

Railway Operators in Japan 5

Northern and Eastern Kanto Region

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Introduction

Tokyo, the capital of Japan, is located in the Kanto region. Kanto faces the Pacific Ocean to the south and east, and is bordered by mountains to the north and west. It has an area of about 32,000 km² and is distinguished by the vast Kanto Plain. Much of the topography is flat or only gently sloped, with a rise in elevation of only about 100 m over a distance of 100 km north of Tokyo. Most people in Kanto live on the plain and although Kanto occupies less than 10% of Japan's total area, it is home to more than 30% of Japan's total population (about 125 million).

Kanto is made up of the Tokyo Metropolis and six prefectures. This article looks at railway lines in four of those prefectures: Saitama, Gunma, Ibaraki and Tochigi, and the northern part of a fifth, Chiba, covering the northern and eastern part of the region.

The Tokugawa Shogunate established itself in Edo, a regional city about 400 years ago, spurring development. Then the nation's capital was moved from Kyoto to Edo (renamed Tokyo) in 1869, making Kanto the political and economic centre of Japan.

Due to its importance within Japan, the region has had an impressive transportation network since the days of the shogunate. Five major post roads or highways—the *Tokaido*, *Nakasendo*, *Nikko Kaido*, *Oshu Kaido* and *Koshu Kaido* linked Edo with other parts of the country. There were also some secondary highways, such as the *Mito Kaido* north of Tokyo. The Tone and Edo rivers were also used to transport people and freight. Soon after Japan began introducing Western technology in the 1860s, the government set out to develop a modern transportation system and constructed the country's first railway, linking Shimbashi in Tokyo to nearby Yokohama in the

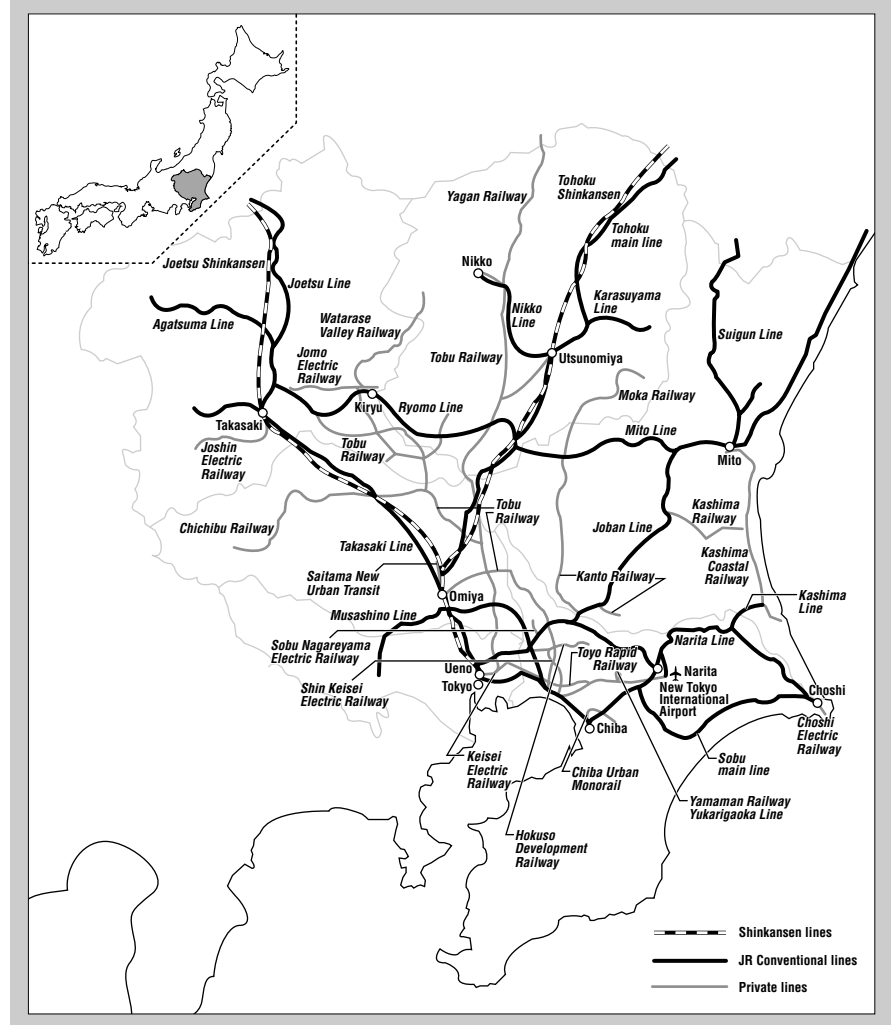
south. However, the government ignored the area north of Tokyo during the early days of railway expansion, so the first lines were built with private capital. As the lines radiated out to serve the major cities on the Kanto Plain, they began forming what was to become Japan's most extensive regional rail network.

Overview of Rail Network

Main lines radiate out from Tokyo to major cities on the Kanto Plain like the

spokes of a wheel. Branch lines link the main lines. Some of the main lines now forming the backbone of the rail network in northern and eastern Kanto were originally constructed in the late 19th century by private railways—mainly Nippon Railway, Sobu Railway and Narita Railway. The government nationalized most of these lines in 1906 and 1907 and they remained part of the government network until Japanese National Railways (JNR) was divided and privatized in 1987. East Japan Railway Company (JR East) now owns the lines

Railway Lines in Northern and Eastern Kanto Region





Tobu Railway's Isesaki Line running through areas that are not covered by JR East (Author)



