



Optimization of Public Transport through the Enhancement of LRT

- Good Practice by Toyama City, Japan

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Road mobility projects in urban regions and their Impact on the environment

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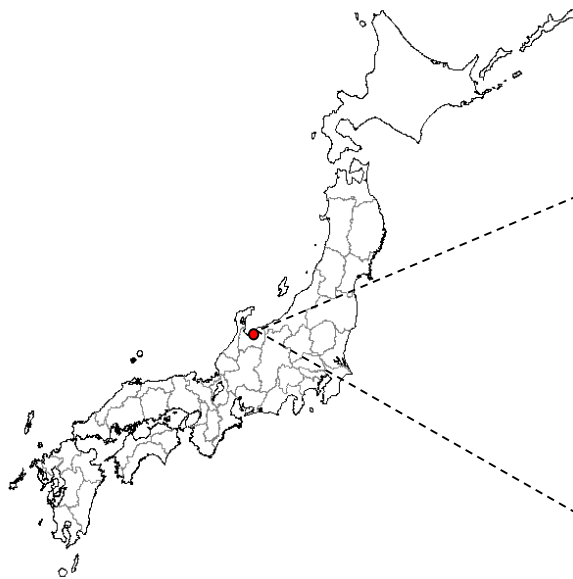
1. Why optimize public transport?

- Constraints in urban space and budget
- Expansion of urban areas and increase in travel demand
- Need to reduce car traffic and fossil fuel consumption
- Need to use road network more efficiently through better integration with other forms of transport (multimodality)
- Encourage alternative modes and their combination - rail, bus, active modes and carpooling
- Public transport must be optimized to compete with private car
- Separated by at-grade railway -> Railway elevation project -> Service improvement by conversion to LRT -> Integration of tram network
- High service levels accomplished to compete with private car

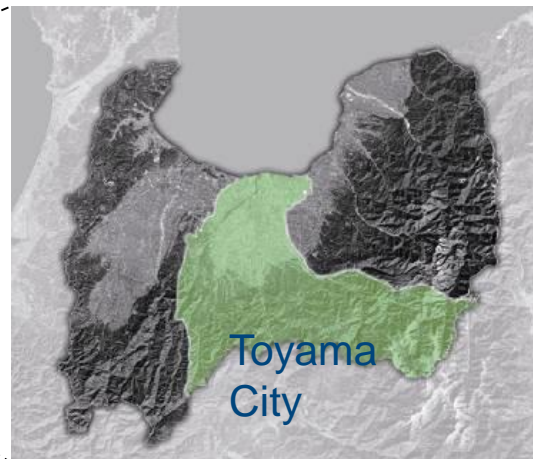
2. The Outline of Toyama City

- Population: 414,000 (About 40% of Toyama Pref.)
*National Population Census in 2020
- Area: 1,242 km² (About 30% of Toyama Pref.)
- Diverse topography - from sea level (0m) to 2,986 m at mountain top

■Japan



■Toyama Prefecture





Bird's eye view of Toyama City

3. The Basic Policy for the Creation of a Compact City

An Illustration of the Compact City Concept

Targeted City Structure:

Dumplings (Areas where people can have access to various city amenities on foot),
and

