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**Flexiwaggon America, Inc.**  
310 E. Walnut Avenue, Unit A  
Fullerton, CA 92832

Surface Transportation Board  
395 E Street Southwest  
Washington, DC 20423

April 28, 2022

**Re: EP 770 Rail Service Hearing**

Dear Chairman Oberman and Board Members,

Flexiwaggon America is the North American subsidiary of parent company Flexiwaggon A.B. of Sweden. The mission of Flexiwaggon America, Inc is to provide railcars and services which will transport freight trucks and trailers safely, economically and efficiently with minimal impact on the environment. Flexiwaggon America, Inc is a railcar company with ambition to provide intermodal transport solutions to the North American transportation industry. The principal objective of Flexiwaggon America, Inc is to capture freight traffic that normally would be truck-only, but can ride on Flexiwaggon rail cars for a significant portion of their journeys.

Flexiwaggon America is pleased to offer this comment letter to the Surface Transportation Board as part of Rail Service Hearing (EP 770) scheduled for April 26 and 27, 2022. This 24-page comment letter was originally submitted on October 17, 2021 to the U.S. Department of Transportation (DOT)'s Request for Information: America's Supply Chains and the Transportation Industrial Base (Docket No. DOT-OST-2021-0106). On the attached 24 pages are Flexiwaggon America's written responses to particular freight and logistics topics, on which the DOT was seeking information from the public, as described by the notice of request for information for US DOT Docket No. DOT-OST-2021-0106. We feel the comments in this letter are also relevant to the Board's current activities related to urgent issues in freight rail service.

Thank you for this opportunity to provide comment on these important issues.  
Sincerely,

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**1. *The identification of major infrastructure or operational bottlenecks and chokepoints across all aspects of the freight and logistics supply chain—including shipping/receiving, intermodal transfer, rail/water/truck transportation, warehousing, etc.—that slow or impede efficient cargo movement within the freight and logistics sector, and the most effective investments and management practice improvements that could be made to alleviate those bottlenecks.***

Although the US railroad network is among the least utilized in the industrialized world (measurement: train miles per track miles, still low on the list when typical US train length is considered against that of other countries), it is also among the most congested. As a result of the corporate expectations under which railroad companies operate, the US rail network operates using the minimum necessary infrastructure (track and signal systems) to get trains where they are going, which is often not consistent with punctuality and short travel time.

Short travel time schedules also require the infrastructure configured for reliability and punctuality. The configuration for a variety of traffic at a variety of speeds (35 mph grain trains, 50 mph general products trains, 60-70 mph container trains, 90 mph express truck shuttle trains, and 100-125 mph passenger trains) requires a means of overtaking with minimum delay. Depending upon the specific number of trains and mix of traffic types, the appropriate configuration may be:

- single track with closely spaced sidings,
- two main line tracks,
- two main line tracks with sidings,
- or perhaps three or more main line tracks,
- control locations with crossover switches connecting the main line tracks to allow trains to change from one track to another for overtaking or to detour around track maintenance work.

There should be dedicated tracks for freight trains entering and leaving yards (like the on and off ramps of an Interstate highway) so that freight trains are not affecting main line traffic as they enter and leave the yard at a very low speed.

All main lines should be equipped with Centralized Traffic Control (CTC), a signal and traffic control system that allows a train dispatcher to remotely operate the signals and switches for the control and direction of trains.

These improvements can often be made in existing right of way or with small strips of additional land along the right of way. Among later improvements that would require property acquisition are re-alignment of curves to reduce sharpness and increase train speed. Most of today's rail network consists of modern track structure and signal systems in the exact location that folks on horses placed the original tracks well over 100 years ago.

They were located for the convenience of the construction techniques of the time. As reconfiguration of the rail network continues, adjustments to track location consistent with modern construction techniques should be employed (lay out rail lines in the manner of Interstate highways). Setting the rail network up for fast, punctual, reliable, and efficient rail service can be done incrementally with service added and/or improved as projects are complete.

Since most of the US rail network needs this kind of work, an assessment should be made of the entire US rail network to determine the infrastructure improvements needed to accommodate the desired traffic. This traffic would include improved or new passenger train service, faster freight service for time-sensitive traffic, ability to serve the local needs of smaller communities (for example, moving grain from local elevators by rail instead of truck, and the movement of trucks by rail to smaller communities). The assessment should include the cost of electrification of existing and new tracks.

In some cases, important routes have been abandoned. Some of the right of way is still vacant and might be re-used for rail service. However, some has been re-purposed as recreational trails. Some has reverted to the original landowner before the railroad was constructed, and some was sold after abandonment.

There should be no question of the appropriateness of investing public funds in private property because property used by a railroad is dedicated to public use. This has already happened many times; government agencies have constructed infrastructure on a railroad company's right of way to support a commuter or regional passenger service, and the infrastructure has become the property of the railroad company upon completion. The railroad company that owns the property must then pay taxes on the increased value of their facility.

In all cases, the first consideration must be for the maximizing the utilization of the existing infrastructure. A careful analysis must be made to make incremental improvements in the order of the most effective service improvements in the shortest time.

Rail freight service is generally required to pay 100 percent of its cost and to make a profit as well. Rail transportation is the least subsidized mode of transportation in North America. Survival for rail freight transportation has meant ignoring the transportation function of railroads and concentrating on the greatest profit for the least cost. For this reason, shipments by rail are limited to distances of over about 700 miles, and rail companies concentrate on shipping entire trainloads of heavy, non-time-sensitive freight, rather than loading smaller shipments into individual freight cars.

Over the past few decades, short- and medium-haul intermodal freight rail has not worked well in North America, largely due to the slow nature of freight rail service and the cost of the intermodal facilities required. The long time it takes to load and unload trains at intermodal terminals is a bottleneck that can be relieved with new technology. Rapid intermodal railcar load/unload technologies are needed in the U.S.

#### *Structured, disciplined operation-*

Railroad infrastructure presents traffic managers with limited opportunities to divert trains from the track they are using, even on the best-configured network. It is the nature of rail systems. For passing a slower train or encountering a train in the opposite direction, there must be two tracks, one for each train. Where there are two tracks, there must be switches for the purpose of changing tracks. There may be sidings or sections of an additional main track for the purpose. If the point of encounter between trains would not occur where the infrastructure allows one train to divert to another track, one of the trains must wait for the other. If that waiting is anticipated and included in the train's schedule, the wait will not affect the train's punctuality.

A railroad can be a complex system, with trains operating at different speeds and stopping in different places a relatively easily managed environment if discipline is applied to operation. US railroads ran in a disciplined manner 50 or more years ago. With deregulation, new management from other fields, and a substantial amount of excess capacity, improvised operation was possible, with acceptable results. Improvised operation was introduced and has been favored because it is easier than disciplined, structured operation. However, utilization cannot be high when operation is improvised. Frequent traffic, with a high proportion of passenger service and time-sensitive freight, requires fixed timetables, with added scheduling integrated into existing schedules in an orderly fashion.

Schedules must be developed that provide for encounters between trains. The time that one train waits for another must be included in the schedule for the schedule to be accurate, necessary for being on time. Deviation of more than a few minutes from the schedule can result in a substantial change in travel time for at least one train, probably more. Some time must be built into schedules to accommodate events that cannot be anticipated.

