# Now is the time for Australia to make high speed rail a reality

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International High-Speed Rail Association
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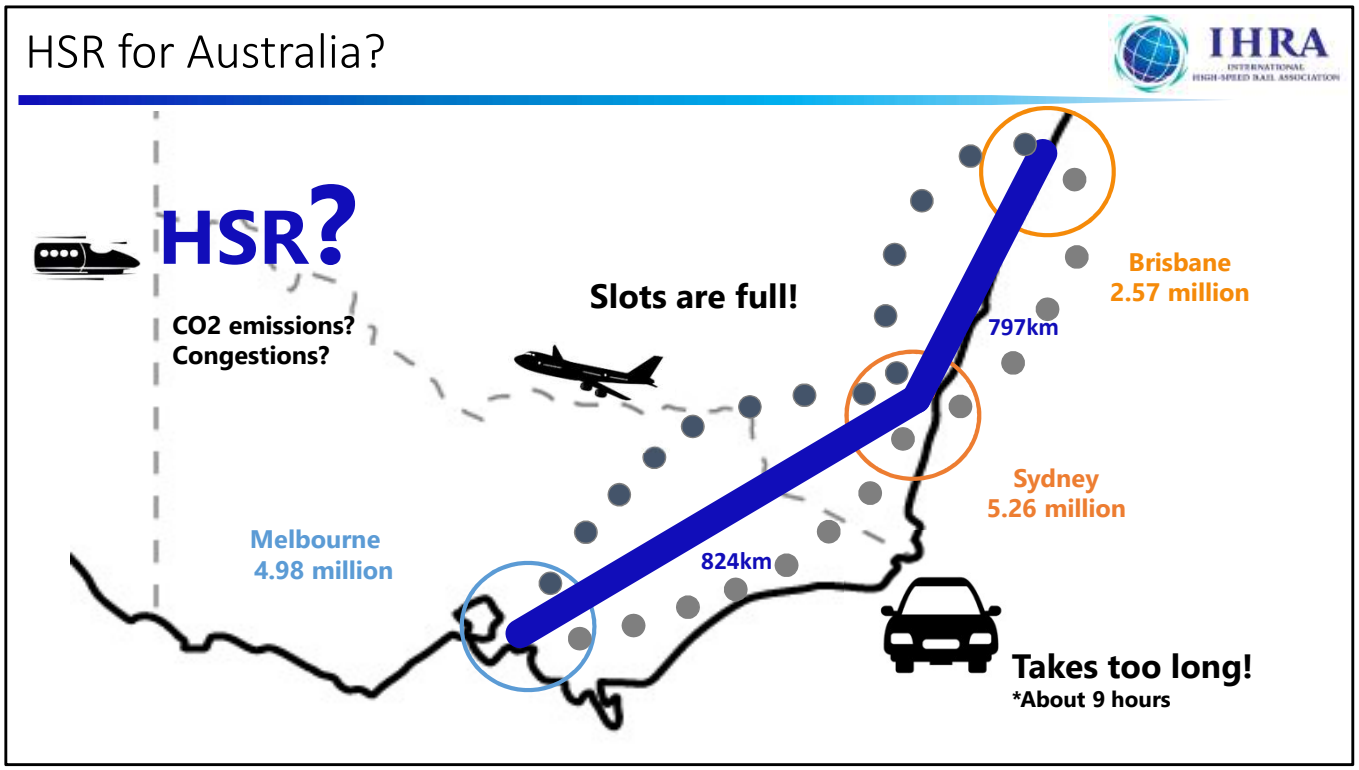
https://www.ihra-hsr.org/en/

**[p.1]**
Thank you for the kind introduction.
My name is Masafumi Shukuri, Chairman of the International High Speed Rail Association.
The title of my presentation is: "Now is the time for Australia to make high speed rail a reality." You might ask me: why is "now" the time to make HSR a reality in Australia? The answer is, because it takes a long time and massive investment to develop HSR. Long-term vision is imperative for developing HSR.




**[p.2]**
To start, why do we need HSR in Australia anyway?
Sydney and Melbourne are very congested, and likely to get worse. HSR enables Australia to "spread the settlement", "reduce travel time and congestion" and "reduce CO2 emissions".
HSR would transform the lifestyle and improve the quality of life of Australia for the future.

# High Speed Rail Projects require time

1970

Initial plan of Bullet Train in 1939
*ceased by WWII

National Shinkansen Railway Development Act in 1970

Basic Plan

Review

Business and Construction entities designated

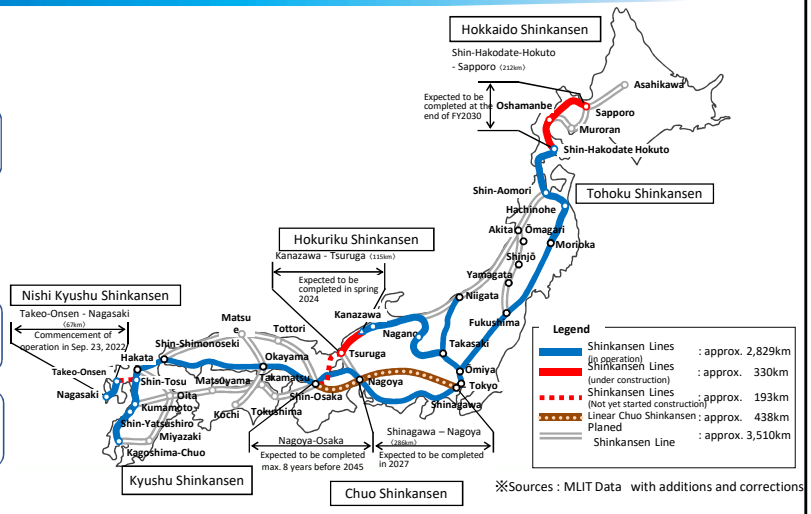
1971
*Tohoku Shinkansen Case

Development Plan
5 Lines designated in 1971, 1973

Instructions for construction

Construction execution plan

Construction initiated




※Sources : MLIT Data with additions and corrections

**Level of Achievement**

**88%** (approx. 2942 km) when the Hokuriku Shinkansen line (Kanazawa to Tsuruga) opens in the spring of 2024

*Includes lines constructed before 1973

https://committees.jsce.or.jp/kikaku/system/files/2023ChekUP_Shinkansen-ALL_0.pdf

