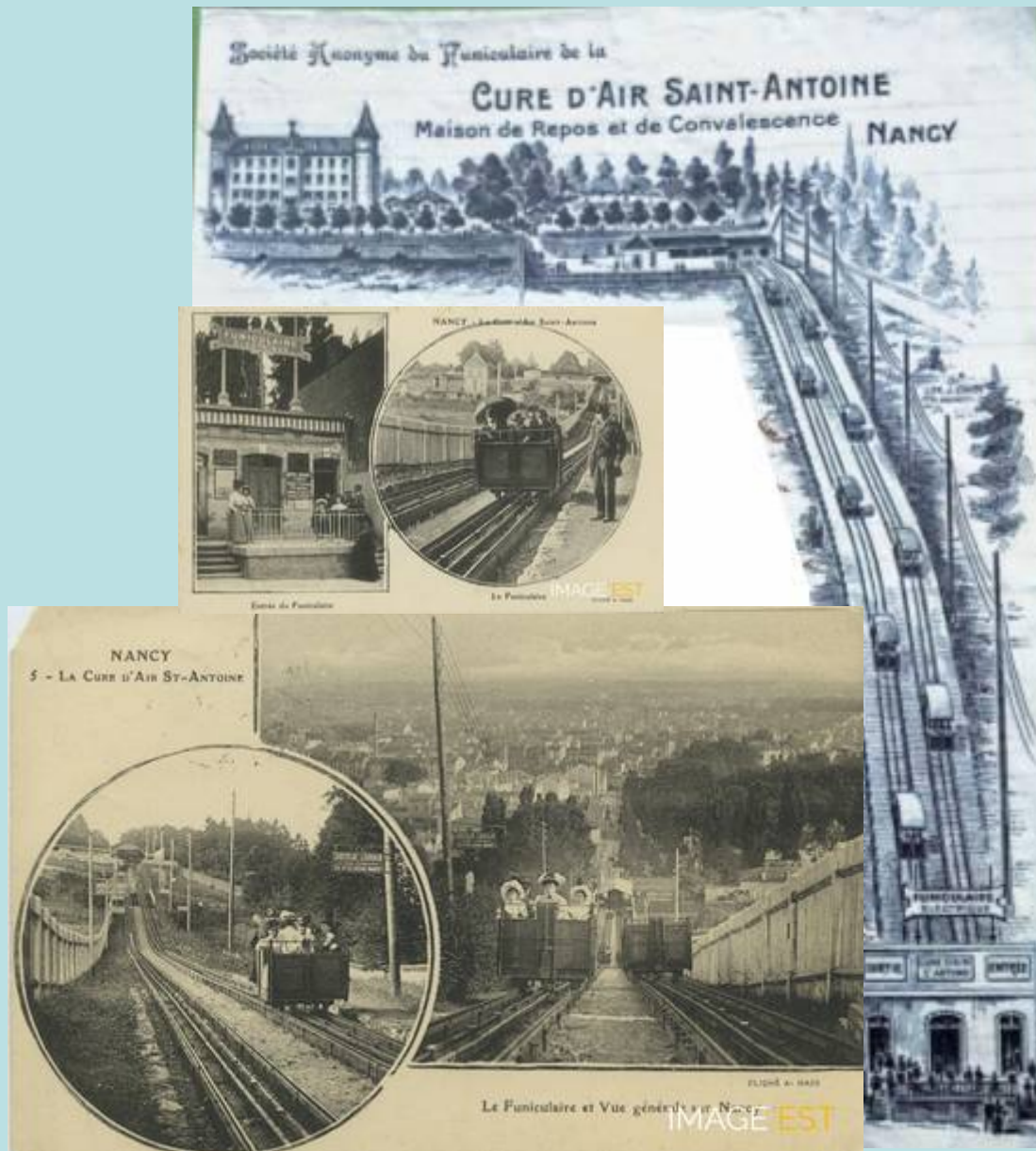
1905

The funicular of the Cure d'air is put into service.

Length 229 m
Gradient to 29%

An accident in
1908 with one
dead and 7 injured

Seems to have run
until 1914





> 1912

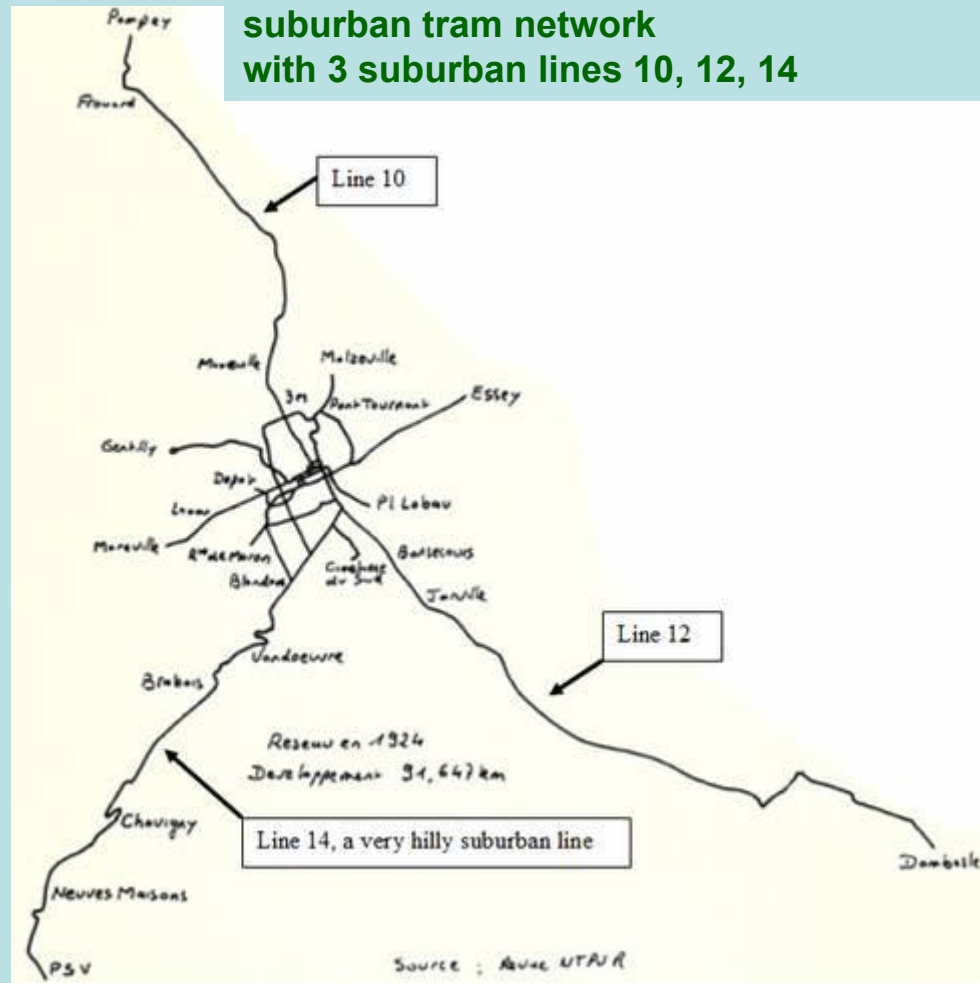
**To avoid overhead lines,
in Carrière place and in
Stanislas place,
6 tramway vehicles with
batteries were in
operation**



**The line was diverged in
1912 through La Fayette
street to avoid these
architectural streets**

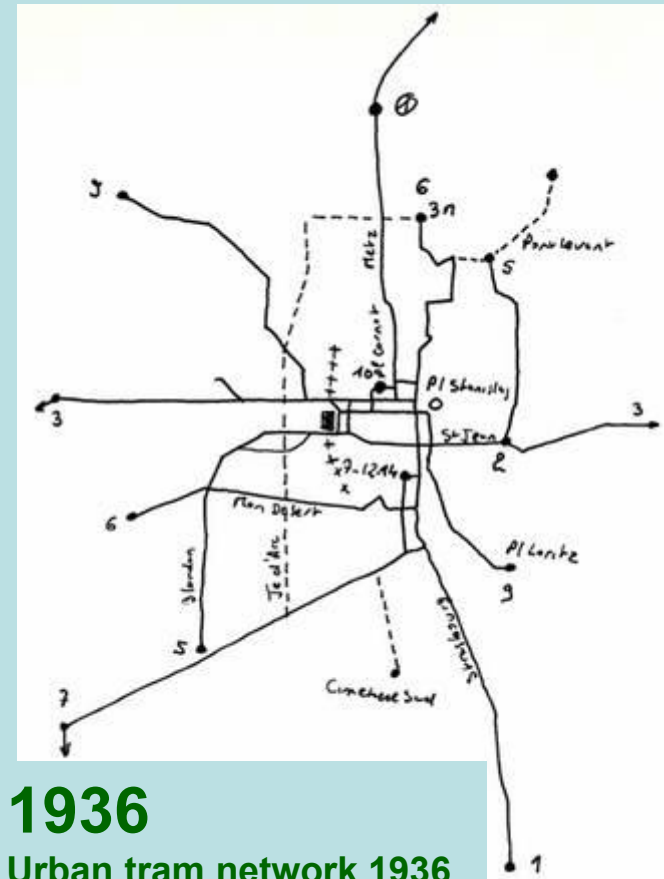
1924

The 92 km urban and suburban tram network with 3 suburban lines 10, 12, 14



1930

The tram carries 25,8 millions passengers
But the question of the replacement of the tram by buses is put on the table, and closures of tram lines begin