Rail network utilization cannot be maximized without structured, disciplined operation.

***4. Major risks to resilience within the freight and logistics sector (including defense, intelligence, cyber, homeland security, health, climate, environmental, natural, market, economic, geopolitical, human-rights, or labor-management risks). What factors help to mitigate, or conversely exacerbate, these risks?***

The history of declaring routes redundant and removing them has presented little opportunity to mitigate the effect of severe weather events. Also, as a matter of attempting to minimize expense, railroads have become reactive rather than proactive in response to severe weather events, preferring to let the event shut the railroad down rather than take preventive or mitigating measures in preparation for an expected event.

***5. The effects of climate change on transportation and logistics infrastructure and its implications for supply chain resiliency.***

There is a great need to reduce both air pollution and highway congestion in the U.S.. Emissions from goods movement, the majority from diesel trucks, is a significant part of air pollution. Truck-involved accidents, on ever more-congested highways, are also an increasing concern.

Since rail transportation requires one-third the energy of highway transportation, it requires one-third the fuel and generates one-third the emissions of highway transportation. That is when using internal combustion engine power. Electrified, there are no emissions and the power consumption is less than one-third that of highway transportation due to the greater energy-efficiency of electric locomotives. Since trains can use a continuous power source, batteries, with their environmental impact in developing and disposing, are not needed.

To address pollution and congestion, a mode shift of more freight ton-miles from truck to rail is critical in North America. There will be major environmental and energy-savings benefits to short-haul freight rail service. Moving a ton-mile of freight by rail uses 1/3rd to 1/5th the energy (and resulting pollution) compared to moving it on a truck. This is true whether you are comparing diesel truck to a diesel train, or an electric truck to electric train. Electric power consumption is important. In addition to the

substantial amount of new power generation and other grid infrastructure (substation upgrades, etc. ) for conversion of highway vehicles to electric propulsion, a substantial amount of new electric power generation will be required to replace the use of oil, natural gas, or coal in residential, commercial, and industrial buildings.

A major national goal in the United States is to reduce greenhouse gas emissions. Cleaner freight transport, and more rail must be part of the solution. Many shippers are looking to shift traffic from the highway to rail to help reach corporate goals for lower emissions.

Stopping human-caused changes requires a variety of solutions, including a substantial shift from highway to rail transportation. Rail transportation requires one-third the energy of highway transportation, a result of the substantially lower friction and resistance to movement because of the hard surfaces and the small steel to steel contact area. Any transportation provided on a railroad, passenger or freight, will reduce greenhouse gas emissions by two-thirds per passenger or ton mile even when a diesel locomotive is pulling the train. When electrified, rail transportation will need two-thirds less new electric power generation than highway transportation. Rail transportation can easily use a stationary continuous power source, eliminating the environmental effects of battery production and disposal. Battery locomotives have shortcomings similar to those of highway vehicles. Ultimately, they will still have a problem of the disposal of depleted batteries, the problem of supply of material for new batteries, and limited range. Electrified railroads using overhead contact wire are a more sustainable solution, and proven to be safe, economical and high-performance. It is far more energy efficient to electrify transportation by electric rail with catenary than by electrifying road vehicles.

*Two important elements of a climate emergency solution must be:*

- Devote all possible resources to developing a rail network designed for fast, frequent, reliable freight and passenger trains.
- Limit resources devoted to highways to maintenance and repair, not additional capacity.

*Government policy must advance rail as a solution to climate change-*

Passenger rail advocates' and freight railroad customer activism against so-called 'Precision Scheduled Railroading' and other ways the Class I railroads are maximizing profit at the expense of passenger trains and short distance or other freight that the industry considers undesirable must also be framed in the context of the climate emergency. Railroad cost-cutting also increases greenhouse gas emissions from freight transport due to more truck traffic on the highways, low volume growth and a decline in rail freight market share. We must demand that the railroad industry be made to act in the public interest, not only for the sake of freight and passenger train service but also for the planet.

***7. Key opportunities and challenges with respect to the existing and future workforce to ensure a well-functioning freight and logistics supply chain and achieve the President's goal of increasing good-paying jobs with the choice of a union. Are there additional workforce or skill set opportunities and needs currently, or expected in the future?***

*Railroad workforce needs-*

Class I railroads have laid off tens of thousands of workers in the past few years alone. They should be hiring them back. The workers left behind are being stretched to the limit. Crew fatigue presents a tremendous safety risk to U.S. rail operations. Forced reductions also affect reliability and congestion in terminal areas because trains are not ready when the crew comes on duty. Often, the crew that is called to handle the train on the road must first perform switching to get the train ready.

The skills lost by firing so many experienced employees will be hard to get back. More railroad education and training programs are needed, as American freight railroads have lost the institutional knowledge needed to handle heavy traffic reliably.

In addition to eroding service quality of freight rail, the workforce reductions of Class I railroads also hurt passenger rail. Fewer railroad maintenance and operations staff of the freight side means more delays, and the greater possibility of passenger trains getting into accidents. There are also fewer railroad company engineering and operations staff to collaborate with public agencies on infrastructure projects which benefit both passenger and freight rail.

The railroad industry is already heavily unionized, and the Federal government should encourage union labor, and thus should strive to increase railroad employment.

*Railroad training and education-*

The success of improving the utilization of rail transportation depends upon restoring the US railroad industry's knowledge of infrastructure design and utilization and the reliable movement of people and time-sensitive freight. Because of the focus on highways, much of the expertise in railroad design, construction, and operation in the US has been lost. The maintenance and furthering of technical expertise requires an educational pathway to allow young people to enter the field. It also requires academic "homes" (departments or institutes) where innovation and research can be nurtured and realized. In the US, there are only three university railroad transportation and engineering programs: University of Illinois at Urbana-Champaign (its rail program was founded over 100 years ago), Michigan Technological University (founded in 2007), and Penn State Altoona (founded in 2011). Their programs are relatively limited in scope. There are 20 discrete, non-program courses offered at other US universities, with the number of courses ranging from one to six at the various universities. Of these only three universities offer more than two courses. There is a roughly 100:1 ratio of highway to rail academic funding in the US (*Tuning Transatlantic Cooperation in Rail Higher Education, Handbook for Rail Higher Education*, 2011).

In the European Union, there are 37 university programs in railroad transportation and engineering. Similar university railroad engineering and transportation programs are offered in Russia, China, Taiwan,

and Australia. There are even entire universities in Russia and China that specialize in rail transportation programs. In Germany, the fundamental rail engineering courses are a requisite for all engineering students. Railroad programs in Chinese universities are attracting students from English as a second language countries all over the world. The university rail programs in Europe and Asia are far more comprehensive in content than the US programs. US rail engineering programs concentrate more on how to build than what to build or how to use it. Engineering and operation cannot be separated in rail transportation as it can in highway transportation.

A full-scale railroad transportation and engineering program should be initiated in several colleges and universities throughout the country. Safe and dependable rail transportation also depends upon well-qualified individuals to operate, maintain, and manage the service. Short line railroads could be used in conjunction with a comprehensive technical training and apprenticeship program in railroad trades (operation, track and signal maintenance, vehicle maintenance, supervision, and management).