JR East's Series E231 EMU serving lines like Joban Line in metropolitan area (JR East)

which enjoy tremendously high passenger levels on most sections. One of the most important main lines, the 739.2-km Tohoku main line was constructed by Nippon Railway in 1883 and runs north from Ueno Station in north Tokyo, passes through a number of prefectural capitals such as Saitama City (Saitama Prefecture) and Utsunomiya City (Tochigi Prefecture), and terminates at Aomori in northern Honshu. (Although the official name is the Tohoku main line, the part of the line running through Greater Tokyo is unofficially called the Utsunomiya Line and this article uses the latter name.) Trains run at intervals of 10 to 15 minutes in both directions. The Joban Line (343.1 km) and the Takasaki Line (74.7 km) branch from the Tohoku main line. The former runs north-east from Nippori Station (near Ueno) through Mito City (Ibaraki Prefecture) to the Pacific coast and then runs parallel with the coast to Sendai City (Miyagi Prefecture). The latter runs north-west from Omiya Station in Saitama City to Takasaki City (Gunma Prefecture). The frequency of services on these two lines is similar to the Tohoku main line. Ueno Station has been an important gateway to the north for more than a century. All Tohoku and Joetsu shinkansen to the north used Ueno Station as their terminus until 1991 when shinkansen track was opened between Ueno Station and Tokyo Station. In FY2000, some 190,000 passengers used Ueno Station

daily and the station was the terminus for 354 shinkansen and 2021 conventional train services. In other words, Ueno Station is one of Tokyo's and Japan's most important termini. Of course, not all lines run north—the 120.5-km Sobu main line runs east from Tokyo Station through Chiba City (Chiba Prefecture) to Choshi port. It brings commuting workers and students from the Chiba suburbs to Tokyo and offers through services to Yokohama and other stations to the south. Heavily used trains to the New Tokyo International Airport (Narita) also run on sections of the Sobu main line. The Narita Line branches from the Sobu main line at Sakura in Chiba Prefecture, passes through Narita City (near the airport), and then runs eastwards towards Choshi where it rejoins the Sobu main line, and westwards to Abiko on the Joban Line. In addition to these JR East lines, a number of private main lines also carry many passengers. Two examples are the Isesaki Line of Tobu Railway and the Keisei main line of Keisei Electric Railway. The former line serves major centres in Saitama, Gunma and Tochigi prefectures that are not served by JR East's Utsunomiya and Takasaki lines. The Keisei main line passes through parts of Chiba Prefecture not served by JR East's Sobu main line. Both private lines offer through services to subway lines in central Tokyo (see *JRTR* 30 pp. 42–53).

These main lines all radiate like the spokes of a wheel from Tokyo at the hub but there are some circumferential lines too. JR East's lines include the Musashino Line, forming an outer loop around the metropolis, the Ryomo and Mito lines, running generally east-west near the northern edge of the Kanto Plain; and the Narita Line, linking the Joban and Sobu Lines. Circumferential private lines include Tobu Railway's Noda Line, the Chiba Line operated by Keisei Electric Railway and the Chichibu Railway in the north-west. There are also some relatively short lines linking the main and branch lines and neighbouring cities. Most are short and the trains have just a few cars; some lines like Tobu's Daishi and Kameido lines and Keisei's Kanamachi Line are operated by major railway companies, while others are operated by smaller bodies, such as the Sobu Nagareyama Electric Railway and Kanto Railway's Ryugasaki Line. With the exception of a few lines operated by smaller companies, nearly all lines have been electrified and are served exclusively by electric multiple unit trains (EMUs) using large-capacity commuter or suburban carriage designs, such as the Series E231 on the Joban Line. The main lines typically operate EMU train sets with 10 to 15 cars, offering seating for more than 2000 passengers. The few loco-hauled trains are long-distance sleepers and freight trains.

Suburban Rail Links to Tokyo

The early development of Tokyo was characterized by a tremendous influx of people from other parts of the country. However, the postwar period of rapid economic expansion saw outward migration from the urban core to the suburbs (the so-called doughnut phenomenon). The mid-1960s saw massive housing development projects especially in Saitama and Chiba prefectures. Chiba New Town was one huge housing project started in the 1970s, and it (like other projects) encouraged further development in nearby areas. Small cities with their own identity in south Saitama and west Chiba were rapidly transformed into Tokyo satellites. Farming villages on the Kanto Plain first

benefited from private rail services and then saw their local trains transformed into commuter trains heading to the cities.

Despite the growth in the suburbs, Tokyo's inner core remains the political, commercial and educational centre of Japan and continues to attract more and more workers and students commuting by train from the Kanto suburbs. Many rush-hour trains are overloaded to 250% or even 300% of capacity, drawing much criticism from the media and public. Railway companies in Greater Tokyo have tried to come up with solutions to alleviate the commuter crush, such as lengthening trains, introducing carriages with five doors on each side and double and quadruple tracking, but the trains still remain very overcrowded.

The densely populated core area inside the Yamanote Line prevented the regional

private railway companies extending their lines into the city centre and forced them to build their terminals outside the inner city, resulting in passengers having to make inconvenient transfers. To ease transfers, some operators cooperated in developing through services onto central subway and railway lines. The Hokuso Kodan Line operated by Hokuso Development Railway was constructed to facilitate commuting from Chiba New Town. When operations began in 1991, the company offered through services on Keisei Electric Railway's Oshiage Line, the Tokyo Metropolitan Government's (TMG) Asakusa subway line, and Keihin Electric Express Railway's main line. This marked the first time in Japan that so many railway companies had cooperated in this way. As another example, Saitama Railway and Toyo Rapid Railway