**[p.3]**

I mentioned that “long term vision” is an imperative for HSR development. This was the case for Japan. Japan’s first HSR, the Tokaido Shinkansen opened in 1964(nineteen sixty-four), but its initial plan was in 1939(nineteen thirty-nine). The Japanese government decided on the National Shinkansen Railway Development in 1970(nineteen seventy). 5 lines were designated in this plan between 1971(nineteen seventy-one) and 1973(nineteen seventy-three) of which only two have been completed. Japan is still working on this plan. When the Hokuriku Shinkansen opens between Kanazawa and Tsuruga next spring, including lines constructed before 1973, the total length in Japan will be 2,942 km(two thousand and nine hundred fourty-two kilometers) and the percentage of achievement will be 88%.

Why HSR?

## Keys for successful HSR

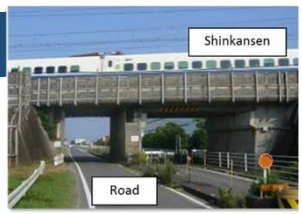
**Safety ➔ Reliability ➔ Frequency ⇒ Ridership**

**Ridership = Revenue Up**

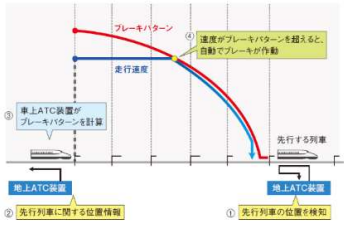
How do you make that happen?

✓ Principle of Crash Avoidance

**Dedicated HSR line**
free of level crossing




**Automatic Train Control system**




✓ Total System Approach

https://www.ihra-hsr.org/en/hsr/shinkansen.html

**[p.4]**

There are many HSR systems around the world and you have choices. In choosing the HSR, I believe it is important that your country consider not only initial costs, but also the long-term costs when assessing and making choices. Once a decision is made, it is difficult to make changes. There are many high speed trains around the world, but what makes the difference are three key factors: Safety, reliability, and frequency of operation. The resulting increase in ridership equals increasing revenue. These are all achievable by the “principle of crash avoidance and a “total system approach”.

## The case of Taiwan High Speed Rail


Fuji River Bridge of Japan

Taiwan HSR Bridge

Dr. Hiromasa Tanaka, JR Central(JSCE Journal Vol.92-9)

**[p.5]**

The case of Taiwan High Speed Rail is an example of when “long-term vision” was not solid. Taiwan first thought they could get a “Best Mix" of Shinkansen and Euro Train, but it actually resulted in a delayed opening, and increased the operating cost year after year. There were many design changes, and they could not take full advantage of the Shinkansen system. One example of the difficulties was the integration of rolling stock and infrastructure. Comparing a Shinkansen bridge and a Taiwan High Speed Rail bridge, the Taiwan High Speed Rail's attempt to achieve the “mix idea” resulted in building bridges that were too sturdy and unnecessarily heavy for the vehicles.

Similarly, 74㎡(seventy four square meter) tunnels were sufficient for the cars to be used in Taiwan, but they ended up being 90㎡(ninety square meters), causing an additional cost of 520(five hundred twenty) million Australian Dollars .

Other examples of the results of the “mix idea” were the failure of turnouts, major revisions to regulations and manuals, and the extra time required for running tests. This caused an additional 37(thirty-seven) million Australian Dollars per day.

## Winning Hearts and Minds


Anti-Shinkansen rally before construction
(Source: Asahi Shimbun newspaper)

Shinkansen Mania after service launch
(Source: Mainichi Shimbun newspaper)

**Connectivity**

**Economic Growth**

**[p.6]**

I mentioned that it takes a long time and massive investment to develop HSR. Benefits of HSR are not often clear to the public. Even in the case of the Tokaido Shinkansen, few imagined success. To win hearts and minds, it is necessary to show benefits to the people. At that time, Japan National Railways was able to ignite the power of dreams. This is important for the success of ambitious projects like HSR.

As a consequence, the Shinkansen commenced operation just before the Tokyo Olympic Games in 1964(nineteen sixty-four). Despite the prevailing winds of doubt, the people of Japan recognized the Shinkansen as a symbol of their dreams. Boosting human connectivity leads to the creation of diverse goods and services and spurs economic growth, which in turn fosters increased connectivity.

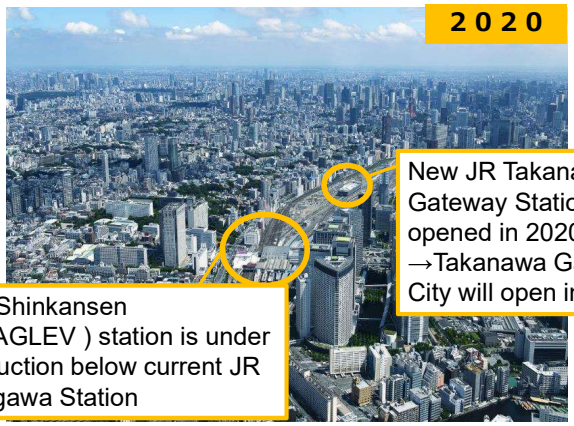
With this virtuous circle, the effect of HSR will continue for generations, as has been the case of the Tokaido Shinkansen.

