

## High-Speed Rail Passenger Traffic Density Statistics

We have excerpted the following table and chart from a recent post (*2008 Cox-Vranich Report Supports Revised California High Speed Rail Patronage Estimates*, [here](#)) for the convenience of readers. This shows various high-speed rail (HSR) systems (and forecasts for California) in order of annual passenger traffic density. We have deleted the “forecasts” produced by Wendell Cox and Joseph Vranich.

**Table 1: High-Speed Rail Passenger Traffic Density**

System	Length (km / mi)	Annual Passenger Traffic and Year (millions)	Average Travel Distance (km / mi)	Annual Passenger Traffic Density and Year (millions)
Japan Tōkaidō Shinkansen	515.4 / 319.5	150.7 (FY 2008)	308 / 191	<b>90</b>
China Guǎngshēn Railway	147.3 / 91.3	83 (2009)	100 / 60	<b>55</b>
Japan San-yō Shinkansen	553.7 / 343.3	62.9 (FY 2008)	252 / 156	<b>29</b>
France TGV Paris-Lyon-Marseille	774 / 480	32 (2008)	600 / 370	<b>25</b>
Japan Tōhoku Shinkansen	593.1 / 367.7	84.8 (FY 2007)	168 / 104	<b>24</b>
Republic of Korea KTX Seoul-Busan	408.5 / 253.3	33 (FY 2008)	280 / 170	<b>23</b>
Taiwan Taiwan High Speed Rail	335.5 / 208.0	32.3 (2008)	215 / 133	<b>21</b>
France TGV Atlantique	279 / 173	30 (2008)	200 / 100	<b>20</b>
Japan Tōhoku, Jōetsu and Hokuriku Shinkansen	980.0 / 607.6	133.3 (FY 2007)	150 / 93	<b>20</b>
<b>United States - California California High-Speed Rail Authority - 2035</b>	840 / 520	41.0 (2035)	400 / 250	<b>20</b>

System	Length (km / mi)	Annual Passenger Traffic and Year (millions)	Average Travel Distance (km / mi)	Annual Passenger Traffic Density and Year (millions)
<b>United States - California</b> <b>California High-Speed Rail Authority - 2025</b>	840 / 520	36.5 (2025)	500 / 300	<b>20</b>
France <b>TGV Nord</b>	333 / 206	20 (2008)	300 / 200	<b>20</b>
Japan <b>Jōetsu Shinkansen</b>	269.5 / 167.1	38.3 (FY 2007)	126 / 78	<b>17</b>
China <b>Jīngjīn Intercity Railway</b>	116.9 / 72.5	18.7 (2008-2009)	100 / 60	<b>16</b>
Republic of Korea <b>KTX - all</b>	674.7 / 418.3	38.0 (FY 2008)	280 / 170	<b>16</b>
France <b>TGV Est</b>	300 / 186	27.2 (2008)	270 / 170	<b>10</b>
United States <b>Northeast Corridor - all</b>	731.9 / 453.8	80 (FY2009)	80 / 50	<b>9</b>
Japan <b>Hokuriku Shinkansen</b>	117.4 / 72.8	10.1 (FY2007)	82 / 51	<b>7</b>
France <b>TGV - all</b>	8,000 / 5,000	114.0 (2008)	443 / 275	<b>6</b>
Norway <b>Flytoget</b>	51.6 / 32.0	5.6 (2008)	51.6 / 32.0	<b>6</b>
Spain <b>LAV - Madrid-Barcelona</b>	619 / 998	5.7 (2009)	500 / 300	<b>5</b>
Spain <b>LAV - Madrid-Andalucía</b>	648 / 402	10.7 (2009)	250 / 150	<b>4</b>
United States <b>Northeast Corridor - Amtrak</b>	731.9 / 453.8	11.5 (FY2009)	260 / 160	<b>4</b>
Spain <b>LAV-all</b>	1,447 / 897	18 (2009)	325 / 200	<b>4</b>

System	Length (km / mi)	Annual Passenger Traffic and Year (millions)	Average Travel Distance (km / mi)	Annual Passenger Traffic Density and Year (millions)
Germany ICE - all	6,550 / 4,060	74.7 (2008)	312 / 194	4
Japan Kyūshū Shinkansen Kagoshima Route	126.8 / 78.6	4.2 (FY2008)	103 / 64	3
Sweden Arlanda Express	39 / 24	3.2 (2008)	39 / 24	3
Italy Frecciarossa	1,001.9 / 621.2	10 (2010 - est.)	300 / 200	3
Sweden X 2000	1,667 / 1,033	15 (2008)	200 / 100	2
United States Keystone Corridor - all	165.6 / 102.7	6.7 (2009)	40 / 25	2
Spain LAV - Madrid-Valladolid	180 / 112	1.7 (2009)	150 / 90	1
United States Keystone Corridor - Amtrak	165.6 / 102.7	1.2 (2009)	85 / 55	0.6

### Notes:

Systems are arranged in order of annual passenger traffic density. This in turn refers to the number of passengers who travel over each mile (or km) of line or system length. We explain this concept [here](#).