The UDOT/Federal Railroad Administration should:

- Develop an immediate and comprehensive program to train and educate current US railroad personnel in designing and operating fast, frequent, reliable, and convenient rail passenger and freight service.
- Develop and implement policy that will provide trade school and university railroad engineering and operations programs.
- Develop and implement policy that will facilitate the introduction of European or Asian rail operations experts into US rail education and service provision.

The USDOT should support 'Rail Tech Hubs'. Such a trackside facility could host:

- High-end manufacturing of electric locomotives and rail equipment ('rail industrial park' for several companies)
- Sites for zero-emissions electric railroad technology demonstrations
- University railroad engineering and research programs

A Rail Tech Hub could provide high-paying manufacturing jobs in the "green technology" sector, by attracting companies who manufacture zero-emissions electric locomotives, and intermodal railcars which reduce pollution by shifting more freight from truck to rail.

***8. Current barriers (including statutory, regulatory, technological, institutional, labor and workforce, management, existing business models/practices issues) that inhibit supply chain performance. For any barriers identified, please address the actors involved and potential outcomes should those barriers be removed.***

*Government subsidy is skewed towards trucking, against freight rail-*

The trucking industry, a direct competitor to rail transportation, is heavily subsidized. Trucks do the overwhelming amount of the damage to roads yet pay a minority of the cost of maintenance. In addition, highways are furnished with additional lanes, runaway ramps, and truck parking areas needed only for trucks. The amount of subsidy will attract increased public scrutiny in the years ahead, especially with societal demands to reduce the pollution from transport. Practical electric trucks for heavy long-haul service will not be available for many years.

With its heavy subsidies, over-the-road trucking is not on a level playing field with freight rail (which is privately owned and financed, with little or no subsidy). Federal and state highway budgets have historically been an order of magnitude greater than the amount allocated to rail. New truck fees and increased fuel taxes are needed to pay for both rail and road infrastructure.

*The business model of U.S. freight rail industry needs to change -*

Measured by weight, trains carry 9.3 percent of the freight in the US; trucks carry 71.5 percent.

Measured by value, trains carry 1.4 percent of the nation's shipments; trucks carry 73 percent.

About 90% of all dry van and reefer truckloads moving in the U.S. never use rail on any part of their journey. The freight mode share of rail has huge potential to increase in the U.S., especially if railroads offered faster, more reliable and cheaper short- and medium-haul freight rail service.

Class I Wall Street priorities of maximum short-term profit, at great societal impact and harm to their own customers. Lack of reliable freight rail service adds to the problem of more freight being shifted to trucks on the highway. Railroad customers are fed up with late shipments, poor service, and even being denied service, etc. Many customers face hefty and unfair penalties for failure to meet railroad carrier 'schedules', even though the railroads regularly deliver shipments days late to the same customers.

US freight rail service is largely improvised, not operated according to a schedule. Trains are run when it is convenient for management, a result of deregulation. The management culture of the deregulated US freight rail industry over the past four decades (formulated during times of economic distress in the rail industry during the 1970s and 80s) resulting in cutting jobs, cutting corners on safety, price gouging of shippers, abandonment of lines and customers, closing facilities, idling equipment, etc. Continued slowing down of freight, ever-worse customer service, abandoning infrastructure will lead to a vicious cycle of destroying the long-term viability of freight railroads. These trends have gotten demonstrably worse in the past several years with the advent of Wall Street-driven "Precision Scheduled Railroading". It is thus not surprising that the percentage of freight mode share of railroads in the U.S. has steadily been declining.

According to the Federal Register: “The ‘common carrier’ obligation refers to the statutory duty of railroads to provide “transportation or service on reasonable request.” 49 U.S.C. 11101(a). A railroad may not refuse to provide service merely because to do so would be inconvenient or unprofitable.” The common-carrier obligations of freight railroads, to provide freight service to all customers in all markets, needs to be strictly enforced. Some rail freight shipments need to be classified as ‘public service obligations’ That must include a different Surface Transportation Board (STB) interpretation of refusing to provide service. Railroads get around the obligation not by refusing to provide service, but structuring the service for undesired shipments in a way that makes truck the only reasonable choice. STB must not interpret common carrier obligations in a way that allows the use of this loophole.

Class I cost-cutting has compromised railroad safety- Federal Railroad Administration (FRA) statistics show derailments, collisions and fatalities have all increased in the last several years. The FRA must aggressively enforce safety rules, and investigate railroad practices which put rail workers and the public at real and unacceptable risk.

Rail transportation is underutilized in the US because of over a century of misguided transportation policy that causes service to be provided on the basis of maximum profit rather than transportation need. Rail freight transportation is generally limited to shipments that are not speed or time sensitive and not easily shipped by truck. Rail freight market share and relevance is falling due to the short-sightedness of both public transportation policy and railroad company profit motives/cost cutting. Rail infrastructure needs investment, not downsizing or abandonment (which the Class I railroads have been doing for four decades now).

Martin Oberman, chair of the Surface Transportation Board, spoke of these Class I railroad problems in his recent address to the North American Rail Shippers Association convention at Chicago, as reported by the American Journal of Transportation on September 9, 2021:

<https://ajot.com/insights/full/ai-stbs-oberman-says-u.s-railroads-reduced-service-raised-rates-and-derived-191-billion-in-dividends-and-buybacks-since-2010>

The article is worth quoting at length:

Martin Oberman, chair of the Surface Transportation Board (STB), charged U.S. railroads with reducing service, raising freight rates, shifting more truckloads onto highways, contributing to global warming while deriving \$191 billion in dividends and stock buybacks since 2010.

“The strategies pursued by the railroad industries as a whole, and it is not the same among all the Class 1s, have serious implications as to whether the ‘common carrier mandate’ is being carried out as intended and as required by statute. This is a subject that may warrant further exploration by the STB.”

According to the Federal Register: “The ‘common carrier’ obligation refers to the statutory duty of railroads to provide “transportation or service on reasonable request.” 49 U.S.C. 11101(a). A railroad may not refuse to provide service merely because to do so would be inconvenient or unprofitable.”

Historically, Oberman said, “Congress recognized ... that the railroads ... can restrict supply and raise prices. To avoid this outcome, the United States decided long ago the public interest requires some balance between the railroads operating as private profit-making companies ... and the public’s interest. This is true because many railroads in various parts of the country have a natural concentration of market power.”

The trends of the past six years, which have coincided with accelerated cost cutting applied to rail operations through Precision Scheduled Railroading (PSR) practices, have raised concerns among shippers and railroad workers about whether railroads had cutback operations so drastically that rail operations have suffered.

...

To underscore the point: Since 2006, our economy has grown by 50%, nearly \$8 trillion dollars of enhanced economic activity... and yet railroads are carrying less freight today than they were carrying in 2006 while rates have gone up. There just might be a connection."

Not counting coal, the railroads' market share "compared to trucks peaked in 2002 and total volumes peaked in 2006. Think about that? For the past fifteen years ... railroads have lost market share both in absolute and relative terms."

