QuickLoadz Intermodal Robotics:
Automated ISO Container Handling Creates Faster, Safer, More Efficient Transport of Global Resources

Presented by Sean Jones, CEO of QuickLoadz. Battelle Conference on Innovations on Climate Resilience. March 30 2022, Columbus, Ohio.

MIT climate report:

Freight transportation plays an important role in our global economy. Billions of tons of cargo are transported around the world each year by trucks, planes, ships, and trains. This transportation makes up 8% of global greenhouse gas emissions, and as much as 11% if warehouses and ports are included. Growing economies in Asia, Africa and Latin America are expected to triple global demand for freight by 2050, which will double freight's greenhouse gas emissions. Even as other energy sectors reduce their fossil fuel use, nearly all freight transportation runs on oil and gas. If we continue with business as usual, freight will become the highest emitting sector by 2050.

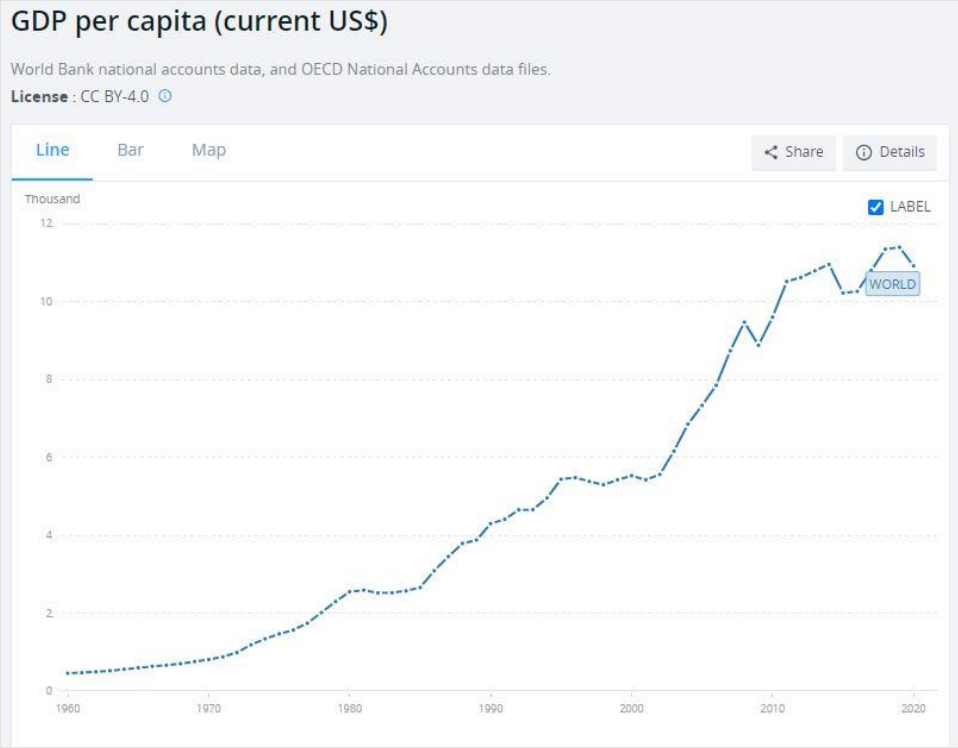
Focusing on changing the way some of the world's largest corporations distribute their merchandise can bring about rapid reductions in greenhouse gas emissions. Demonstrating that change makes financial sense and even gives a competitive advantage will encourage adoption. These companies will change the way the world of logistics works if they can save money and provide better service. It is our mission to explain how they can do this while reducing their carbon footprint.

The invention of intermodal freight led to world trade.

