

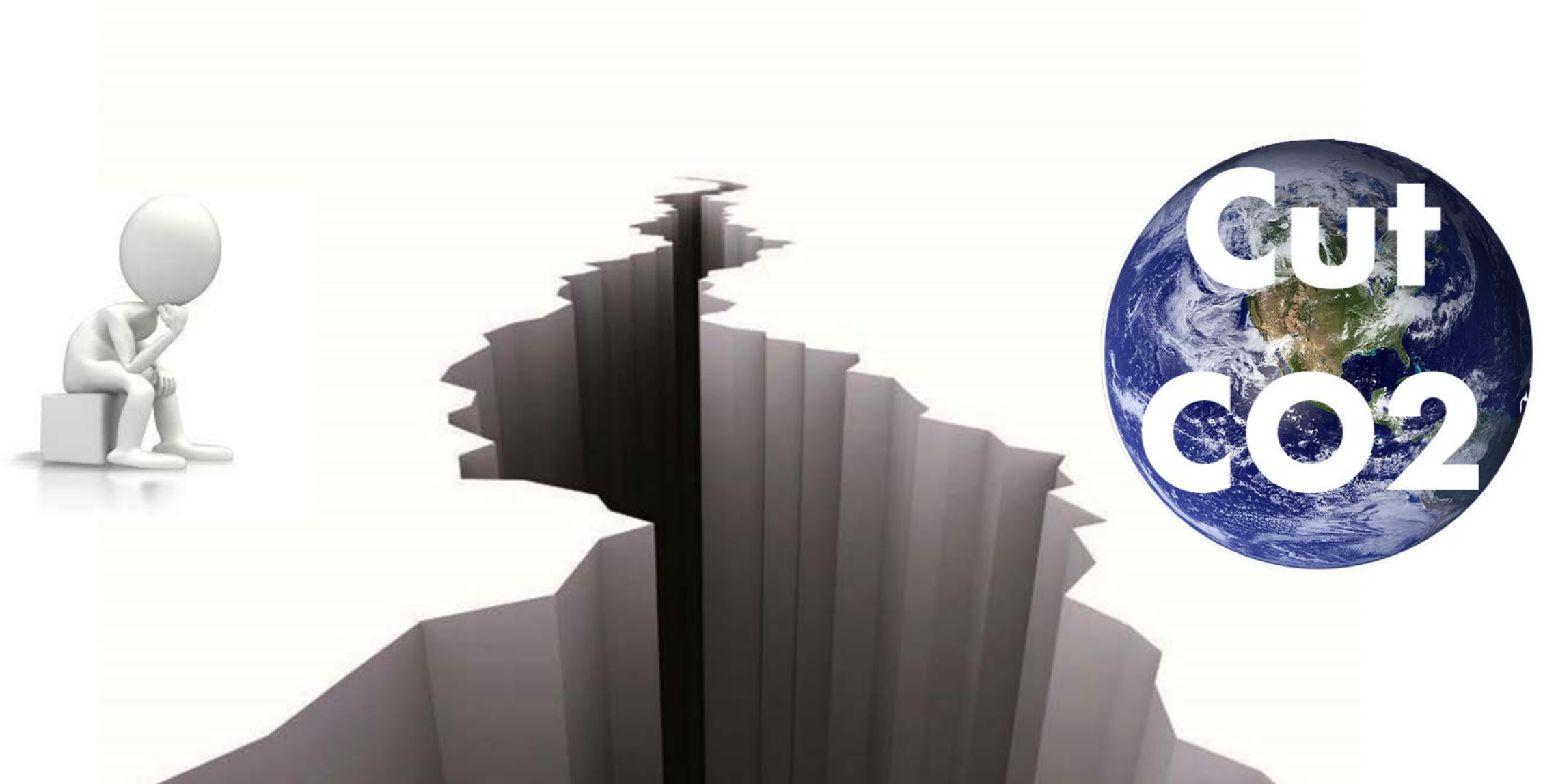
# Logistics Sustainability & Profitability 101

A Simple Overview to Help Shippers Save  ,  , & 

---

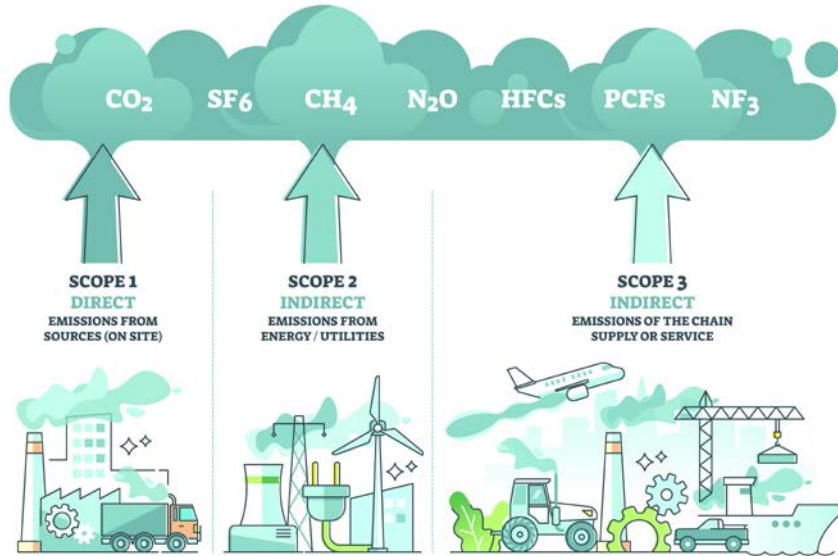
Kevin J Mireles

Who wants to be a supply chain sustainability hero but is wondering how?



When you hear the term, “Sustainability” what comes to mind?

## SCOPES OF EMISSIONS



Complicated!

# WHOLE PAYCHECK

M A R K E T

Costly!

How many of you think being sustainable will be more expensive?



# Good news!

## Decarbonizing can cut costs!

12 watt LED



**\$200 Lifetime Savings**  
over an incandescent with the same brightness

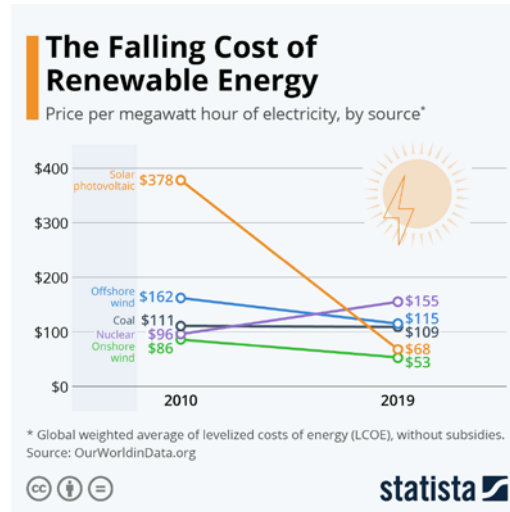
Yearly Operating Cost - **\$2.58**

Energy Usage - **12w**

Brightness(Lumens) - **800**

Bulb Lifetime- **50,000 Hours+**

+



+

=



### Energy Efficiency

### Plunging Solar Costs

### Tax Incentives

### Cost Savings

# Sustainability can cut your logistics costs and emissions!

|   | Cost savings        | Pollution Reduction |
|---|---------------------|---------------------|
| <b>Rightsize Packaging</b>                            | 10-30% <sup>1</sup> | 10-50% <sup>1</sup> |
| <b>Distribute from Center of US Instead of Coasts</b> | 5-20% <sup>2</sup>  | 30-40%              |
| <b>Fulfill from Two or More Locations</b>             | 10-65%              | 40%-70%             |
| <b>Use trucks instead of planes</b>                   | 20-50%              | 90%+                |
| <b>Use intermodal instead of Truckload</b>            | 0-20%               | 60-70%              |
| <b>Improve Warehouse Energy Efficiency</b>            | 20-50%              | 20-50%              |
| <b>Turn Your Roof into a Solar Powerplant</b>         | Up to 75%           | 100%                |

# Good news!

## Sustainability sells!

Amazon to Require Suppliers to Report Emissions, Set Climate Goals

Mark Segal | July 19, 2023



**Global Behemoths**

+

**US government requires suppliers to report supply chain emissions**

posted by *Juliette Rowsell* in *Sustainability* 16 November 2022

**Governments**

+

**CORPORATE SUSTAINABILITY IN HIGH DEMAND ACROSS GENDER AND GENERATIONS**

PERCENTAGE OF RESPONDENTS WHO SAID THAT IT IS "EXTREMELY" OR "VERY" IMPORTANT THAT COMPANIES IMPLEMENT PROGRAMS TO IMPROVE THE ENVIRONMENT



=



**Consumers**

**Sales**

So, what's the biggest driver of emissions, warehousing, packaging or transportation?



**Warehousing**



**Packaging**



**Transportation**



# How much do freight emissions contribute to the Climate Crisis?

5%

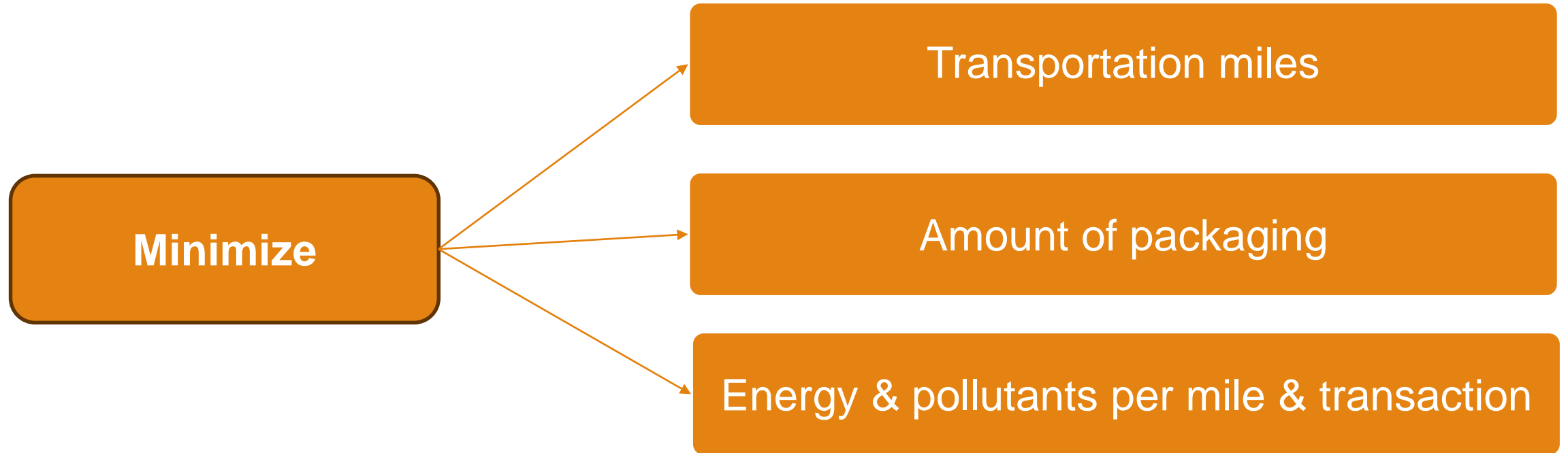
10%

20%

By 2050 they are on track to double unless we do something!

**20%**

## What are the keys to sustainability in logistics?



**Now let's get serious!**

**Who likes beer?**



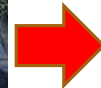
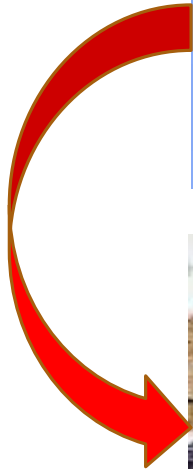
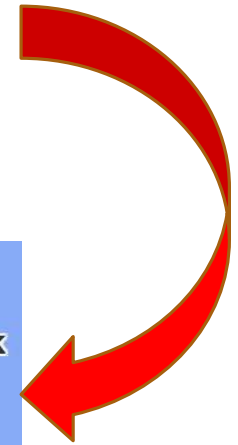
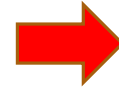
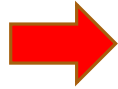
# Do you care about the bottle, the distance traveled, or the beer?