1936

Urban tram network 1936
---- tram closed from 1930

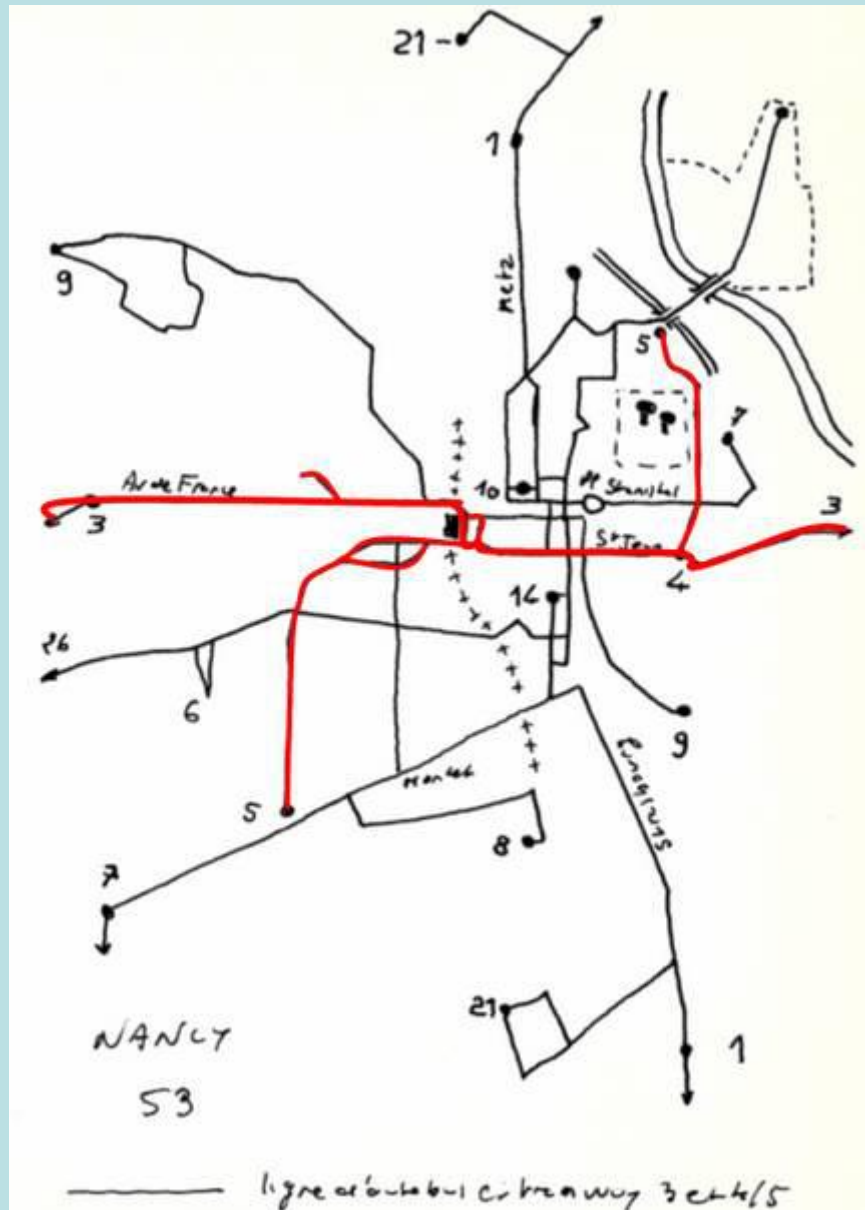
1948-1958

Closure of the tram lines.

From 1952 : no more
suburban tram line

From 1953 : tram run only
on lines 3 and 4/5 (in red)

Urban bus lines and tram
lines (in red) in 1953





1948-1958

The tramways in operation until 1952 on suburban line 14 were 6 modern tramways SATRAMO built in 1933



The tramways and trailers in operation on the urban network until December 1958 were built in 1903 with a modernisation in 1920.

A tram and a trailer are saved in the AMTUIR Museum but are not visible <https://amtuir.org>



The new bus Renault replacing the tram 3 in 1958



The development of the SAVIEM SC10, among the best buses, was made with help of CGFTE Nancy which received the first vehicles. Nancy N° 217 was exhibited in München IVA 1965

1959-1974

The bus network operated by CGFTE (the new name of CGFT) is among the best French urban networks :

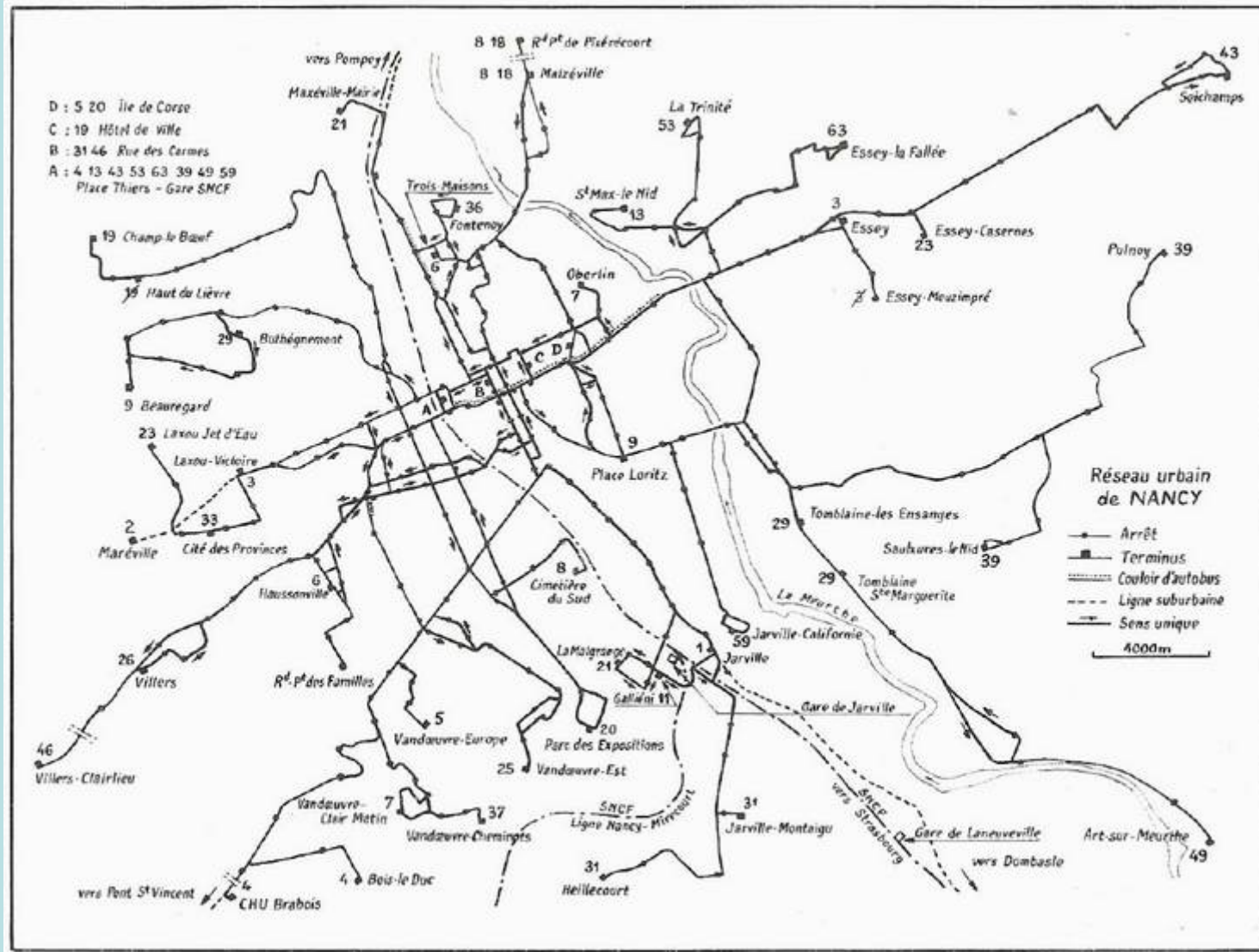
- buses very well maintained and always very clean (thanks to Mr VENTURIN and his workers)
- operation perfectly organised (thanks to Mr BIGEREL and his staff)
- high frequency services for all districts of the cities

Buses in operation in the seventies : Chausson, Renault, Saviem, Berliet



22-1379V1 PDeb 150 years Nancy
Zoom NTA Trolley Assoc 20230110

Fig. 2. Plan du réseau de Nancy en 1974 (document P. Debano).