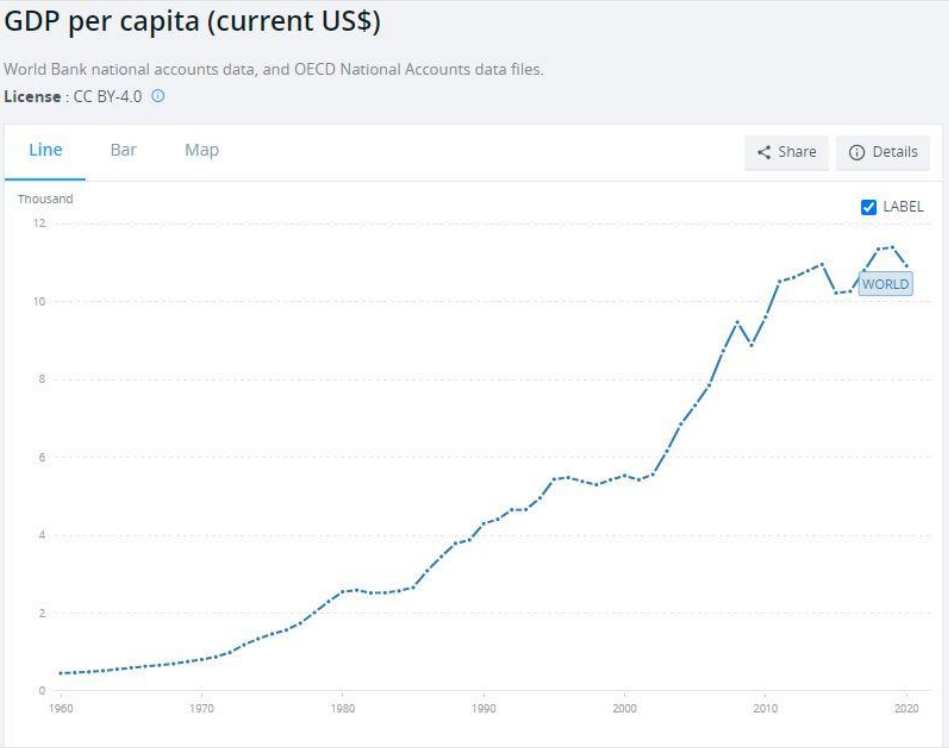
In 1956, Malcolm McLean created the standard cargo container, which is basically still the standard today. This system dramatically reduced the cost of loading and unloading a ship. In 1956, manually loading a ship cost $5.86 per ton; the standardized container cut that cost to just 16 cents a ton. This innovation made the modern globalized world possible. The quantity of goods carried by containers soared from 102 million metric tons in 1980 to about 1.83 billion metric tons as of 2017.

World trade is a great enabler.