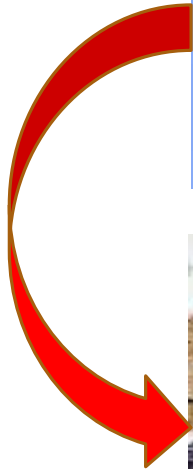
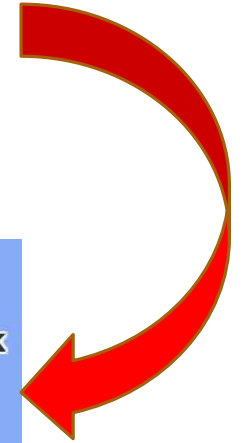
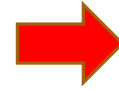
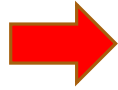
## The beer!



# Which of these steps adds value, and which are waste?

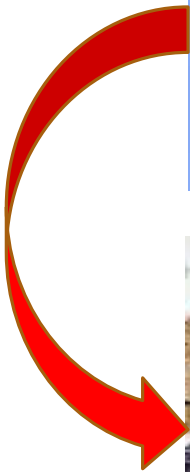
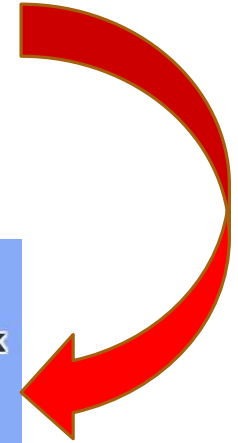
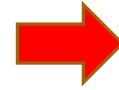
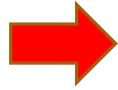


# Which of these steps adds value, and which are waste?





# Almost all movement and packaging is waste



# Save money and improve experience by reducing movement and packaging



# How do you price freight transportation?

$$\text{Weight/} \times \text{Distance} \times \text{Mode} = \text{Shipping Costs}$$

Cube/

|       |
|-------|
| Air   |
| Truck |
| Ship  |
| Train |

# How do you calculate freight transportation pollution?

$$\text{Weight/ Cube/} \times \text{Distance} \times \text{Mode} = \text{Shipping Emissions}$$

|       |
|-------|
| Air   |
| Truck |
| Ship  |
| Train |

## Use the formula to reduce costs and emissions in tandem

$$\begin{array}{ccccccc} \text{Cut} & & & & & & \\ \text{Weight/} & \times & \text{Cut} & \times & \text{Adopt Cheaper,} & = & \text{Cut Shipping} \\ \text{Cubic} & & \text{Distance} & & \text{More Efficient} & & \text{Costs \&} \\ \text{Dimensions} & & & & \text{Mode} & & \text{Emissions*} \end{array}$$

In logistics, sustainability drives a green profit premium!

# What's more important, reducing weight or cube?

Planes & trucks  
almost always  
cube out before  
weighing out

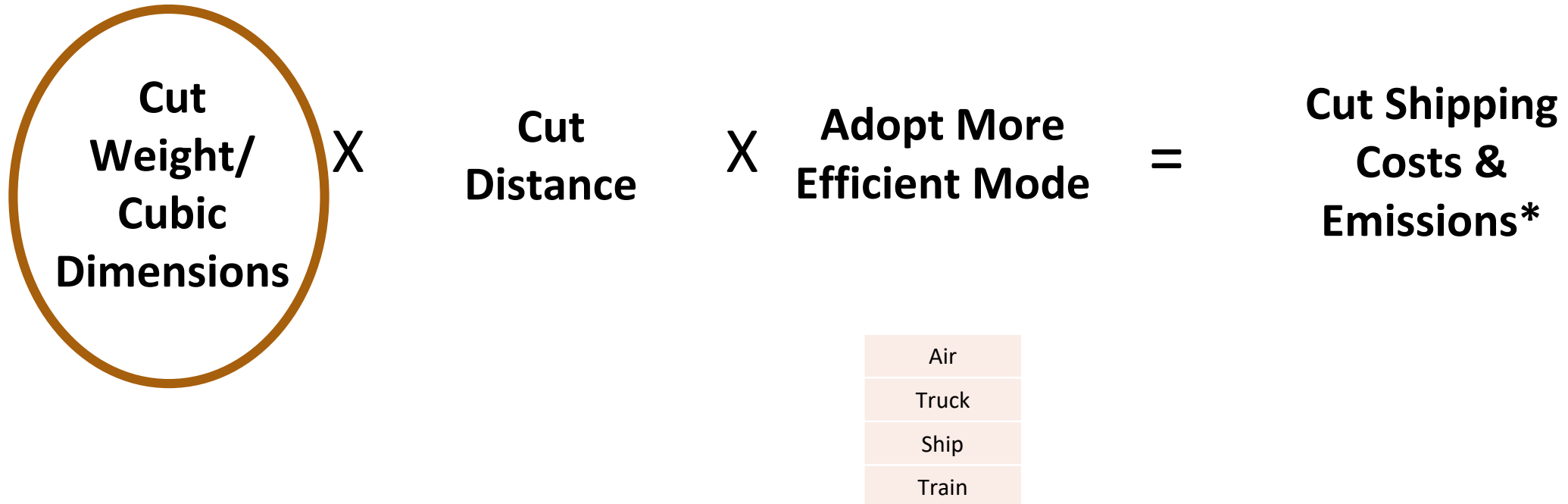
Cargo weight  
has zero impact  
on ocean  
shipping  
emissions

Only a 15% to  
30% change in  
emissions  
between fully  
loaded and  
empty truck

Cargo load is  
small % of plane  
weight &  
emissions

**Reduce cube to reduce cost and emissions!**

# Start with cutting dimensions to fit more items into the same space



\*CO2 equivalents, usually in metric tons

**What's the technical term for this strategy?**

**Rightsizing!**



This is why I am here!

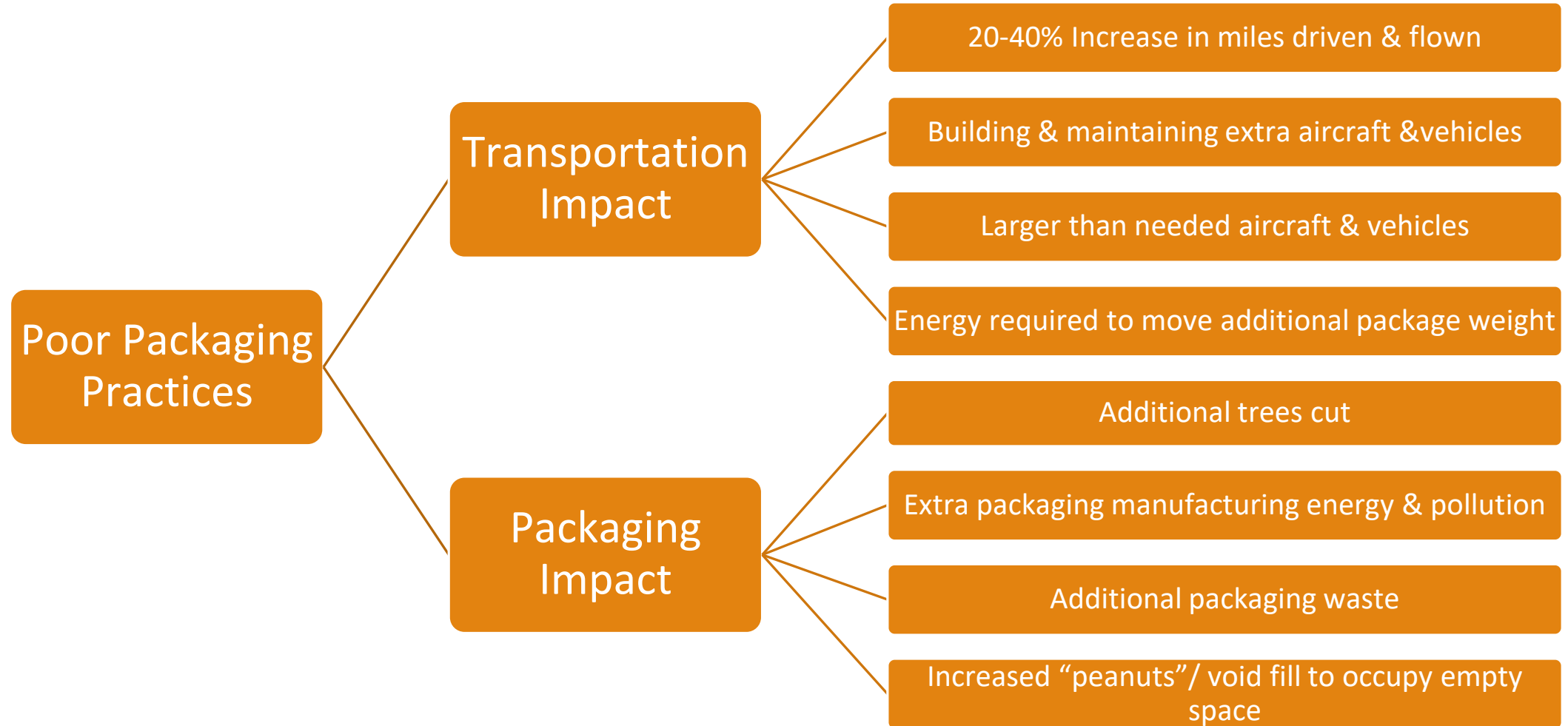


# Today, poor packaging practices result in the average box being 20-40+% bigger than required

Generating huge amounts of easily avoidable CO<sub>2</sub>, other air pollutants and packaging waste



# Driving inefficiency, waste & GHG emissions in tandem



©2021 KEVIN J MIRELES

# Small size reductions can drive huge capacity increases!

**Before**



- 800 Packages per trailer

**After**

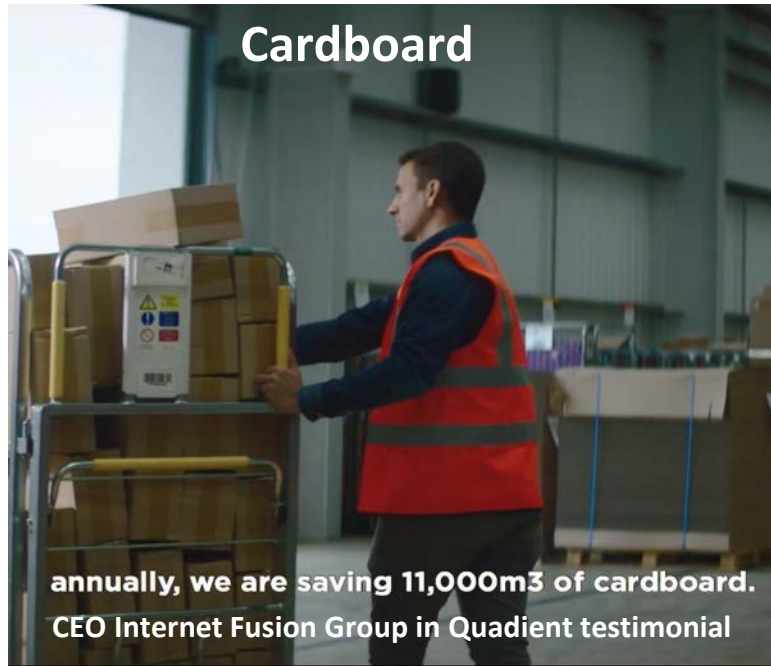


- 1,400 Packages per trailer

**After implementing a rightsizing system, a national retailer increased trailer capacity by ~75% while saving \$1.3 million in packaging costs**

# Another shipper avoided 90 truckloads and cutting down 5,600 trees

## Cardboard



## Transportation



## Trees



If 100K more similar businesses adopted, would eliminate 388M ft<sup>3</sup> of cardboard, 900K truckloads & save 560M trees!