1974

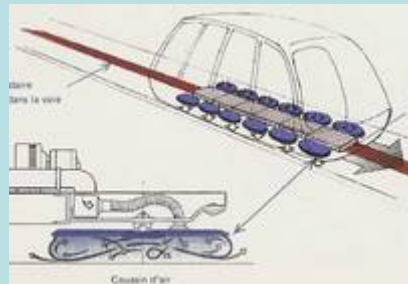
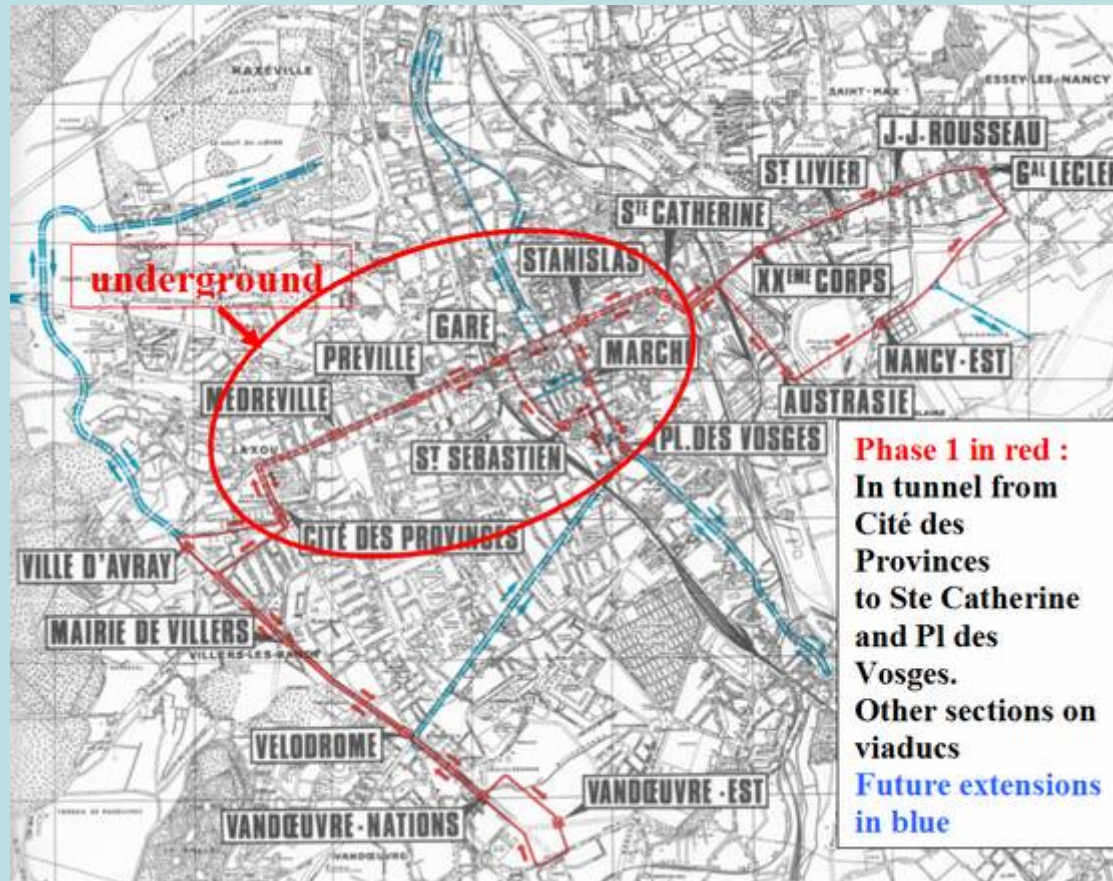
The bus network carries 19,8 millions passengers.

1974

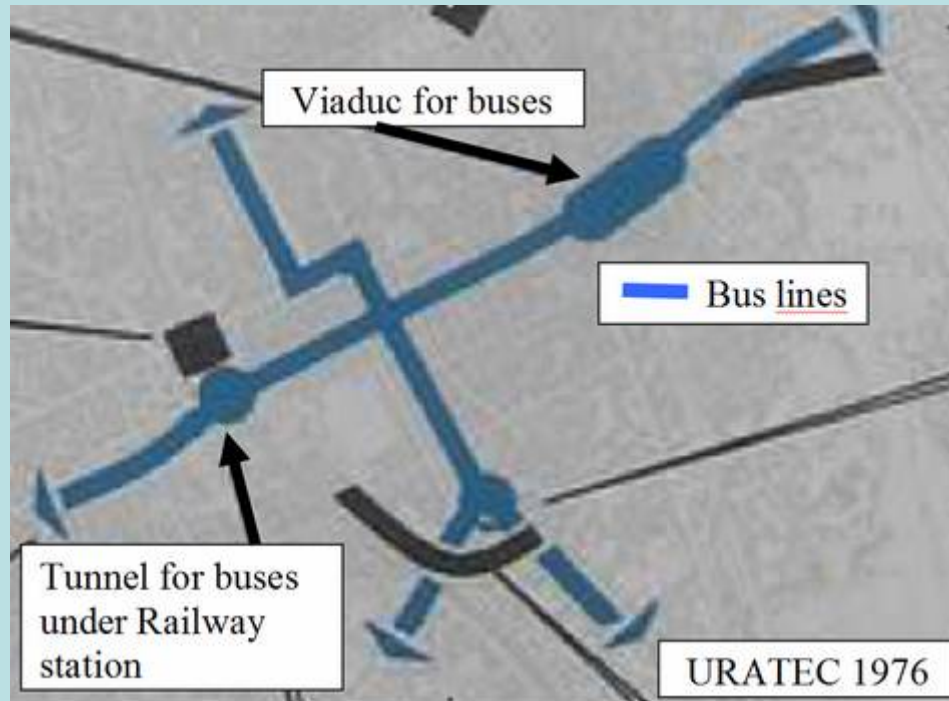
A crazy project :
the PRT TTI Otis
(in French TRP)

- air cushion suspension,
- linear motor,
- computer controlled vehicles

Project quickly,
not abandoned,
but postponed,
because of technical
impossibilities



1976



A new surprising project to replace the postponed PRT : The bus project URATEC

(today we could say it is a BHLS project)

Buses partly underground or on viaduc in the center of the city, with possibility for the tunnel and to the viaduc to accept later the PRT TTI Otis

Due to municipal elections in 1977, the project is abandoned by the new electeds



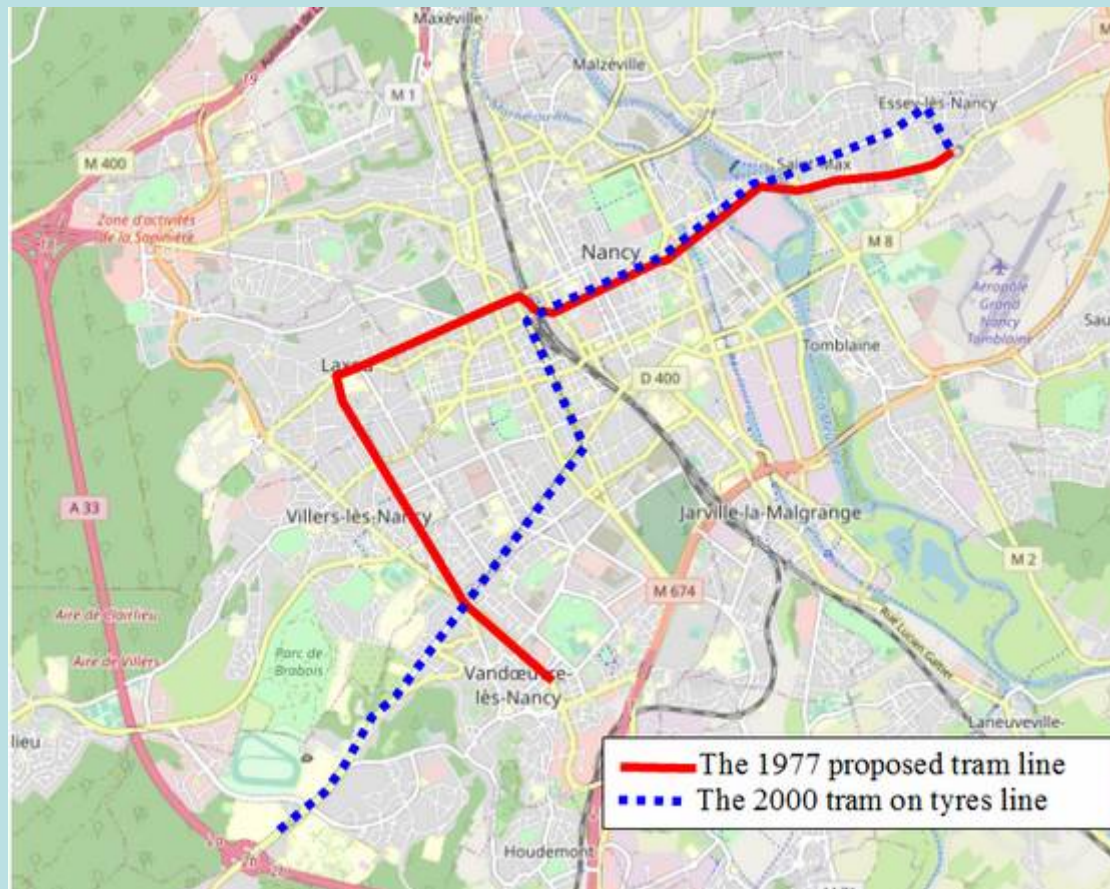
Picture not in Nancy

1977

Mr COULAIS is elected Mayor of Nancy.