The Chinese, French, German, Italian, Korean, Norwegian, Spanish and Swedish fiscal years coincide with the calendar year. The Japanese fiscal year begins on April 1. The U.S. fiscal year begins on July 1.

**Tōkaidō Shinkansen** (東海道新幹線): This is the eastern segment of the Tōkyō – Fukuoka HSR line, and extends between Tōkyō Station and Ōsaka (Shin-Ōsaka Station). It was opened on October 1, 1964.

**Guǎngshēn Railway** (广深铁路, *Guǎngshēn tiělù*): This extends between Guangzhou and Shenzhen (广深, *Guǎngshēn*, is an abbreviation meaning “Guǎngzhōu-Shēnzhen”). The line was opened on October 8, 1911. A second track was built during 1984-1987, and a third during 1991-

1994. The line was electrified during 1998-2000, and a fourth track was built during 2005-2007. Train speeds were lifted in stages from 1991. Today, one pair of tracks is dedicated for passenger service; the maximum permitted speed is 200 km/h (124 mph). The second pair of tracks is used by passenger and freight trains; the maximum permitted speed is 160 km/h (99 mph). The line was reorganized in stages from 1984 and became China's first joint-stock railway company in 1996.

**San-yō Shinkansen** (山陽新幹線): This is the western segment of the Tōkyō – Fukuoka HSR line, and extends between Ōsaka (Shin-Ōsaka Station) and Fukuoka (Hakata Station). It was opened in two stages during 1972-1975.

**TGV-Paris-Lyon-Marseille:** Statistics include all passengers carried on the dedicated HSR lines *LGV Sud-Est*, *LGV Rhône-Alpes* and *LGV Méditerranée*.

**Tōhoku Shinkansen** (東北新幹線): This line extends northward from Tōkyō to Hachinohe. It was opened in four stages during 1982-2002. Opening of the Hachinohe – Aomori (Shin-Aomori Station) segment, 81.8 km / 50.7 mi, is planned for December 2010. Passenger traffic statistics are inclusive of passengers carried aboard Akita Shinkansen and Yamagata Shinkansen trains while working on the Tōhoku Shinkansen.

**KTX - Seoul-Busan** refers to Seoul – Busan HSR services. For additional information, see KTX-All.

**TGV Atlantique:** Statistics include all passengers carried on the dedicated HSR line *LGV Atlantique*. The authors have addressed uncertainty, arising from apparent inconsistencies in source documents, by rounding to a single significant digit.

**TGV Nord:** Statistics include all passengers carried on the dedicated HSR line *LGV Nord-Europe*, including those carried aboard Eurostar and Thalys International trains. The authors have addressed uncertainty, arising from apparent inconsistencies in source documents, by rounding to a single significant digit.

**Jōetsu Shinkansen** (上越新幹線): This line diverges from the Tōhoku Shinkansen at Ōmiya, and extends to Niigata. It was opened on November 15, 1982.

**Jīngjīn Intercity Railway** (京津城际铁路, *Jīngjīn chéngjì tiělù*): This line extends between Beijing and Tianjin, and was opened on August 1, 2008 (京津, Jīngjīn, is an abbreviation meaning “Běijīng-Tiānjīn”). Passenger traffic statistics pertain to the first full year of operation.

**KTX-all:** The first phase of the KTX (“Korea Train eXpress”) system was opened on April 1, 2004. The project may be described in brief as:

1.) electrification of the existing Gyeongbu Line, Seoul – Yongsan – Siheung junction – Daejeon – Daegu (Dongdaegu Station) – Busan, 441.5 km / 274.5 mi,

2.) electrification of the existing Honam Line, Daejeon – Mokpo, 252.5 km / 156.5 mi, with a branch to Gwangju 13.7 km / 8.5 mi,

3.) Construction of the initial segment of dedicated HSR line, the Gyeongbu High-Speed Line, extending Siheung junction – Daejeon – Daegu (Dongdaegu Station), 223.6 km / 138.6 mi. The current Seoul – Busan distance, via the new line, is 408.5 km / 253.3 mi.

KTX-all refers to all KTX services using the Gyeongbu and Honam lines. See also KTX - Seoul-Busan, above.

The system length statistics are exclusive of segments that have infrequent service by KTX trains (e.g. Daejeon – Gimcheon – Dongdaegu).