Size and Financial Status of Railways in Northern and Eastern Kanto

	Headquarters	Route-km	Number of Employees	Capital (Ymillion)	Operating Revenues (Ymillion)		Operating Expenses (Ymillion)		Operating Profits/Losses (Ymillion)		Ordinary Profits/ Losses (Ymillion)
					Railway	Non-railway	Railway	Non-railway	Railway	Non-railway	
JR East	Tokyo	7,538.1	75,380	200,000	1,827,835	55,813	1,534,031	33,246	293,803	22,568	104,421
Tobu Railway	Tokyo	463.3	7,251	66,166	157,325	77,189	127,737	71,278	29,588	5,911	35,499
Keisei Electric Railway	Tokyo	102.4	1,898	23,145	52,581	35,138	44,860	32,549	7,721	2,590	10,311
Saitama New Urban Transit	Saitama	12.7	162	2,000	2,246	484	2,113	434	133	50	183
Saitama Railway	Saitama	14.6	273	60,575	-	-	-	-	-	-	-
Shin Keisei Electric Railway	Chiba	26.5	518	5,935	11,105	7,907	9,943	7,500	1,162	406	1,568
Hokuso Development Railway	Chiba	32.3	284	24,900	11,587	-	7,481	-	4,106	-	4,106
Chiba Urban Monorail	Chiba	15.2	174	10,000	3,248	-	4,312	-	-1,064	-	-1,064
Toyo Rapid Railway	Chiba	16.2	293	19,630	12,262	-	10,905	-	1,357	-	1,357
Hitachi Electric Railway	Ibaraki	18.1	31	500	443	4,021	466	3,721	-23	300	277
Ibaraki Transport	Ibaraki	57.4	33	489	273	7,876	277	7,774	-4	102	98
Kashima Coastal Railway	Ibaraki	72.2	134	1,226	1,230	191	1,336	164	-106	27	-79
Kashima Railway	Ibaraki	27.2	48	100	383	71	452	15	-69	56	-12
Kanto Railway	Ibaraki	55.6	254	510	3,134	10,706	3,023	10,384	112	322	434
Yagan Railway	Tochigi	30.7	52	1,000	493	6	604	6	-111	0.3	-111
Joshin Electric Railway	Gunma	33.7	99	280	879	854	963	1,021	-84	166	-250
Jomo Electric Railway	Gunma	25.4	83	60	542	51	779	21	-237	30	-208
Chichibu Railway	Saitama	79.3	427	750	4,411	1,498	4,848	1,151	-437	347	-90
Sobu Nagareyama Electric Railway	Chiba	5.7	74	38	630	258	624	214	7	44	51
Choshi Electric Railway	Chiba	6.4	23	129	144	277	212	219	-68	58	-11
Yamaman Railway	Tokyo	4.1	29	800	233	14,308	305	12,408	-72	1,900	1,828
Moka Railway	Ibaraki	41.9	56	250	466	58	584	56	-118	1	-116
Watarase Valley Railway	Gunma	44.1	51	325	300	180	421	169	-121	11	-110

*Sources: *Tetsudo tokei nempo* (Railway Annual Statistics), Ministry of Transport Railway Bureau, 1999 and *Tetsudo yoran* (Railway Directory), Ministry of Land, Infrastructure and Transport Railway Bureau, 2001

Passenger Volume and Density by Railway Company

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
JR East Utsunomiya Line (Tokyo–Kurihashi)	No. of Passengers (1,000)	1,192,904	1,166,522	1,205,542	1,212,681	1,290,625	1,291,828	1,331,337	1,306,540	1,302,291	1,327,198
JR East Takasaki Line (Omiya–Fukiage)	No. of Passengers (1,000)	138,805	146,220	149,212	150,789	149,922	150,234	150,797	144,370	139,830	139,093
JR East Joban Line (Nippori–Ushiku)	No. of Passengers (1,000)	457,445	466,050	472,228	476,614	477,402	478,339	480,683	472,102	468,392	464,793
JR East Sobu main line (Tokyo–Yachimata)	No. of Passengers (1,000)	649,755	673,054	682,398	685,289	677,702	676,362	660,101	642,099	645,750	630,521
JR East Musashino Line (Fuchu Honmachi–Nishi Funabashi)	No. of Passengers (1,000)	222,437	234,474	251,570	261,685	267,465	272,746	275,935	272,811	274,876	276,312