#### More Freight By Truck

Oberman said the railroads actions have resulted in more freight going by truck which increases traffic, congestion and has also increased the generation of carbon emissions when freight is moved from more fuel-efficient trains pulled by a few locomotives to trucks which are less fuel efficient and more polluting:

"We know that for every one percent of freight lost by the railroads to trucks it amounts to an extra 5 million tons of CO2 dumped into the atmosphere. Yet since 2002, railroads have lost nearly 2% of freight market share to trucks. Again, this is not counting coal ... If railroads had just kept the same share of market, they had in 2002 there would be one million fewer trucks on the highways each year..."

The result: "That means an extra 8.2 million tons of CO2 pumped into the atmosphere annually from this lost growth... Since 2002, over 123 million tons of global warming CO2 has been pumped into our atmosphere just because the railroads chose not to maintain their market share as compared to trucks.

Imagine how much better we would be as a country and as a planet if railroads had not only not lost ground to trucks, but had outgrown trucks in picking up more of the growth in our economy and there would have been a greater cut in CO2 emissions. This pattern simply cannot be allowed to continue."

**10. Technological practices, including data sharing, that are being implemented at various levels across the supply chain sector. What are the upsides, challenges, and drawbacks of further adoption?**

*Rail Electrification-*

Rail transportation is an essential part of the carbon emissions solution, and can reduce emissions by two-thirds using current diesel locomotive technology. Emissions would be reduced to zero after electrifying railroads. The lack of willingness of U.S. freight railroads to invest in electrification has resulted in much avoidable environmental damage and public health impacts.

The U.S. should invest in conventional railroad electrification, which would replace dirty diesel locomotives with clean electric locomotives. The movement of trains is limited to narrowly defined paths, making them ideal for electric power supply from overhead contact wire instead of batteries. Electric power transmission and distribution systems can be included in railroad electrification projects. The USDOT needs to encourage and implement policy that will electrify the nation's rail network.

Conventional rail electrification, with overhead catenary wire, should be implemented for both passenger and freight trains across the U.S. Electrification with overhead catenary wire has been used for over a century for freight rail, and is used today on about one quarter of all railroad tracks in the world. Outside of North America, electric freight trains are very common. Nations from India to South Africa, China to those of Western Europe, are expanding electrification of heavy freight and passenger lines. A large pool of manufacturers and engineering expertise exists around the world for this technology. Most urban rail systems in the U.S. run on electricity, but electrification is sparse in the nation's intercity rail network. Amtrak runs electrified passenger service along the 457-mile Northeast corridor from Boston to Washington, and the Keystone Corridor from Philadelphia to Harrisburg, Pennsylvania. While electricity is now a major source of motive power for freight railroads in most advanced economies, the percentage of U.S. rail freight hauled using electricity is close to zero.

Electric locomotives improve the speed of travel with better acceleration, quieter operation, and twice as energy efficient as diesel locomotives. Used successfully all over the world for over a century, electric freight locomotives have many advantages:

- Zero emissions
- Quieter than diesel locomotives
- More energy-efficient and lower energy cost, can be powered by renewable energy via the power grid
- Simpler locomotives, lower O&M costs
- Established, proven technology

Electric trains are the most energy efficient way to move freight on land, moving a ton with as little as one-tenth the energy used by diesel truck. Electric locomotives are twice as energy efficient as diesel locomotives. The electrification of freight rail is the best way to reduce the public health impacts to local communities affected by diesel-powered freight transportation and reduce greenhouse gas emissions of freight movement.

*Why not just convert to electric road vehicles?*

Merely converting all road vehicles to electric is a popular concept for addressing the climate emergency. State and federal legislation and policy, both existing and in development, put tremendous emphasis on public funding for infrastructure and incentives for electric road vehicles. Electric rail is seldom mentioned.

The coming of EVs will significantly improve the environmental problem of fossil fuel-burning highway vehicles, but will not eliminate all of the environmental problems associated with highway transportation. Electric highway vehicles require batteries. The number of electric highway vehicles is currently small, so EV battery disposal is not yet a large problem. However, with current recycling methods less than half of a disposed electric vehicle battery can be recycled or reused. Most of it is junk, some of it hazardous, and some of it is even burned! There is no environmentally friendly means of disposal for the hazardous materials found within EV batteries. The battery recycling process itself is usually polluting, and requires hazardous chemicals. There is an expectation among battery experts that with improved recycling methods, the amount of reusable material in batteries will increase. It is also expected that the cost of reclaiming the greater amount of materials will increase. There will be a constant need for raw materials required for the manufacture of new batteries. The environmental problem associated with highway vehicle batteries is substantial given the existing number of highway vehicles. The problem will be substantially greater given the historic and present rate of increase of highway vehicles and their use.

It is relatively easy to make a policy of providing charging stations for electric vehicles. But if they are to make any difference to the climate emergency, that electric power they use must come from zero-emissions sources. We already need much more renewable-source electric power than we have. Highway vehicles in the US use 143 billion gallons of gasoline and 36 billion gallons of diesel fuel annually. The equivalent electric power is 5.3 trillion kilowatt hours (kWh). Merely replacing the highway gasoline and diesel fuel requires the equivalent of 83 Grand Coulee dams, 292,000 wind turbines or 7,700 square miles of solar panels. However, highway fuel is not the only fossil fuel that must be substituted with renewable electricity.

Road vehicles that are electrically powered also do nothing to solve road congestion and traffic accidents. The introduction of electric cars thus needs to be accompanied by a significant reduction in overall vehicle miles traveled (VMT) by car. Vastly improved rail transportation is needed for this to happen, given its far greater energy efficiency compared to rubber tires on pavement. Rubber tires on pavement also wear, leaving toxic particulate that is washed off into ground water, affecting wildlife.

*Electric railyard switcher locomotives-*

Applications such as railyard 'switcher' locomotives are an ideal opportunity for deployment of the first generation of zero-emissions battery-electric locomotives. Zero-emissions switcher locomotives would also directly replace existing diesel switchers, which are typically the oldest and dirtiest locomotives in a railroad fleet. These legacy locomotives in urban railyard service have a disproportionate impact on neighboring communities. They should be taken out of service as soon as they can be replaced with electric switchers with significant public health benefits. BNSF and Wabtec have tested a battery-electric locomotive in California. To be most useful, electric freight locomotives outside of the railyard would require electrification infrastructure across a region. Battery-electric locomotives may also play a significant role in the implementation of electric intermodal short-haul, freight shuttle trains.

*All-electric intermodal facilities-*

Electrification is possible for all land movements of a shipping container, from unloading off of a ship with an electric crane, drayed by an electric truck to a nearby transshipment facility or intermodal yard, moved around at that facility with an electric forklift, and carried away on an electric train. A new intermodal facility could be designed from the ground up as all-electric, utilizing both electric trucks and electric trains, along with electric freight movement equipment. It is technically feasible for such a facility to have cranes, forklifts, trucks, and locomotives that are 100% electric. For example, the local community and environmental opposition to new and existing intermodal railyards could be mitigated if the facility would be required to utilize a significant fraction, or even entirely, all-electric trucks and all-electric shuttle and long-haul freight trains.