Example of Tokaido Shinkansen:
Differences before and after opening

IHRA
INTERNATIONAL HIGH-SPEED RAIL ASSOCIATION

## Shinagawa Station

Opened in 1886 for conventional lines
Opened in 2003 for Shinkansen lines

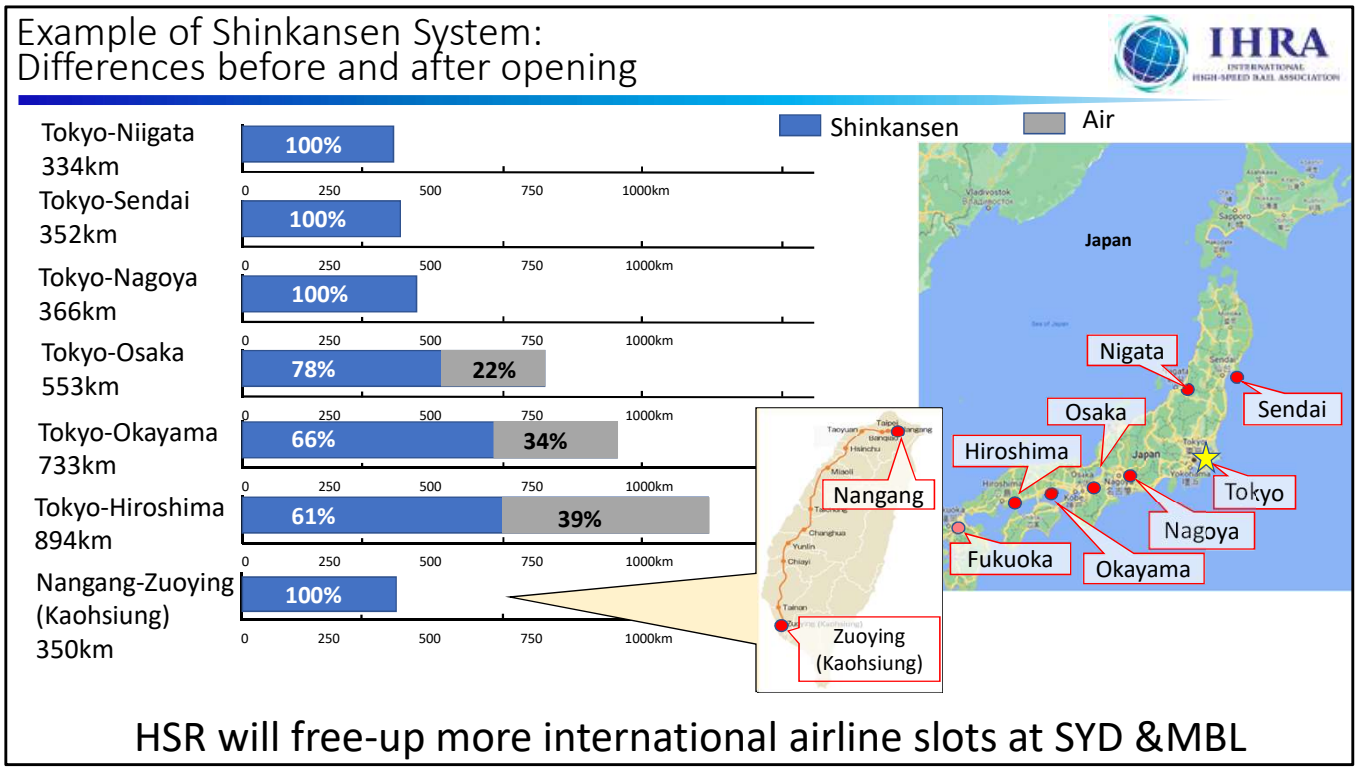

Takanawa Gateway City

SCMAGLEV

https://www.takanawagateway-city.com/en/

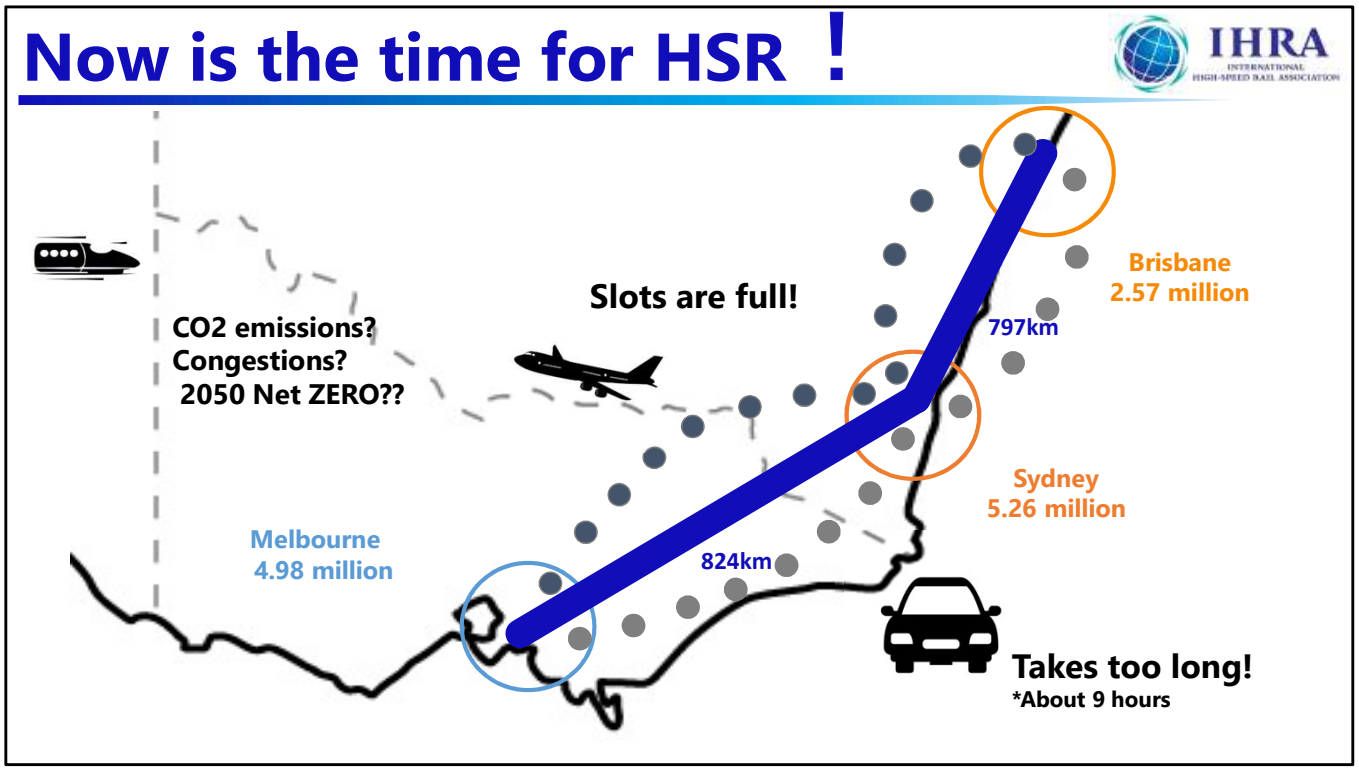
**[p.7]**

The upper left photo of the area around Shinagawa Station was taken eight years before the Shinkansen station opened.
The orange line in the center represents what became the Shinkansen line and in 2003(two thousand three) Shinagawa Shinkansen station was opened.
In 2020(twenty twenty), Takanawa Gateway station opened next to Shinagawa Station on the conventional railway line, and the future Takanawa Gateway City is scheduled to open in the area in 2025(twenty twenty-five).
With the completion of the construction, the operation of the Chuo Shinkansen will begin before 2030(twenty thirty). Further development and growth around the station will certainly follow in the near future.
It is clear that connecting to the Shinkansen will make the station and city very active and increase human interaction.