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Tobu Railway Isezaki Line	No. of Passengers (1,000)	445,132	454,180	454,873	453,313	446,102	443,244	429,502	418,806	410,689	401,949
	Passenger Density*	56,202	57,277	57,274	57,145	56,114	55,206	53,424	51,935	50,715	49,470
Tobu Railway Noda Line	Volume Density	178,143	183,362	186,385	188,318	188,297	190,416	187,186	181,865	177,632	176,124
	Density	70,001	72,138	73,623	74,486	74,975	76,098	75,107	72,844	71,250	70,574
Keisei Electric Railway	Volume Density	262,904	276,038	279,401	281,349	280,432	280,996	273,037	266,553	261,383	257,671
	Density	111,899	112,727	114,296	115,083	115,572	115,722	112,340	108,751	100,826	94,717
Saitama New Urban Transit	Volume Density	9,299	10,117	11,419	11,869	11,942	12,275	12,578	12,458	12,670	12,677
	Density	13,263	13,768	15,494	16,099	16,226	16,462	1,685	16,676	16,893	16,937
Shin Keisei Electric Railway	Volume Density	115,153	113,048	114,690	116,026	117,840	117,407	111,119	106,888	104,117	102,329
	Density	84,490	81,099	82,820	84,181	86,862	86,651	83,090	80,222	78,507	77,223
Hokuso Development Railway	Volume Density	9,279	16,559	19,482	21,715	23,785	25,778	27,012	28,098	30,070	30,187
	Density	16,303	22,118	27,213	30,995	35,191	32,725	34,716	36,546	38,972	38,998
Chiba Express Electric Railway	Volume Density	-	-	985	1,365	1,501	3,025	3,519	3,868	2,395	-
	Density	-	-	2,366	3,232	3,544	4,661	5,696	6,454	8,251	-
Chiba Urban Monorail	Volume Density	5,549	10,425	12,451	13,279	13,274	15,450	16,689	16,465	16,061	16,654
	Density	6,749	10,814	14,351	13,185	13,345	13,911	14,740	14,426	14,133	102,715
Toyo Raptic Railway	Volume Density	-	-	-	-	-	-	25,224	33,386	36,225	37,489
	Density	-	-	-	-	-	-	43,819	54,668	59,651	61,629
Hitachi Electric Railway	Volume Density	3,876	3,963	3,957	3,887	3,801	3,492	3,219	2,918	2,746	2,406
	Density	3,082	3,105	3,073	3,073	3,086	2,876	2,656	2,399	2,271	2,009
Ibaraki Transport	Volume Density	1,500	1,498	1,400	1,240	1,157	1,131	1,062	1,012	976	929
	Density	2,496	2,480	2,317	2,034	1,911	1,867	1,764	1,676	1,601	1,519
Kashima Coastal Railway	Volume Density	3,346	3,521	3,588	3,583	3,533	3,491	3,401	3,169	3,103	2,991
	Density	3,158	3,226	3,310	3,378	3,345	3,272	3,130	2,873	2,779	2,627
Kashima Railway	Volume Density	1,283	1,318	1,430	1,436	1,360	1,313	1,259	1,185	1,109	1,036
	Density	1,062	1,055	1,138	1,117	1,027	999	947	869	790	739
Kanto Railway	Volume Density	13,706	14,759	15,260	15,575	15,665	15,766	15,512	15,233	14,958	14,159
	Density	5,353	5,772	6,013	6,139	6,232	6,258	6,180	6,075	5,917	5,525
Yagan Railway	Volume Density	1,122	1,175	1,100	1,021	1,000	956	874	817	752	737
	Density	1,887	1,977	1,843	1,684	1,657	1,552	1,425	1,304	1,192	1,169
Joshi Electric Railway	Volume Density	4,430	4,497	4,435	4,314	4,088	3,802	3,589	3,320	3,093	2,961
	Density	4,627	4,661	4,685	4,592	4,445	4,125	3,909	3,620	3,413	3,278
Jomo Electric Railway	Volume Density	3,672	3,651	3,543	3,428	3,261	3,173	3,056	2,787	2,572	2,389
	Density	3,825	3,810	3,736	3,601	3,493	3,422	3,387	3,053	2,820	2,569
Chichibu Railway	Volume Density	12,785	12,892	12,364	12,074	11,743	11,373	11,109	10,374	9,999	9,653
	Density	6,891	6,892	6,687	6,579	6,444	6,263	6,179	5,792	5,592	5,371
Sobu Nagareyama Electric Railway	Volume Density	5,626	5,757	5,841	6,107	5,991	5,886	5,799	5,666	5,607	5,435
	Density	10,514	10,715	10,852	11,321	11,070	10,802	10,720	10,529	10,446	10,076
Choshi Electric Railway	Volume Density	1,031	1,038	1,056	1,043	1,030	932	908	868	837	837
	Density	1,488	1,529	1,512	1,517	1,524	1,391	1,359	1,306	1,265	1,265
Yamaman Railway	Volume Density	549	566	573	571	603	649	657	666	714	731
	Density	822	842	833	856	847	898	897	904	981	990
Moka Railway	Volume Density	1,476	1,518	1,556	1,519	1,713	1,624	1,640	1,569	1,552	1,527
	Density	1,443	1,570	1,616	1,573	1,777	2,045	1,736	1,734	1,725	1,924
Watarase Valley Railway	Volume Density	1,007	1,017	1,027	1,053	1,065	1,059	1,042	1,023	973	912
	Density	892	866	878	913	960	946	967	961	911	868

* Passenger Density = Daily Passenger-km/Route-km

* Sources: *Tetsudo tokei nempo* (Railway Annual Statistics), Ministry of Transport Railway Bureau and *Tetsudo yoran* (Railway Directory), Ministry of Land, Infrastructure and Transport Railway Bureau



JR East's Musashino Line forming an outer loop around the metropolis (Author)



TMG's Series 5300 EMU on Hokuso Kodan Line in Chiba New Town linking with Keisei Electric Railway (Author)

(established in 2001 and 1996, respectively) were unable to construct terminals in Tokyo's inner city but their tracks connect to older subway tracks of Teito Rapid Transit Authority's (TRTA) Tozai Line, permitting through services to the downtown core. After its planned launch in autumn 2002, Shibayama Railway will operate just 2.0 km of track near Narita Airport. This very short track operated by a very small carrier is located some 60 km from Tokyo but it will connect to Keisei Electric Railway's main line which in turn connects to the TMG subway. Consequently, passengers will enjoy through services from Shibayama's stations to Tokyo's core. A newcomer to Tokyo's railway network might be surprised to see trains of different designs in different liveries all pulling into the same platform.

Of course, it is very difficult to construct a new line through a heavily developed area. Construction of JR East's Musashino Line in 1978 was not as difficult because it had been used previously for freight transport and was located away from existing built-up areas. The line created a large outer loop around the metropolis for both passengers and freight and because it bypasses Tokyo's core it has reduced freight congestion in the city too, making it possible to run more passenger trains on former inner-city freight track. A recent example of this conversion of freight track is the Saikyo Line running from Omiya City via Shinjuku to Ebisu in the heart of the metropolis.