The transport program of Claude COULAIS for the municipal elections :

- Public transport must run at ground level with a lot of bus lanes
- Electric transports must be favored
- A tram line East to West
- Some trolleybus lines to climb to the West plateaus



The 1977 proposed tram did not climb to the plateau of Brabois because it was not so developed as in 2000



At its return to Zürich, the staff gave it the nickname «Der Legionär ». Many thanks to Zürich for the loan free of charge

A story of this Tram 2043 exhibition is at disposal

1978

To show to Nancy citizens what are modern electric vehicles :

- a modern Lyon trolleybus**
- a modern Zürich Tram 2000**

are exhibited in Nancy during a 3 days transport exhibition « Journées d'étude des transports terrestres » in Januar



Tram 2043 going back to Zürich per rail

1977-1980

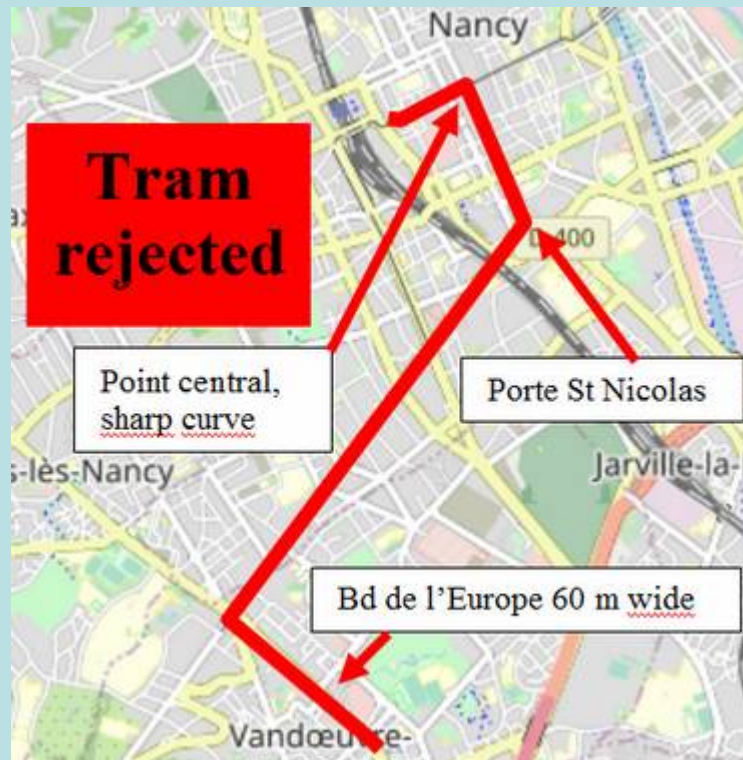


To define the future public transport network, a working group associating electeds and technicians is created : « Groupe de travail Déplacement de personnes »

As elected, I am member of this working group

But it is to cloud the issue.

1977-1980

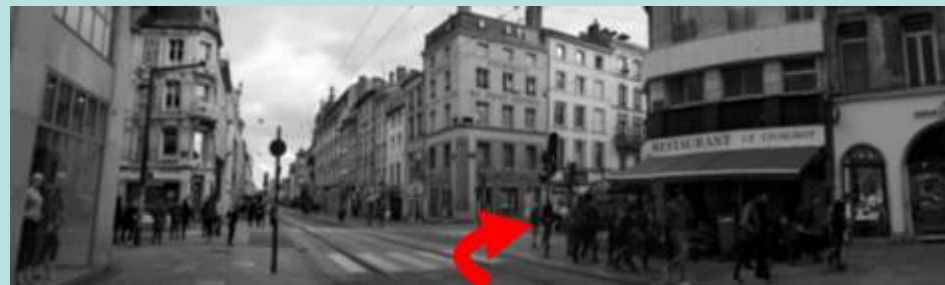


A first tram line is studied by the technicians with the itinerary decided without preliminary discussions.

This itinerary is well chosen to show that a tram is impossible to implement :

- Terminal station in the center of Nancy with no possibility of siding tracks
- A sharp curve at the Central Point of Nancy which probably obliges to destroy a building for the tram (modern trams at this period were not turning so easily as today)

- The necessity to modify the historical Porte St Nicolas

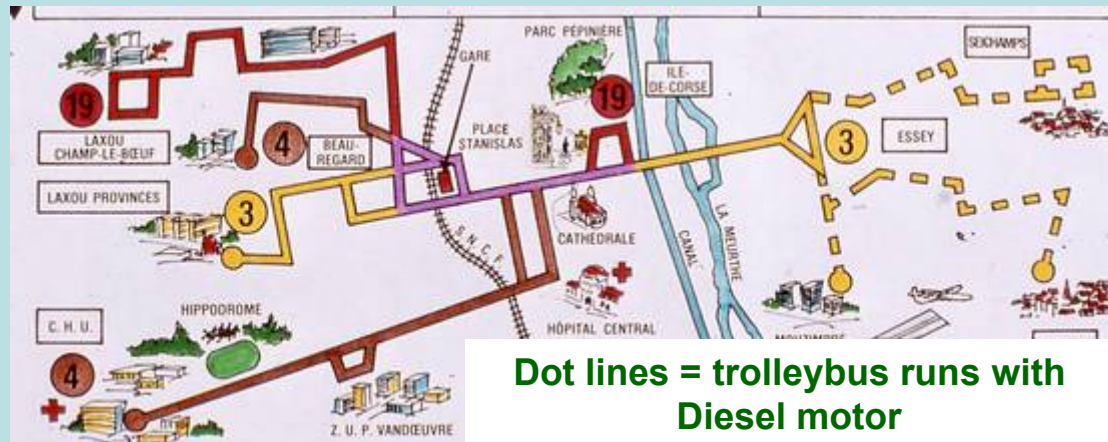
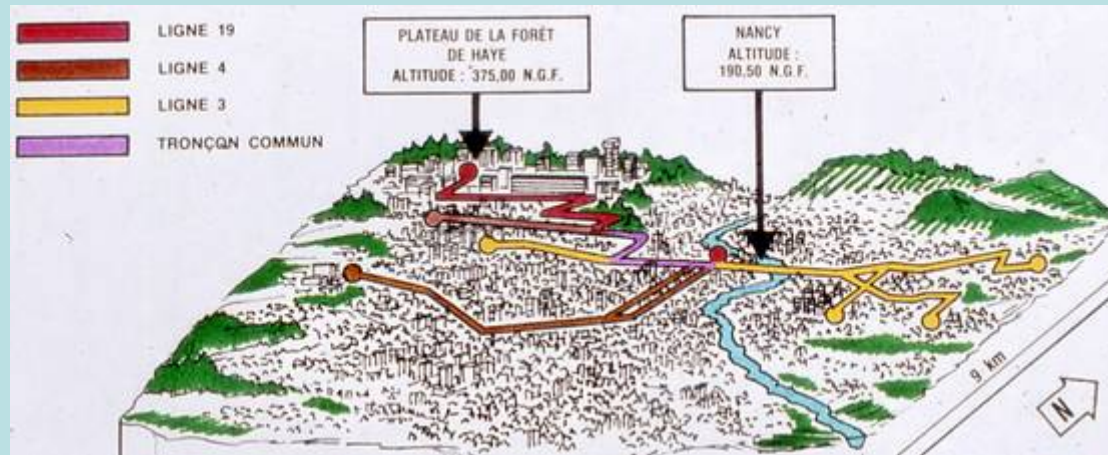


- The final route is in Vandoeuvre Bd de l'Europe only !!! 60 meters wide, where the mayor of this city always says it is impossible to implement a tram !!!

