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## Opportunities Abound for Transporting Goods by Tram — If Properly Coordinated

Yonah Freemark

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Zurich's CargoTram, from [Flickr user Sven Dowideit](#) (cc

» Though a proposal in Amsterdam has been abandoned and freight transport in Zurich and Dresden is limited, Paris considers options for using its new tramways to move goods to stores.

There was a lot of excitement in the transportation press in mid-2007 when Amsterdam **signed a deal** to allow the transport of local goods by tramway beginning in 2008. In theory, fifty light rail trains operated by a company called CityCargo would move freight from warehouses to local stores without interruption along the city's existing and extensive passenger tracks, reducing the need for trucks in the city center by half while cutting down on pollution significantly. A network of 600 electric trucks would move the freight minimal distances from the trains to the stores.

Unfortunately, the company fell short of its goal to raise the €150 million necessary to commence operations and the city refused to subsidize the project, so the project died even before the project

could come into being.

Needless to say, the concept still has currency in European cities that are looking to reduce traffic and clean the air and which have tramway tracks running through some of their most congested areas.

In 2001, VW implemented the **CarGo tram** between a logistics site and an automobile factory in the center of Dresden, creating a carbon-free mechanism to transport parts along 3 km of passenger lines. Zurich uses **CargoTrams** — old tramway vehicles, such as those pictured above — to move recycling. Vienna **attempted a similar experiment** a few years' back, but never implemented it despite successful results.

These projects are of limited scale, so their effects have been similarly small.

A new experiment called TramFret in Paris, however, could transform the way cities think about moving goods from place to place by establishing a regionwide system by which freight like groceries can be moved between distribution facilities and stores by electric tram. Experimentation will begin next month, with full implementation possible by 2014; positive results could show that rail can play an important role in moving freight not just at the intercity scale but also within regions, a market now completely dominated by trucks. But the success of the project will require significant coordination between competing stores and it will need to be carefully planned to as to avoid conflicts with passenger transit routes.

Under Mayor Bertrand Delanöe, the French capital has been a pioneer in all things transport, introducing huge bike-share and **car-share networks**, building dozens of miles of reserved bus and tram lanes, **reducing speed limits to 30 km/h in many neighborhoods**, and allowing reverse-direction bike riding on most small streets. But these projects have largely avoided the issue of cargo transport so far, despite the fact that one million daily deliveries are made each day in the Paris region, 90% by road; those trips produce 25% of the region's carbon dioxide emissions and 50% of particulate releases — as well as consuming 20% of all road space. A successful TramFret could thus improve quality of life significantly.

The Atelier Parisien d'Urbanisme (APUR), the Paris city planning study office, has **conducted a study on the project** and has led thinking about its implementation, which is increasingly relevant considering recent public policy choices. The Paris region, called Île-de-France, has begun a significant investment in new tramway lines (much like American light rail) and by 2016 expects to have 105 km (65 miles) of them in operation, carrying about 800,000 people a day (there are currently 26 miles of trams in operation, carrying about 350,000 people a day). Unlike metros or commuter rail, which Paris has much more of, the street rights-of-way offered by tram could allow much almost direct small-scale delivery to stores. With so many tram routes, many stores could be linked up for reduced truck deliveries. In addition, the French government plans a pollution tax on tractor trailers beginning in 2012 that should encourage the movement of goods off the road.

APUR suggests beginning with the existing T3 and T2 lines, which roughly run around the southern and western sections of the city. A new distribution facility would be created at the future terminus of the T2 line at Pont de Bezons, to which grocery stores would bring their goods from other facilities throughout the region. The APUR study suggests that within 500 meters of the two tram lines are 128 grocery stores representing the four largest chains in Paris (Casino, Carrefour, Monoprix, and Franprix, along with their subsidiaries). Trains would each carry the equivalent of three to four truckloads of goods, which means there would likely have to be dozens of trains each day to handle the needs of all these stores.

In order for implementation to occur, the tracks of the two lines would have to be connected at Porte de Versailles, but that will require just a few hundred feet of new track. But new sidings for freight trains to stop would have to be built\*, not necessarily an easy proposition considering that the tram lines have been built in dense urban areas. In addition, stores would have to acquire small electric trucks to move goods the final few blocks from the trains to stores. [Note: the study suggests that short rail extensions directly to stores be built so this final step is avoided, but it is my (perhaps unfair) presumption that it would be more simple to implement trucking from distribution points along the line than it would be to go through the regulatory process required to build these line extensions.] All this would necessitate a huge degree of logistical coordination to work efficiently, but better web-based mobile tracking of goods could make it possible.