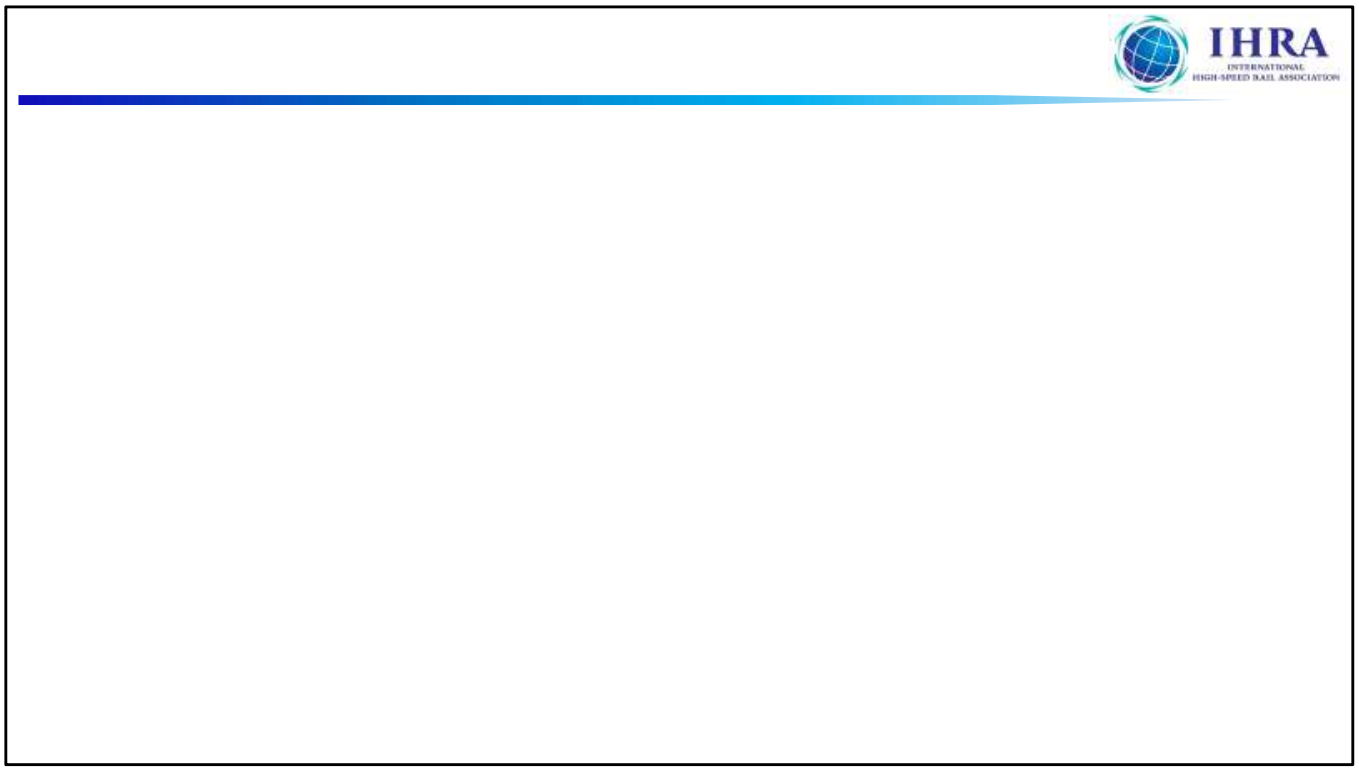



**[p.8]**

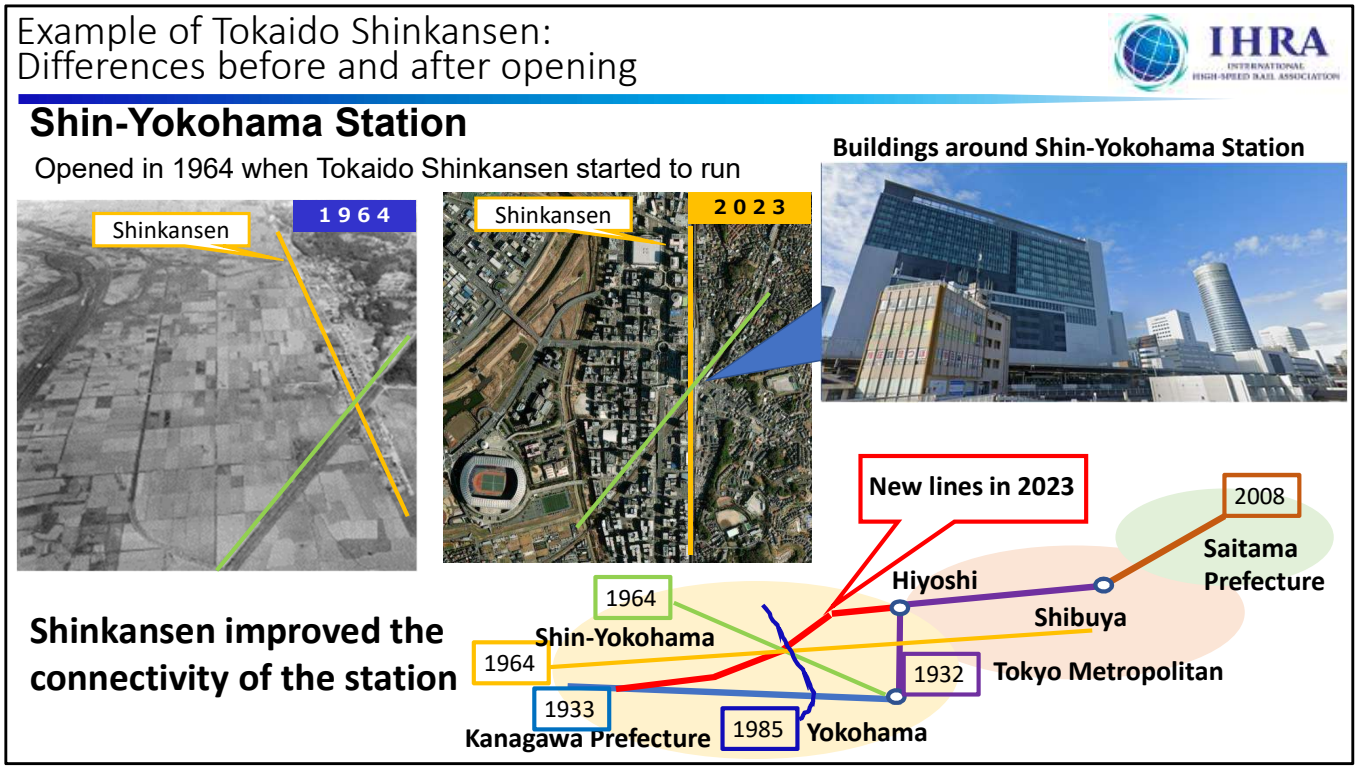
This slide shows the modal shift from air travel to high speed rail that HSR has brought to Japan and Taiwan. The modal shift would significantly open airline slots to more international travel. Longer distance flights reduce CO2 emission per passenger kilometer compared to shorter commuter flights.




[p.9]
Even if we start construction now, it will take at least 10 years. With future growth projected in Sydney and Melbourne and with the Australian commitment to 2050(twenty fifty) NET ZERO, can this be achieved without HSR?