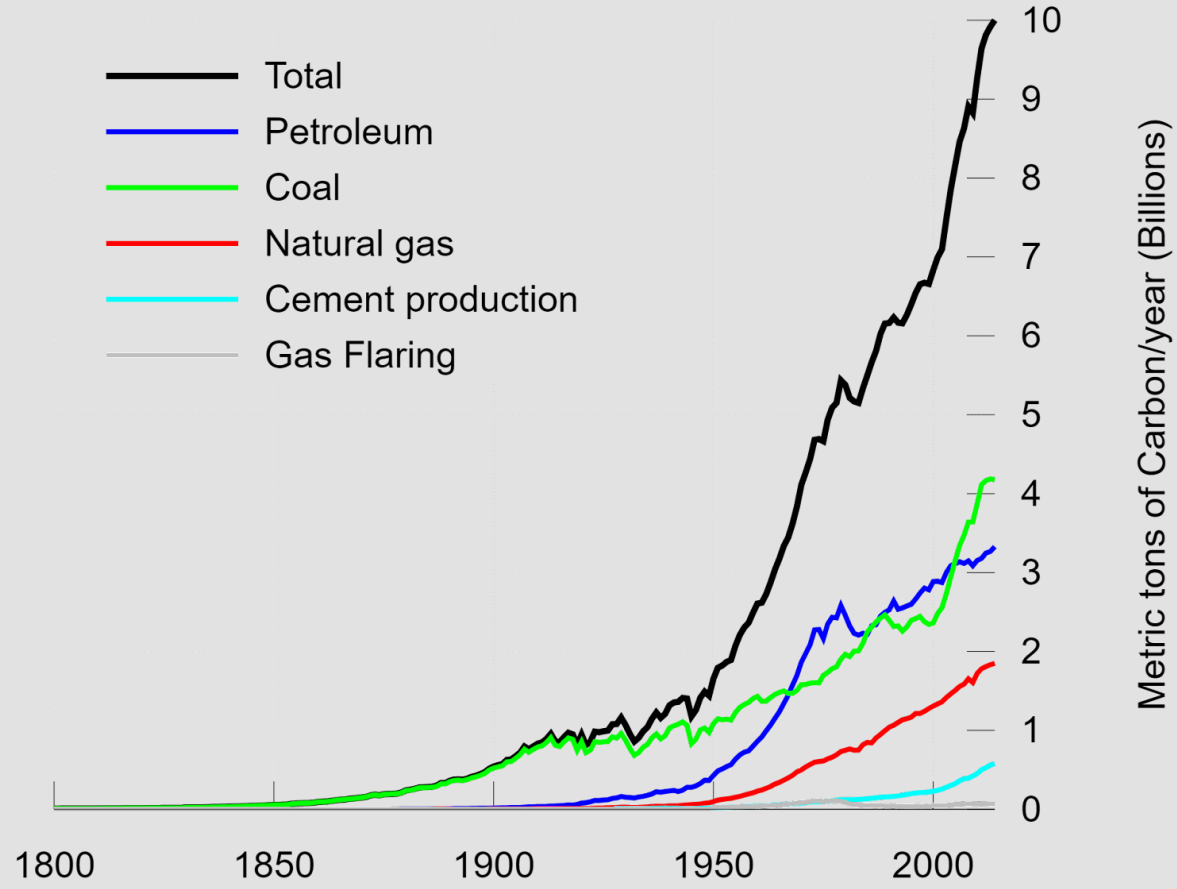
Billions of people have been raised out of abject poverty. When trade costs drop to 3% of what they were the world opens up. Suddenly hundreds of millions of people all over the world are able to participate in the world's economy. Industry isn't geographically limited the sources of materials they use. This allows ever more complicated machines and products that might use materials from all over the world to exist.



The rise of global trade goes hand-in-hand with global GDP per capita.



But, there is a cost.



Transportation modes have vastly different footprints.

	Amount of freight moved *(billions of tonne-kilometers)*	CO_2 emissions *(millions of tonnes)*
Air	228	174
Rail	10,127	79
Road *(mainly trucking)*	19,551	1,800
Sea, inland waterways	77,862	867

A simple shift of transportation modes makes a big difference.

1.3 billion tons of carbon dioxide can be kept from entering the atmosphere by shifting long distance freight movement to rail from truck.

At the port:

Procedure: A container arrives at a sea shipping port and is unloaded by a ship gantry crane onto a transport trailer. The transport trailer pulls the container to another part of the port and is stacked by a straddle carrier crane. A truck arrives at the port and connects to a special trailer called a container chassis. The container full of merchandise is found in the stacks, often times requiring other containers to be moved to gain access. Once out of the stacks a large carrier places the container on the truck pulled chassis. Current wait for a ship berth is 18 days. Emissions from containers ships doubled between July 2020 and 2021, time to unload a ship is 1 to 3 days. Truck wait time is currently 5 hours, this means 5 hours of trucks idling.

Bottleneck: U.S. ports are bottlenecks. Geography limits the available space and ability to rapidly move containers in and around the facilities. America's busiest port is less than 1/100 the size of China's busiest port. Under current conditions, slow equipment and staffing shortages lead to long lines of idle trucks waiting to load or unload.

Solution: A way to move sea shipping containers that is road worthy, flexible and not dependent on the current method of heavy straddle carriers and stack reach loaders.