# Upsides of rightsizing far exceed benefits of switching to larger trailers

The following efficiency gains would have been realized in 2018 had Twin 33s been allowed nationwide:



**3.36 BILLION**  
Fewer Vehicle  
Miles Traveled



**\$2.8 BILLION**  
Saved in  
Shipping Costs



**57.2 MILLION**  
Hours Saved Due  
to Less Congestion



**274 MILLION**  
Fewer Gallons  
of Fuel



**3.12 MILLION**  
Fewer Tons of  
CO<sub>2</sub> Emissions

Image courtesy of Americans for Modern Transportation based on research partially sponsored by UPS

Adopting 33-ft trailers would result in 18% more space than the current 28-ft trailers, which would be the same as shrinking packages by average size 18%.

**So, what are some ways you can you reduce your cube?**

# Design



**HP Designed printer so could  
be stacked and ship without  
boxing**

= 2X as many in same space = 50% reduction in cost and emissions



# Postpone



# Millions of Amazon Packages Will Now Arrive Without Any Packaging At All

The e-commerce giant is now offering customers the option of less or zero packaging. Customer responses have ranged from criticism to praise for the eco-friendly move.

BY [MADELINE GARFINKLE](#) • AUG 11, 2023

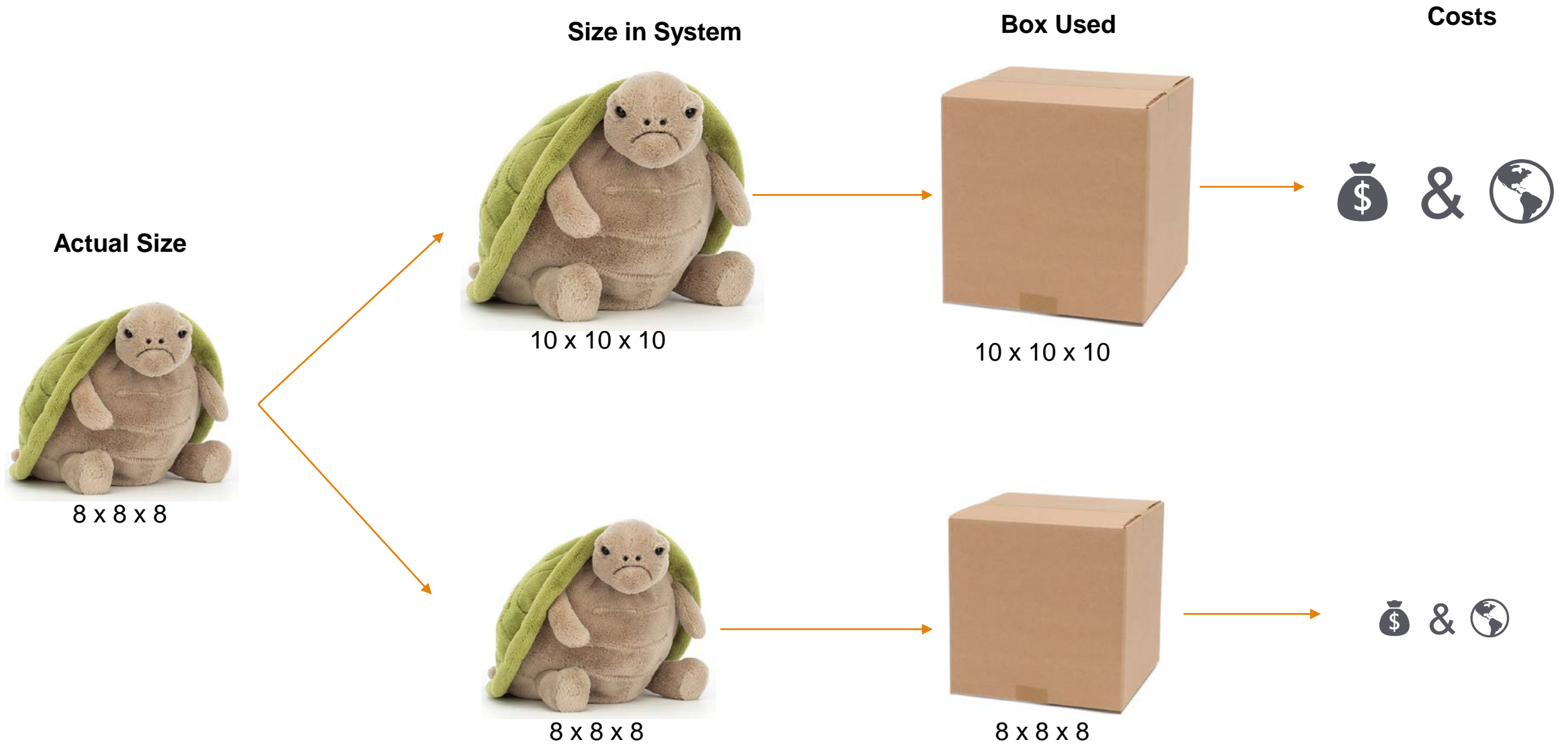
Share 

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### Key Takeaways

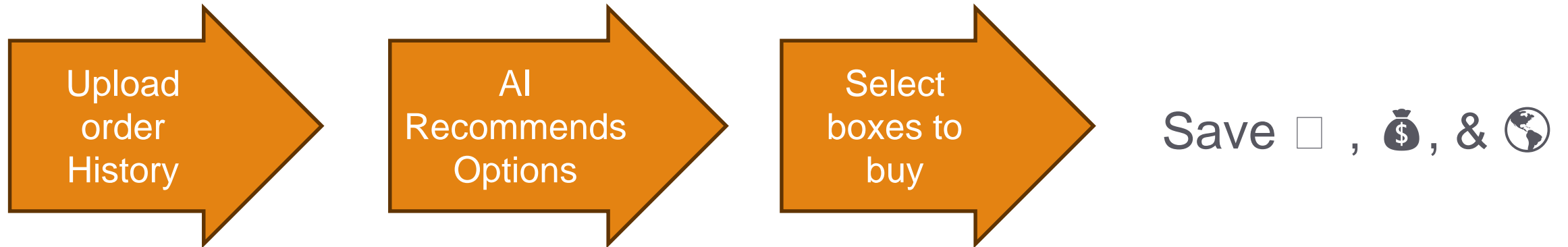
- ▶ 11% of U.S. Amazon orders will now ship without extra packaging.
-

# Correctly Measure



# Buy

## Use AI to determine which boxes to buy



# Select

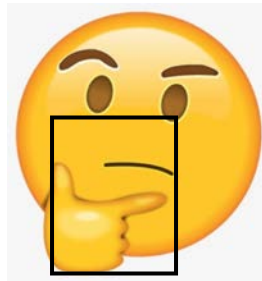
Use AI to determine which box to use



Order



Box Options



Packer

# Make

## Box on demand solutions cut and form boxes specific to shipment



Order



Box or bag maker



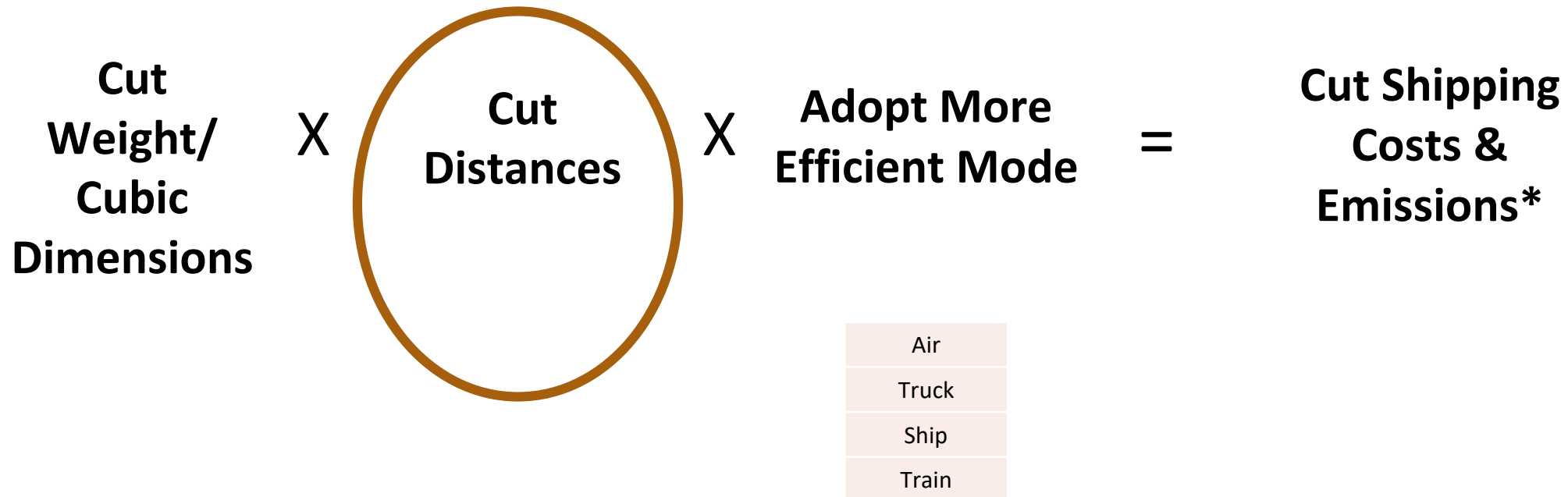
Rightsized box

## Make, pack, and ship

Automated systems eliminate need for manual packing and labelling



## Next, cut distance to minimize miles traveled/fuel usage and emissions



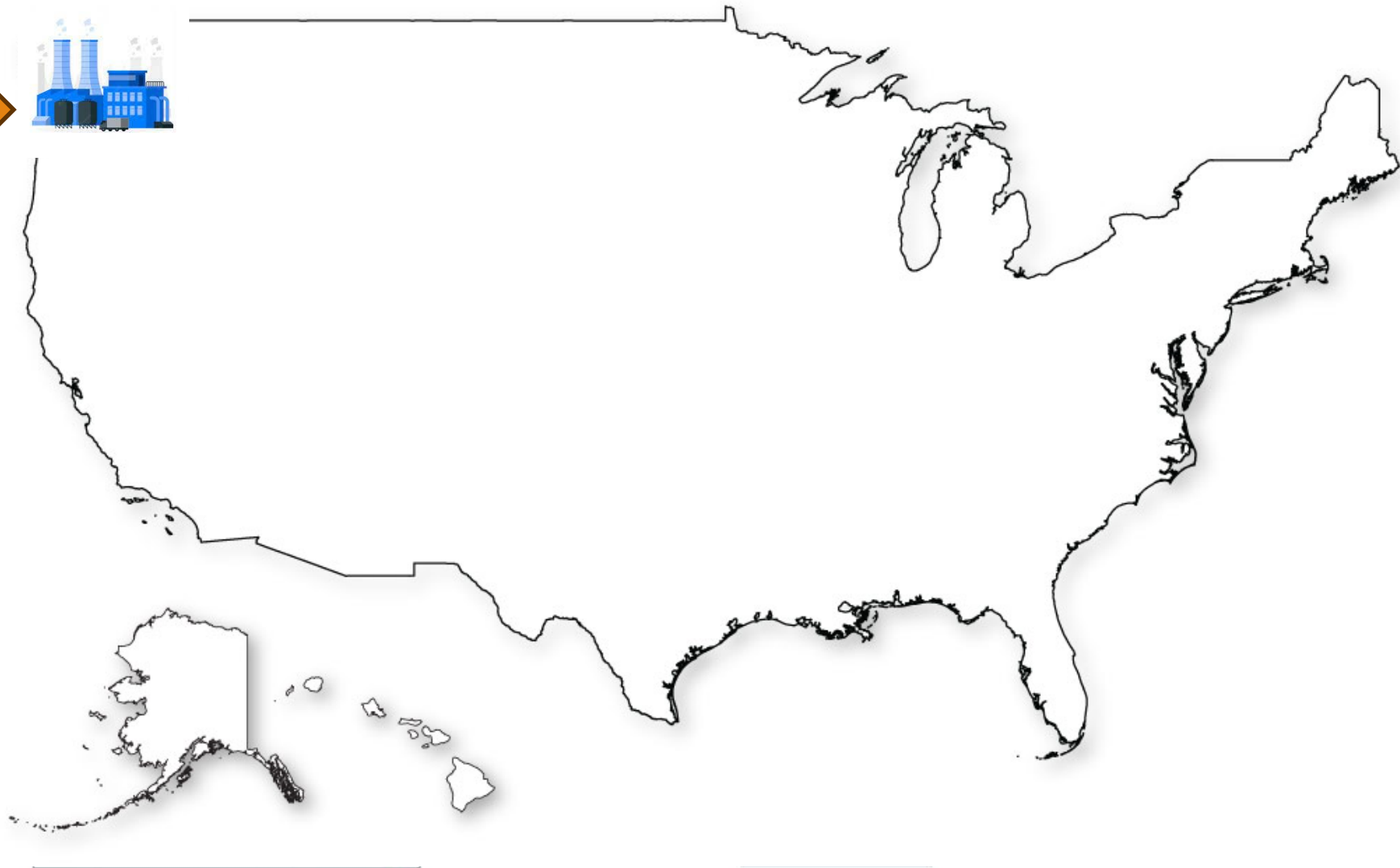
\*CO2 equivalents, usually in metric tons