It's not too late, we have to start it now. Now is the time for Australia to make high speed rail a reality.
Thank you very much for your kind attention.



Example of Tokaido Shinkansen:
Differences before and after opening




Shinkansen contributed to the development along the line and around the stations.
Here is a case study of Shin-Yokohama.
Originally, there was nothing in the area, but the Shinkansen station was built, and a station for conventional lines was built in 1964.
In 2023, a new lines opened through Shin-Yokohama, greatly improving the urban area's connectivity.

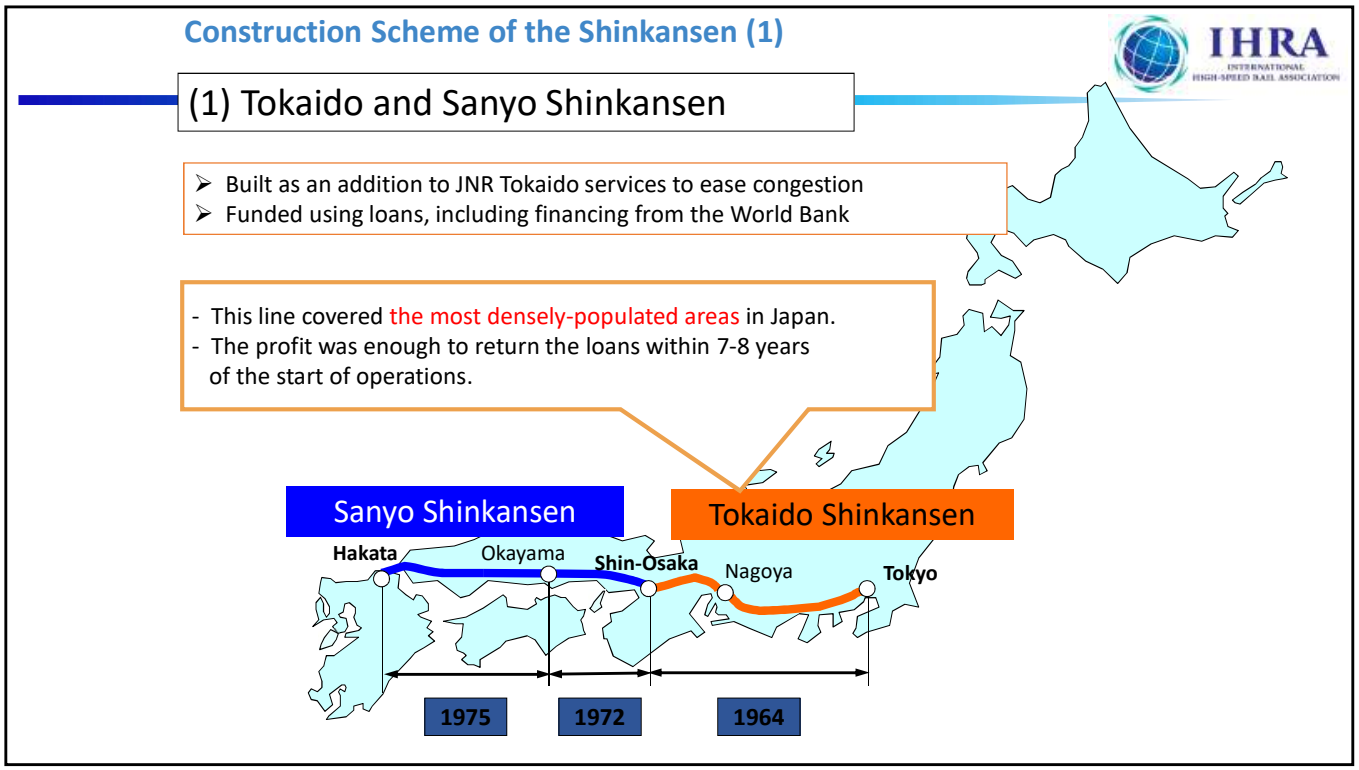
This development is an example of the effects of the opening of the Shinkansen line.