1977-1980

The bi-modal trolleybus project (a trolleybus with a powerful Diesel motor)

A project developed in a greatest secret, the elected members of the transportation working group were never informed of its existence until the presentation and the quick following vote in March

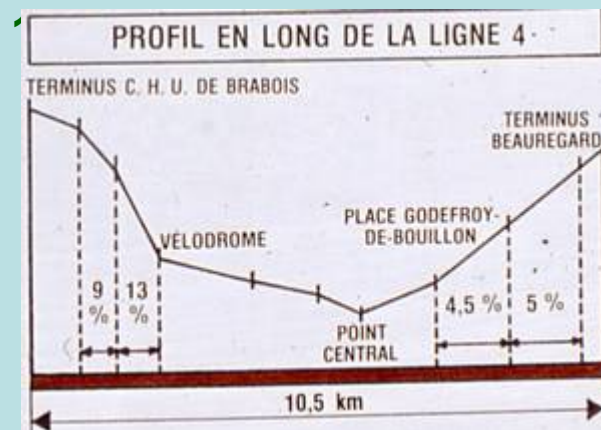


Dot lines = trolleybus runs with Diesel motor



First phase : 3 trolleybus lines
3, 4, 19

Second phase : 4 more
trolleybus lines, never made



Higher gradient 13%



13%

1980-1983

Construction and putting into operation in 1982-1983

Perfectly managed by the Authority, District Urbain de Nancy, and the operator CGFTE

Line 19 : 25/11/1982

Line 4 : 20/12/1982

Line 3 : 04/11/1983

Some weaknesses :

- Too few bus lanes
- Only putting overhead lines on existing bus routes, without rethinking their itineraries to better serve the inhabitants and to optimize the operating costs
- 2 electric equipments Alstom and TCO for 48 vehicles
- The trolleybus Renault PER180H is not the best, because of the chassis, compared to other trolleybuses
- Expensive trolleybus vehicles in investment, maintenance and consumption (80 l/100 km) to do the job of 12 m buses on the not electrified extremities

Good things :

- Electric traction
- Power of trolleybus (slope of 8% climbed at 41 km/h compared to 20 km/h with a Diesel bus) allowing a direct shorter route (- 650 m) between Vélodrome and Brabois)
- Main streets St Georges and St Jean pedestrian and bus only

In 1980, for the whole bus network
24,5 millions passengers

In 1986, for the whole trolleybus + bus network
28,4 millions passengers (+ 14%)

Evolution 1980-1986	<u>Increase passengers</u>	<u>Increase vehiclexkm</u>	<u>Elasticity</u>
Line 3 trolleybus	+ 1,0 %	- 1,6 %	
Line 4 trolleybus	+ 53,2 %	+ 7,8%	+ 6,8
Line 19 trolleybus	+ 17,1 %	+ 12,7 %	+ 1,3

In 1999, for the whole trolleybus + bus network
only 20,2 millions passengers

1999, end of the trolleybus operation

Overhead lines of East part of line 3 and South part of line 4 were reused for the tram on tyres.
Overhead lines of line 4 North part and line 19 were stupidly dismantled in 2016.

1983-1999 Trolleybus operation

The first years of the
trolleybus operation are
successfully

Later, due to some
reorganisations of the
trolleybus network
(merging lines 4 and 19)
and technical problems
with the trolleybus
vehicles, the passenger
number is falling down

1982-1999 Trolleybus operation in Nancy



Prototype in test, Champ le Boeuf Nov 1981



Arrival at Tamaris at the end of the first climbing to Champ le Boeuf



June 1985 Climbing to Champ le Boeuf. Peter Haseldine



St Jean Street

In 2020, IVECO tested the capacity of its new trolleybus IMC to climb very high gradients and to run a long time on battery. Nancy was chosen, due to its gradients.

For the tests, the still existing overhead lines on the West part of former line 3 was feeded to charge the battery before running on battery in a street with high gradients



Nov 1982 Near Polyclinique Eastbound



June 1985 Seichamps terminus, end of the section without wires. Peter Haseldine



5 June 2020 IVECO trolley in Nancy



Dec 1982 running down the 13% gradient line 4

For pictures of Jean Henri MANARA about Nancy see <https://www.flickr.com/photos/jhm0284/albums/72157627431931112>

22-1379V1 PDeb 150 years Nancy
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1998-

The tram on tyres TVR Bombardier
(Transport sur Voie Réservée)

Without real deep comparative
studies, Nancy (Caen also) choices
the tram on tyres TVR Bombardier.

The tram on tyres TVR Bombardier is,
in fact for Nancy, a trolleybus guided
on some sections in Right of Way,
and not guided out of these sections



Guided on Right of Way sections



Not guided in mixed traffic





**TVR also named GLT
(Guided Light Transit)
by Bombardier
here in test in Belgium**

1998-

The tram on tyres TVR Bombardier

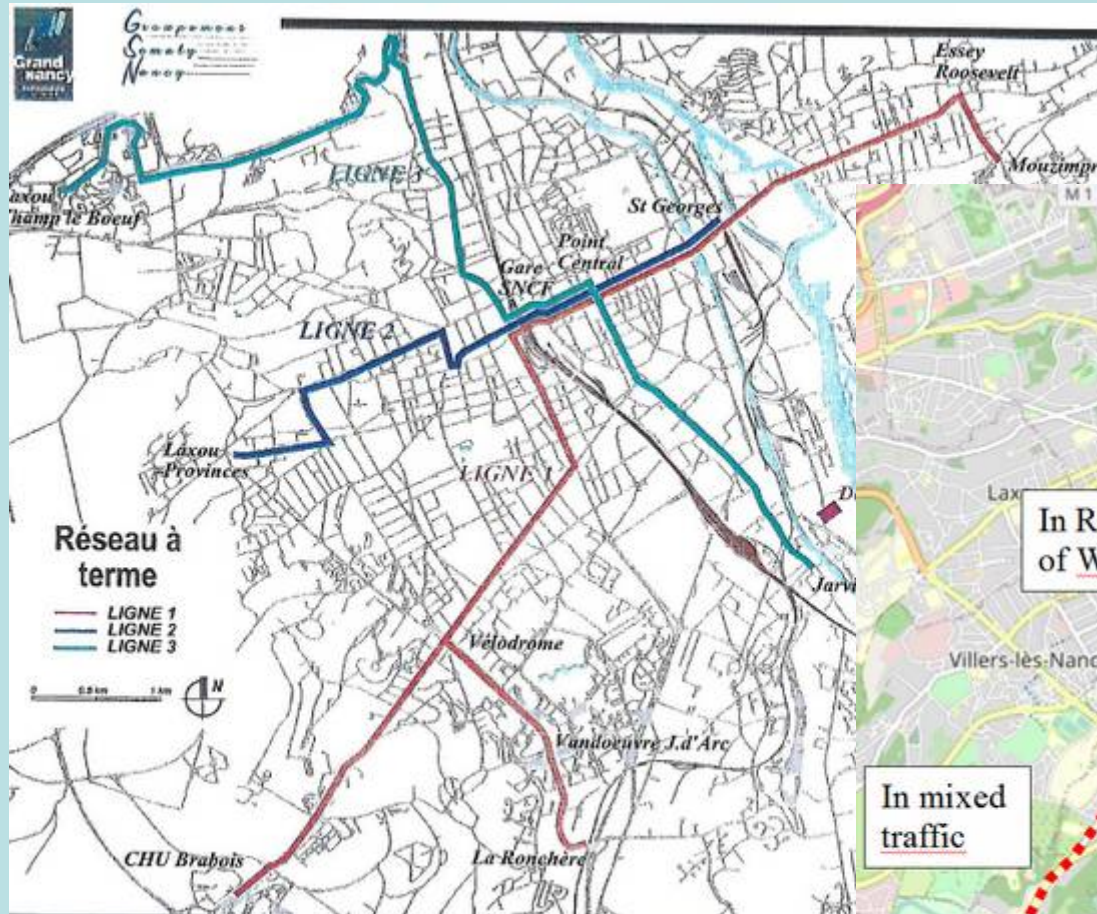
Why the (bad) choice of the tram on tyres TVR Bombardier ?

This technology of tram on tyres (Bombardier, Translohr) was promoted by the manufacturers but also strongly by the French State

Compared to a tram, people say that trams on tyres :

- are less expensive to build the infrastructure**
- have no problem with asphalt for the roadway, even with guided vehicles**
- are less expensive to operate and maintain**
- are more flexible in operation**

**Experience shows that
a lot of these says are wrong**



The planned network of 3
Tram on tyres lines
Lines 2 and 3 never made

1998-

The tram on tyres TVR



The line 1 put
in commercial operation in 2001
Length 10 km, RoW 6 km



**State and roadway
work in 2009 after less
than 8 years operation**



2001-

The tram on tyres TVR

Quickly appear problems :

- electrical problems (solved)
- bad conditions of ergonomy and visibility for the drivers
- many losts of guidance so the operation is stopped during one year in 2001
- important wear of the roadway
- high costs of maintenance