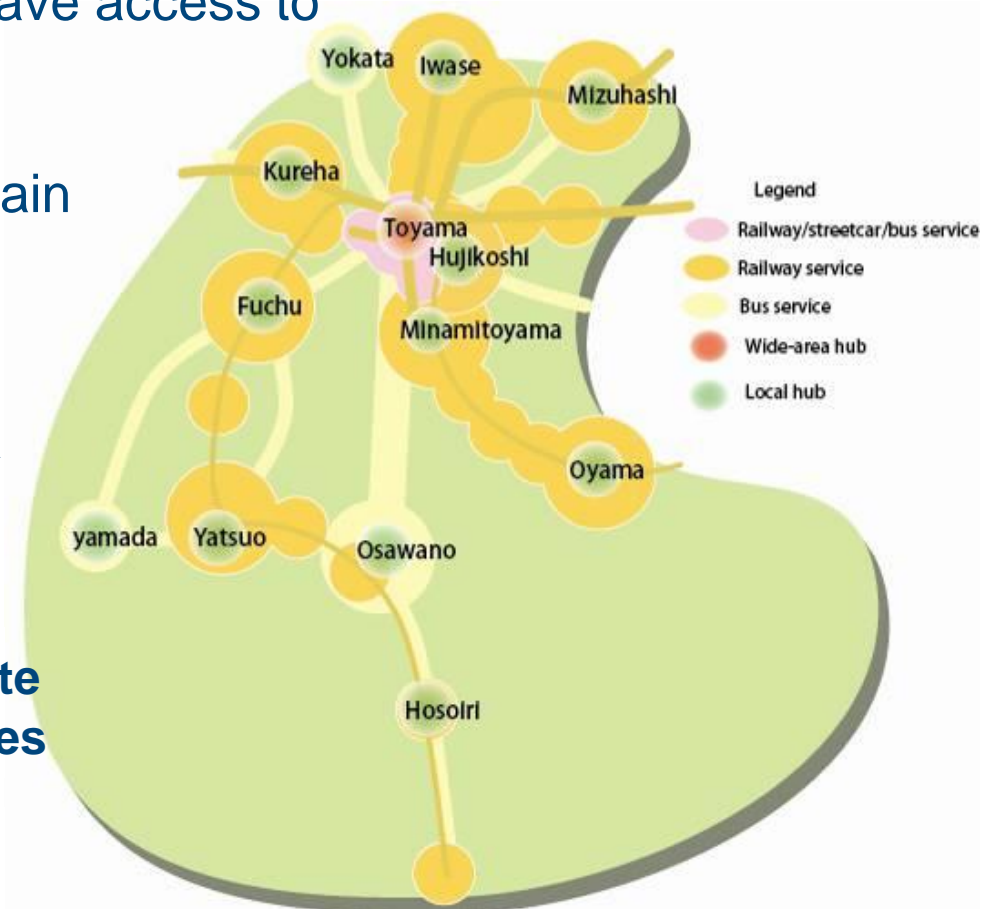
Skewers (public transport above a certain service levels) penetrating them.

<Three pillars of projects toward the goal>

① Revitalizing public transport

② Encouraging citizens to relocate to areas along public transport lines

③ Revitalizing the city center



4. Revitalizing Public Transport - Formation of LRT network -

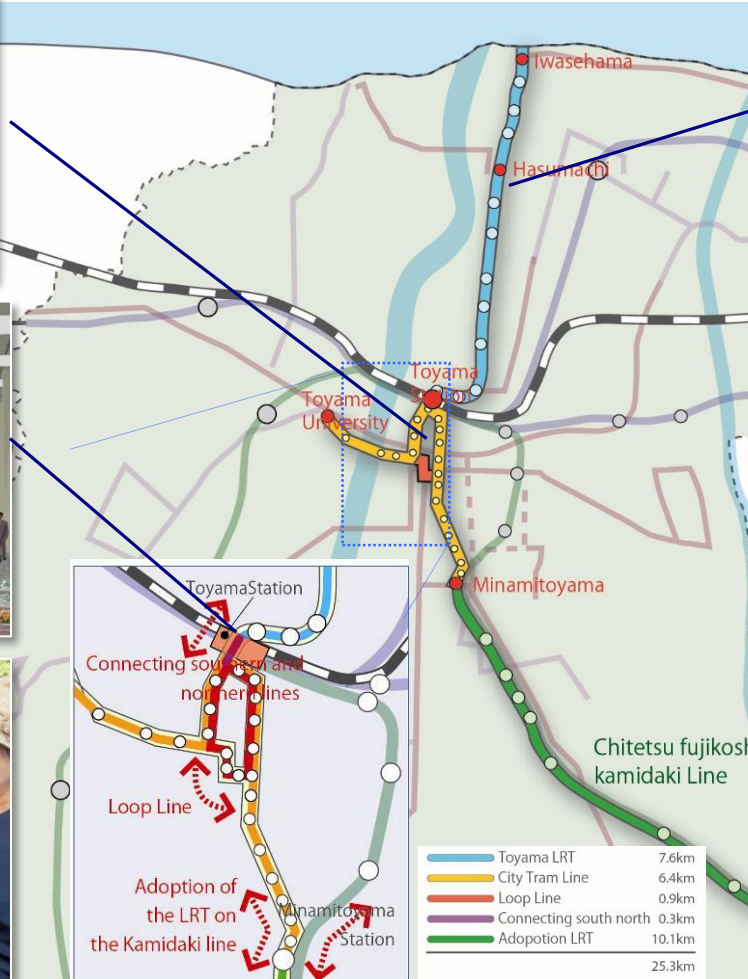
By forming the LRT network, we aim to modify the current life style of too much dependence on automobiles and realize **a town with every city amenity within walking distance.**