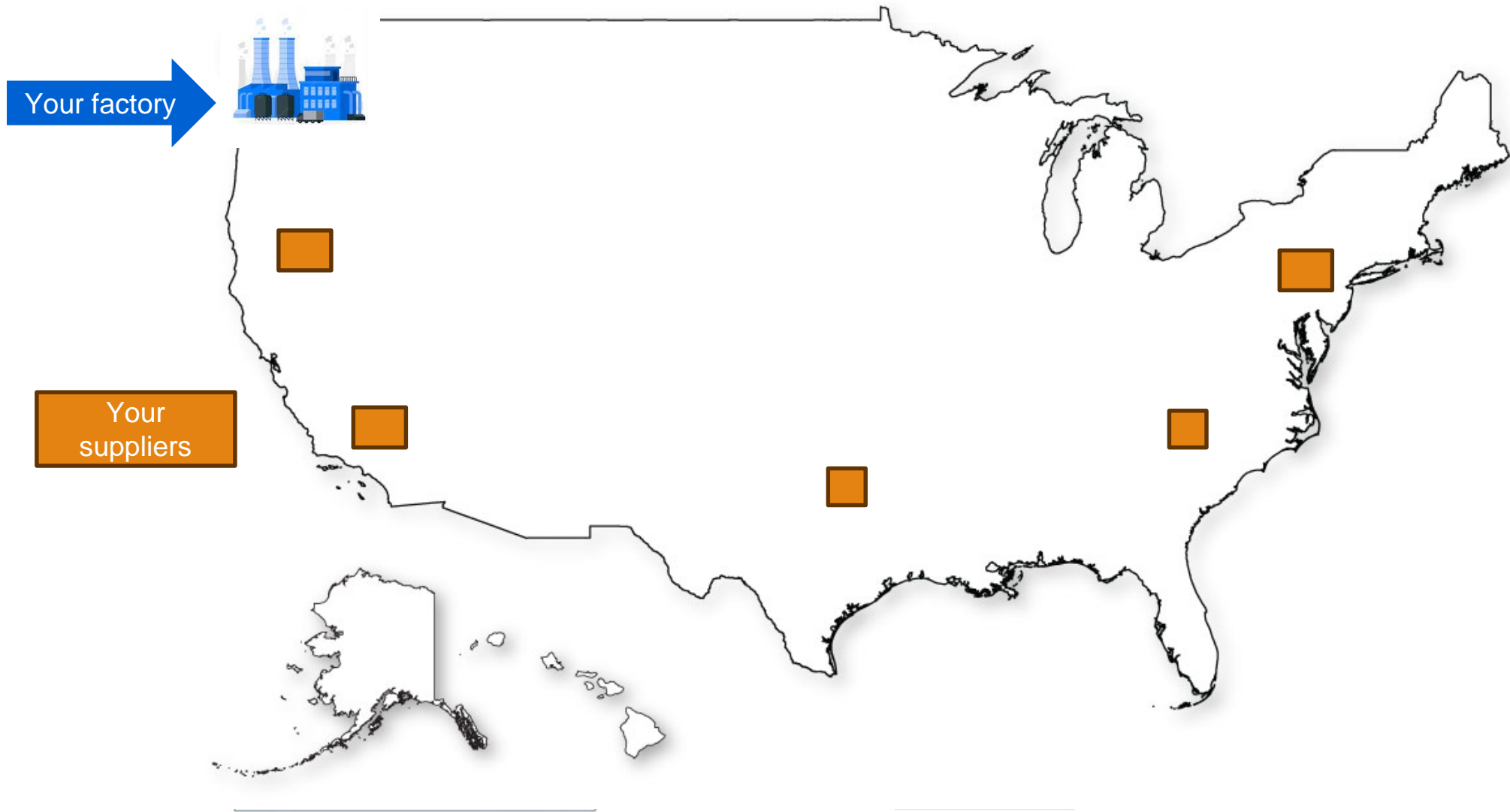
# Distance cutting tactics

1. **Shorten** distances
2. **Straighten** routes
3. **Ship** less frequently
4. **Avoid** deadhaul