However, purchasing land and keeping up with changes in government transport policy is now so difficult and time consuming that any new line would take at least 10 years to move from planning to operations. And experts agree that the tremendously high land prices and construction costs would make it impossible for a new urban line to be viable based only on farebox revenues. An extreme case is Chiba Express Electric Railway; it opened in 1992 but attracted only about 20% of the forecast passengers. The parent company, Keisei Electric Railway was finally forced to take over operations in 1998. More cost-effective automatic guided

transit (AGT) systems are being used to carry commuters in areas with lower passenger densities. The first AGT in Japan was the 4-km Yukarigaoka Line opened by Yamaman Co., Ltd. in 1983 to link Yukarigaoka New Town with the Keisei Electric Railway main line. The three-car train sets can each carry about 200 people. Each car is less than 9-m long and runs on rubber tyres. Trains operate at intervals of about 15 minutes and are manned by a single crew member. Saitama New Urban Transit operates the 12.7-km *New Shuttle* running between Omiya and Uchijuku on rubber tyres on a guideway on the side of the Joetsu Shinkansen viaduct. However, passenger



Yamaman's Yukarigaoka Line near Koen Station is the first AGT in Japan.

(Author)



JR East's Series E231 EMU serving new Shonan Shinjuku Line and connecting northern and southern Kanto using freight track through central Tokyo (JR East)



JR East's 12-car Series E1 on Tohoku and Joetsu shinkansen is the first all double-decker shinkansen rolling stock. (JR East)

demand is very low and the trainsets consist of only four to six carriages that are each less than 8-m long.

Development in the Chiba City area resulted in greater road congestion and the city and prefecture joined forces to establish and finance Chiba Urban Monorail to alleviate the problem. The company began opening sections of suspended monorail in 1988 and the line presently extends 15.2 km in different directions from JR's Chiba Station. In areas where buses must negotiate road congestion, a journey by monorail is roughly twice as fast as by bus; ridership continues to grow and further extensions are planned.

When a new rail line is constructed, it generally attracts large housing developments on both sides of the track. This is expected to occur along a new line to be constructed by Metropolitan Intercity Railway Co., Ltd., which will operate the *Tsukuba Express* (Joban New Line). Metropolitan Intercity Railway was recently established to promote rail travel in northern and eastern Kanto and is pursuing the development project under the provisions of the 1989 Law for Special Measures to Promote Harmonized Development of Housing and Rail Transport in Metropolitan Areas. In 1992, the company obtained a category-2 railway operator's licence from the Ministry of Transport (now the Ministry of Land, Infrastructure and Transport) and is planning to construct an urban railway capable of a maximum speed of 130 km/h. The line

will be 58.3-km long, stretching from central Tokyo's Akihabara through small segments of Saitama and Chiba prefectures to Tsukuba Science City (Ibaraki Prefecture). As of January 2002, the company has acquired 96% of the required land and has completed tendering for construction of the entire rail bed. Operations are targeted to start in FY2005. The line is expected to take some pressure off JR East's congested Joban Line and to spur new housing developments along the tracks. Related local governments are promoting new development within norms set by existing basic plans and areas where stations will be built are attracting the most attention. The project will encourage the planned expansion of housing supply in this part of Kanto and spur construction of various public facilities.

Changes in Commuter Patterns

The tracks of the Tohoku and Joetsu shinkansen were constructed in the same traffic corridors as the conventional Utsunomiya and Takasaki lines. When the shinkansen opened, the conventional lines lost many of their express and limited-express trains. Today, these two lines are operated by JR East mainly for workers and students commuting to Tokyo. The longest EMUs have 15 cars and operate at high frequencies. JR East has replaced older carriages with new stainless-steel cars over the last few years.

It launched *Rabbit* rapid service trains on the Utsunomiya Line in 1988 and similar *Urban* trains on the Takasaki Line in 1989, reducing travel times by more than 20 minutes on the Tokyo-Utsunomiya and Tokyo-Takasaki sections. Another new and popular *Home Liner* service with reserved seating only uses limited-express rolling stock during the evening rush hour.

I have already mentioned that when Nippon Railway constructed its lines north of Tokyo more than a century ago, its Tokyo terminus was at Ueno. Prior to this, the national government had constructed Japan's first railway running south-west from Shimbashi (Tokyo) to Sakuragicho in Yokohama; this line was later extended north from Shimbashi to Tokyo Station. All these lines eventually passed to JNR (and then JR East) but the rail traffic pattern of those early days did not change—Ueno remained the terminus for trains to the north, and Tokyo remained the terminus for trains to the south and west. Not a single train offered through service via both the Ueno and Tokyo stations. As a result, commuters from Saitama Prefecture bound for Kanagawa Prefecture had to change at Ueno Station and then change again at Tokyo Station for the Tokaido main line. However, in December 2001, JR East began running through trains from the Utsunomiya and Takasaki lines via Shinjuku (instead of Ueno) to the Tokaido and Yokosuka lines. This was achieved by using freight tracks on the Yamanote



The 16-car Series E4 on Tohoku Shinkansen with a large capacity for carrying commuters

(JR East)

Line and marks a significant change in traffic patterns. The route is unofficially called the Shonan Shinjuku Line and is expected to change regional transport patterns, because passengers no longer have to transfer when travelling between major centres in northern Kanto, such as Utsunomiya, Omiya and Kumagaya, and Yokohama, the capital of Kanagawa Prefecture south-west of Tokyo. In addition, JR East announced a plan to extend Utsunomiya, Takasaki and Joban lines to Tokyo Station by constructing new tracks between Ueno–Tokyo section by the end of FY2009. Several through trains to Tokaido main line will run on newly constructed tracks. It will be an alternate route to connect southern and northern Kanto regions along with above-mentioned Shinjuku Shonan Line.