City Tram Loop Line (Dec. 2009)



The image of Tram going under the elevated Toyama Station



Toyama LRT (Apr. 2006)



4.1 Toyama LRT

JR Toyama Port line (a local line), which had been suffering from a constant decline in the number of passengers, was revitalized as **the nation's first full-fledged LRT**. This was achieved by adopting a **PPP concept** in which the public sector constructs the track while the private sector runs the business.

■ Outline

Inaugural Day: April 29th, 2006
Operation Distance: Approx. 7.6km
No. of Stations: 13

- Former JR Toyama Port line



Revitalized as the nation's first full-fledged LRT

- Toyama LRT



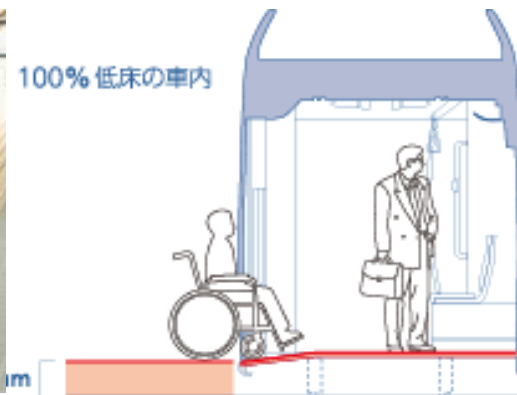
4.1 Toyama LRT - Operation and Service -

■ Operation

	Former service		New Service
Operation interval	30 to 60 min.	→	15 min. (10 min. during rush hour)
First / Last Train	5-6 / 21-22:00	→	5-6 / 23-24:00
No. of stations	9	→	13
Vehicles	Railroad vehicles	→	All super-low floor vehicles

*Fare is uniformly 200 yen.

