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# We Can't 'Take It Easy' – European Draft Beer in Arizona Has to Change

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Sustainability is becoming an increasingly hot-button topic in the beer industry. For export-oriented European brewers, one area to explore for reducing greenhouse gas emissions (GHG) may be in the shipment of kegs, especially as kegs are shipped to distant, inland places such as Winslow, AZ. One-way kegs and 'bag-in-tank container' transport are innovative solutions that can help make the value chain greener and should be considered by brewers. What is clear is that both consumers and investors are demanding more sustainable solutions and that brewers can no longer 'take it easy' with the status quo.

## Footprint of European Beer in Returnable Kegs Is High

Sustainability is becoming increasingly important for consumers. A 2017 study by Cone Communications shows that 87% of Americans would purchase products from businesses that advocate environmental responsibility, but 76% would boycott those that behave in ways contrary to this. For many places where foreign beer is consumed today, the existing solutions will continue to be optimal. We believe, however, that there are also situations in which the value chain needs to be re-examined. In this note, we analyze one of the more obvious ones – European draft beer in Arizona – as an example.

As previously described, American consumers insist that foreign beer is brewed in its country of origin, creating an authentic product. Most European draft beer is currently brewed in Belgium or the Netherlands and kegged at the brewery. The kegs are subsequently shipped in containers via Los Angeles to the warehouse of a local distributor. From there, the keg will travel to a bar where the beer is consumed. Once the keg has been emptied, it will make the reverse journey, all the way back to the brewery. From a cost and sustainability perspective, there are two very inefficient stages in this chain:

- On the outbound journey from Europe to the US, less than 50% of what is shipped is beer, with the remainder made up of metal, air, and protective materials.
- On the return journey to Europe, the container is full of empty kegs and cannot hold goods from other value chains (i.e. goods that need to make their way from the US to Europe, such as Californian wine).

## One-Way Kegs Are an Alternative but Have Drawbacks

In recent years, one-way kegs have become a popular alternative. Their main advantage versus traditional returnable kegs is the absence of a return journey. When offloaded, the container is no longer needed by the brewer and can be used for other goods, which means the return journey is not adding to the costs and CO<sub>2</sub> footprint of the brewer.

Additional advantages of one-way kegs are: reduced risk of theft and damage, lower weight, a small initial investment, and the absence of keg cleaning. Compared to returnable kegs, one-way kegs also have a low manufacturing cost and a small CO<sub>2</sub> footprint per unit. For each journey, however, these figures remain constant and do not decline, as happens for a returnable metal keg.

The optimal keg choice will depend upon the shipping distance and the number of journeys a returnable keg will make during its lifetime. For some faraway markets where kegs are frequently damaged or 'disappear,' the number of trips a returnable keg will make is small (resulting in a high CO<sub>2</sub> footprint per journey), and one-way kegs are attractive. For short and controlled distances between the brewery and a nearby pub, however, the number of journeys will be large, and returnable kegs will look better.

We are using the Kuehne + Nagel Global Seafreight Carbon Calculator to estimate CO<sub>2</sub> emissions for various alternatives (*see box below*). The total footprint of one-way kegs will depend on assumptions about the quantity of material, recycling, energy sources, and inbound journey, but for Winslow, AZ, it looks like one-way kegs will come out on top by 15% to 25%.

## A 'Bag-in-Tank Container' Solution Looks Promising

An interesting recent innovation that addresses the two aforementioned weaknesses in the current set-up is the 'bag-in-tank container' (BITC). By shipping beer in bulk from Europe to the US, container volume is optimally used and the number of westward journeys is minimized. A major problem has been that brewers don't like the tank to be used by other liquids on the return journey. By inserting a bag, which prevents the liquid and the inside of the tank from touching each other, contamination risk and 'prior cargo restrictions' can now be eliminated. An additional benefit is that tank cleaning, which was needed for traditional tank transport, is no longer required.

The BITC looks promising, but some issues must be addressed. Before bulk beer arrives at the American distributor, it will still need to be kegged. This will lead to either savings or additional costs, depending on the existing local network of the brewer. By moving kegging close to the point of consumption, returnable kegs are a more likely partner for BITC than one-way kegs.

When the tank has been emptied, an alternative use for the eastward journey needs to be found. This is still more restricted than for a box container, although the use of the bag greatly increases the options available, making it suitable for almost all non-hazardous liquids.

Finally, the one-way recyclable bag is made of plastic which, in combination with returnable kegs, will create additional waste versus today's solution. However, the CO<sub>2</sub> savings, which could amount to 25% to 50%, will more than offset this.

## Conclusion

Traditionally, shipping draft beer across the world in returnable kegs has been the tried-and-trusted solution. As destinations change and innovations emerge, brewers should consider alternatives for certain markets. Both one-way kegs and BITC eliminate the necessity of a long return journey for empty kegs, and the latter solution also maximizes beer volumes on the outward journey. Although use of recycled plastic will be frowned upon, the massive reduction in shipping miles can make these innovations a more sustainable solution for certain markets, such as the western United States.

## Calculations and underlying assumptions

The CO<sub>2</sub> footprint of returnable kegs, one-way kegs, and BITC depends on the model selected (by weight or volume) and the assumptions made.

<i>Option</i>	<i>Description</i>	<i>CO<sub>2</sub>/250hl beer (metric tons model)</i>	<i>CO<sub>2</sub>/250hl beer (TEU model)</i>
Returnable kegs	2 full-keg box containers RTM–LA	4,600kg	2,600kg
	2 full-keg box containers LA–AZ	2,000kg	1,100kg
	2 empty-keg box containers AZ–LA	800kg	1,100kg
	2 empty-keg box containers LA–RTM	1,300kg	2,600kg
	Depreciation/cleaning	900kg	900kg
	<b>Total</b>	<b>9,600kg</b>	<b>8,400kg</b>
One-way kegs	2.08 full-keg box containers RTM–LA	3,900kg	2,700kg
	2.08 full-keg box containers LA–AZ	1,900kg	1,200kg
	Manufacturing keg	2,500kg	2,500kg
	<b>Total</b>	<b>8,300kg</b>	<b>6,400kg</b>
BITC	1 tank container RTM–LA	3,800kg	1,300kg
	2 full-keg box containers LA–AZ	2,000kg	1,100kg
	2 empty-keg box containers AZ–LA	800kg	1,100kg
	1 BITC and depreciation/cleaning kegs	500kg	500kg
	<b>Total</b>	<b>7,100kg</b>	<b>4,000kg</b>

### Underlying assumptions:

<i>Volume of a returnable keg</i>	<i>50 liters</i>	<i>Volume of a one-way keg</i>	<i>20 liters</i>
Weight of a returnable keg	12.25kg	Weight of a one-way keg	0.25kg
Returnable kegs/box container	250	One-way kegs/box container	600
Life of a returnable keg (RTM–AZ)	20 journeys	Weight of a box container	2 metric tons
Life of a returnable keg (LA–AZ)	60 journeys	Weight of a tank container	4 metric tons
US transport	Road	US kegging location	Los Angeles*

Sources: [Kuehne + Nagel](#), [Thielmann](#), discussions with one-way keg manufacturers, Rabobank 2020

Note: TEU=twenty-foot equivalent unit. Route=Rotterdam (RTM) to Los Angeles (LA) to Arizona (AZ).

\*If optimal US kegging location is closer to Arizona, BITC footprint will decrease.

# Imprint

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