Some of JR East's aging commuter rolling stock on the Utsunomiya, Takasaki and Joban lines is being replaced by the newly developed Series E231 stainless-steel carriages with a wider body and considerably more seating. The company plans to make this series the standard for EMU commuter trains in Greater Tokyo. The Tohoku and Joetsu shinkansen used to terminate in Omiya, too far from the central business district to be of much use to many commuters. But the terminus was moved closer to the city to Ueno in March 1985. Then in June 1991, it was moved again even further south to Tokyo Station. As a result, more workers and

students are using the shinkansen for commuting. Others are attracted by more convenient scheduling, which has reduced congestion during rush hours, and by the addition of more shinkansen trains within about 100 km of Tokyo—on the Tohoku Shinkansen between Tokyo and Nasushiobara or Utsunomiya, and on the Joetsu Shinkansen between Tokyo and Takasaki. The rolling stock is usually typical shinkansen carriages, but new Series E1 all-double-decker 12-car trainsets were launched in 1994 to increase seating capacity during the morning rush hour. Two new trains—the *Nasuno* (place name) and *Tanigawa* (place name) of the Tohoku and Joetsu shinkansen, respectively—were introduced in 1995 for passengers travelling relatively short distances. These trains also use double-decker cars as much as possible.

Tohoku and Joetsu shinkansen trains used to be configured for either high-speed runs or for slower runs with stops at every station and both types were used for long- and short-distance trips. However, as a result of changing usage patterns, long-distance trains are now designed for speed and make few station stops, while short-distance trains are designed for greater capacity and operate at greater frequency, especially within 100 km of Tokyo.

Shinkansen FREX commuter passes have been sold since 1983. Only about 500 FREX were sold per month for the Tohoku

and Joetsu shinkansen in FY1984, but the number had risen to 21,000 by FY2000. The passes have made commuting more than 100 km one way from northern Kanto to Tokyo's central business district a reality. The student FREX-PAL pass was launched in 1986 and now enjoys monthly sales of more than 3000.

Access to Narita Airport

Narita Airport in Narita City (Chiba Prefecture) opened in 1978 because the older Tokyo International Airport (Haneda) had become far too congested. As a result, Kanto has had two major airports since 1978—Haneda for domestic travel, and Narita for international travel. About 17.5 million passengers used Narita Airport in 2001 with the total reaching 420 million since 1978.

One problem of Narita Airport is its location 60 km (as the crow flies) from the centre of Tokyo. A new expressway for motor vehicles and a new track for trains were seen as essential to ensuring convenient access. One early plan envisioned construction of a 30-minute downtown-to-airport rail link (RAL) operating at high speeds (max. 260 km/h). Construction of a small section of the line began, but was soon frozen because of changing circumstances. Today, part of that short stretch is being used by slower trains operated by JR East and Keisei Electric Railway.

JR East's *Narita Express (NEX)* links Narita to Yokohama and Ofuna in Kanagawa Prefecture, to Takao via Chuo Line, and to Omiya via Shinjuku and Ikebukuro. There are 23 daily return services at intervals of approximately 30 minutes during the day. The fastest trains take 53 minutes. At first, JR offered only reserved seating, but demand was so high that it now also sells tickets for standing passengers, when seats are full and is introducing more services.

Keisei Electric Railway's *Skyliner* also provides express services between Ueno and Narita with 21 daily journeys from the airport and 19 journeys to the airport at intervals of about 40 minutes. The travel time is about 1 hour. The rolling stock on both the JR East and Keisei airport services were designed to boost company prestige. Both companies also run local stopping trains between the airport and Tokyo.

Since 1998, Keisei's *Airport Kaitoku* services to and from Narita permit through connections to TMG subway lines and the main line of the Keihin Electric Express Railway, reducing or eliminating transfers. These connections allow domestic air travellers to land at Haneda Airport, take a *Airport Kaitoku* train directly to Narita and then catch an international flight. There is no limited-express surcharge and the travel time between the airports is about 1 hour 45 minutes.

Limousine buses also provide access to Narita Airport. Their services are in demand because there is no need to carry luggage from one train platform to another and they offer direct access to hotels and major railway stations as well as access from major cities with no direct rail link to the airport. The buses run from early morning to late evening at intervals of 10 or 15 minutes. Another advantage of travelling by bus is that travellers can

complete immigration and boarding procedures for some airlines at Tokyo City Air Terminal (T-CAT) in Hakozaeki. As a result, the limousine buses enjoy an impressive 15% share of the Tokyo–Narita Airport market. JR East and Keisei also hope to offer downtown immigration and boarding procedures, but have not been able to do so yet.

There is a plan to construct a new route to Narita Airport using Hokuso Kodan Line. Third-sector *Narita Shin Kosoku Tetsudo Access* (Narita New Rapid Railway Access Company) will construct 19.1-km track between Imba Nihon-Idai (Hokuso Kodan Line's terminus) and Narita Airport and Keisei will run direct *Skyliner* train reducing the time by 30 minute starting FY2010. The government is topping the amount of subsidy to improve still-inconvenient airport access. However, there are environmental issues needed to be accomplished.

Tourism and Railways

Nikko in Tochigi Prefecture has been a popular tourist destination for centuries after Ieyasu Tokugawa (1543–1616), the first shogun, was enshrined at Toshogu Shinto shrine. About 6 million tourists now visit his shrine and the nearby Kegon Falls and Lake Chuzenji each year. The

Kinugawa hot-spa district also gets many visitors. UNESCO designated Nikko's shrines and temples as a World Heritage Site in December 1999.