# Types of Shinkansen

| | | Status | Date of initial plan | Date of revised plan |
|---|---|---|---|---|
| ① | Tokaido Shinkansen<br>Sanyo Shinkansen | Built as extensions to the network of non-Shinkansen lines | – | – |
| ② | Tohoku Shinkansen (Tokyo-Morioka)<br>Joetsu Shinkansen | Built in accordance Nationwide Shinkansen Railways Construction and Improvement Act | 1971 | 1971 |
| ③ | Five Projected Shinkansen Lines<br>・Hokkaido Shinkansen (Aomori-Sapporo)<br>・Tohoku Shinkansen (Morioka-Aomori)<br>・Hokuriku Shinkansen (Tokyo-Osaka)<br>・Kyushu Shinkansen (Fukuoka-Kagoshima)<br>・Kyushu Shinkansen (Fukuoka-Nagasaki) | | 1972 | 1973 |
| | ・Maglev (Tokyo-Osaka) | | 1973 | 2011 |

（省略）

（参考）
こちらは、これまで整備してきた新幹線を３つのグループに整理したものです。
この整理に沿って、我が国の新幹線整備の経緯やスキームをご説明致します。



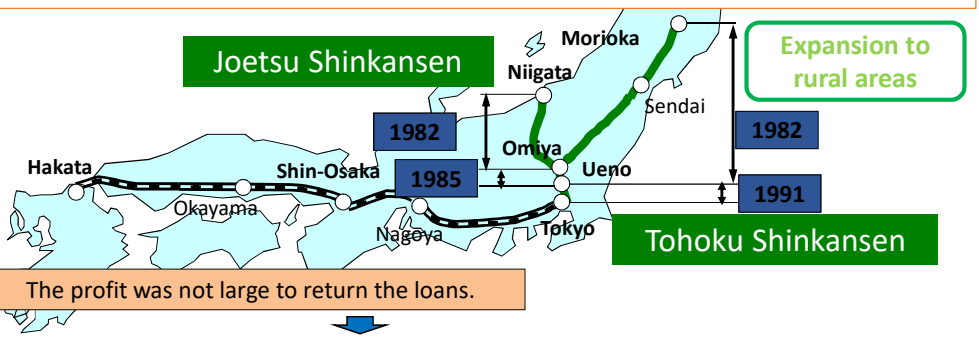

・まず東海道、山陽新幹線は、3大都市圏を結んでいる当時の国鉄の在来線の東海道本線や山陽本線の輸送力が逼迫していた背景があった。この在来線の線路増設工事として新幹線が整備された。皆さんご存知の通り、日本の在来線は狭軌で整備されている。当時の議論として、この線路増設工事を、在来線に並行して狭軌で整備するか、標準軌で新たな路線として整備するか、議論された。結果、標準軌の新幹線として整備された。また、東海道新幹線の整備には世界銀行の借款も充当されている。

・東海道新幹線は、着工からわずか5年半で開業したが、着工前に一部の区間で用地買収が終わっていたことや、一部のトンネルの掘削が終わっていたなどことが、短い工期の理由とされている。

## Construction Scheme of the Shinkansen (2)

### (2) Tohoku and Joetsu Shinkansen

- The success of the Tokaido Shinkansen led to demands to the service to be extended to other regions.
- In 1970, the "Nationwide Shinkansen Construction Act" was passed in order to create a nationwide transport network contribution to the equal growth of all Japan's regions. The law also established the Japan Railway Construction Public Corporation.
- The majority of the construction expenses were funded by loans
- Construction was greatly delayed due to problems purchasing land and objections from local residents (Tokyo-Omiya) .
- Construction costs were also higher than expected due to difficulties including the construction of long tunnels through mountainous regions.