- 11. Actions that DOT or other agencies in the U.S. Government (USG) could take under existing authorities or in partnership with States, local governments, the private sector, or labor to address current and evolving challenges within the freight and logistics sector.**
- 12. Other policy recommendations or suggested executive, legislative, or regulatory changes to ensure a resilient supply chain that DOT/USG should consider, including means to collaborate more effectively across government agencies and suggestions based on state and international models.**

In conjunction with Congress, DOT must allocate grants, in greater amounts than heretofore, to rail projects. Rail project grants must include those that increase the ability of a rail line to accommodate passenger and fast short haul freight without regard to the benefit to the property owner.

US DOT needs lead the expansion of both freight and passenger rail in all parts of the country. State or local governments and private railroad companies should also invest more in rail infrastructure and service, but only the Federal government can offer a transformational level of funding (on a state/federal match ratio similar to highways).

Specifically, the DOT/FRA needs to:

- Encourage mode shift of freight from trucks to rail.
- Launch an intensive study of the possibility of bringing European-style “open access” to the US railroad industry. This can be accomplished by requiring the current property owners to separate infrastructure from service, in separate subsidiaries. The subsidiaries of Deutsche Bahn, a government-owned corporation in the manner of Amtrak or Conrail.
- lead the electrification of rail (the Federal government should provide funding and financing for it.)
- Provide more grants and low-interest financing of freight rail capital projects.
- Allow more flexible service options such as reciprocal switching, which “allows sole-served shippers to seek access to another nearby railroad via interchange”.

Railway freight and passenger services compete favorably in function, power usage and land use with highway transportation. They can be implemented as incremental improvement of the existing rail network with minimal environmental impact and significant emissions reduction. To this end, the

USDOT must support solutions such as freight rail electrification, and mode shift of more freight movement from truck to rail.

In the US, rail infrastructure owners provide rail transportation service exclusively on their property. Rail service is limited to that which is most profitable to the corporations owning the infrastructure. However, US rail infrastructure is generally the least utilized in the industrialized world. Increased utilization of rail infrastructure and a wider variety of rail services that will reduce highway transportation and the associated emissions, power consumption, and congestion will require innovative transportation policy changes.

Transportation policy must change to allow innovation in rail services:

- Expanded and improved regional and commuter rail service,
- Expanded and improved long distance passenger trains carrying high value, time-sensitive freight, too, moving these shipments from truck to rail.
- Fast, frequent short-haul and intrastate freight rail services, including drive-on/drive-off truck shuttle trains through dense urban areas and along or near long distance highway routes (moving the shipments from road to rail with minimal effect on owner-operator drivers).

The Interstate and US highway network in the US closely duplicates the railroad network. Innovations pioneered by the European Union make all railroad infrastructure open to any qualified freight or passenger operator, with access fees similar to a toll road. North American railroads should look more like European railroads- electrified with more frequent passenger service and shorter, faster freights. Highway competitive, hybrid freight-passenger trains, carrying both drivers, and tractor trailers, or straight trucks, could substantially reduce highway truck travel. Truck origins and destinations may be distant from the rail route. Truck drivers may be legally off duty while moving toward destination, saving fuel, or replenishing batteries in electric trucks while moving.

Although US rail infrastructure is generally underutilized, more frequent and faster trains will require modifications or additions to the existing track infrastructure. These infrastructure improvements can generally be constructed within the existing right of way.

In addition to shifting more movement of people and goods from highway to rail, there also needs to be a shift from air to rail. Domestic air freight should shift to rail to the greatest extent possible. Seamless modal interconnection is essential to give people the greatest diversity of travel choices.

#### *Planning and Continuity-*

Railroad companies have a five year planning horizon. They usually look at every potential solution to a problem through the lens of payback in five years. If a project can't pay for itself in five years, it doesn't make it through the process. That is just the nature of Wall Street-driven planning.

State government planning changes as elections change the nature of government philosophy. There is no continuity. One administration can pursue a program that takes twenty years to implement, spend millions on plan development and early stages of construction, then have another administration or

another legislative session ignore, scrap it, or forget it. Ultimately, the institutional knowledge is gone and some future administration starts with a new plan from scratch.

The federal government establishes grant programs with funds for which states can apply. There is generally no cohesive planning involved. However, the federal government provides planning grants to the states.

We must have state or multi-state planning agencies that have continuity over decades, to establish effective planning and implementation of an effective rail transportation system. We must also have an effective federal agency dedicated to national planning and coordinating the state or multi-state programs. There must be a single multi-decade planning and implementation effort that does not blow about in the political wind.

The Federal government needs to show leadership and undertake comprehensive freight transportation planning on the national level. As concluded by a recent paper by the Virginia Rail Policy Institute:

“Although the private ownership model arbitrarily restricts the availability of capacity, neither the public nor disadvantaged shippers have leverage or recourse to fix the problem under the current system of regulation and public policy. It is clear the railroads themselves lack insight and incentive for change. Only the government can do the job, and USDOT needs to recognize this. A true [national freight] plan would tackle this dilemma, suggesting possible actions and evaluating their feasibility and effectiveness. The USDOT needs to take the lead.”

***13. Recommended actions by non-Federal entities, including State and local governments, private firms, labor, and other participants in the freight and logistics sector that could be encouraged by DOT/USG.***

*Less-Than-Carload Service-*

As reported in *Trains* magazine, October 2021, Norfolk Southern has launched the experimental Thoroughbred Freight Transfer service of expedited less-than-carload service in the Chicago-Atlanta-Miami corridor, designed to be more competitive with truck than typical U.S. freight rail. Small loads are loaded into boxcars at rail-served warehouses, and then the boxcars are hauled in local trains to an NS intermodal yard, where they are coupled to long-distance intermodal trains. Railroad companies should offer more less-than-carload service across the nation.

*“Rolling-Road” Short-Haul Freight Rail Service-*

A ‘rolling highway’, ‘rolling road’, or ‘land ferry’ train enables complete tractor-trailer trucks to drive on or off train cars quickly. This roll-on/roll-off intermodal transport practice is similar to how a truck would drive on and off a ferry boat as part of a longer journey. That concept has rapidly grown in Europe over the past two decades.

The business model of a ‘rolling-road’ train is to provide an alternative to road trucking within a dense and congested region with a high amount of traffic delay. However, this concept is both an alternative to trucking and an enabler of a more efficient truck haul. The beginning and ending of the journey of the shipping container or other load would still be on a truck. Therefore, trucking would only be for a short

parts of the overall journey, where it makes the most sense. This enables truck tractors to move more loads per day over shorter drayage trips, instead of wasting much of the day idling in traffic jams.

As an example of this concept, Austria and Switzerland have long had policies which encourage trucks ride through the Alps via electric 'rolling highway' train, to reduce pollution, congestion and accidents on mountain highways. Swiss company RAlpin (<http://www.ralpin.ch/>), operator of the all-electric rolling highway trans-mountain train shown below, is one of several freight rail operators which carry trucks travelling between France, Germany and Italy. These trains typically have a set schedule, similar to a ferry or passenger rail service. All of the Austrian and Swiss mainlines are electrified, and the 'rolling highway' truck trains share the tracks with fast passenger service. These trains typically operate at speeds similar to US passenger trains.