# Your factory



# You have five suppliers

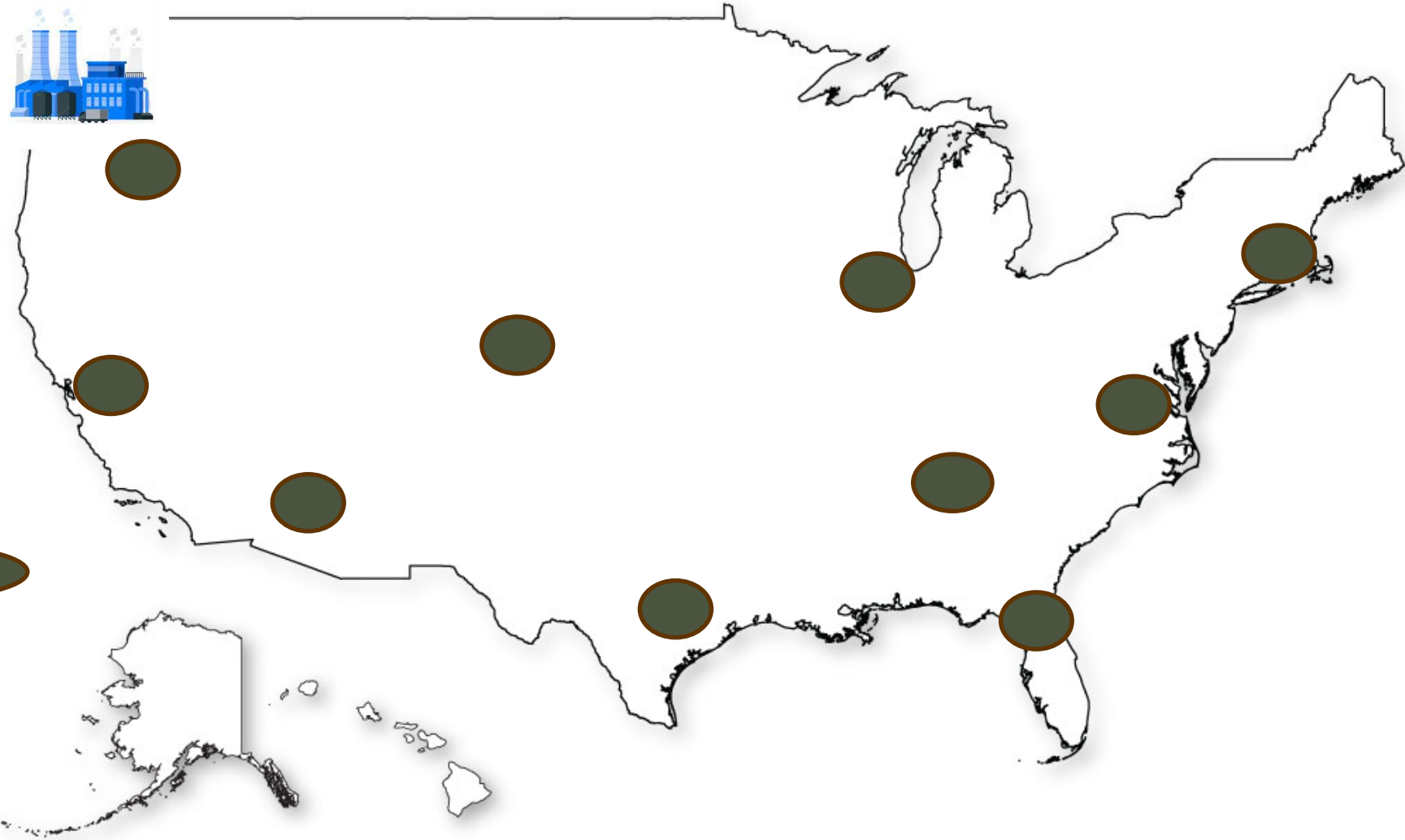


# Avg. distance = 1,720 Miles or 8,600 miles per 10 widgets



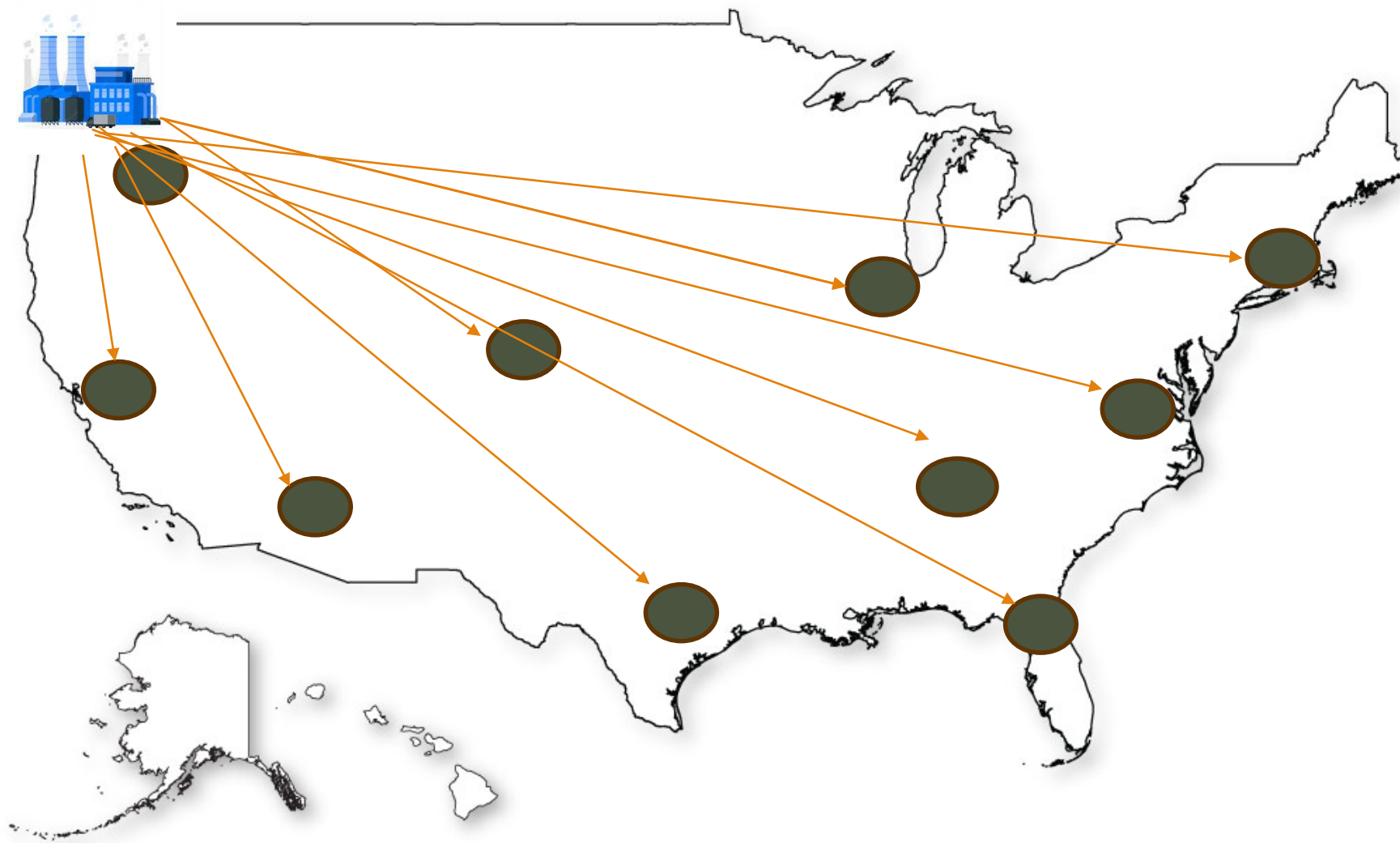


# You have 10 customers

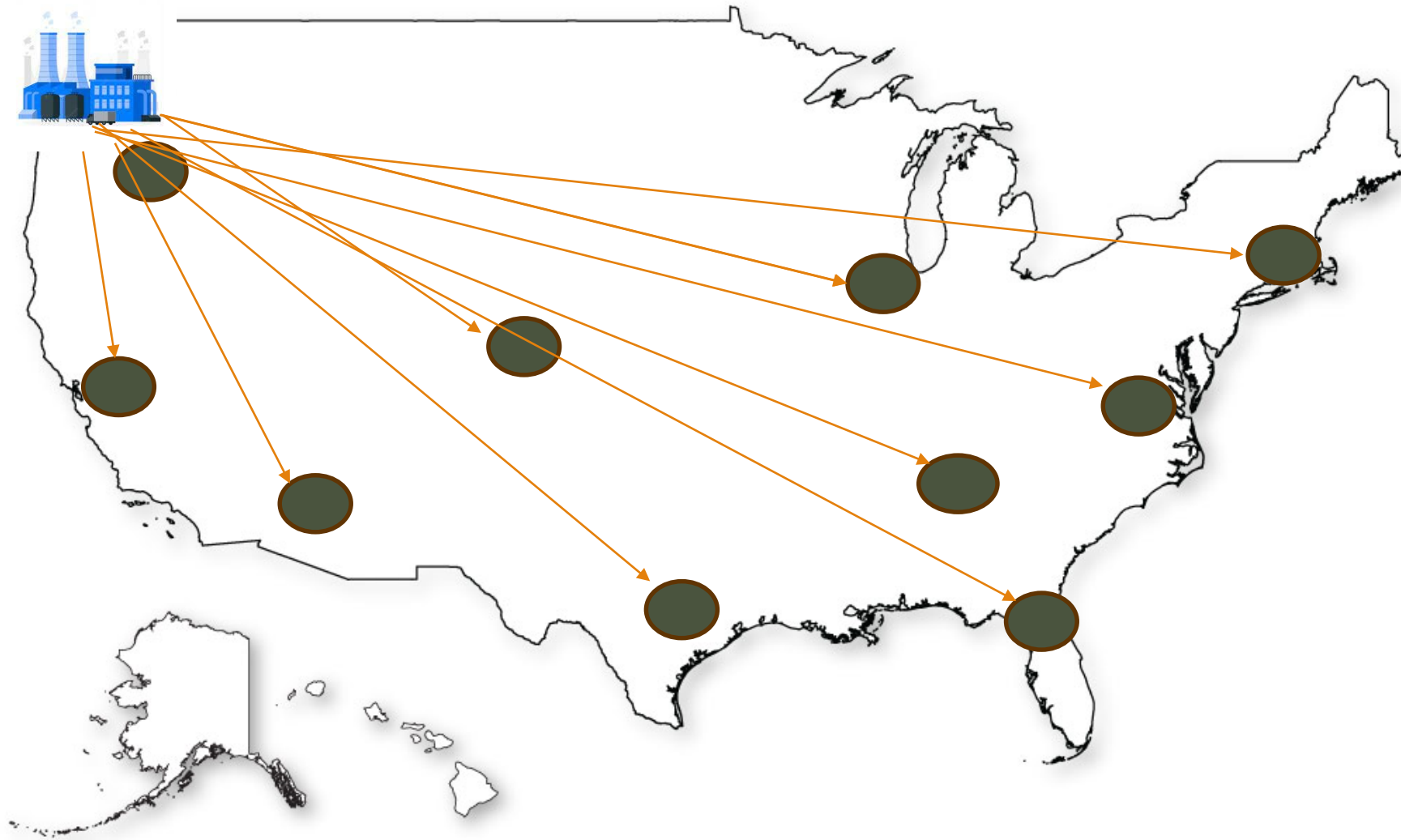


Customers

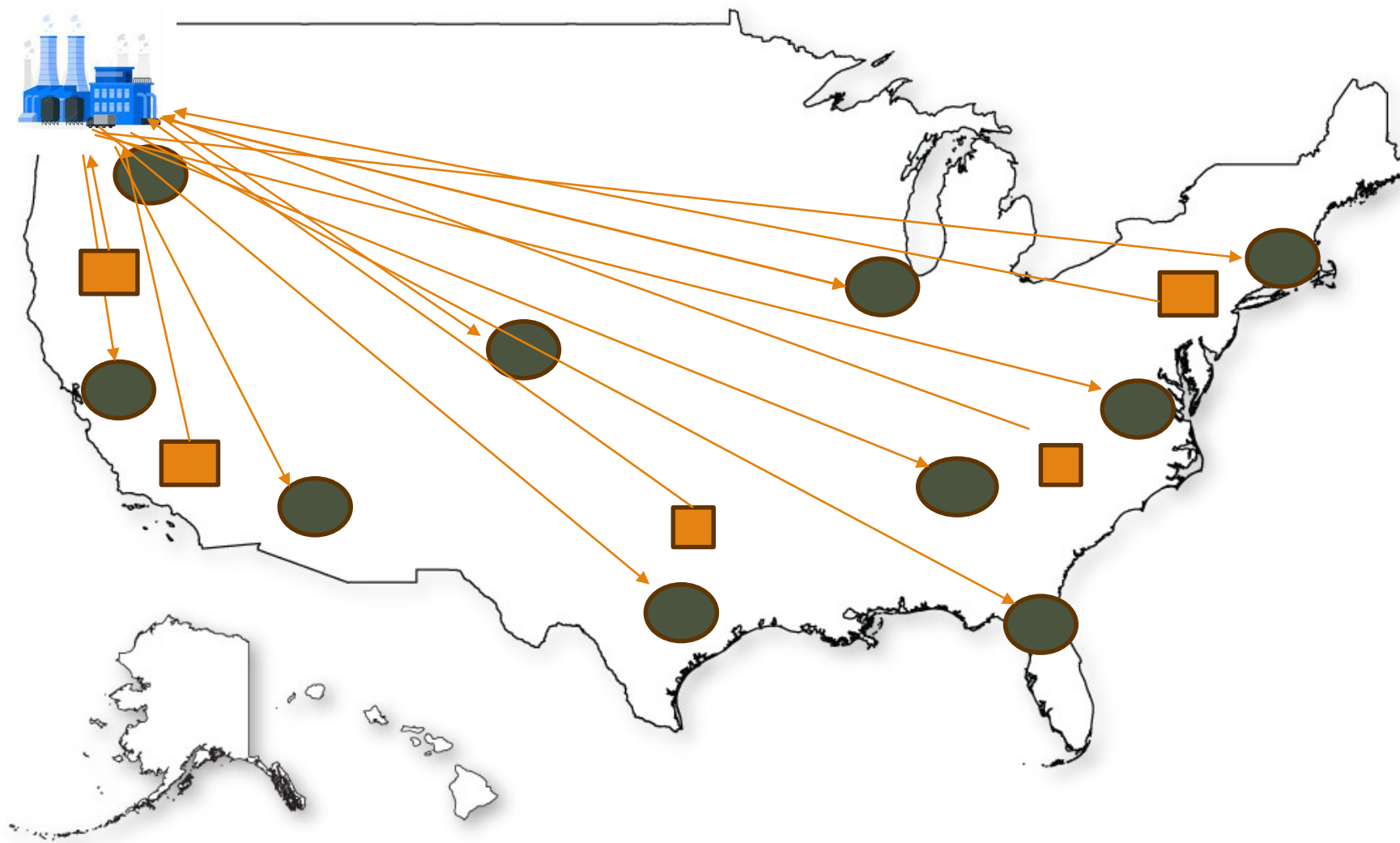
Avg. distance = 1,840 Miles



**Total Distance = 18,400 miles total if each orders 1 widget**

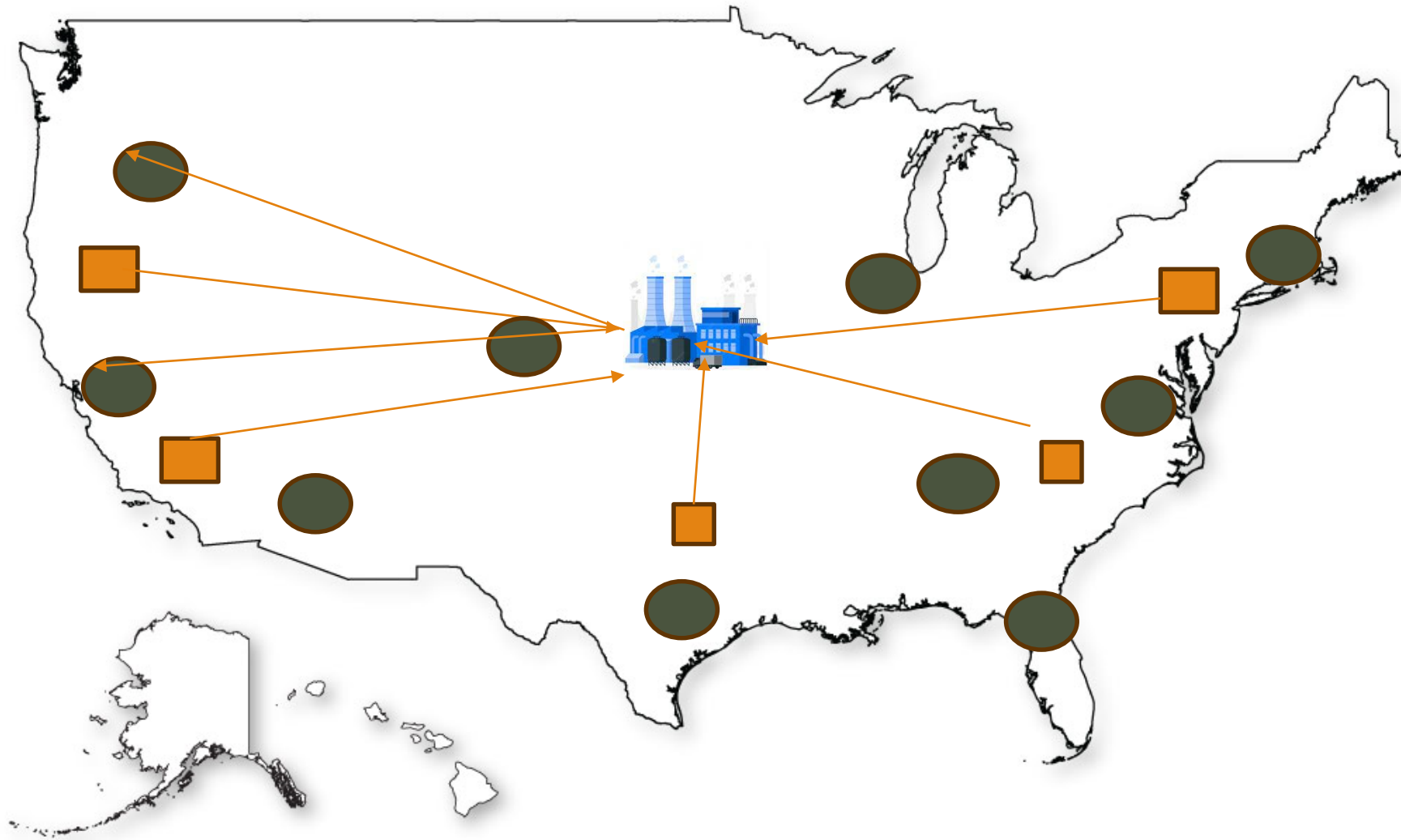


# Make and Deliver Distance = 27,000 truck miles for 10 widgets



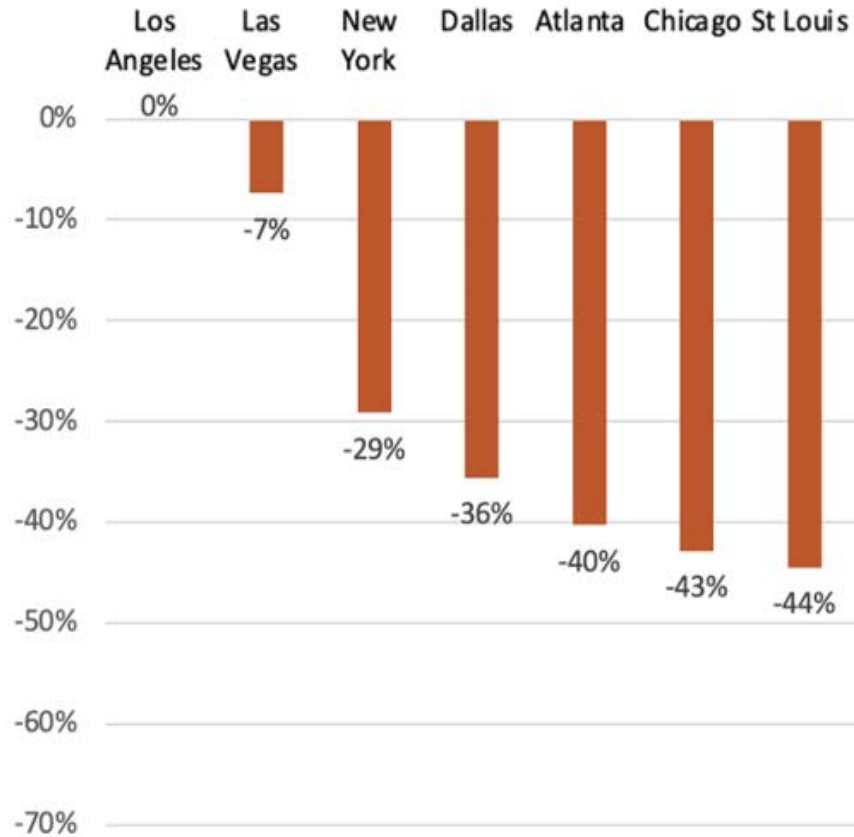


# Moving your factory Centerville USA cuts distances and emissions by 44%



# More examples

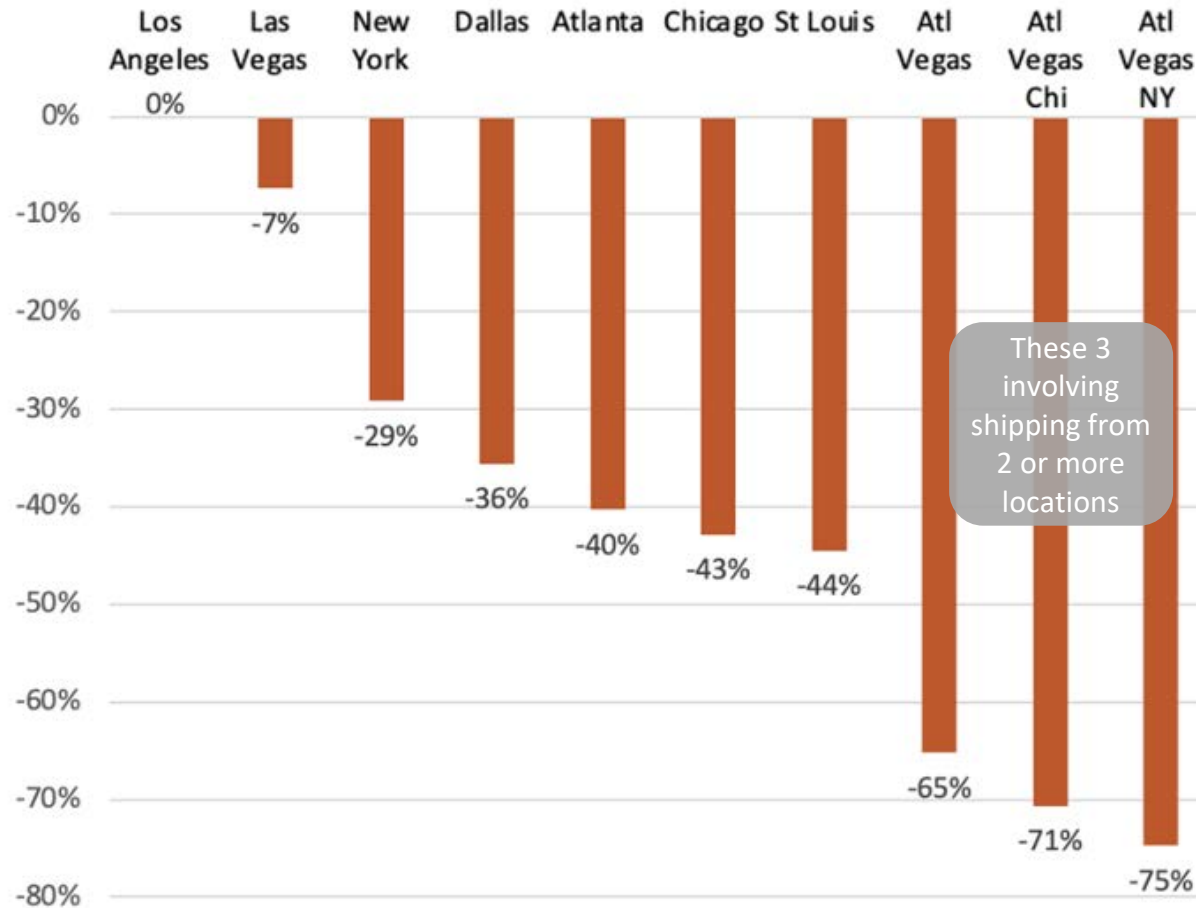
## Potential Reductions in Distance & Emissions vs. Shipping from So Cal



\* Distances are based on averaged-weighted straight-line distance between origin locations and the top 320 US metropolitan areas representing over 80% of the US population