Tobu Railway offers convenient rail access to Nikko. Trains depart from Asakusa, one of Tokyo's most popular tourist spots. The *Kegon* limited express uses Tobu's flagship *Spacia* rolling stock to provides direct connections to Nikko. In order to further boost tourism, in April 1993, the railway company opened Tobu World Square near Nikko. It is a theme park with 1/25 scale models of famous buildings from around the world. JNR used to offer a direct connection from Ueno in recognition of Nikko's status as an international tourist destination. In 1959, it introduced a semi-express service using Series 157 *Nikko* luxury cars. However, JR East no longer offers direct connections from Tokyo to Nikko—its Nikko-bound trains depart from Utsunomiya on the Nikko Line. Direct connections were abandoned after the Tohoku Shinkansen opened with a station at Utsunomiya. The Nikko Line's short commuter-type EMUs stop at all stations. Nikko statistics for FY2000 show that 660,000 visitors used Tobu Railway trains while another 420,000 used JR East. These railway passengers represent less than 20% of the approximately 6.5 million visitors to Nikko each year—the



JR East's Series 253 *Narita Express* now stops at stations on the Chuo Line in western Tokyo in addition to central Tokyo and Saitama and Kanagawa prefectures. (JR East)



Keisei Electric Railway's first *Skyliner* started operation as link to Narita Airport in 1973 and this new Series AE100 came into operation in 1990 (Author)



JNR's Series 157 was manufactured from 1959 exclusively for *Nikko* semi-express services between Tokyo and Nikko. (Transportation Museum)



Watarase Valley Railway operates open-air *Wagon Trains* during the sightseeing seasons. (Author)

remaining 80% go by road. During the spring holiday season, very long traffic jams on the switchback road near Nikko are another notable feature of the region! Elsewhere in Kanto, railways themselves are promoted as tourist attractions. For example, some heritage steam locomotives have been brought back into service for weekend tours (JR East's Joetsu Line in Gunma Prefecture), Chichibu Railway (Saitama Prefecture), and Moka Railway (headquartered in Ibaraki Prefecture). However, as Chichibu Railway has discovered, keeping a steam locomotive in working order can easily drain the resources of a small railway company; the association commissioned by Chichibu Railway to operate the heritage rail tour is to be disbanded, leaving future operations in doubt. Two small local companies—Choshi Electric Railway (Chiba Prefecture) and Watarase Valley Railway (Gunma Prefecture) offer a different type of close-to-nature rail tour using open-car *Wagon Trains* that attract many passengers.

Industry and Rail Freight

As the economy expanded, large factories sprang up in a number of northern Kanto cities, including Utsunomiya, Oyama, Ota and Takasaki. The companies laid spur lines to their factories to deliver raw materials and ship products; trains shunting in and out of the factories were a common sight. Freight trains ran on many lines but still could not keep up

with demand. This encouraged JNR to build the new Musashino freight line in 1973 to bypass central Tokyo, which was heavily congested with passenger traffic. This freight line is now part of JR East's Musashino Line network. The huge Musashino Marshalling Yard began operations the following year and was heralded for its modern automatic controls. However, by the 1980s many factories were finding they could transport goods more flexibly by truck. Railways, too, were changing their freight-handling methods, switching from freight wagons to containers for door-to-door services. This rapid evolution was typical of Japan's transportation industry, where distribution channels can change very quickly. The Musashino Marshalling Yard closed little more than a decade after it had opened.

Private railways benefited from their close association with local industry in northern and eastern Kanto. One example is the legacy left by Ashio Railway, which constructed a line to Japan's most important copper mine in the 1910s. The mine was located in a mountainous region of Tochigi Prefecture. Soon after it was established, Ashio Railway was purchased by the government and the line eventually became part of JNR's network as the Ashio Line. The closure of the mine and smelter in 1973 jeopardized the line and ownership was transferred in 1989 to a locally controlled public-private partnership, the previously mentioned Watarase Valley Railway.

Limestone for manufacturing cement is hauled by Chichibu Railway and used to be hauled by Tobu Railway on its Aizawa and Ogano lines. Tobu Railway stopped hauling freight after road haulage became more common and cheaper. Around 1960, Tobu Railway owned upwards of 1700 freight wagons—more than any other private railway in Japan. Today, it has none. Chichibu Railway fared better and now hauls more freight than any other private railway in Japan. Even so, its freight volumes have plummeted from a peak of 8.7 million tonnes in FY1979 to 3.2 million tonnes in FY1999. Its client cement manufacturers are restructuring their operations to cope with the business downturn and Chichibu's prospects are not bright.

On the Pacific coast of the Kashima district (south-east Ibaraki Prefecture), land was excavated in the 1960s to develop a large port and the Kashima Coastal Industrial Region grew up around the port. Kashima Coastal Railway was established as a freight company and became the region's most important carrier of products and raw materials. The network extended throughout the industrial complex and contributed greatly to regional industrial development. However, volumes have fallen here too as a result of changing freight patterns. Due to declining freight revenues, management of one section of the JNR-built Kashima Line between Mito and Kita Kashima (now called Kashima Soccer Stadium) was transferred to Kashima Coastal Railway, which—

despite its roots in the freight business—has strongly promoted passenger services since 1985. The line has benefited from construction of the nearby Kashima Soccer Stadium, Japan's first sports stadium built exclusively for soccer. The stadium is now home to the Kashima Antlers professional soccer team and the stadium hosts more than 20 games each year, attracting 1000 to 2000 rail passengers for each game, helping to keep the line viable.