**TGV Est:** Statistics include all passengers carried on the dedicated HSR line *LGV Est européenne*, which was opened on June 10, 2007

**Northeast Corridor - all:** Statistics include all passengers carried on the Northeast Corridor line between Boston, New York and Washington, DC, whether aboard National Railroad Passenger Corporation (Amtrak) trains or not.

**Hokuriku Shinkansen (北陸新幹線):** This line diverges from the Jōetsu Shinkansen and extends to Nagano. It was opened on October 1, 1997. Opening of the Nagano – Kanazawa segment, 228.0 km / 141.4 mi, is planned for December 2014.

**TGV-all:** Statistics include all passengers carried aboard TGV trains, on dedicated HSR lines (*Lignes à grande vitesse*, LGV) or not. System length statistics are the total length of lines, LGV and conventional (*classique*), worked by TGV trains. The total length of LGV segments was 1,893 km / 1,174 mi at 2008. This figure includes connections to conventional lines.

**Flytoget:** Statistics include all passengers carried aboard Flytoget trains, which are permitted a maximum speed of 210 km/h (130 mph). These use the *Gardermobanen*, a new railway built to German ICE 200 km/h standards. The new line was opened in stages during 1998-1999. The Flytoget airport service was started on October 8, 1998. The line is also used by express passenger trains operated by *Norges Statsbaner AS*, and by freight trains.

**LAV - Madrid-Barcelona:** Statistics include all passengers carried on the dedicated HSR line between Madrid, Zaragoza and Barcelona.

**LAV - Madrid-Andalucía:** Statistics include all passengers carried on the dedicated HSR line between Madrid, Toledo, Córdoba, Sevilla and Málaga.

**Northeast Corridor - Amtrak:** Statistics include all passengers carried aboard National Railroad Passenger Corporation (Amtrak) trains between Boston, New York and Washington, DC.

**LAV-all:** Statistics include all passengers carried on the dedicated HSR lines Madrid – Zaragoza – Barcelona, Madrid – Toledo / Córdoba – Sevilla / Málaga, and Madrid – Segovia – Valladolid.

**ICE-all:** Statistics include all passengers carried aboard ICE trains, on dedicated HSR lines or not. *Schnellfahrstrecke* (SFS) refers to an HSR line in general. *Neubaustrecke* (NBS) refers to a purpose-built HSR line, and *Ausbaustrecke* refers to a line upgraded from an existing railway. The system length statistic is the total length of lines, NBS, ABS and other, worked by ICE trains. The total length of SFS (i.e. NBS and ABS segments) was 1,300 km / 800 mi at 2008, including connections to conventional lines.

**Kyūshū Shinkansen (九州新幹線):** This is the first stage of an HSR line between Fukuoka, Kumamoto, Yatsushiro and Kagoshima. It extends between Yatsushiro (Shin-Yatsushiro Station) and Kagoshima (Kagoshima-Chūō Station), and was opened on March 13, 2004. Opening of the remaining segment, Fukuoka (Hakata Station) – Kumamoto – Shin-Yatsushiro, 103.5 km / 64.2 mi, is planned for March 2011. Trains will operate through between Ōsaka and Kagoshima.

**Arlanda Express:** Statistics include all passengers carried aboard Arlanda Express trains, which are permitted a maximum speed of 200 km/h (124 mph). The airport railway proper extends 17 km / 11 mi. The line was opened on 1999 November 24.

**Frecciarossa - 2010 (estimate):** Italy opened an HSR trunk line between Torino, Milano, Bologna, Firenze, Roma, Napoli and Salerno, 898.9 km / 557.3 mi, in stages during 1977-2009. The new *Frecciarossa* HSR services were introduced on December 13, 2009. At the time of writing, the *Trenitalia* website stated that these carried “a million passengers a month.” The authors used this as the basis for a passenger traffic density estimate for 2010, addressing uncertainty by rounding to a single significant digit.

**X 2000:** Statistics include all passengers carried aboard X 2000 trains, which are permitted a maximum speed of 204 km/h (127 mph). The system length statistic is exclusive of segments that have infrequent service by X 2000 trains (e.g. Gävle – Östersund, Sundsvall – Östersund).

**Keystone Corridor - all:** Statistics include all passengers carried on the Northeast Corridor line between Boston, New York and Washington, DC, whether aboard National Railroad Passenger Corporation (Amtrak) trains or not. Amtrak trains are permitted a maximum speed of 177 km/h (110 mph) on upgraded segments of this line.

**LAV - Madrid-Valladolid:** Statistics include all passengers carried on the dedicated HSR line between Madrid, Segovia and Valladolid.

**Keystone Corridor - Amtrak:** Statistics include all passengers carried aboard National Railroad Passenger Corporation (Amtrak) trains between Philadelphia, Lancaster and Harrisburg.

