

Superiority of the railway to see with a carbon footprint

1. Motivation behind Research Paper

I was shocked to see the income and expenditure report of the local lines in the red by the West Japan Railway company in April 2022. I felt threatened when those lines were decommissioned because of a decrease in the number of passengers and also proportionately how the emission, or the carbon dioxide, has been increasing. I'm interested in how to use railways in freight transport in a way that reduces emissions, or the carbon dioxide.

2. Introduction

First, the number of unprofitable routes is increasing, especially in depopulated areas such as mountainous regions. Railways always have CO₂ emissions, regardless of the number of passengers. In some countryside areas, trains do not use electricity so there is an even larger amount of CO₂ emitted due to the use of diesel. As a result, cars are better than trains, at least for transporting small amounts of passengers. So if the amount of people using trains increases, it will be more efficient and environmentally friendly.

Secondly, the use of freight transportation is increasing. That's because they are reserved by companies and local governments, they have special trains, reaching higher speeds and have more cars than regular passenger trains. With 26

freight cars, when fully loaded with containers, one engineer and one locomotive can transport 65 10-ton trucks at a time over long distances. In terms of distance, there is a long-distance train that runs 2,127 km from Sapporo to Fukuoka via Toyama and Osaka.

3. Results and Analysis

First, regarding loss-making local lines, the Geibi Line's 25.8-km line between Tojo Station and Bingo-Ochiai Station had an operating coefficient of 26,906 yen and an average of 9 passengers per day from 2018 to 2020, the worst figures in the country. This is not a problem that is unique to the Geibi line, many other countryside lines are definitely under-used so there will be an increase in lines being discontinued in the near year.

In freight transportation, many chartered trains and containers are operated by companies (e.g., Kuroneko Yamato, Bourbon), Japan Railways (JR), and local governments. Every autumn, potatoes are transported from Hokkaido to Kumagaya, and onions from Kitami to Sapporo via Asahikawa. Each thing is transported by special train for all of Japan. Freight transportation by railway is the main form of mass transit. Small-rot transports have been declining. Recently, however, small-rot transports have increased again. For example, Sagawa Express, which used to be very inefficient when transporting packages in Niigata Prefecture because it had to detour around mountains and other obstacles, has been using regular trains on the Hokuoku Line of the Hokuetsu Kyuko Line, which passes through tunnels in the mountains, to transport its packages since 2017.

According to the Ministry of Land, Infrastructure, Transport and Travel graphs, to transport one person one kilometer, a car emits 130 grams of carbon dioxide, while a train emits only 17 grams. To transport 1 kg of cargo, a private cargo vehicle emits 1166 grams of carbon dioxide, while a business emits 225 grams, So compared with other modes of transportations, railway freight is the most eco-friendly.

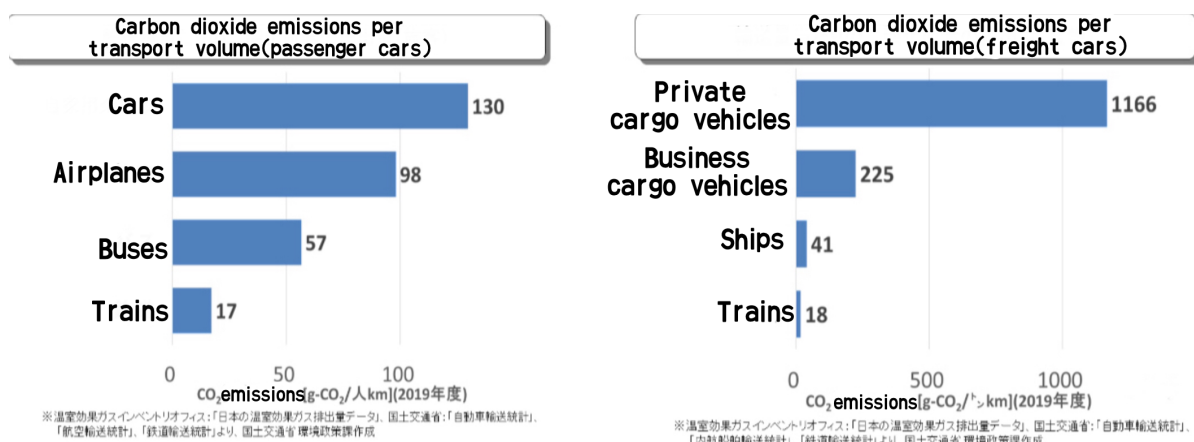


Figure 1. Carbon dioxide emissions average of transport volume

4. Conclusion and Future Problems

In the near future, Japanese people are decreasing and depopulating in the countryside. So I think railways are changing. In countryside lines, not only is there a decrease in the number of trains but also an increase in the abolition of lines. So to avoid the situation, the local government needs help to invite visitors and issue free tickets for a day. Next, freight transported by railway. If a company uses the railway, it should be subsidized by the government. For JR freight, subsidized running costs. Therefore we are going to use eco- friendly railways.

5. Reflection

I thought about how to increase passengers on the countryside lines. First, the head of local governments have to be more involved. Second, the driving community buses should have posters with the railway's diagram. Also subsidize the maintenance fee for trains and railway trucks.

For me, when I'm going to go out, I use the railway, not only the red line. Next I think that railway freight can be more appealing to be used not only by companies but also TV commercials and social networking services. For eco-rail-mark, increasing authorized products but many people don't know about them. So they should raise popularity by making handouts, appealing to TV and social networking services. For me, when I move, I want to use railway freight.

6. Work Cited

Hokkaido Japan Railway Company, "Attached sheet3 Geibi line." 13 Apr. 2022. Web. 19 Oct. 2022.

https://www.jrhokkaido.co.jp/CM/Info/press/pdf/220909_KO_rumoihaisi.pdf

Hokutetsu Express Co., Ltd. "What is modal shift." Web. 19 Oct. 2022.

<https://www.jrfreight.co.jp/jrfreight/modalshift.html>

Japan Freight Railway Company. "Dedicated Potato Transport Train in Operation." News Release. 9 Sep. 2022. Web. 19 Oct. 2022.

https://www.jrfreight.co.jp/info/2022/files/20220909_01.pdf

Ministry of Land, “Carbon dioxide emissions per transport volume” Web. 19 Oct. 2022.

https://www.mlit.go.jp/sogoseisaku/environment/sosei_environment_tk_000007.html

Ministry of Land, “The current situation of rail freight transportation 3・4” 14 June. 2011. Web. 19 Oct. 2022.

<https://www.mlit.go.jp/common/000147302.pdf>

Ministry of Land, “Abolition of Railway” 1 Apr. 2022. Web. 19 Oct. 2022.

<https://www.mlit.go.jp/statistics/details/content/001482062.pdf>

West Japan Railway Company, “reference material 4.” 13 Apr. 2022. Web. 19 Oct. 2022.

https://www.westjr.co.jp/press/article/items/220411_02_sankou.pdf

West Japan Railway Company, “Issue Recognition and Information Disclosure on Local Lines.” News Release, 11 April, 2022

https://www.westjr.co.jp/press/article/items/220411_02_local.pdf

Railway Freight Association. “Press release of agreement.” 8 Jun. 2016. Web. 19 Oct. 2022.

<https://hokuhoku.co.jp/press/20160608.pdf>

Railway Freight Association. “How to get ECORAIL MARK” Web. 19 Oct. 2022

https://rfa.or.jp/wp/pdf/ecorail/pamphlet/guidance_202106.pdf