■ Low floor cars and barrier-free stations



■ Introduction of total design



TOYAMA LIGHT RAIL

■ Adoption of IC card pass



■ Light Rail attendants

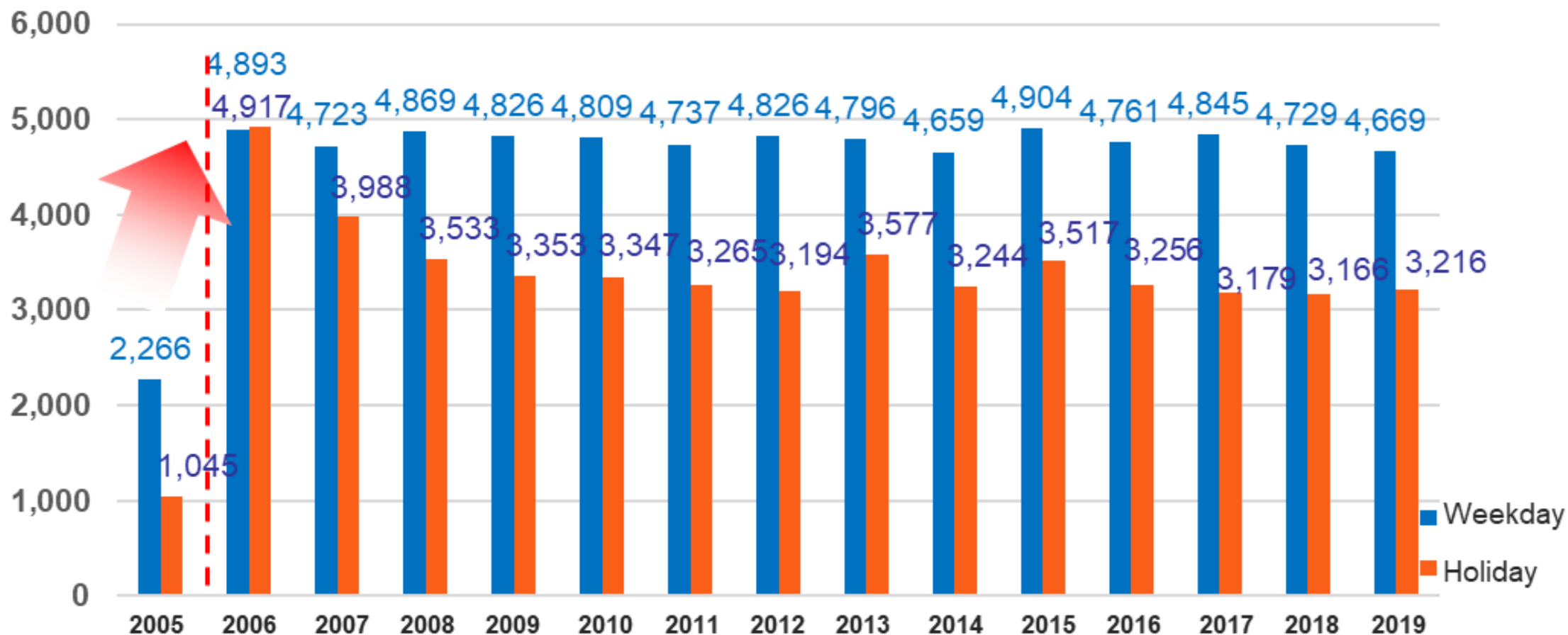


■ Vibration-dampened track



4.1 Toyama LRT - Effects -

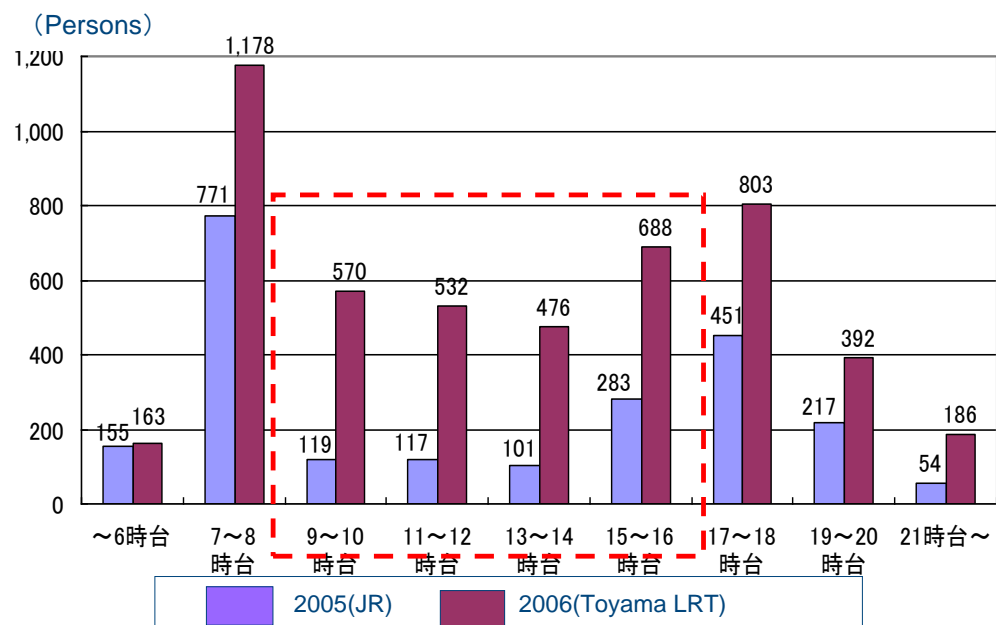
■ **On weekdays there are 2.1 times** as many passengers as before the project, and **on holidays there are 3.3 times** as many passengers using the new service.