# Forward stocking can reduce your distances and emissions 65% and more

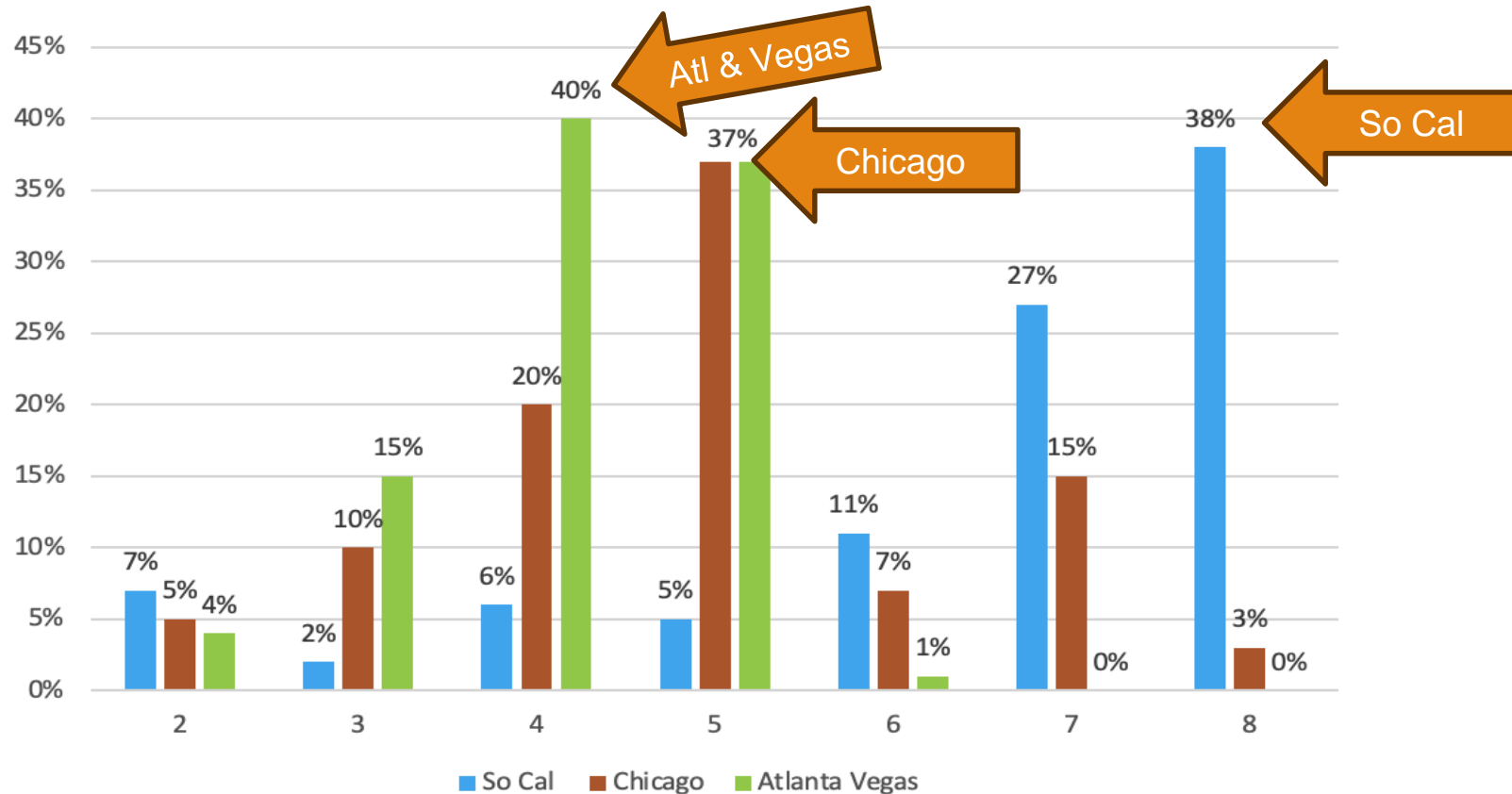
Potential Reductions in Distance & Emissions vs. Shipping from So Cal



\* Distances are based on averaged-weighted straight-line distance between origin locations and the top 320 US metropolitan areas representing over 80% of the US population

# Reducing distance also results in reduced shipping costs

Percent of US Population that Falls Within Each Pricing Zone Based on Origin Locations



*\* Calculations are based on averaged-weighted straight-line distance between origin locations and the top 320 US metropolitan areas representing over 80% of the US population.*

# Bath & Body Works represents a real-life example



- A 99.99% reduction in freight transportation-pollution per product.
- Reduced air freight shipments.
- Reduced business flights from/to Asia.
- Reduced packaging.
- Reduced Waste from damaged inventory.
- Reduced Waste from unsold inventory.