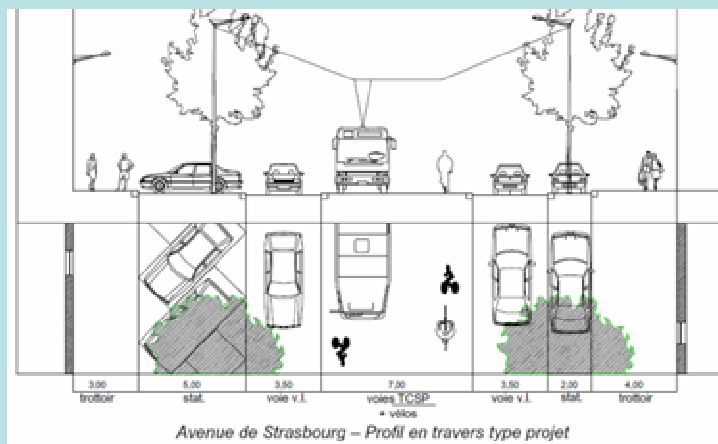
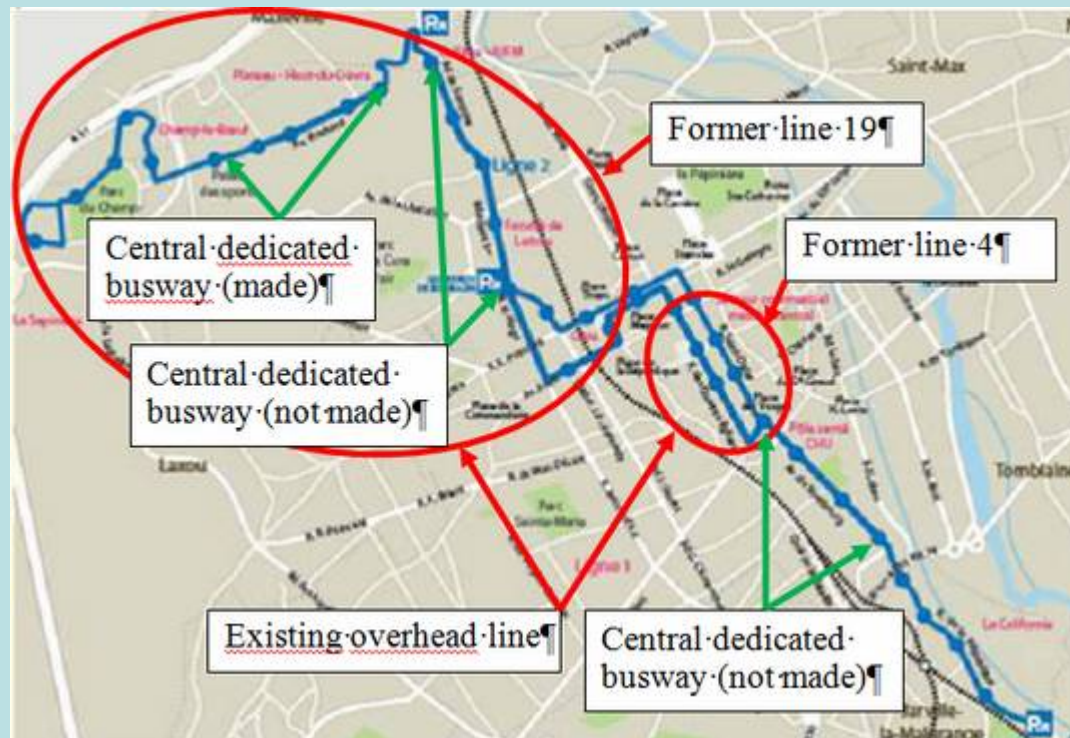
**So, the tram on tyres
Bombardier,
a very nice vehicle to see,
but not nice to operate**

2009 -2011

The trolleybus line 2 project

A nice project with :

- reusing existing overhead lines
- electrifying the South part of this new line (former bus lines 1 and 12)
- creating central dedicated busways



Unfortunately, it was decided to equip the line with CNG buses and to implement curb bus lanes instead of central busway.

The result is a low commercial speed



The report examines some solutions (Translohr, BHLS possibly trolleybus, tramway) to replace the tram on tyres.

The solutions Translohr and tramway are a little bit detailed but nothing for the trolleybus which is only named

The report recommends an overhaul of the tram on tyres to give it 10 years more life

2010

The tram on tyres TVR Bombardier

The French State publishes a report about the ways to solve the problems of the tram on tyres Bombardier

Mission de diagnostic et de prospective sur les réseaux de transports urbains de Caen et Nancy (CGEDD).



2013 - The renovated TVR goes on running but with a lot of problems



Général Leclerc Street in Nancy



13% gradient Jean Jaurès street in Vandoeuvre



Viaduc Kennedy in Nancy



Viaduc Kennedy in Nancy



St Jean street in Nancy

2013-2017

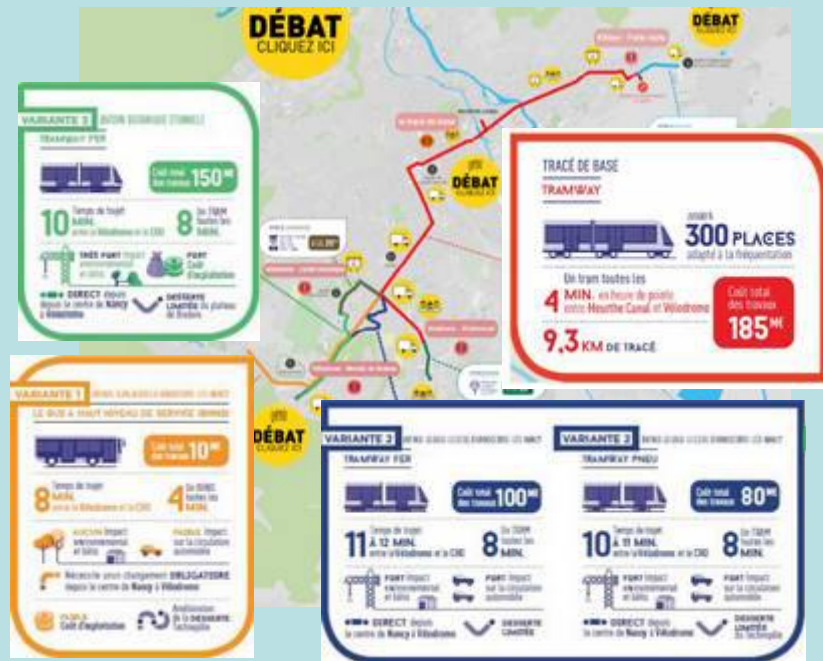
The life of the tram on tyres is limited, so necessity to choose the system of transport which will replace the tram on tyres.

The result of the studies is different variants with a tram on tyres Translohr, or a classical tram.

A classical tram is choosed but only on the flat part of the city, and it is a bus shuttle from Vélodrome to climb to Brabois (because a classic tram cannot climb to Brabois !!! Remember tram line 14 until 1952)

The cost of 255 millions euros is without options, so for red (tram) and yellow (bus shuttle) lines

18-1003-26-4V PDeb notice_Avenirligne1 Nancy



Many people protest and request for a tram line climbing to Brabois. They are right

Pierre DEBANO proposes 4 ways for a classic tram to climb from Vélodrome to Brabois with a maximal slope of 9%



KEOLIS the winner, it is surprising when we know the bad results of KEOLIS in Rheims, fired in 2007 before the end of the contract

RHEIMS	1990	2005	2005/1990
Ratios of the bus network	TUR Local bus company	VIA GTI Keolis	VIA-GTI Keolis % TUR
Population	212 036	218 928	+ 3%
Passengers per year (1000)	30 816	30 324	- 2%
Km per year (1000)	6 542	7 688	+ 18%
Buses number	122	168	+ 38%
Total staff number	442	574	+ 30%
Drivers number	319	437	+ 37%
Km per bus per year	53 251	45 762	- 14%
Km per driver per year	20 400	17 580	- 14%
Passengers per bus x km	4,7	3,9	- 17%

The Rheims elected in charge : "until now we had Keolis, which was skidding on costs. The equilibrium subsidy had doubled in ten years, without much improvement". In fact, the productivity of the Rheims bus network had falled dramatically with KEOLIS (- 14%)



In Nancy, KEOLIS designs and implements a new bus network from August 2019, and immediately the passengers traffic, which was growing up from years, falls down

2018

The historical operator, present in Nancy for 138 years with different names (CGFT, CGFTE, CGEA Connex, VEOLIA, TRANSDEV), loses the new contract to operate the Nancy transports. KEOLIS is the winner



This tram has a cost of 429 millions euros, far from the 255 millions euros of the initial project, and some things (works on bridges) are not included