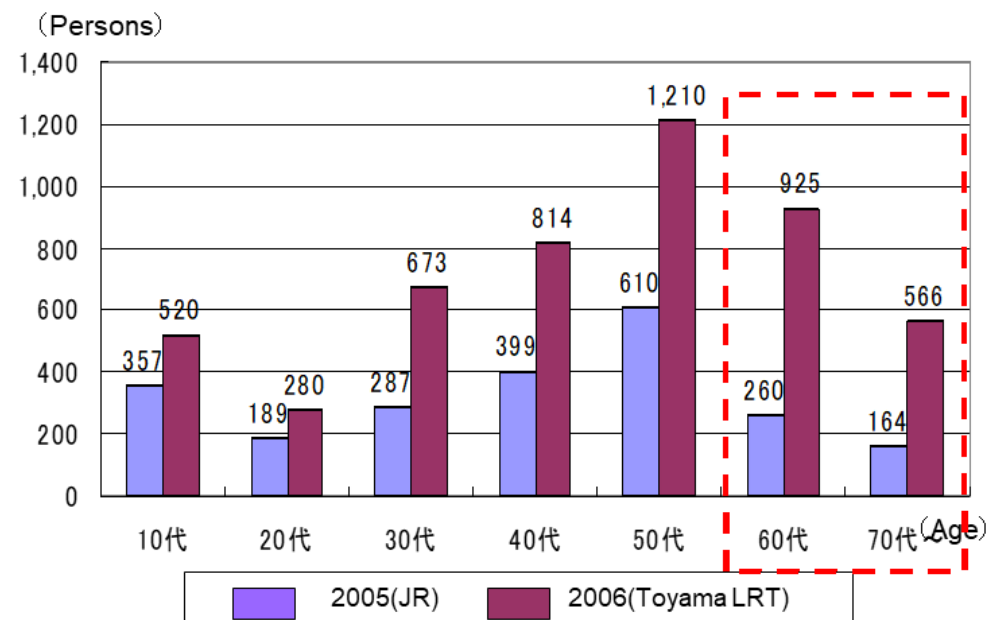
4.1 Toyama LRT - Effects -

- The number of **senior citizens** using the new service has increased.
(The change of their life style)

【Number of Passengers by Time Zone (Weekday)】



【Number of Passengers by Age (Weekday)】



4.1 Toyama LRT - Effects -

Effects on road traffic and congestion

- About 600 persons/day on weekdays and about 700 persons/day on holidays have shifted from private car to LRT, accounting for 21% on weekdays and 15% on holidays respectively out of the increased passengers compared with before the project.
- Along the LRT line, decreased car traffic is estimated to be about 400 vehicles/day on average.
- Travel speed improvement is estimated to range from 0.1 km/h to 1.0km/h depending on the degree of traffic decrease.

Environmental Effects

- Reduction of 436 tons of CO2 emissions annually is estimated.

4.2 City Tram Loop Line Project

The extension of the tram line contributed to making the downtown area more appealing and easier for people to move around.