There is some precedent in Paris for using rail lines for intra-regional goods transport. The Monoprix brand uses the RER D passenger rail line to move goods from a suburban distribution location to a facility in Paris, from which trucks move goods to their final destinations during night trips.

Over a year's period, this eliminates 10,000 trips by trucks and reduces the emissions of carbon and NOx by about 50% over previous conditions. These are hardly negligible results.

Experimentation **will begin this fall** on the T3 line. Empty trams will be placed with normal headways between passenger trains to see how much capacity is available on the route for more trains (it already carries 112,000 daily riders with high frequencies). APUR will follow up with economic studies beginning next year.

There a number of questions to consider: Will there be enough reduction in pollution and congestion within the center city to justify what is likely to be a more complicated distribution procedure? After all, what right now is a relatively simple truck-from-warehouse-to-store process would be replaced with a journey for goods that requires a truck or train from the warehouse to a logistics facility, to a tram, to a local electric truck making the final trip to the store. Even if trams are cheaper than trucks to operate (because they use electricity and can transport more goods per driver), it's hard to imagine that these tram-freight trips would be cheaper overall, especially since these trains would have to operate around the passenger train system and in coordination with competing stores.

If tram freight is more expensive than truck freight, does it deserve to be subsidized? Under a typical economic model, the answer is up to the externalities freight rail eliminates. If moving goods by tram reduces congestion or pollution by an amount that is larger than the price difference with the trucking status quo, the public has a societal interest in encouraging its use — unless congestion and pollution of those trucks are appropriately taxed, which they are not. But a source of funds would have to be identified to make such subsidies.

There's the final question of whether improving freight access by rail into the city is more important than encouraging transit-oriented development. A new distribution facility for the rail line will have to be near the rail line. Would it be more environmentally friendly in the long-term to build high-density housing where that facility would be, even if it required goods to be trucked to it?

26 Comments

**Helen Bushnell**

**23 October 2011 at 19:23 · Reply**

This sounds like something that might work better outside the urban core of Paris. France has unfortunately low freight percentages, so it actually might make sense to concentrating on getting goods to warehouses by train first.

Danny

**23 October 2011 at 19:49 · Reply**

From a logistical perspective, there is a ton of extra cost in there that doesn't seem to add much value to the customer. Costs are already socialized, and there if there is no savings to the customer, then there is no incentive to act.

But that doesn't mean that there can't be savings to the customer. If the logistics are worked out correctly (a task far more difficult than just adding "web-based mobile tracking of goods" btw), there can be a huge cost benefit.

While trucks have the ability to handle warehouse-to-customer service without any change of hands (a liability and risk benefit as much as efficiency benefit), they have a major drawback in the sense that the majority of the driver's time is spent sitting in a truck either going an average 5mph or sitting at stop lights. That is expensive. From my own experience as a truck driver in Northern CA, I know that I was probably about half as productive per labor hour when I had deliveries in San Francisco as when I had deliveries in Stockton, Fresno, Merced, or Sacramento. A cargo tram system eliminates congestion, but it also eliminates a lot of wasted labor time in addition to the wasted fuel. If they can work out the logistical issues with material changing hands frequently (still a pretty big if), there is a ton of benefit that could happen.

A pollution tax would help, and a vehicle weight tax would help even more, but even with current

conditions, I think it could probably work.

Max Wyss

**24 October 2011 at 05:14 · Reply**

In fact, a transfer warehouse is still needed in the case of Paris, because, as there are limitations for trucks. As far as I understood the description of the Monoprix operation, trucks allowed are limited in weight and length, which means that, for example, semi-trailers are not allowed to reach the stores at all. So, transferring is needed.