2018-2020

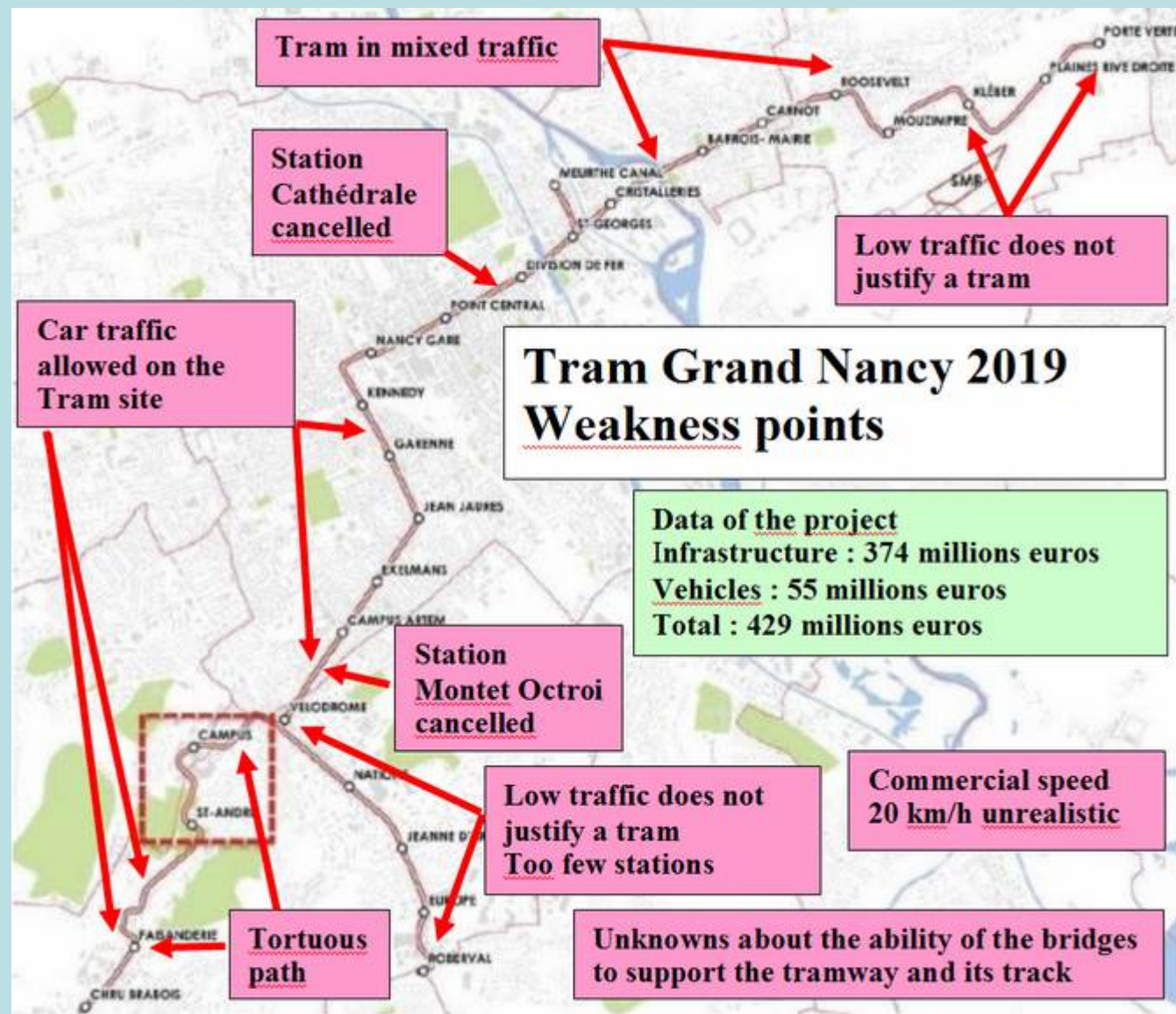
A classic tram project

The final project of a classic tram, includes :

- the climbing to Brabois**
- the extensions East and South-West, requested by the mayors of these cities**

The project is approved by all the elected.

But new municipal elections are coming in 2020



2019
 A classic tram

Good point : it is
 a proven classic
 tram

But a lot of
 weakness points,
 of which the cost
 which seems
 underestimated



2019

A trolleybus IMC ?

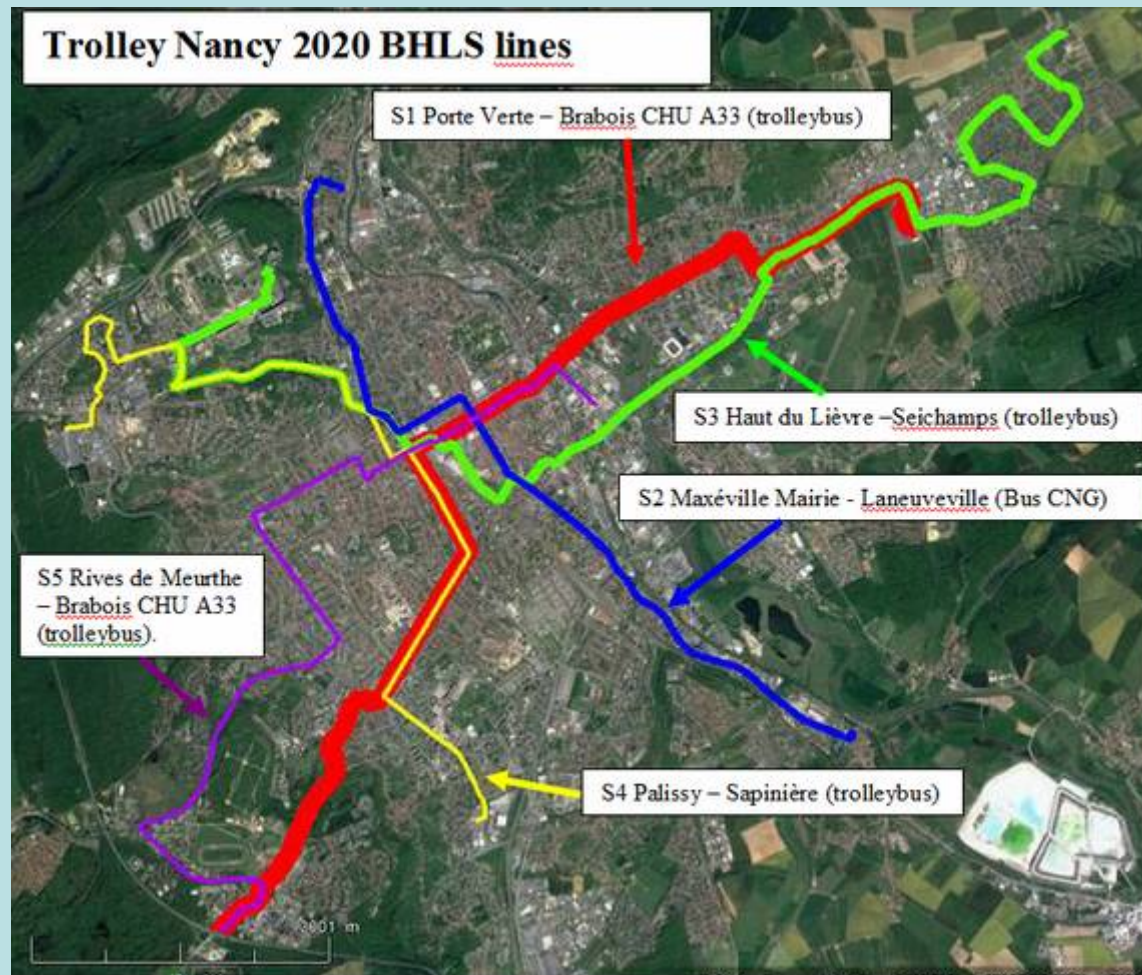
Counter-proposal from Pierre Debano who proposes to replace the TVR tram on tyres by a trolleybus IMC.

Calculated on the same duration of 30 years, the economy is very important for the same ability to carry the expected passengers

Calculation made on 30 years	Tram Grand Nancy	Super - Trolley	Savings with Super-trolley
Infrastructures millions euros	374	191	183
Rolling stock millions euros	55	98	- 43
Total infrastructures and rolling stock millions euros	429	289	140
Annual operating savings millions of euros			1
Total energy consumption over 30 years in millions of kWh	229	210	19

This proposal, widely disseminated, interests only the candidate «Unis pour Nancy» to the municipal elections

Caution, the comparison is only valid for Nancy (could be also valid for Caen), where some infrastructures used by the tram on tyres can be reused



2020

Municipal elections

A candidate, Unis pour Nancy, proposes a new transport network :

- 4 trolleybus IMC BHLS lines 7,5 mn
- 1 CNG Bus BHLS line 7,5 mn
- 8 city lines 10 mn
- 3 ring lines 10 mn
- 16 district lines, 7,5 mn to 20 mn,
- a lot of new bus lanes or busways precisely drawn

Unis pour Nancy lost the election with only 2% of voters

The transport program : <http://www.unispournancy.fr/transports.php>

2021-2022

The victory of the trolleybus

The new elected President of the Grand Nancy was for the classic tram and strongly against the trolleybus solution during the municipal campaign.

But, when he opened the cash box of the Grand Nancy, he discovered that there was not enough money to realize the tram project.

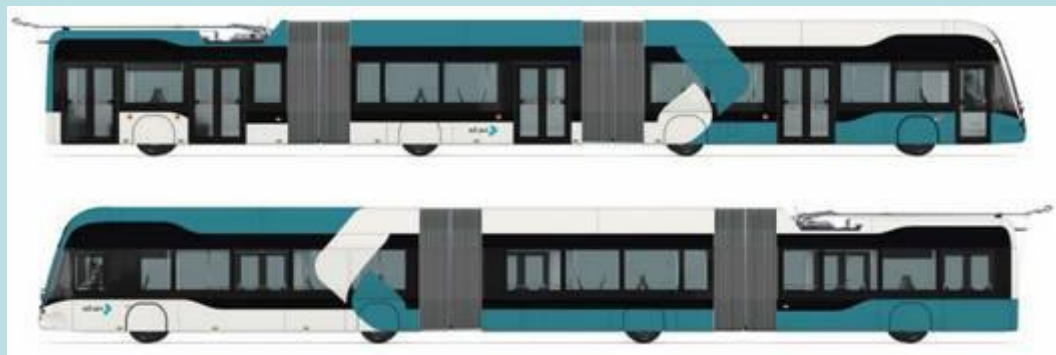
In February 2021, the tram is postponed, without giving a new date.