■ Outline

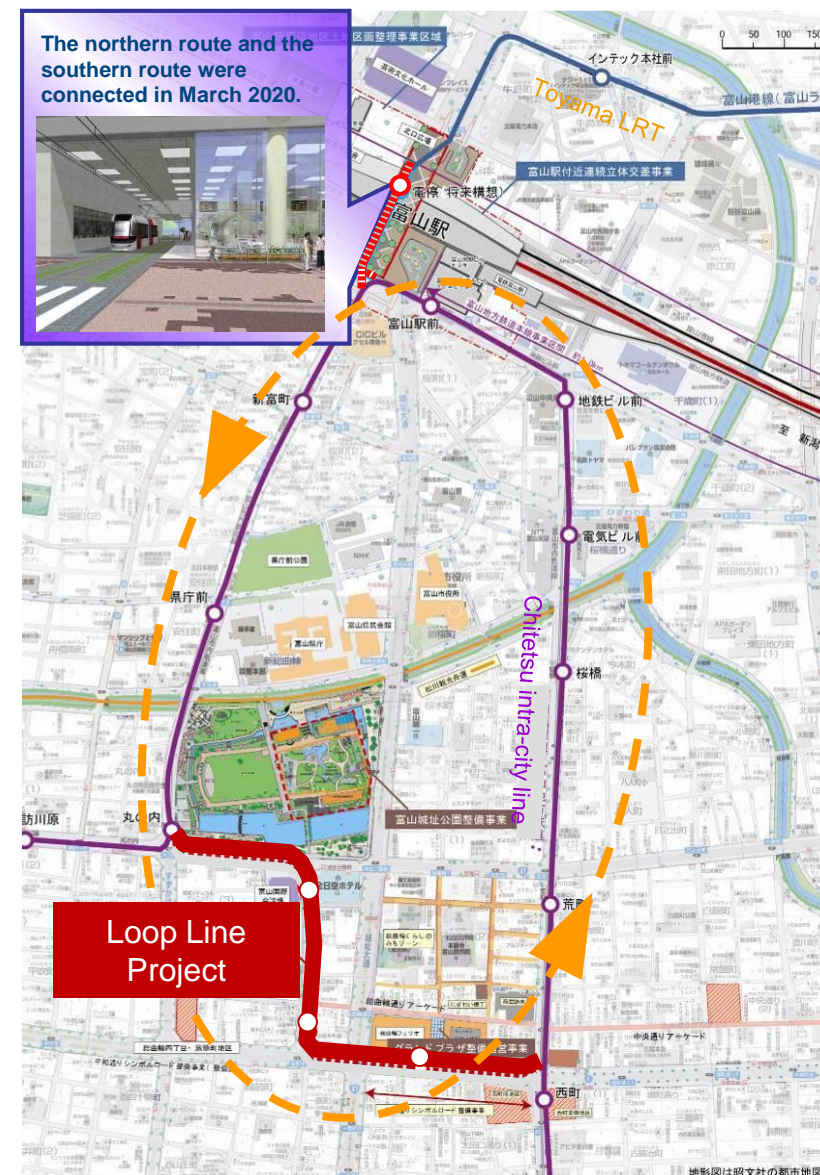
Inaugural Day: December 23rd, 2009

Extended Distance: Approx. 0.9km

(Loop Line approx. 3.4km)

No. of Stations: 3 new stations were added along the extended route.

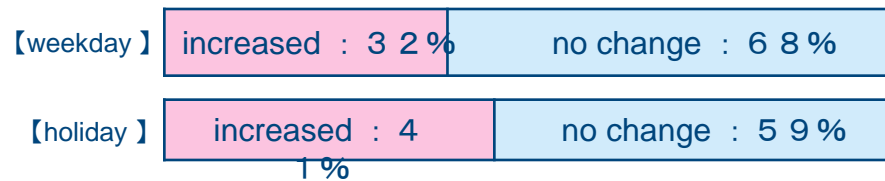
Vehicle: 3 new low-floor cars were adopted.