Now, using some smart logistics (essentially containers), the transfer can be simplified. When you look at the map of the supermarkets, you will notice that many stores are just next door to each other. This would kind of ask for a non-supermarket-chain-based distribution; a train would serve a stop within “walking distance” from the supermarket, and carry boxes for different operators. Or, with according sidings, it can serve several stores with one run. We'll see how the operation tests later this year come out, and then, how they specify the system. The easiest would be using the existing tram platform (mainly Alstom Citadis), and hire STIF/RATP for the operation. This could keep the operation costs low, as the drivers could also operate the passenger trams, and there would be common parts with the passenger fleet. IMHO, it could actually work out.

david vartanoff

**23 October 2011 at 21:20 · Reply**

Historical irony. Phila and Pittsburgh streetcar lines were built to non standard track guages in order to prevent freight interchange. OTOH, Capital later DC Transit #20 streetcar carried sacks of mail between the Glen Echo MD PO and the Main DC PO next door to Union Station. More recently BART has been used by the USPS to move priority mail from Fremont to the West Oakland main PO because it is way faster than the I 880 bumper to bumper rush hour mess.



mulad

**24 October 2011 at 08:50 · Reply**

Streetcars serving the University of Minnesota used to transfer freight cars of coal and other supplies from the Minnesota Transfer Railway out to the St. Paul campus, though that route was along a dedicated right-of-way (not on the street). Elsewhere in the streetcar system, I think the only freight consisted of streetcar parts and other maintenance materials.

The old freight railroad system used to be very extensive here, so there may not have been much need for streetcar-based delivery. However, I wouldn't be surprised if there is/was a law or regulation on the books preventing streetcars from moving goods — that was the Minnesota Transfer Railway's job, and it was co-owned by all or most of the freight railroads operating in the Twin Cities.

Buckeyeman

**24 October 2011 at 13:10 · Reply**

If want to get really historical, there were many other streetcars were used for mail service. I think there might have even been sorting done just like on the steam railroads' RPOs. I've even read of some systems having funeral cars, not to mention party cars.

Buckeyeman

**24 October 2011 at 21:00 · Reply**

David, do you know how much revenue BART rakes in on handling mail traffic? there may be other opportunities out there using light rail, heavy rail and even regional commuter rail for postal traffic.

david vartanoff

**25 October 2011 at 00:00 · Reply**

last I knew, a PO employee boards w/a hand truck with mail in containers, rides to West Oakland where he is met by a truck for the last several blocks. I don't know if he pays an extra fare. In the archaic DC Transit in stance<sup>4</sup> the mail sack was thrown on the floor behind the M/M in Glen Echo and retrieved by a PO employee at Unionb Station. I will enquire via a yahoo group to see if anyone knows more.

Jake

**23 October 2011 at 23:37 · Reply**

They should free up the regulations to let individual companies use the tram network if they deem it useful. I know that Cincinnati, Ohio did this back in the day. A certain metal and pipe manufacturer (that still exists today, actually) would use trams to transport some of their goods to the main freight rail yard. It wasn't a widespread thing throughout the city but it worked for this certain company. That would make much more sense, I believe.

Alan Robinson

**24 October 2011 at 02:11 · Reply**

Hi Yonah,

The study proposes to serve stores with dedicated freight sidings, not to truck in from the tramway. Apur want to minimize mode changes. In the near term, a truck to tram transfer will be required as only one potential customers' warehouse is near a proposed tram line.



**Yonah Freemark**

**24 October 2011 at 07:57 · Reply**

I will be very interested to see how goods will be transported from those sidings into the stores for those shops that are not directly along the tram line. Rail extensions onto side streets seem unlikely.

Alan Robinson

**24 October 2011 at 12:16 · Reply**

The statement, "In addition, stores would have to acquire small electric trucks to move goods the final few blocks from the trains to stores." is incorrect.

Apur's study hypotheses (on page 9 of the report) state that the tramways will deliver goods directly to the stores my the means of freight sidings. They recognize the cost of a change of mode and want to minimize them. They are even consulting with the various stores to see if they would want to set up distribution warehouses near the tram lines once a system is up an running.



**Yonah Freemark**

**24 October 2011 at 12:30 · Reply**

Yes, the study says trams would serve grocery stores or shopping centers directly via short line

extensions (noted above). I simply suggest that building those line extensions seems unlikely considering that the vehicles would have to run along regular streets in mixed traffic, not ideal for a freight-carrying tram. This is why I mentioned the likely need to have distribution trucks. But you're right that the study's intention is to avoid having to use them.

Max Wyss

**24 October 2011 at 13:03 · Reply**

It may not necessarily be the case for longish street running. I must say that I am not familiar with the T2 and T3 lines, but at least in one place, it seems that the supermarket (well, a Hypermarché, if I interpret the maps correctly), is more or less directly on the line. In this case, the siding needed for accessing the unloading dock(s) is essentially what the current delivery trucks use.