On 26 August 2021, Nancy chooses the trolleybus to replace the tram on tyres, and announces a budget of 50 millions euros (25 millions for the infrastructures and 25 millions for 25 biarticulated trolleybuses. That seems not sufficient in term of infrastructure (no more trolleybus Rights of Way) and number of vehicles (the same number as tram on tyres).

On 06 Januar 2022, Nancy chooses the bi-articulated trolleybus IMC Hess (order in June 2022 at a costs of 1,4 mio euros each for a delivery of the first vehicle end 2023 and operation in September 2024)

The tram on tyres
Bombardier will be
removed from operation
on 12 march 2023.

The design of the trolleybus



The civil work for the trolleybus on the dedicated roadway

The Grand Nancy has published end 2022 a call for tender to full renew the 6 km dedicated roadways of the TVR

- The roadway will be scrapped on a depth of 28 cm
- The rail will be pulled out and its beam will be destroyed
- The new roadway will be constructed with beton, excepted in the center of the city (St Jean and St Georges streets) which will be paved



- Reuse of the existing structure
- Supporting soil

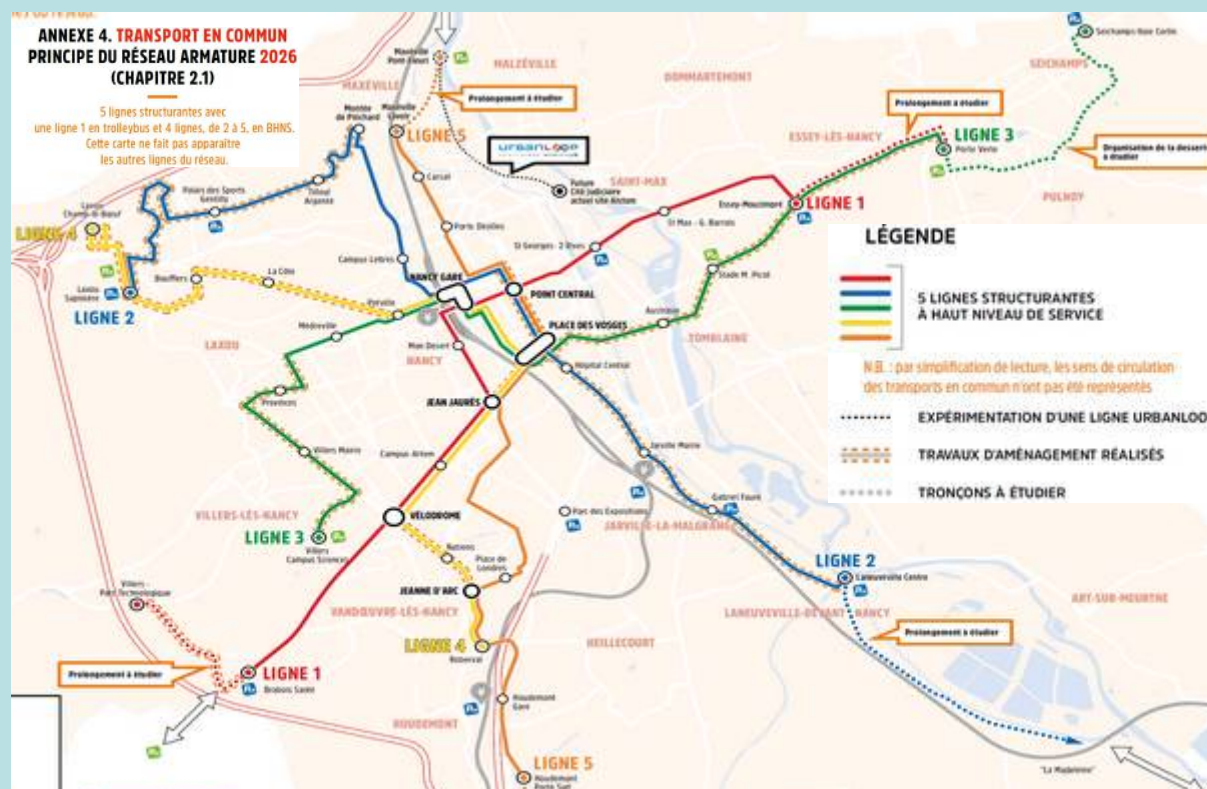
- Perhaps the overhead line could be dismantled on 1,8km between Mont Désert- Division de Fer (not yet decided)
- Perhaps the trolleybus could run down from Brabois to Vélodrome via Av Leclerc instead of J Jaurès street (+ 650 m)
- Duration of the civil works : 12 monthes
- During the civil works, alternative bus lines will be implemented



Alternative bus lines

2026

A victory for the public transport ?



In Januar 2023, 30 months after the elections, only this drawing with :

- no modifications of the itineraries of some bus lines to get more efficiency
- no indication of new bus lanes
- no indication of frequencies
- etc..

Is it a professional work?

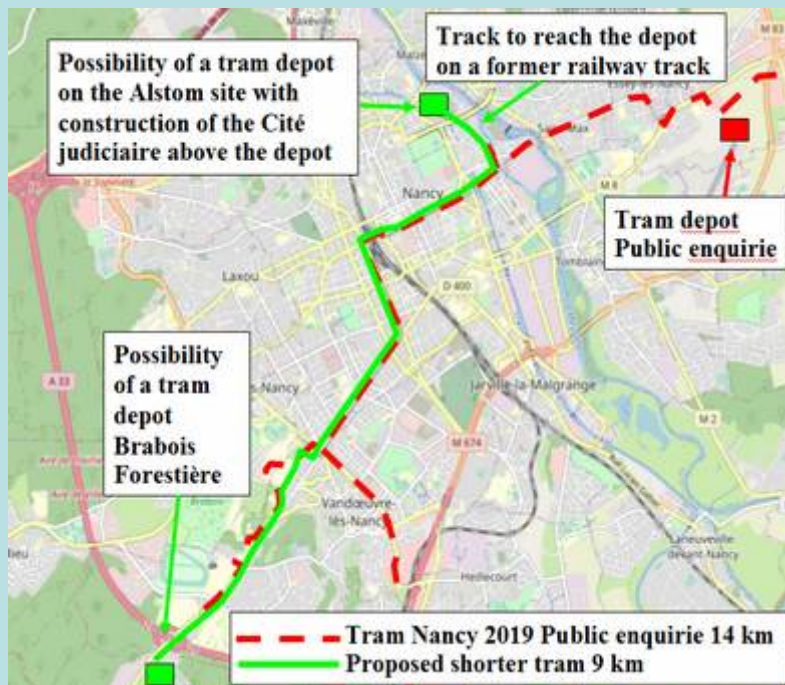
[https://agglo.grand-nancy.org/delib.nsf/758b76f19cfef8efc1256df90057ddee/b6e8065d27a4d486c1258776003c9c50/\\$FILE/Annexe%2004-Transport%20en%20commun%20-%20Principe%20du%20r%C3%A9seau%20armature%202026.pdf](https://agglo.grand-nancy.org/delib.nsf/758b76f19cfef8efc1256df90057ddee/b6e8065d27a4d486c1258776003c9c50/$FILE/Annexe%2004-Transport%20en%20commun%20-%20Principe%20du%20r%C3%A9seau%20armature%202026.pdf)

The trolleybus is a very good choice if well made. Sure.
But tram could have been also a good choice. Was a cheaper tram project for the most crowded sections possible ?

To avoid the new President of Grand Nancy to have to eat his hat (he was strongly against a trolleybus solution), was it not possible to build a cheaper tram for the most crowded sections in a first phase?

The elected in charge of transport asked that to his technicians; they answered, as reported in La Semaine of 06/11/2021, «But there is the workshop and depot at Kléber, so we can't modify the route” (“Mais il y a le centre de

remisage et le dépôt à Kléber, donc on ne peut pas toucher au tracé.”)



Really? (see left)

Only 9 km tram (green line) instead of 14 km tram (red dot line)

Surprising that the elected in charge did not ask other advices.

Was he strongly for the trolleybus?
Not sure



URBANLOOP

The birth in Nancy of a new means of transport which will revolutionize the transport worldwide !!!!!

Mr Mangeot, professor-researcher, the inventor : « I was stuck in a traffic jam, and I thought that transportation must be like Internet”

What do you say?

« Already a lot of projects of this type, never worked ».

Please repeat louder, Nancy does not hear you!!!.

3000 passengers per hour per direction.

Capsule for 2 persons.

Consumption 0,05 kWh/km



Thank you for your attention.

You will find on the website
<http://www.unispournancy.fr/transports.php>
all the detailed reports and drawings.

If you want to discover Nancy (my birth city) with nice pictures
<https://jcb1.pagesperso-orange.fr/ny.html>

I stay at the disposal of everybody.

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