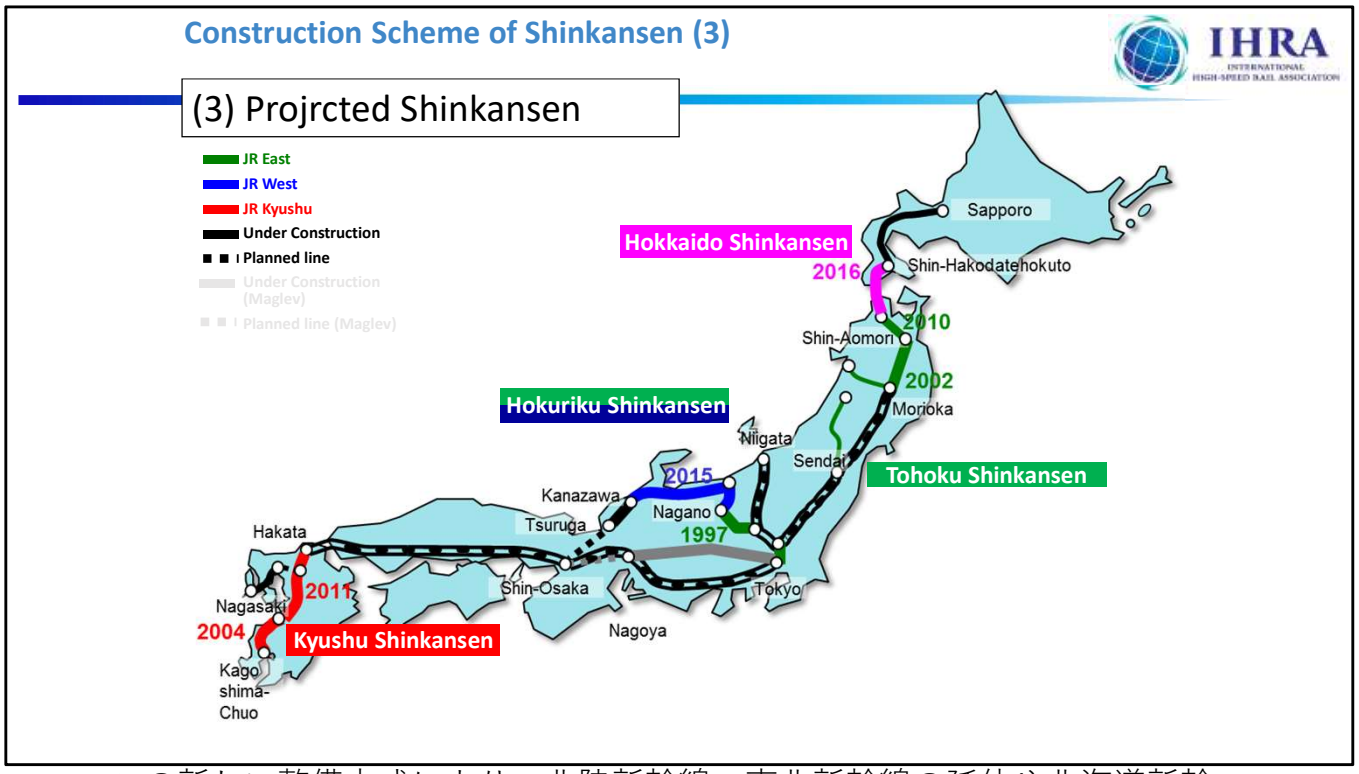

The profit was not large to return the loans.

The construction cost placed a heavy burden on the Japanese National Railways (JNR).

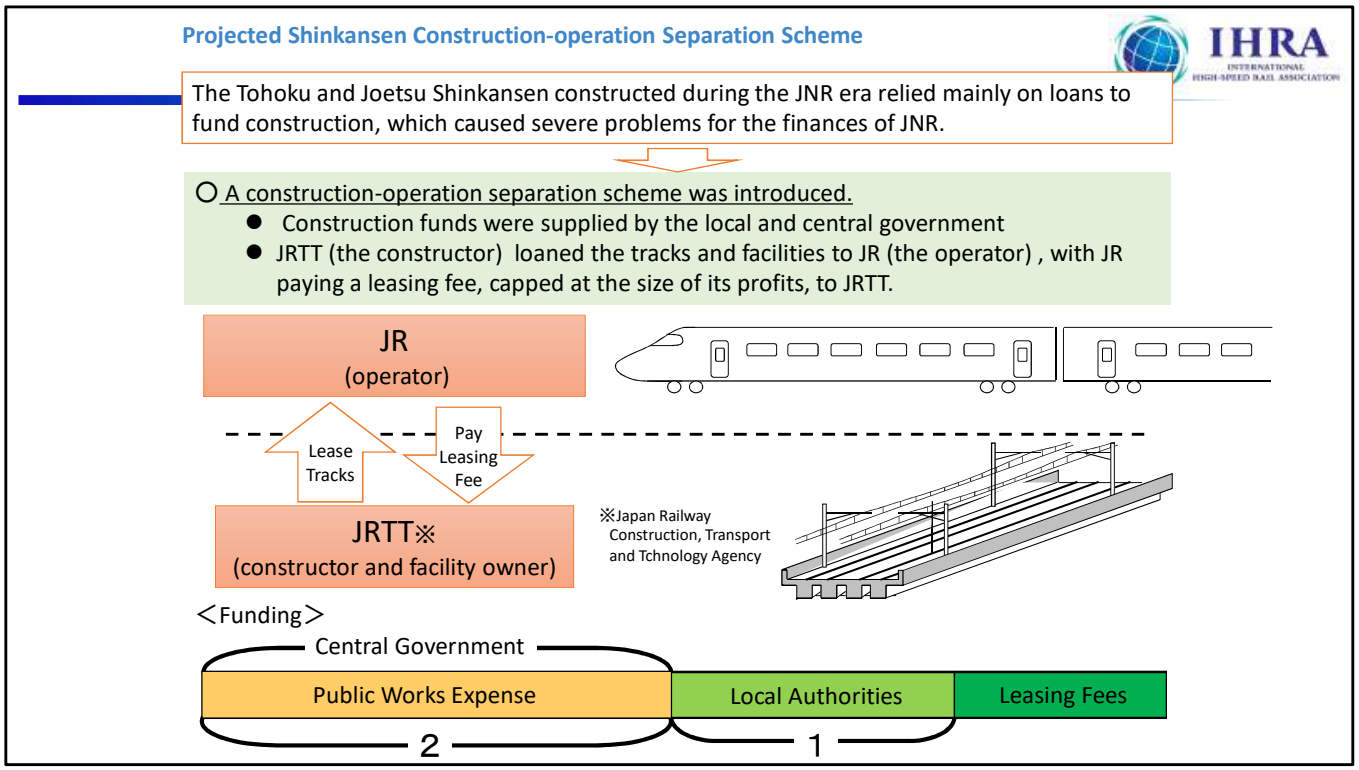
・このような東海道新幹線の成功を受けて、他の地域にも新幹線を整備しようとする機運が高まった。東海道新幹線開業から6年後の1970年に新幹線を整備するための法律が制定された。この法律の目的は、国土の均衡ある発展に寄与するために新幹線ネットワークを整備するもの。
・この法律に基づき、東北、上越新幹線の建設が1971年から始まった。建設費の大半は借入金で賄っていた。
・これらの新幹線は、東京圏などで用地買収が難航、沿線住民の反対等もあり、開業は大宮までが11年後の1982年、さらに東京まで乗り入れるのにさらに10年近くかかった。
・また、急峻な山岳地帯を貫く長大トンネルの建設等が難航し、建設費も当初予定を大きく上回った。特に、上越新幹線の中山トンネルでは、異常な出水にみまわれ、最終的に、トンネルの中のルートを一部変更している。

（次のスライドを説明後）

・このような背景があり、東北、上越新幹線では、営業収入が建設費の借金返済を十分に行えるほどの営業収入がなかったことから、これらの新幹線の建設費は当時の国鉄の経営に大きな負荷を与えることとなった。




・この新しい整備方式により、北陸新幹線、東北新幹線の延伸や北海道新幹線、九州新幹線の整備が行われている。現在、北陸新幹線は、ここ金沢まで開業している。東北、北海道新幹線は新函館北斗駅まで、九州新幹線は、博多から鹿児島まで整備が終わり、営業されている。