Also, we can assume that the access streets do not have heavy traffic, which means that the disturbance by the tram would not be much more serious than the disturbance by the currently used truck(s).

Alai

**26 October 2011 at 00:46 · Reply**

Given that trams already travel in mixed traffic, and that truck deliveries happen in the same places, it doesn't seem like it would be a problem. Also, sidings would have to be built anyway, I think, since the freight trams can't sit on the line while they wait to be unloaded. Given the relatively high operational cost of getting products into a supermarket, requiring many workers, the extra one-time cost of the extension may well be justified even if it is high.

NCarlson

**24 October 2011 at 03:11 · Reply**

The approach to this that strike me as most feasible would be piggyback type operation over light rail lines... I know that no one has really tried this, and can't see any obvious reasons it couldn't be made to work. The biggest problem I see is that it start to look threateningly like putting conventional freight trains in the streets, which seems to be something most of these projects have been trying to avoid.

Marcella D.

**24 October 2011 at 13:14 · Reply**

Tram tracks are structurally unable, without great danger, to carry freight trains. Too much incompatibility: signaling, the track abatement design, the wheel design, the bogies, alignment etc.

NCarlson

**24 October 2011 at 14:31 · Reply**

To be clear, I was suggesting that they have been trying to avoid the APPEARANCE of freight trains in the street.

Max Wyss

**24 October 2011 at 05:21 · Reply**

Note that this concept does not have any intention to connect to the main freight network; its idea is to use the tram infrastructure in the way the tram infrastructure can handle it, and with no (or minimal) disturbance of the tram network's main use.

Ideally such a system connects directly to the distribution centers (where only one supermarket chain has one really nearby). Otherwise, you need a transfer center, where pre-commissioned goods would be transferred to the freight tram. How the goods get to the transfer center does not really matter; it could be by truck (most likely), but also by train.

Tom West

**24 October 2011 at 12:27 · Reply**

For passenger transport, a tram is a more efficient use of road space than a car. If people switch from car to tram, congestion falls.

For freight transport, I can't see a tram hauling significantly more than a truck, so there's no congestion gain. Further, freight has to be door-to-door – a 5 minute walk to a tram is fine of a person, but not for a tonne of freight.

Solution: use road/rail vehicle which can use electric power while on the tracks, and a regular engine otherwise. That would reduce pollution, minimise the effects on passenger trams, and still allow door-to-door freight service.

antón

**25 October 2011 at 17:14 · Reply**

Seems like a good idea. And since the vehicle will only spend very short distances on the road, they could probably be over-sized and drive really slow on the road or something.

francis

**28 October 2011 at 18:03 · Reply**

If reduced pollution is the main issue, battery powered trucks for local deliveries makes much more sense.

Tom

**26 October 2011 at 00:35 · Reply**

I live on a major street in Toronto, and my garbage pickup is at night. If there was no overnight streetcar service, would it make sense to have a garbage train, picking up garbage from alongside the tracks?

Max Wyss

**26 October 2011 at 05:25 · Reply**

Are the tracks on the side or in the center of the street?

In the center would cause quite a bit of danger for the workers, as they had to cross the traffic lanes a lot.

At the side, it might work, although there would still be technical issues to solve; Note that the Zürich tram transports bulky garbage. The collection points are not along the route, but at the end loops, where the second track is not needed for during the day operation. People bring their stuff to that place, and it is then dumped into the containers. This kind of collection takes place once every week or every other week. The schedules are published, and they are part of the



city's garbage collection schedules.

FG

**26 October 2011 at 09:46 · Reply**

The Toronto garbage pickup might work if it's a narrow street or for the side the tracks are on if it's wide. Part of that also depends on the type of waste receptacle too – small plastic bin or metal dumpster. However, it seems like it would be a big expense to buy equipment since you have to collect refuse from streets without tracks as well (I don't know how Toronto handles it, but in my city the city only picks up from buildings with 4 units or less and above that you have to pay for a private service, which adds complexity).

Max, I'm intrigued, is this like say old furniture and the like? It would work for recycling too I would guess. How is regular trash picked up in Z?

Max Wyss

**27 October 2011 at 03:26 · Reply**

In the city of Zürich, the regular trash is picked up twice a week. Paper is picked up once a week (if I remember correctly), and cardboard every other week.

The stuff picked up using the tram is indeed old furniture (small; has to be carried there by the people), but also metal, ceramics, etc.