**RAlpin 'rolling road' electric train carrying trucks in Switzerland**  
(Photo: RAlpin AG, <http://www.ralpin.ch/media/> )

Rolling road trains can carry the tractor and trailers together, with the drivers riding in a passenger car, or as trailers alone like conventional 'piggyback' intermodal rail cars. Traditionally there have been two general applications of short-haul and medium-haul rolling highway intermodal trains in Europe:

- Transportation of trailers or containers, but not in double stack configuration.
- Transportation of semi truck-trailer combinations. In this configuration, over-the-road drivers ride on a passenger car on the train. While riding, drivers are off duty for the purpose of driving hours limitation.

Both types of rolling road service use some type of drive on/off system. Some use "circus loading" in which there is a ramp leading to the first car in a string. Trucks pull on to the train using the ramp and drive along the train until reaching the farthest empty rail car. Others use some configuration of a rotating rail car deck that allows trucks to drive on off and on of rail cars individually. This generally involves a specifically designed terminal that provides ramps for trucks to drive on and off each car.

With the latest technology, such a service can use existing tracks and intermodal facilities, or new ones with a relatively small land footprint, without the need for heavy machinery to load or unload the train.

A conventional U.S. intermodal terminal typically requires at least 300 acres of land alongside a rail line. It is therefore very difficult to find an available site in a metropolitan area, where the vast majority of land has already been developed. New types of rail freight service must be explored for the US, which do not depend on slow freight trains which take hours to load or unload at large, conventional intermodal facilities. Such trains use minimal intermodal terminals with short loading and unloading times, which do not require large amounts of land. Fast 'land ferry' freight trains, running on frequent, detailed schedules like passenger trains, designed to be competitive with highway trucking for distances less than 500 miles, are an essential part of rail system design.

A viable proposal for rolling-road short-haul rail for America will draw upon the European commercial service experience of intermodal drive-on/drive-off railcars. This requires a demonstration in the U.S. of this technology, in collaboration with freight railroad and trucking companies. Such a pilot project would be needed to develop strategies to optimize utilization of the existing Southern California regional freight rail system for short-haul service, and fully integrated with line-haul freight and passenger rail trains. To be competitive with trucking, the short-haul rail service needs to be fast, frequent and flexible. As described in the article "Railroad Vision 2020: Lessons from Europe" by Brian Solomon in the August 2020 issue of *Trains* magazine:

..European-style freights offer a model to attract customers to rail that doesn't fit the North American model. Short (12 to 36 cars long), tightly coupled, precision-scheduled, point-to-point freights could provide high-value shippers better service that would be more competitive with trucks while making better use of equipment and quicker turnaround times. Using better marketing, improved customer service, nimble dispatching combined with the ability to accelerate and decelerate quickly without suffering long delays at yards, short fast freights could reach markets that modern North American railroads have forsaken.

#### *The Flexiwaggon innovation-*

Flexiwaggon's main product is a rail freight car which trucks and other vehicles can be transported. The Flexiwaggon drive-on/drive-off intermodal cars need no lifting machinery, while enabling quick loading and unloading. Flexiwaggon is an intermodal breakthrough that can relieve truck congestion and pollution in North America.

The driving of the truck on and off the car takes place on a hardened surface, such as compacted gravel, asphalt or concrete. The driver boards or exits the Flexiwaggon as the railcar's central platform rotates to the left or right and expands a ramp. The Flexiwaggon's flexibility makes driving on and off possible in both directions of travel without disturbing traffic on adjacent tracks. This makes Flexiwaggon's solution easy to implement in existing infrastructure without the need for cost heavy terminals or crane dependence. Low terminal costs are crucial for competitiveness in intermodal traffic. The terminal cost of a Flexiwaggon 'rolling road' truck shipment by rail is much lower compared to the handling of double stack intermodal containers. A Flexiwaggon can also load and unload where there are overhead electric wires.

Flexiwaggon rail cars can form an entire special freight train or can mix smaller numbers of them with other freight cars or even passenger cars. Its smart design makes it possible to drive on and off without

the need of terminal handling. A Flexiwaggon train can also carry one or more passenger cars for transport of the truck the drivers.

Multiple trucks can drive on and off a group of Flexiwaggon cars simultaneously and take less than eight minutes. Since a Flexiwaggon's ramp lowers alongside the track for each truck loading or unloading on the rail car. The only infrastructural requirement is a hardened surface, such as gravel, asphalt or concrete. The minimal infrastructure required for innovative European-style roll-on/roll-off rail cars makes adding new short-haul intermodal rail service more feasible in North America. The capital cost/lack of available land is not as big an issue with new roll-on/roll-off intermodal with Flexiwaggon, which only requires a flat surface next to the tracks.





*Global Focus Markets of Flexiwaggon AB-*

The primary global target market is comprised of freight railroads, freight companies, trucking companies, and freight railcar providers. Flexiwaggon provides the opportunity for these potential partners to access an untapped market, utilizing the intermodal 'rolling highway' services. Flexiwaggon is well-suited to high-end, priority shipments with faster service than provided by conventional intermodal trains.

*Acceptance of Flexiwaggon by North American freight industry-*

Flexiwaggon America will thoroughly investigate all potential markets in North America, and select the most promising opportunities for a small-scale pilot project.

Unfortunately, the large Class 1 railroad companies of North America are risk adverse — and are very protective of their current long haul transportation business franchise. Flexiwaggon will have to guarantee future traffic volume and profit sources to the Class I railroads at minimum risks to themselves, unless open access policies are in place to allow other train operators to provide the service. Other alternatives include government agencies operating or contracting for Flexiwaggon truck shuttle trains in the same manner as they do for commuter or regional passenger services.

The conventional wisdom in North America is that intermodal rail is not profitable for distances of less than 750 miles. However, the Class I railroads CSX and Norfolk Southern have found a viable business (with state support) in hauling containers from East Coast ports to inland terminals for distances under 500 miles away. Successful U.S. inland ports are operating in Virginia and Georgia, so the concept of a dedicated short-haul rail service from the docks to a special inland intermodal freight yard is not unknown to North American railroads.

Flexiwaggon presents an opportunity for North American railroads to win back freight business that was once profitable to them, before it was lost to highway trucking. This lost freight traffic includes:

- Single-truckload and less-than-truckload shipments
- Time-sensitive, express freight
- Perishables (food), temperature-controlled shipments
- Short-haul and medium-haul intermodal freight
- Postal service

With Flexiwaggon service, the railroads can widen market opportunities, revitalize declining freight corridors and find new customers. The Class I railroads are now losing a large segment of their existing business with the decline of coal and oil shipments, so they need to find new business to replace lost business. Flexiwaggon cars should be handled on short, fast express freight trains operating on first class scheduled passenger train schedules. Congestion resulting from large container stacks in railyards and ports leads to excessive handling time during high demand periods. Time sensitive and temperature-controlled shipments risk getting stuck in the bottom of the stack for several weeks, with spoiled perishable shipments the end result. Reducing the amount of freight containers handled in conventional railyards and ports will result in fewer delays, less spoilage, and overall improved efficiencies in the freight transportation supply chain. Eliminating need for crane lifts also results in less freight damage claims.

### *Small-package service-*

Flexiwaggon offers a viable solution to the fast-growing market for small package express delivery services, for businesses such as Amazon, Wal-Mart, as well as UPS, FedEx and other similar freight logistical consortiums, who are integrated with on-line consumer purchases. The conventional over-the-road trucking companies and freight railroads must find new ways to retain their present business, as well as finding new business, or lose out to 'High Tech and AI' service-driven competitors who are finding better ways to meet consumer demand. The freight railroads could lose out in the exploding new market for small package express delivery services. The size of this market is hundreds of billions of dollars in the U.S. alone.