At the destination:

Procedure: Once out of the port, the container on its chassis is taken to a distribution center or warehouse. The container and chassis wait for 3 to 5 days until a truck ferries the container and chassis to a loading dock where the contents are unloaded into the warehouse. The empty container is then ferried from the loading dock to a storage yard, where it sits for 3 days and is then trucked back to the port. Meanwhile the contents of the container are often completely transloaded into a dry freight van and trucked to the next stop, generally a regional Distribution Center.

Bottleneck: Once a container is placed on a chassis it becomes just like a dry freight van. The contents of a dry freight van or a container sitting on a chassis can only be unloaded at a loading dock. The loading dock bottleneck requires that the contents of the container wait at a warehouse and are then transloaded twice at 3 to 4 hours a time into the warehouse then into a dry freight van to be trucked long distance. The container and chassis are then returned to the port for another 5 hour wait. In addition, trucking and freight companies keep in stock at least 3 dry freight vans for each power unit (truck). Current conditions are requiring trucking companies to keep 4 dry freight vans for each truck at current prices of $42,000 each.

Solution: A container chassis that can move containers to and from ground level by itself. This eliminates the need to return the container chassis to the port. This eliminates the need to trans-handle the container contents into dry freight vans for long distance trucking. A container can be taken out of the port to a remote staging area as soon as it is unloaded from the ship. From there the container can be taken directly to a rail head for long distance transport, or directly to a distribution center. If trans-handling is required the container can be placed on the ground. Distribution Centers and warehouses can be greatly reduced in size because with all of the containers on the ground access to the contents is as easy as opening the doors.

Big Box Retail.

Increase efficiency for big-box stores.

4 out of 7 Walmart loading docks have idle trailers that cost the retailer for every hour they sit unloaded. If containers full of merchandise are dropped off at ground level access is as easy as opening the doors on the container. No loading dock nor dry freight van needed.

Smaller stores.

Container storage is $3/sq. ft., floor space is $100/sq. ft. With containers full of merchandise delivered at ground level, the parking lot becomes the storage, flexible, on demand storage.

Trade 3½ hours for 3 minutes.

Average wait time for a loading dock is 23 minutes, unloading time is 3 hours. By placing the container on the ground 3 ½ hours of loading dock time, unloading crew time, driver time, truck time can be traded for 3 minutes.

Use savings to encourage carbon emission reduction.

All big box use containers for storage; By using a different method that already fits into their system companies can save billions while reducing carbon emissions. Modal behavior change motivated by dollars saved.

Micro Distribution.

No loading dock bottleneck.

Ground-level containers are safe and accessible. No box trucks, no freight vans, no loading docks accidents, no delays.

Parking lot distribution center.

Any flat space becomes a distribution center. Scales big and small as needed. Neighborhood sized distribution centers can be dropped into a parking spot and completely changed out in 3 minutes.

By bringing micro-distribution to neighborhoods,

dozens of delivery vehicles no longer need to travel to distribution centers. Thousands of miles of driving are saved.

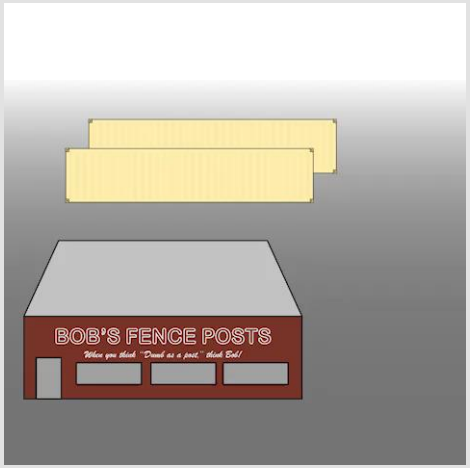
Dynamic capacity.