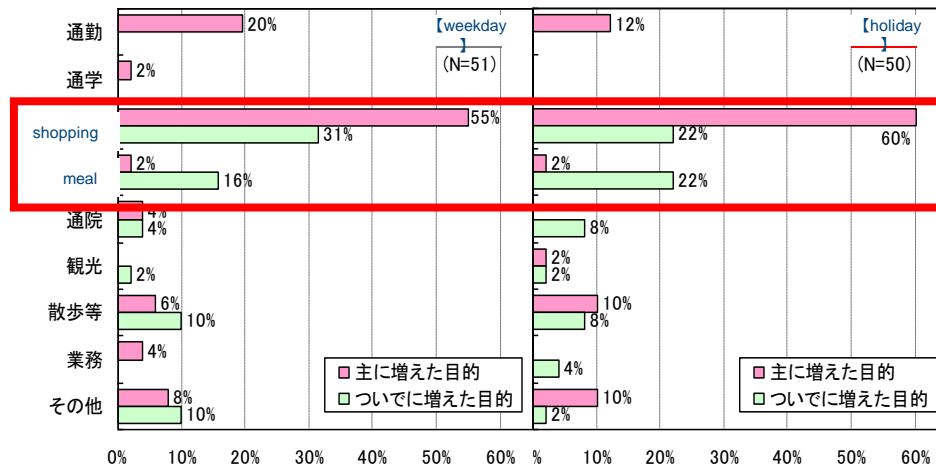
4.2 City Tram Loop Line Project - Effects -

- The average daily passengers are 2,236. People use this line more on the **weekends/holidays** than on the weekdays.
- About half of the passengers **use it for shopping**.
- The project made the downtown **more appealing** and easier for people to move around.
- It contributed to the increase in the frequency of visiting the downtown and the length of stays.
- Visitors using the line spend more money than those coming by car, revitalizing the downtown.

【Frequency of Visiting the Downtown】



【Purpose of Visit (increased)】



【Average Length of Stays for Shopping/M Meal】

weekday			holiday		
car	Loop Line		car	Loop Line	
2010	2010	2011	2010	2010	2011
96min	80min	101min	113min	97min	145min

【Frequency of Visiting the Downtown and Amount of Consumption】
Average Frequency of Shopping (times / month)