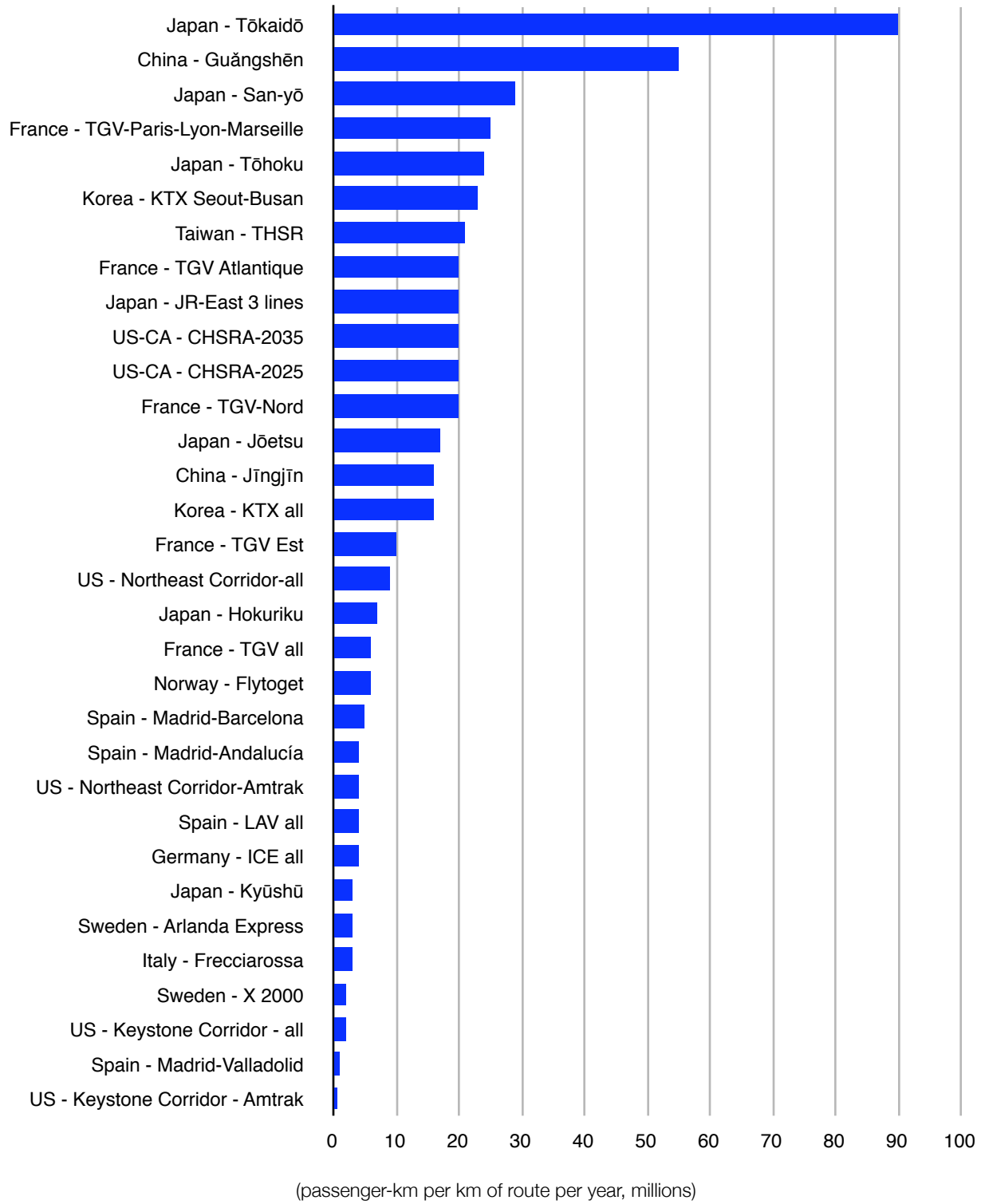
Sources consulted by the authors did not provide passenger traffic statistics for dedicated HSR lines in Germany, nor for the component of “total” traffic on conventional lines in France, Germany and Sweden worked by “conventional” trains. For example, the lines worked by X 2000 trains in Sweden are also worked by “conventional” trains, but the authors did not locate passenger traffic data for such services.

The authors believe that annual passenger traffic density carried by the dedicated HSR segments in Germany is similar to that carried by dedicated HSR segments in France - 20 million - 30 million passenger-km per km of route.

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Figure 1 (below) below illustrates the passenger traffic density statistics presented in Table 1 (above)

**Figure 1: High-Speed Rail Passenger Traffic Density**



**Acknowledgment:**

The authors express sincere appreciation to Edson L. Tennyson, P.E. (former Deputy Secretary, Pennsylvania Department of Transportation and former Deputy Commissioner for Transit Engineering, City of Philadelphia), who suggested inclusion of the Keystone Corridor in the tabulation above, and who provided data to facilitate this.

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