## e-Street-Turns: The Easy Street to Green

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January 14, 2017

### Follow the Money

Recent data from CBInsight indicates we are in the midst of a surge in funding for technology startups in freight and trucking with over $620 million invested since 2009 and over $275 million in 2016 alone. Those investments, from recognized players, including SandHill Angels, Intel Capital, UPS Strategic Enterprise Fund, Pritzker Group Venture Capital, Kleiner Perkins Caufield & Byers, Google Ventures, Sequoia Capital, Draper Fisher Jurvetson, Andreessen Horowitz, BlackRock, etc., are funding ventures in a number of areas from the familiar autonomous vehicle and last mile delivery platforms,  such as Otto, Mobileye, Kanga, UberRUSH and RenRen Kuaidi,  to more esoteric fleet management, freight tracking and e-brokering services, like Fleetmatics, Macropoint and CoyoteGo. One service that belongs squarely on this list is what might be called "e-street-turns" or, more commonly, street-turns. Shipping containers used in the import and export process are the building blocks of global trade. But those containers have to be moved from importers who empty them to exporters who fill them and moving empty containers costs the industry billions of dollars annually. Optimizing the process could have a major impact. That's where street-turns come in.

### What is a Street-Turn?

Street-turns or matchbacks improve the utilization of empty shipping containers. To understand them, let's start with the typical cycle in the life of an international container. As Figure 1 illustrates, the container is poorly utilized -- it is empty for half the miles it travels. And the dray carriers make at least three trips between the port and the warehouse or factory for every loaded container they move.  Not every cycle is this bad, but this sort of behavior is common enough that Boston Consulting Group estimates container repositioning costs the shipping lines between $15 billion and $20 billion each year.[1]

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[1] Sanders, U. et al. "Bringing the Sharing Economy to Shipping", *BCG Perspectives*, Nov. 14, 2016

- *Pick up the loaded container and bring it to port. In the worst case, this can require bringing an empty chassis from the port.*
- *Sail the loaded container to the destination port*
- *Dray the loaded import container from the port to the consignee and bobtail or haul an empty chassis back to port.*

Exporter — Empty Pickup — Marine Terminal — *Reposition Empty Container* — Marine Terminal — Empty Return — Consignee DC

- *Dray the empty container to a shipper and bobtail or haul an empty chassis back to port.*
- *Reposition the empty container*
- *Retrieve the empty container and haul it back to port. In the worst case, this can require bringing an empty chassis from the port.*
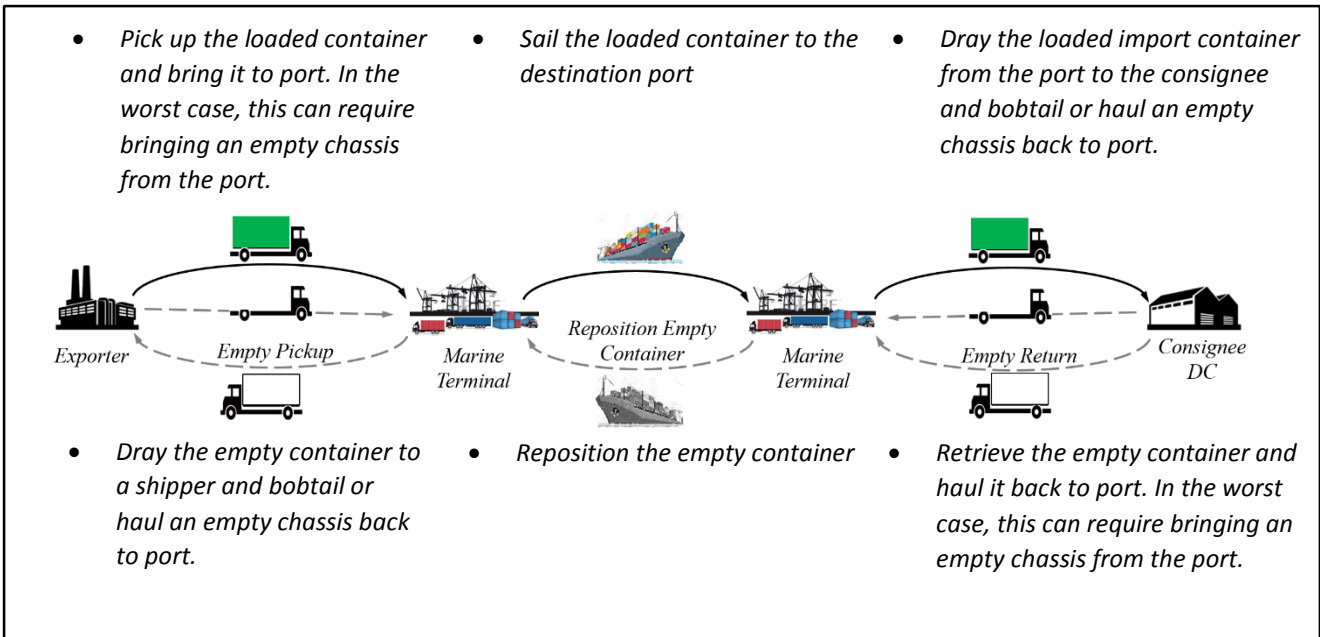
**Figure 1***: The typical cycle of a marine container.*