Local Railways Facing Uncertain Future

Roads in Greater Tokyo are generally jammed and finding a parking space is not easy. Many companies discourage their employees from driving to work, and regulations are being implemented in the inner city to reduce motor-vehicle emissions. Rail ridership is very high for these reasons and because there is an excellent network of JR, private railway and subway lines. Two regional companies, Kanto Railway (Ibaraki Prefecture) and Sobu Nagareyama Electric Railway (Chiba Prefecture), also enjoy good ridership levels, because their lines extend to commuter destinations. On the other hand, car ownership in northern Kanto is high, and is among the highest in Japan in Gunma and Tochigi

prefectures. This explains why local public transportation companies, especially smaller private railways and bus companies operating only in specific regions outside the metropolitan region are facing serious declines in ridership. Due to financial difficulties some companies are reducing costs by running shorter trains, operating driver-only trains, eliminating manned stations, and downsizing management. Some large private railways are taking similar steps. For example, Tobu Railway examined low-ridership sections in Gunma Prefecture and announced its intention to operate some driver-only trains.

Smaller local operators in the worst financial straits are Tsukuba Railway, which abandoned all its 40 km of track in Ibaraki Prefecture in 1987; Jomo Electric Railway, which withdrew from its bus business in Gunma Prefecture; and Joshin Electric Railway, which has reduced its bus services.

These and other companies cannot assume that their rail operations will protect them from collapse. Regional private railways are in the midst of changing and difficult times. For example, the national government has eliminated the subsidies it used to pay to cover carriers' deficits and a number of head-on collisions on track operated by Keifuku Electric Railway in Fukui

Prefecture has led to calls for replacement of older rolling stock and immediate adoption of safety equipment such as ATS throughout Japan.

Jomo Electric Railway's 25.4-km line runs in an almost straight line from Maebashi, the capital of Gunma Prefecture, to Kiryu, a city that flourished due to the local silk weaving industry. JR East's Ryomo Line also links the two cities, but the track was routed via Iseaki City. This gave the straighter Jomo Electric line an advantage until the Ryomo Line was electrified (during the JNR days) to permit faster services. Thereafter, the straighter line received subsidies from the national and prefectural governments to cover its deficit. After the national government stopped subsidizing railway company deficits, the prefectural government has shouldered the full load. In March 1999, Jomo Electric Railway received sufficient subsidies from Gunma Prefecture and the local municipalities along the line to replace all its dilapidated electric rolling stock with new stainless-steel cars.

Joshin Electric Railway began operations in 1897 with a 762-mm gauge track between Takasaki City and Shimonita Town. It operates the oldest local line in Gunma Prefecture. In FY1979, Joshin's financial outlook was so good that it lost its subsidies from the national and prefectural governments. But ridership



Joshin Electric Railway's driver-only EMU is covered in advertising as an attempt to cut costs and increase revenue. (Author)



Most Choshi Electric Railway trains are driver-only single railcars formerly used by TRTA. (Author)

has dropped to only about 60% of what it was 10 years ago and the company is now in difficulties. In FY1998, it requested subsidies from municipalities along the line and has been subsidized for some operating losses since FY2000. Choshi Electric Railway in Chiba Prefecture is best known as the operator of an extremely short line that extends just 6.4 km from Choshi Station at the end of JR East's Sobu main line to Tokawa, a fishing village on the Inubosaki Peninsula. Like Jomo Electric Railway, Choshi Electric fell into difficulties after the national government stopped subsidizing railway deficits. The local municipality of Choshi City decided to maintain subsidies at a high-enough level to entirely cover annual deficits for a limited period of 5 years. Fortified by this decision, the railway is replacing its dilapidated rolling stock with modern equipment. It has also branched out into manufacturing *nure sembei*—a traditional soy-sauce-flavoured rice cracker. The crackers are selling so well that cracker revenues are double the rail revenues! Of course, the crackers cannot cover the railway deficit and it is the subsidies that are keeping the company afloat. The 5-year period ended in March 2002 and it is not clear what will happen next fiscal year. The company is considering to apply for subsidies to modernize its operation by renewing rolling stock, etc.

Kashima Railway in Ibaraki Prefecture has also recently fallen into dire straits. Its 27.2-km line was built to provide access to Kashima Shrine but the company has been unable to prevent a drop in ridership, which fell below 1000 passenger-km per day in FY1995 and continues to decline. Of all companies mentioned here, Kashima is in the worst financial shape. Summer 2001 saw the suspension of its freight business, which accounted for 30% of all revenue, and the company anticipates a ¥100 million



Chichibu Railway's three-car local train uses stainless-steel rolling stock formerly belonging to TMG. (Author)

deficit in FY2001. It has requested subsidies and support from municipalities along the line. The governments of the prefecture and five municipalities have shown their support by establishing the Council for Kashima Railway and are looking into the future with concern. Other lines have also experienced past financial difficulties. Several local lines in deficit operated by JNR (later JR East) were restructured as public-private partnerships with local bodies, local municipalities and private companies. Watarase Valley Railway now operates a line that was originally built to haul ore from the Ashio copper mine in Gunma Prefecture. The mine's subsequent closure pushed the line into a tailspin but it was reborn as a public-private partnership in 1989. The track passes through a sparsely populated mountainous area and passenger density is the lowest in the Kanto region. The railway has established a tie-up with

municipalities along the line to stop the passenger decline mainly by attracting more tourists.

Another company discussed above, Moka Railway in Tochigi Prefecture, took over JR East's Moka Line in 1988 but is now in deficit although ridership is stable. Both these railways received financial assistance when they were transformed into public-private enterprises and both put the money into a reserve fund. Both are now digging into those reserves. People living outside the metropolitan areas are increasingly using their own cars for transport and railways in these areas are at a crossroads. There is an increasingly urgent need to re-examine rail transport in this new light, looking closely at the ability of trains to provide large-capacity transport and examining the various roles they are asked to play in public transport with a view to perhaps considering more public subsidies. ■



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