Flexiwaggon could be a valuable tool in attracting small package express delivery business and beating the competition. Some of these advantages include:

- Producing greater pick-up and delivery flexibility in serving secondary and tertiary markets, not presently served by double-stack intermodal trains and air freight services.
- Offering lower cost, faster point-to-point express train transit times, very competitive in overnight and second day delivery services now offered by more expensive over-the-road trucking and much higher cost air freight services.
- Handling capabilities better suited to handle higher surge, holiday and emergency shipments by simply adding more Flexiwaggon railcars as needed.
- Utilizing present local small trucking companies in providing last mile pick-up and delivery services, freight sorting and consolidation facilities.
- The scale of investments needed to start a Flexiwaggon service are minuscule compared to the huge investments Amazon, Wal-Mart and others are making now.

### *Seaport intermodal lanes-*

Most of the geographic examples of potential markets described below would represent what the North American railroad industry would consider short-haul and medium-haul (less than 750 miles), and largely focused on de-congestion of lanes to and from major seaports. A typical 40' international container which comes off ship would represent two Twenty-foot Equivalent Units (TEUs) on a trailer or Flexiwaggon. These port-oriented Flexiwaggon services would most likely be a team truck operation, with a driver at both ends of trip.

### *Long-haul 'mobile truckstop' rolling road service-*

Flexiwaggon America will also investigate markets for long-haul rolling-road 'accompanied' transport of tractors and trailers together, with the drivers riding in a passenger car. This could be considered a long-haul, North American version of the European trans-Alps rolling road or 'mobile truck stop', which would allow the drivers to rest while en-route (especially if a sleeper car is provided). The added weight and space of the truck tractor decreases the payload ratio to total weight on the train, which does hurt energy efficiency and cost effectiveness per trailer hauled. However, operational constraints such as dangerous driving conditions (especially during winter) and required driver rest periods can offer a competitive advantage to long-haul Flexiwaggon trains. The map below shows potential overnight 'rolling road' routes in the Western US, a small example of the possibilities:

### Potential overnight 'rolling road' trains with sleeper cars



Federal motor carrier regulations require truck drivers to be off-duty for periods of 8 to 10 hours. An overnight ride on a freight train of 8-10 hours could easily cover a distance of 400 to 500 miles, giving

drivers on a 'mobile truck stop' that much of a head start over drivers who must park and sleep for the night. Routes of this length include Portland/Seattle-Boise, Vancouver-Edmonton/Calgary, Denver-Salt Lake City, Oakland-Salt Lake City, Willamette Valley (Oregon)- Central Valley (California), California-Arizona, and Mexico City-Monterrey.

The North American trucking industry has many independent truck owners (owner-operators), independent drivers who lease a truck (lease operators) and very small companies, which together represent the majority of trucks in operation. Such small operators could be dispatched to Flexiwaggon trains using new cell-phone-based platforms such as Uber Freight or J.B. Hunt's Carrier 360, enhancing their ability to compete with large trucking companies.

*An example of a regional opportunity: short-haul freight rail in Southern California-*

The "starting point" of long-haul trains leaving California is very important for pollution and truck congestion in the state. Thus, the location of intermodal railyards ("ramps") has a huge impact on the overall amount of truck traffic, both local and regional. The fewer "ramps" in the state, the longer trucks must drive to intermodal railyards. Another freight issue is the closure of intermodal terminals to increase railroad profits. This has resulted in much longer drayage trips by truck, creating added pollution and road congestion. There used to be ramps at Fresno, Bakersfield, Oxnard, Sacramento. Now it's LA/Industry/San Bernardino, and Modesto/Stockton, plus the ports. International trade through the ports remains the biggest driver of intermodal rail traffic in California. Many of the "domestic" 53' containers which are loaded onto long-distance trains at California intermodal yards contain goods which originated via trucks from local transloading facilities, and 40' 'international' containers trucked to said facilities from the ports.

Emissions from goods movement (particularly from diesel trucks) is a significant part of Southern California's air pollution. Diesel exhaust is a major source of greenhouse gas, particulate matter and smog-forming NOx emissions. Although, rail facilities are the subject of substantial complaints, the larger problem is the truck traffic associated with the facilities. A short-haul intermodal freight rail service is needed for the region, which is competitive with truck between the Ports of LA/LB and the Inland Empire. Significant numbers of import/export containers that congest ports and highways need to be transported on short-haul, inland port trains to relieve that congestion.

As a regional planning consideration, short-haul freight rail within the Southern California region (particularly between San Pedro Bay and the Inland Empire), has long been discussed as a strategy to shift freight transport from truck to rail to reduce truck congestion and pollution in Southern California. The San Pedro Bay Ports' 2017 Clean Air Action Plan has a goal of increasing the amount of cargo leaving the port complex by rail to 50% by 2030, up from less than 30% today. To help achieve this goal, the plan stated that "the Ports will explore the potential of short-haul rail in inland sorting facilities about 60 to 80 miles away from the Port area".

For example, in Southern California short-haul freight rail would increase the economic value of publicly-owned rail infrastructure within Port property, the Alameda Corridor, International Container Transfer Facility and on county-owned railroad lines. These include ongoing and planned public investments in rail capacity expansions at the Ports of LA (Alameda Corridor southern terminus gap closure and Terminal Island railyard enhancement) and Long Beach (Pier B, Pier G/J, Terminal Island wye improvement), and rail-road grade separation projects going on throughout the region. In addition, Metrolink's Southern California Optimized Rail Expansion (SCORE) 10-year, \$10 billion capital program

will not only greatly increase the capacity, reliability and frequency of passenger service in the region, but will help do the same for freight movement by increasing the overall capacity of rail corridors. A component of the SCORE program which is directly relevant to the LA-Anaheim corridor is the Fullerton Junction project and related track capacity upgrades (3<sup>rd</sup> and 4<sup>th</sup> tracks) on the BNSF San Bernardino Subdivision between Fullerton, Riverside and San Bernardino.

Switching from a freight rail system that relies on diesel power to one that relies on electric power will have a substantial impact on emissions in California. According to a 2016 RailTEC report for the California Air Resources Board, if all line-haul freight rail locomotives in the South Coast Air Basin were all-electric (and all electricity used from zero-emissions sources), compared to using a fleet of 100% Tier 2 diesel locomotives, the annual emissions reductions possible would be as follows:

- 372,000 tons CO<sub>2</sub>
- 3,750 tons NO<sub>x</sub>
- 1,000 tons CO
- 200 tons hydrocarbons (HC)
- 140 tons particulate matter (PM)

The above figures do not include the region's freight yard/switcher or passenger locomotives. However, over 80% of locomotive emissions in the South Coast Air Basin are from line-haul freight trains. In addition to reducing emissions of pollution with local public health impacts, electrifying freight rail will also help meet the state's goals for reducing greenhouse gas (GHG) emissions. If more freight and passenger traffic is shifted from road to rail in the future, the emissions benefits of electric rail would be more significant.