In its report on "Truck Drayage Practices", the National Cooperative Freight Research Program (NCFRP) estimated that the 13 million containers handled at U.S. ports in 2008 required 41.6 million drayage trip legs or an average of 3.2 per container. Those trips amounted to an estimated 326 million vehicle miles and over 750 thousand tons of $CO_2$ emissions.[2] Extrapolating those estimates to the approximately 527 million sea container trips made each year[3], yields over 1.6 billion dray trip legs covering over 13 billion miles and emitting over 9.5 million tons of greenhouse gases annually.

As Table 1 shows, street-turns can dramatically reduce container repositioning costs, improve container utilization, eliminate dray miles, reduce congestion and significantly reduce greenhouse gas emissions.

**Table 1**. *Annual impacts of matching just 5% of the US Export containers*

| If only 5% of the exports in the United States are matched with available containers inland | |
| --- | --- |
| **Matchbacks** | 398,650 |
| **Miles saved** | 32,000,000 |
| **Emissions saved** | 55,000 metric tons |
| **Equivalent passenger vehicles off the road** | 10,000 |

How? A street-turn matches an available import container with a nearby booking for an export container and, as illustrated in Figure 2, can essentially halve the number of miles the container is drayed.
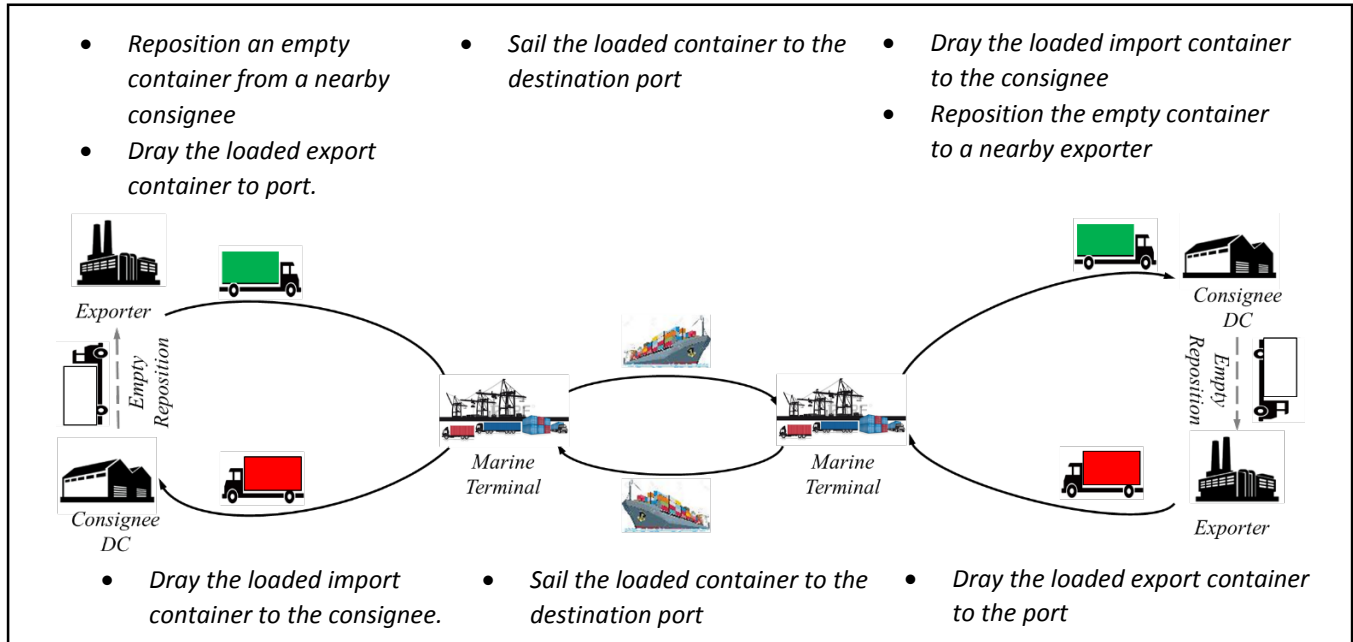


- Reposition an empty container from a nearby consignee
- Dray the loaded export container to port.