## Ship less frequently

Ship partial loads daily  
 $30 \times 6,400 = 192,000$

## Ship less frequently

Ship partial loads daily

$$30 \times 6,400 \text{ M} = 192,000 \text{ M}$$

vs

Ship full loads every other day

$$15 \times 6,400 \text{ M} = 96,000 \text{ M}$$

**50% Reduction in Miles!**

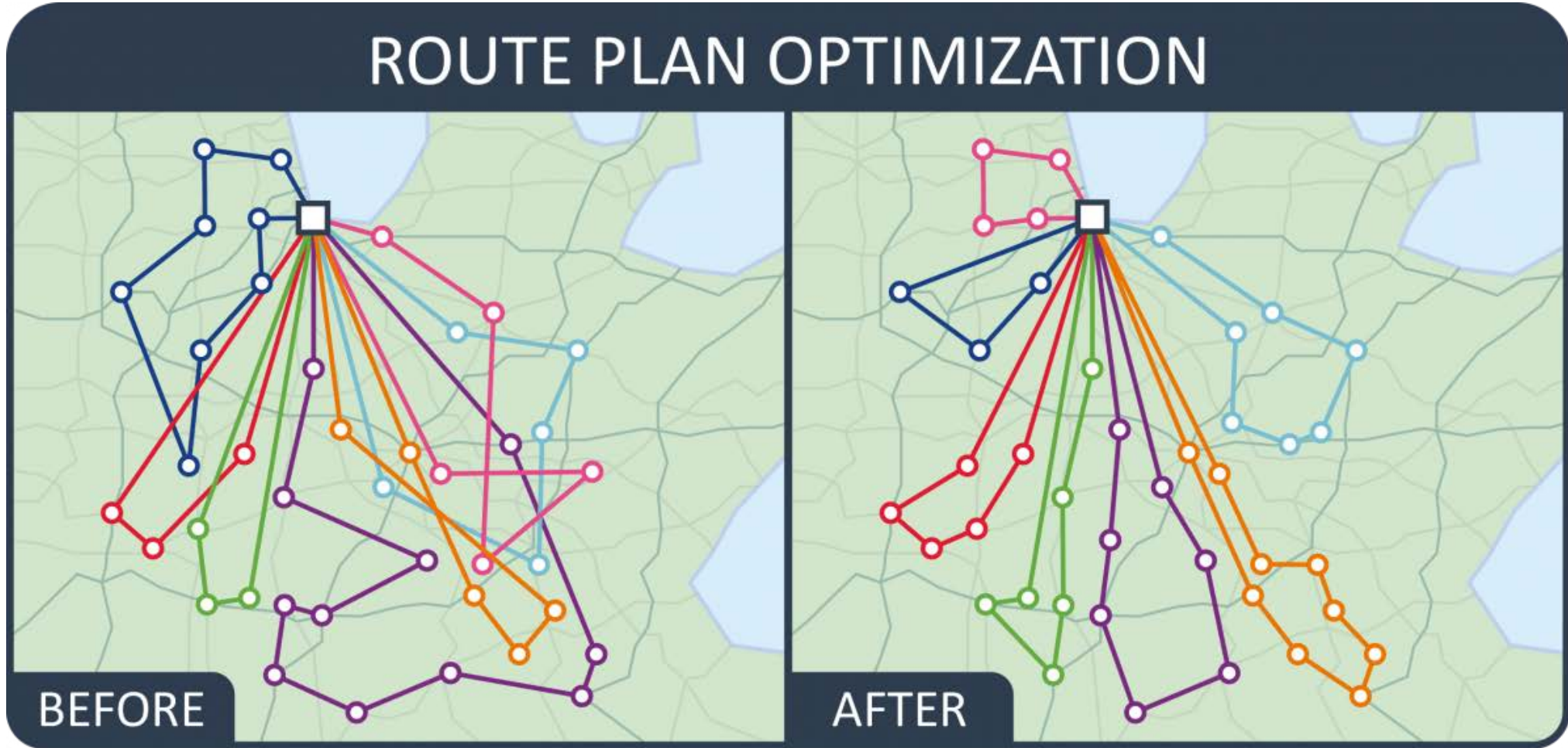
**35-45% Reduction in fuel/emissions!**

## Avoid deadhaul to avoid twice the emissions!

Today ~35% of all truck miles are empty miles , so eliminating outbound trips, often eliminates empty return trips



# Straighten your routes

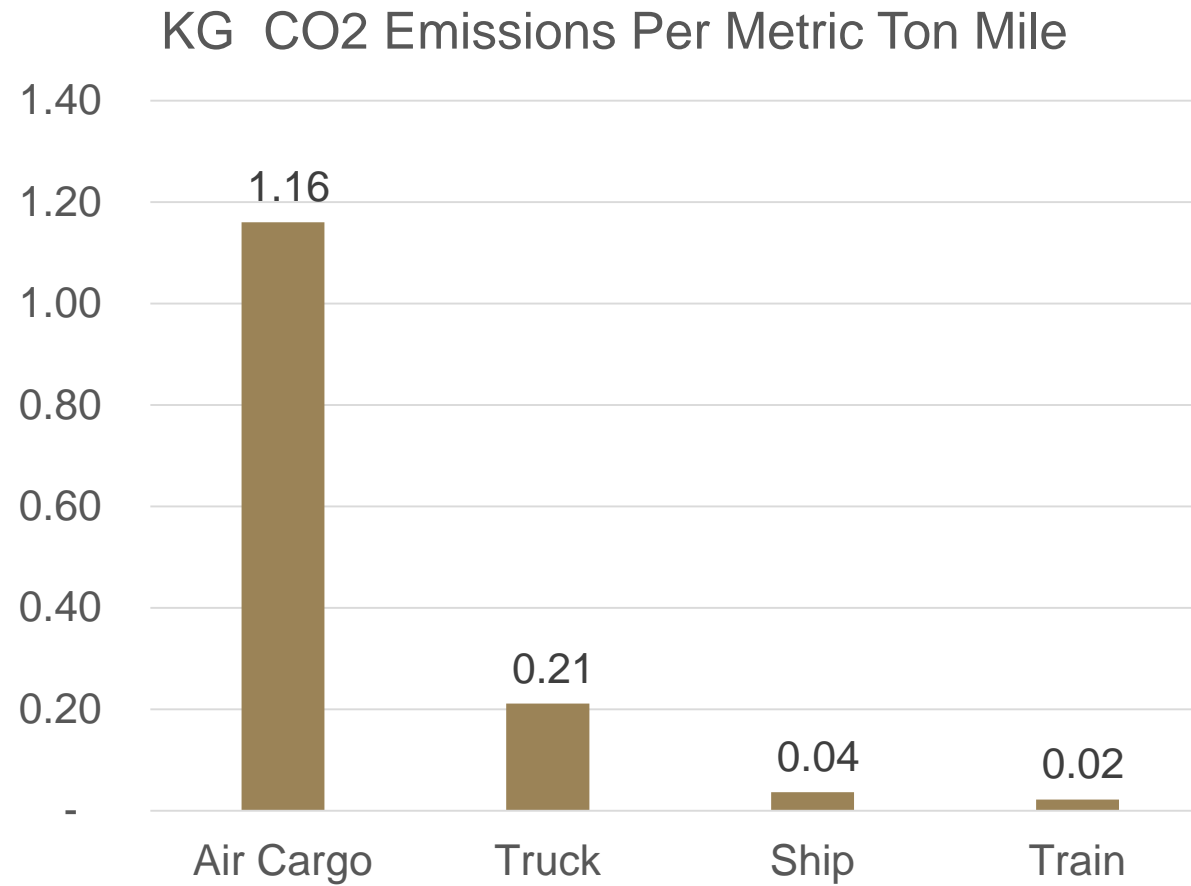


## Finally, switch modes to reduce fuel usage and emissions

$$\begin{array}{ccccccc} \text{Cut} & & & & & & \\ \text{Weight/} & \times & & \text{Cut} & \times & \text{Adopt More} & = & \text{Cut Shipping} \\ \text{Cubic} & & & \text{Distance} & & \text{Efficient Mode} & & \text{Costs \&} \\ \text{Dimensions} & & & & & & & \text{Emissions*} \end{array}$$

\*CO2 equivalents, usually in metric tons

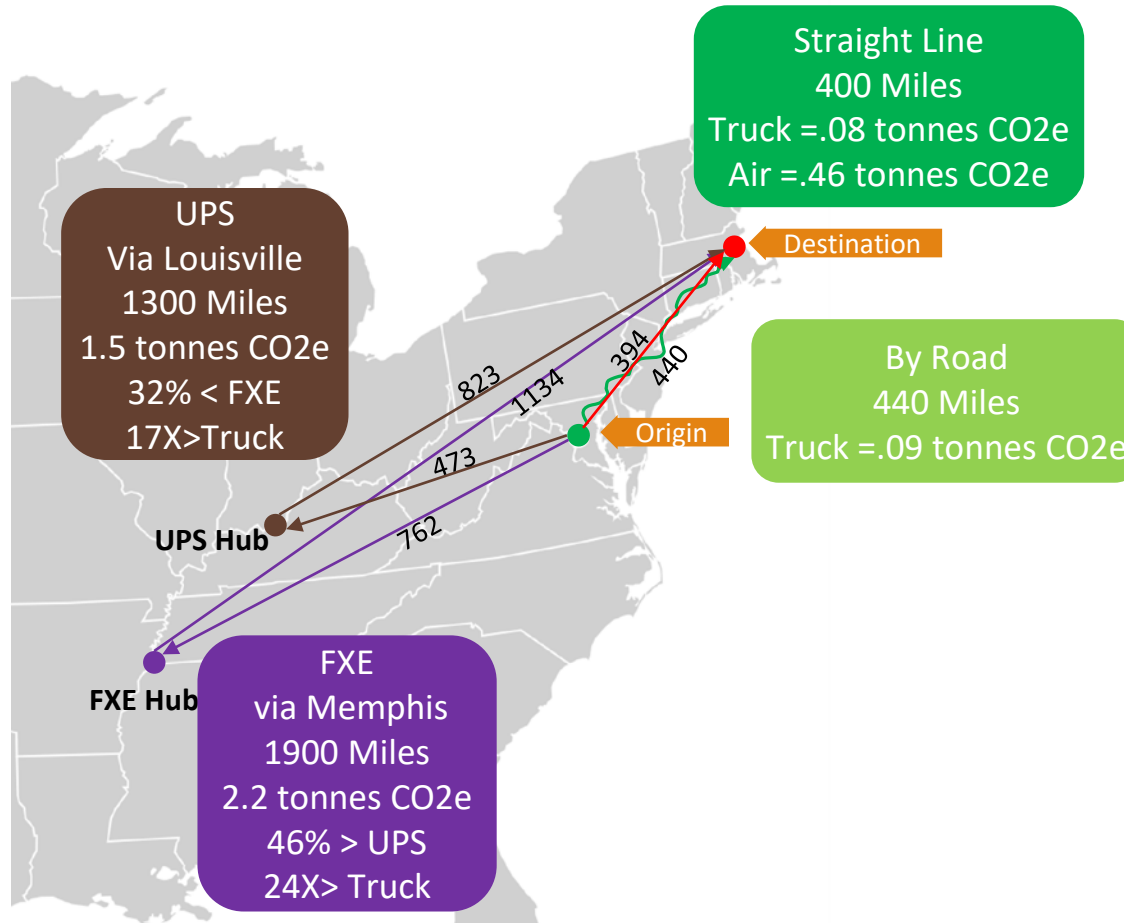
# Air freight is by far the most expensive and polluting mode