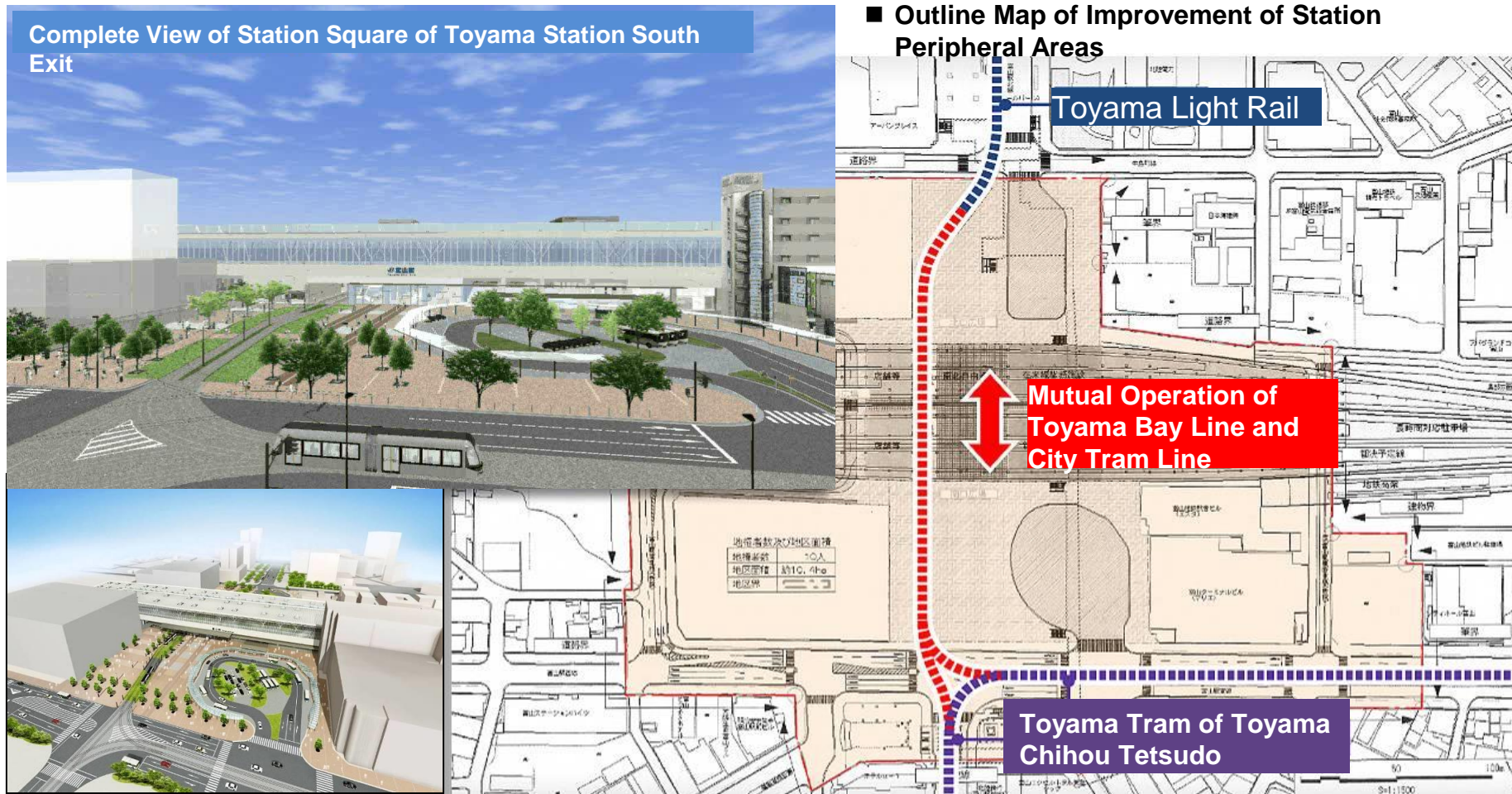
weekday			holiday		
car	Loop Line		car	Loop Line	
2010	2010	2011	2010	2010	2011
2.5times	5.6times	6.1times	1.8times	4.7times	6.4times

Average Amount of Consumption (yen / day・person)

weekday			holiday		
car	Loop Line		car	Loop Line	
2010	2010	2011	2010	2010	2011
\11,489	\5,491	\12,533	\9,207	\11,811	\14,994

4.3 Integration of North and South Tram Lines

With the completion of the elevation project of the existing railway lines in 2019, the lines of the Toyama Light Rail and those of the city tram located at the south of the station were connected in March 2020.



4.3 Integration of North and South Tram Lines – Effects -

- Operators of North Tram Line (Toyama LRT) and South Tram Lines were integrated.
- Fare systems are also integrated so that the fare is flat at 210 yen for any travel within the integrated network.
- Before, a trip from an LRT stop to the downtown cost 210 yen to Toyama Station and another 210 yen to the downtown. After the integration, it costs only 210 yen.
- The time to the downtown has also been significantly reduced due to train operation without transfer or waiting at Toyama Station.
- As a result, the number of passengers using North Tram Line in 2022 is 10% higher than that in 2019 before the integration of North and South Tram Lines. About 17% of the passenger is shifted from private cars etc.

5. Conclusions

- By converting a conventional rail line to LRT, service levels have been dramatically improved.
- This resulted in passenger increase, shift from driving cars, reduction of car traffic and CO2 emission.
- Opening of City Tram Loop Line revitalized the city center.
- After completion of railway elevation project, the LRT on the north of Toyama station was integrated with the tram network on the south of the station.
- This integration enhanced service levels for the residents along LRT.
- This strengthened the modal shift from private cars.

Thank you for your attention!



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