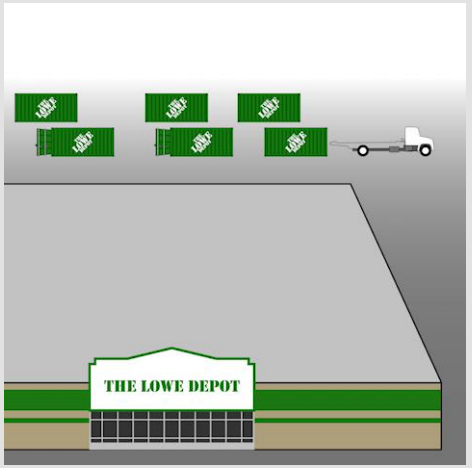
Capacity can be added to existing centers during shipping surge or add entirely new locations immediately.

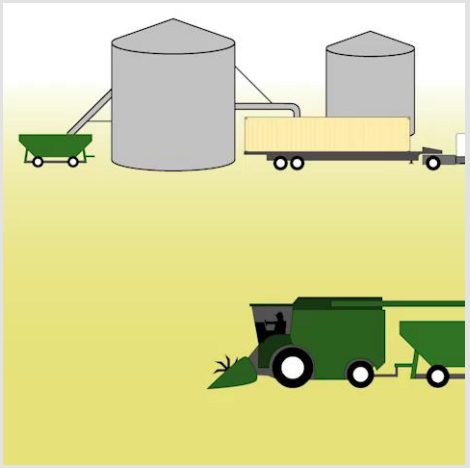
Emergency distribution.

Containers are the way supplies are shipped and stored worldwide. With ground level delivery those containers can be dropped where needed, when needed.

Eliminate trucks and trans-handling.







1/10 cost, portable, dynamic warehouse

Containers are cheap commodities. Businesses can ship part of their container warehouse directly to the customer; the container can be returned or sold into the market.

Improve agriculture distribution

Farmers can replace grain trailers, elevators with containers and eliminate trans handling. Containers become the cheap, insect- and rodent-proof way to store and ship food.

Eliminate half of Lowe's delivery trucks

Lowe's could eliminate half of their delivery fleet by making contractor deliveries in containers. The dollar savings of replacing a $120,000 box truck with a $3,500 sea shipping container make the carbon savings attractive.

Intermodal freight is by far the most efficient way to move freight around the world.

Containerized systems can be rapidly deployed to provide shelter, water, power, hospitals, vaccine manufacturing plants, communications, or, in the case of Ocean Plastic Technologies, a portable way to clean the worlds' oceans of plastic.

Ocean Plastic Technologies builds micro recycling plants that collect, sort, wash and process all categories of plastics for recycling back into the economy at cost levels comparable to new plastics — a truly circular plastic economy.

These containerized systems need deployed in locations which do not have cranes, straddle carriers or other heavy equipment. This same need extends to containerized water purification systems, containerized sewage systems, containerized power systems. Containerization is a incredibly efficient way to package and transport not only goods but other systems that are needed as well.

So far:

- 450 jobs created
- 1,553 tons recycled
- 3,640,350 products remanufactured
- Eliminate toxins, VOCs
- Reduce carbon footprint
- Create entrepreneurs and jobs in impoverished communities

Ocean Plastic Technologies

Summary

Modal change is needed, but it is possible with today's technology, and even economically attractive.

Intermodal freight has transformed the world by lowering costs of shipping to 3% of what it was previously. This has led to worldwide trade and lifted billions of people out of poverty. This same innovation has led to the catastrophe of global warming.

It is easier to change the behavior of hundreds of large corporations than billions of individual people. Change can be made attractive to the world's largest corporations by increasing their efficiency and thereby saving them money. Changes which show immediate monetary benefit are much more likely to occur than changes which don't.

The change of making the contents of the the cheap, durable "box" of the sea shipping container accessible anywhere without specialized equipment makes economic sense to the companies adopting it and environmental sense by eliminating waste in the logistics and freight systems.