For example, the 2018 California State Rail Plan (pg. 109) stated that the expectation that the majority of rail passenger miles in California would be on electric trains by the year 2040, and also states (pg. 168, 5.2.7 Advancement of Zero and Near-Zero Emissions Technologies):

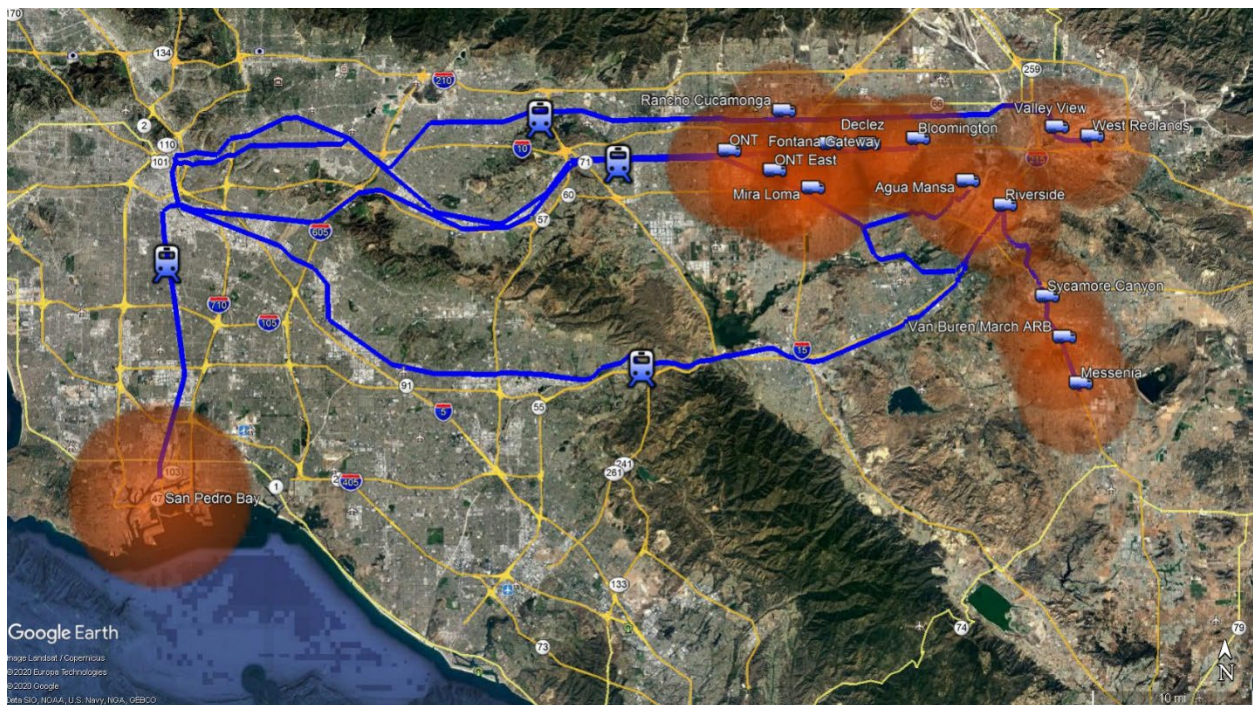
Priority should be given to rail projects that support the deployment of technologies that produce zero or near-zero air emissions. An element of the California Sustainable Freight Action Plan is that zero-emissions equipment should be deployed, where feasible, to reliably and efficiently transport freight; near-zero emission equipment powered by clean, low-carbon renewable fuels should be used everywhere else. The use of less polluting equipment reduces GHGs and other toxic emissions, and ultimately improves air quality. The freight railroads are private companies that operate in national and transcontinental markets, and therefore may be more reluctant to invest in zero and near-zero emissions technologies to meet California-specific standards. However, the State's role in advancing the adoption of this technology is central, from both a regulatory and financial perspective, because it can help advance development of the prerequisite technology; and by providing financial incentives, support its commercialization.

Available land in Southern California next to rail lines tends to be scarce and expensive. With the Flexiwaggon, a new intermodal facility could have a much smaller land footprint and minimal capital costs compared to a conventional intermodal facility. A track of sufficient length to accommodate the train would be required for loading/unloading operations. However, if there is a new or existing railroad

siding track of sufficient length, all that would be then required is a flat surface of gravel or asphalt/concrete road, a securing gate and office trailer built alongside it.

The minimal infrastructure required for innovative European-style roll-on/roll-off rail cars makes adding new short-haul intermodal rail service more feasible at existing freight facilities in California. The capital cost/lack of available land is not as big an issue with new roll-on/roll-off intermodal, which only requires a flat surface next to the tracks. Southern California has potential for European-style “rolling highway” or roll-on/roll-off intermodal sites at existing railyards and sidings, minimal new infrastructure required. Several possible inland terminal sites will be studied during this project. The first pilot project will have one inland destination. Once the concept is proven at one inland location, more inland terminals and routes could be developed throughout the region (as shown on the maps below). Full deployment would have many inland terminals, perhaps as many as twenty or more. Potential inland terminal sites are described in the appendices.

These facilities would not have to be full-fledged “inland ports”, but rather simple, inexpensive facilities along existing tracks, serving nearby existing warehouses, distribution centers and other industry. Several terminals along rail lines, would bring the majority of existing warehousing and manufacturing facilities through the Inland Empire within a relatively short distance of a Flexiwaggon site:



**Proposed network for San Pedro Bay-Inland Empire  
short-haul freight rail Flexiwaggon sites  
(5-mile radius shown around each proposed inland rail Flexiwaggon site)**

### About the Authors:

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Brian Yanity has experience with design, construction, maintenance and testing of industrial electrical and power generation systems, including programs with tight deadlines, challenging logistical scenarios and in mission-critical environments. With over a decade of experience working for an industrial electrical contractor, he has extensive hands-on field experience with utility- and industrial-scale electrical equipment and substations (up to 66 kV), including substation commissioning, maintenance and troubleshooting, as well as wind, hydroelectric, wave and solar power generation systems. Brian has also worked on several utility-scale energy storage projects. Brian has been working with Flexiwaggon since 2018, and is determined to bring this innovative concept to America. Brian has a BS degree in Electrical Engineering from Columbia University.

**Thomas White** , Executive Vice President of Flexiwaggon America, Inc.

Thomas White has over 50 years of experience in rail operations. He worked for railroad companies for 28 years in traffic and transportation management and planning service, capacity management, and infrastructure design for new or improved service. Since 1997, he has worked as a railroad operations consultant in the US, Canada, Mexico, and South Africa. He had a significant role in the Burlington Northern effort to structure freight operations in the early 1990s. He was substantially involved in the development of Sound Transit (Seattle area) Sounder commuter rail service, the Washington State passenger rail program (Amtrak Cascades), commuter services in Canada and Mexico, and restructuring of rail operations in South Africa. He was substantially involved in the introduction of tilting train technology and Talgo trainsets to the Amtrak Cascades service. Tom is the author of three railroad operation textbooks, and co-author of a rail transportation policy book, *Traffic*. His latest book *The Climate Emergency, Trains- An Effective Response* can be purchased at: <http://www.vtd.net/>  
See the descriptive video:  
<https://www.youtube.com/watch?v=hTzf2L2Pzo>