- Sail the loaded container to the destination port

- Dray the loaded import container to the consignee
- Reposition the empty container to a nearby exporter

*Exporter*

*Empty Reposition*

*Consignee DC*

*Marine Terminal*

*Marine Terminal*

*Consignee DC*

*Empty Reposition*

*Exporter*

- Dray the loaded import container to the consignee.

- Sail the loaded container to the destination port

- Dray the loaded export container to the port

**Figure 2**. The ideal cycle for a marine container with a street-turn at each end.

**The Challenge**

Despite the compelling benefits, street-turns remain surprisingly rare today. Why?

Today, street-turns are attempted on a small scale by some, and with limited degrees of success by others.  Some of the common challenges include the fact that no single party has all the pieces of the puzzle. Parties with an available import container do not know about export bookings and vice versa. Even the steamship lines and railroads do not have the full picture, because they lose visibility to containers in merchant haulage.  Today, planners already overwhelmed by their complex day-to-day activities, rely on dated and cumbersome tools like email, phone calls and spreadsheets to navigate this complex process. When they do find a container of the right size and type along with a matching chassis, negotiating a rate with a trucker, securing the container line's approval to reuse the box and negotiating the transfer of liability can require as many as 17 "touches" to execute a single street-turn.

**e-Street-turns**

Sound familiar? This is an industry that is clearly ripe for an e-marketplace to streamline commerce. And several ventures are developing platforms to bring the "e" to e-street-turns.

One strategy is to develop what is often called a Virtual Container Yard to share information and facilitate transactions among the various parties around a port complex. For example, IAS's [InterAsset](#) platform includes two systems to facilitate street-turn transactions:

- When a container line receives a work order for an export, [DispatchOptimizer](#) brings up the best matching import boxes considering appointment times, travel distance and cargo type. The carrier selects a match, agrees the drayage fee with the trucking company and generates a new work order, completing the street-turn in a few clicks.
- Similarly, an exporter looking for a box can use [DispatchTender](#) to find a trucker who has suitable empty equipment.

Motor carriers can find street-turns via Intermodal Association of North America's (IANA) web-based [Street Interchange Application](#) or, in the Ports of Charleston, Savannah, Virginia and Montreal, via [Quick180.com](#)'s mobile app. These systems streamline the process of finding and completing a street-turn.

[MatchBack Systems](#) has developed a more comprehensive approach open to shippers, ports, steamship lines, forwarders, truckers, and other third parties. Built on a neutral data platform and supported by cutting edge technology and big data analytics, the system includes a configurable matching engine that lets customers define selection criteria and customize street-turns around their business processes. In addition to the one-to-one matches supported by other systems, Matchback Systems' engine automates and optimizes street-turns across a company, an eco-systems or a market. For example, a freight forwarder or container line with many boxes entering and leaving through a given port can simultaneously match all those boxes to optimize specific business objectives and instantly communicate the results to the field using customized protocols. One such customer eliminated more than 120,000 miles per month, saving more than $3,000,000 annually.

Matchback Systems' platform also serves as a true e-marketplace to facilitate 2-party matches – exporters finding available boxes from importers, truckers or container lines. Matchback Systems' engine exploits cutting edge algorithms developed with researchers at Georgia Tech and grounded on

theories of recent Nobel laureates, Alvin Roth and Lloyd Shapley, to find matches that simultaneously address each party's specific objectives. The resulting matches have the remarkable property that if an exporter prefers a box from a different trucker, for example, that trucker prefers his recommended match.[4] Matchback Systems' engine recognizes each participant's individual preferences and ensures the smooth functioning of the market. This is no small feat. The process, which takes only a few seconds, requires interrogating and optimizing more than a million potential pairs every day.

Utilizing big data analytics, Matchback Systems also mines historical information to discover trends and identify patterns that allow the system to move beyond ad hoc matches and recognize systematic street-turn opportunities in advance.  The system uses predictive analytics to create "what-if" scenarios and provide companies with data to make informed decisions about their ecosystem, such as the most cost-effective lanes and transportation partners.

Over the past year, the system has evaluated over 194 million potential pairs to identify over 243,000 optimal matches saving a total of 13.2 million vehicle miles and 33 thousand tons of $CO_2$ emissions (removing the equivalent of 960 trucks from the road each day).  That's a good start. But there's more work to be done. The easy street to "green" will be paved by early adopters who embrace new technologies that increase visibility within the supply chain, inform strategic business decisions and significantly reduce emissions.

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[4] *Stable Allocations and the Practice of Market Design*, compiled by the Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences, October, 2012.