こちらの図は、整備新幹線の事業スキームを表したものです。

整備新幹線については、鉄道・運輸機構が新幹線施設の建設・保有・JRへの貸付を行い、運行主体のJRは受益の範囲で貸付料を支払う「上下分離方式」により運営されています。

また、建設のための財源については、貸付料収入を充てた残りの部分について、国が3分の2、沿線の地方自治体が3分の1を負担することになっています。

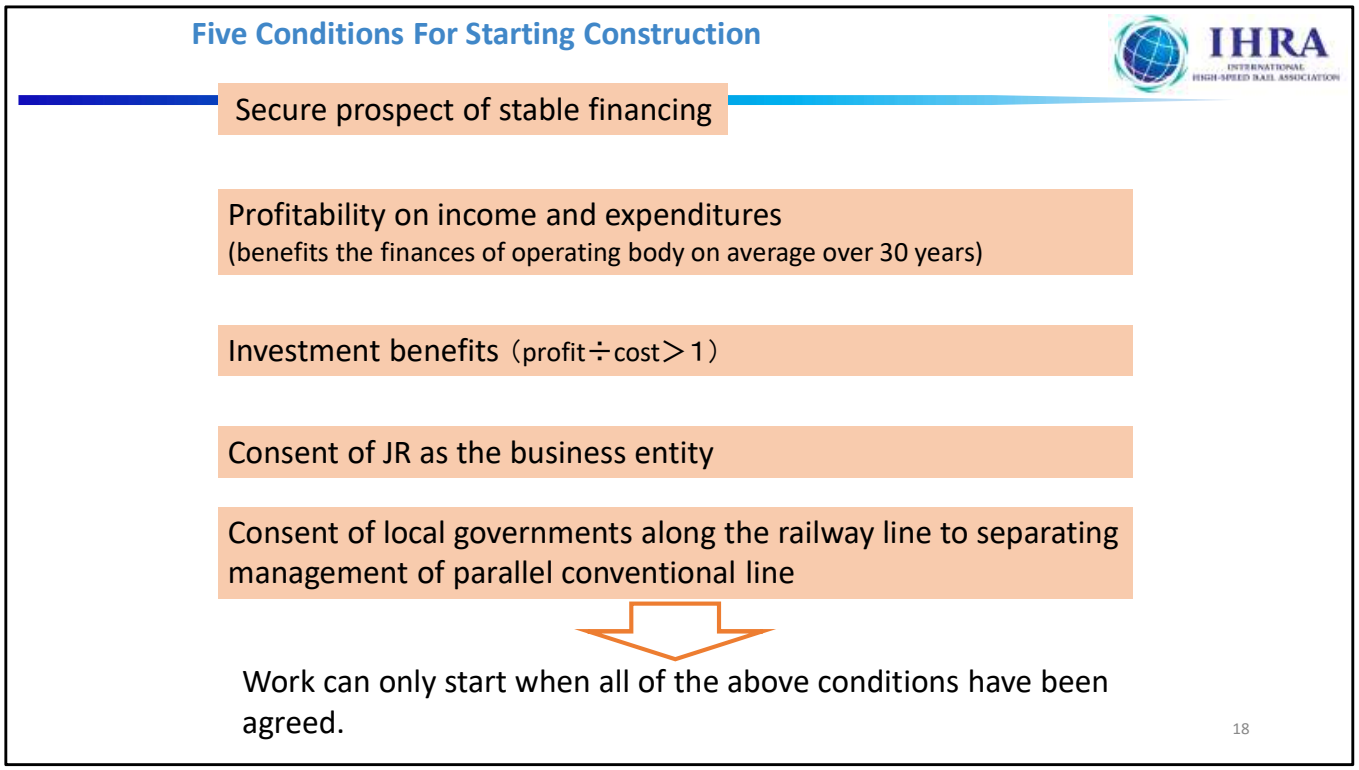
他の交通手段との競争の中で効率性を高めることができる運行部分と、競争環境にあっても効率化が難しくかつ固定費負担が大きい施設の建設・維持管理の財源を分離し、上部を運行事業者たるJR、下部を国・地方自治体で分担することで、安定的に経営・運行することが可能になります。

そのうえで、JRは上下を一体的に管理・保守し、トータルシステムに基づいた効率的な運行を実現しています。

## Summary of Shinkansen Project Scheme

| | Governments | JRTT (Builder and Owner) | JR (Operator) |
|---|---|---|---|
| Construction cost | ○ | – | – |
| Completion of construction | – | ○ | – |
| Rolling Stock cost | – | – | ○ |
| O&M cost | – | – | ○ |
| Ridership | – | – | ○ |

・以上を整理すると、国と地方の政府は建設コストに対する補助金を出し、ＪＲＴＴが施設を整備する、これをＪＲが借り受け、車両を自ら調達して運行する。その際のＯ＆ＭコストはＪＲが負担することとなる。




・新たに新幹線を整備するにあたっては、5つの条件を設けている。
・一つ目は安定した財源。これは国や地方公共団体からの補助金、貸付料が安定して入ってくるかを確認するものである。例えば、国費については、近年は毎年755億円となっている。
・二つ目は、経営するJRの収支採算性である。先程少し説明したが、JRは受益の範囲内で貸付料を負担することとなる。JRが新幹線を運営することにより経営が悪化しないことを確認するもの。
・三つ目は、費用対効果である。これは新幹線だけではなく、公共事業一般に当てはまることで、事業に着手する際には費用対効果が1より大きいことを確認している。
・四つ目はJRの同意である。これは二つ目の収支採算性とも関係するが、JRに運行を押し付けていないことを確認している。
・五つ目は沿線自治体の同意である。これは少し複雑だが、新幹線が整備されると、その新幹線と並行して走行している在来線の特急列車は不要となるので、廃止される。これに伴い、並行している在来線の経営はJRから分離され、地方自治体が出資する鉄道会社に移管される仕組みとなっている。このため、地方自治体の同意が必要なのである。
・これらの5つの条件が全て満たされた際に着工することとなっている。