# Contrails actually nearly double the warming impact of air shipping!



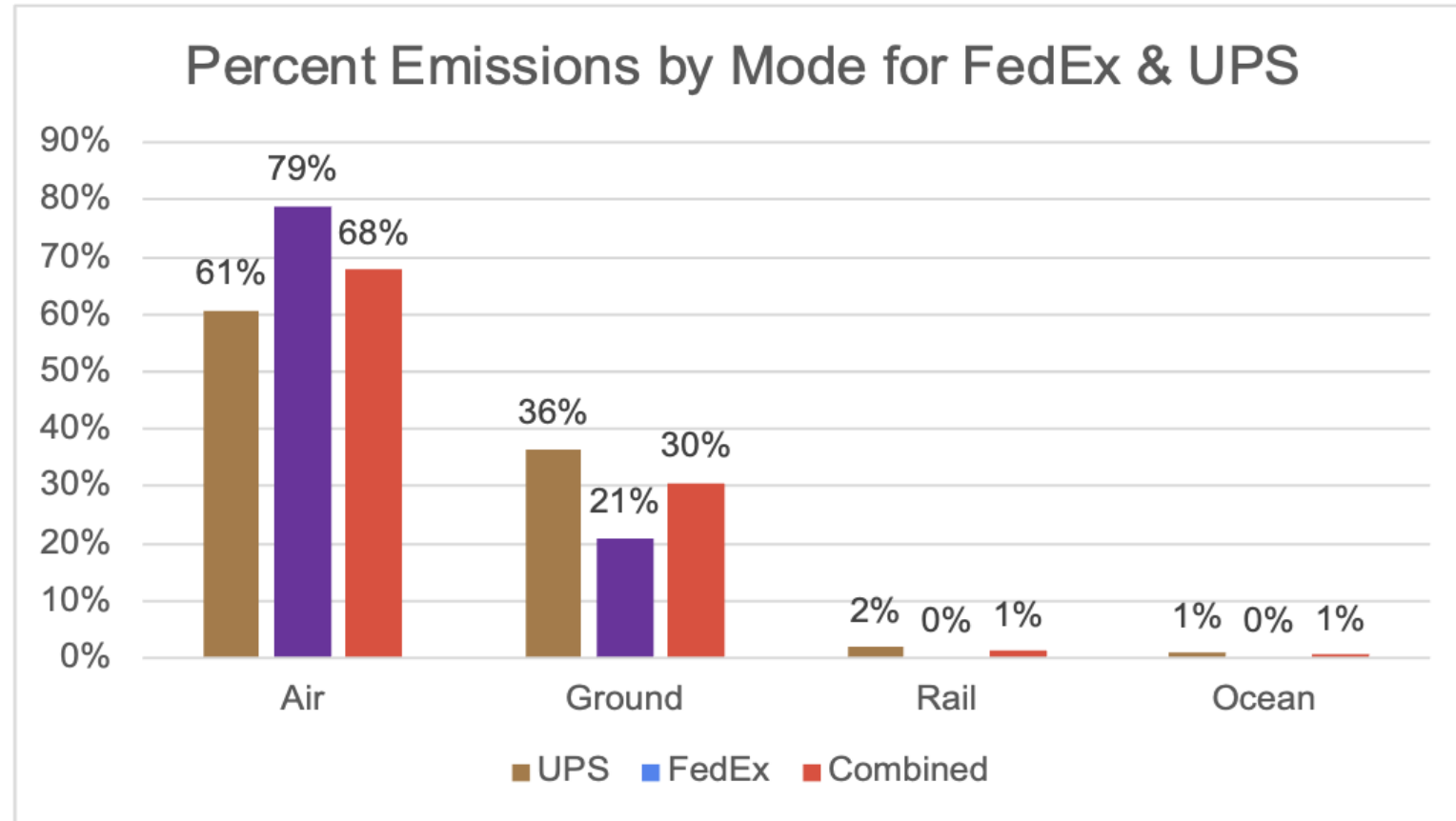
# Express hub and spoke models can 2 to 5X shipment distances & emissions



\*The analysis is not based on an actual shipment but hypotheticals as I don't have access to FedEx or UPS routing data. FedEx could also potentially route the shipment through their Indianapolis hub, which would result in the distance and emissions being the same as UPS at 1,300 miles & 1.5 tonnes. Emissions calculations are based on US EPA emission factors.

# Air shipments drive up to 80% of FedEx & UPS emissions

And this  
excludes  
contrails!



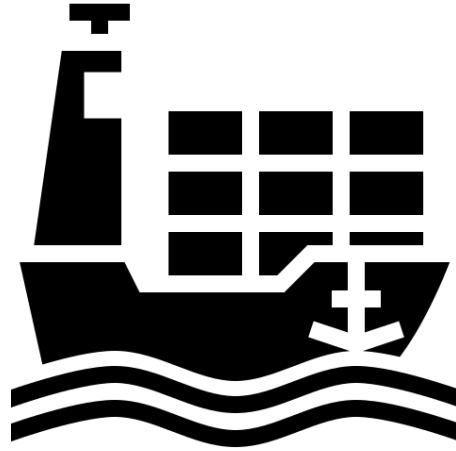
\* FedEx FY 2020 Data from report for Climate Disclosure Project.

<https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/2021/FedEx2021CDPClimateChangeResponse.pdf> UPS from FY20 SASB Standards Table [https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/2020\\_UPS\\_SASB\\_Standards\\_Table\\_081921.pdf](https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/2020_UPS_SASB_Standards_Table_081921.pdf) FedEx only reports emissions from FedEx-owned transportation while UPS reports for both UPS owned and contracted transportation.

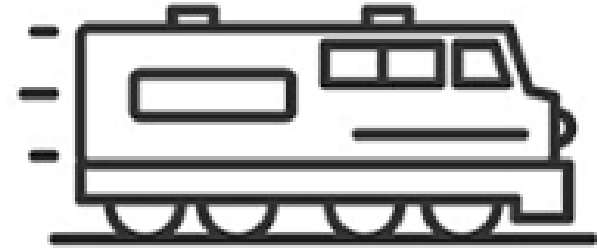
# Stop shipping by air to reduce emissions by 80%+!



**Truck =  
80+% Reduction  
vs air\***



**Ship =  
97% Reduction  
vs air\***



**Train=  
98% Reduction  
vs air\***

## Collocate next to express air hubs so direct flights





# Use direct flights on commercial air to reduce air miles & cargo emissions



# Move inventory closer to your customers so cut need for air shipping

**1 DC**



**1 day = 5%**  
**2 day = 59%**

**2 DC**



**1 day = 19%**  
**2 day = 91%**

**3 DC**



**1 day = 21%**  
**2 day = 99%**

## Ask your providers what they're doing to eliminate contrails

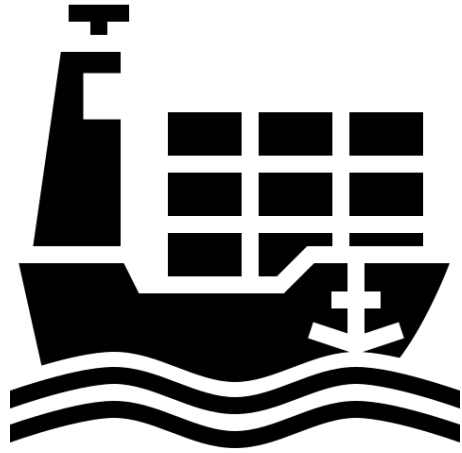


New  
computer  
models cut  
cuts  
contrails by  
54%

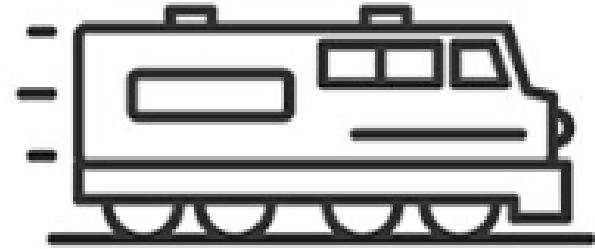
## Don't pay for air shipping if you don't have to

Use analytics and transportation management systems to determine whether you can use cheaper, less polluting options that deliver similar transit times.

If shipping by truck, shift to boat or train.

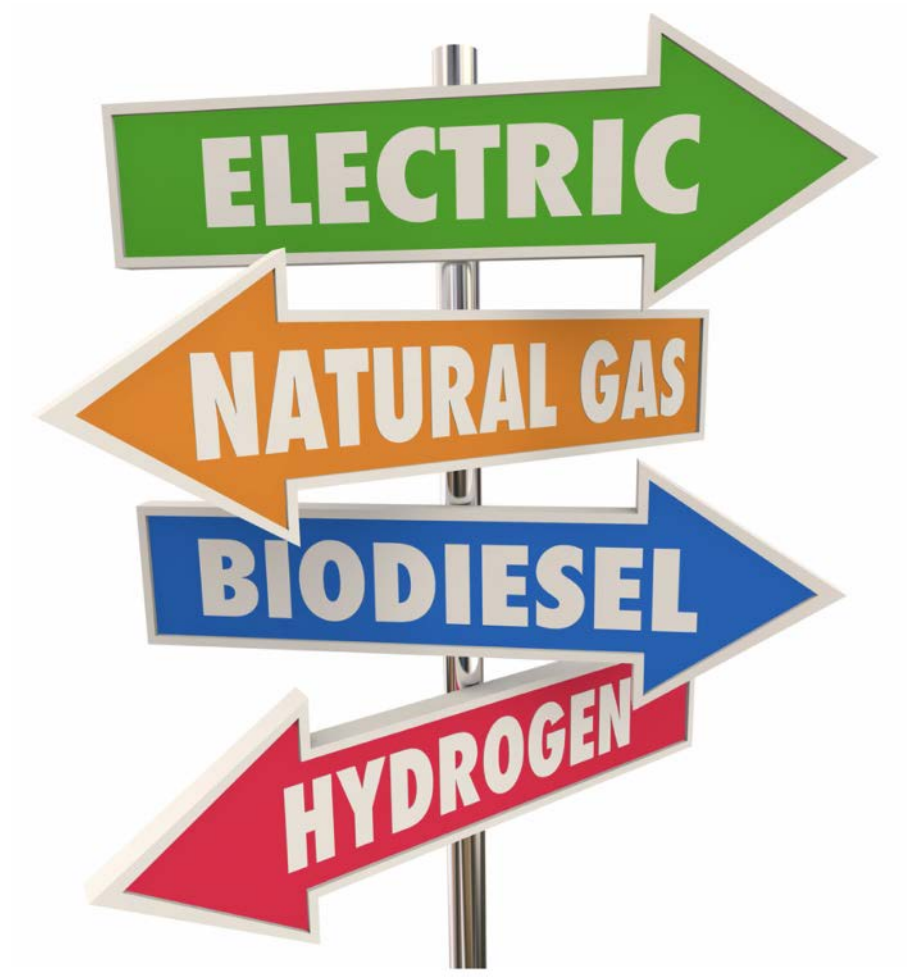


**Ship =  
80% Reduction  
vs truck\***



**Train=  
90% Reduction  
vs truck\***

# Good news! More transportation options coming into market



# Ease logistics pioneering platooning here in Ohio!

Ohio trucking company to become 'first in U.S.' to use platooning to haul freight for paying customers

By Ashley - May 22, 2023



# Need to explore electrifying Ohio highways



- ✓ Instead of needing 400 miles worth of battery, only need 50 or 100
- ✓ Reduces cost per vehicle
- ✓ Improves energy efficiency since don't lose energy from:
  - charging battery
  - Carrying weight of larger battery
- ✓ Don't waste time charging trucks
- ✓ Reduces need for off-road charging infrastructure



# Finally, adopt energy efficiency and solar for your warehouse



|                      |
|----------------------|
| <b>LED</b>           |
| Avg Life: 25,000 Hrs |
| No Mercury           |
| 6-8 Watts            |
| Uses 84% less energy |

**Energy  
Efficiency**

+

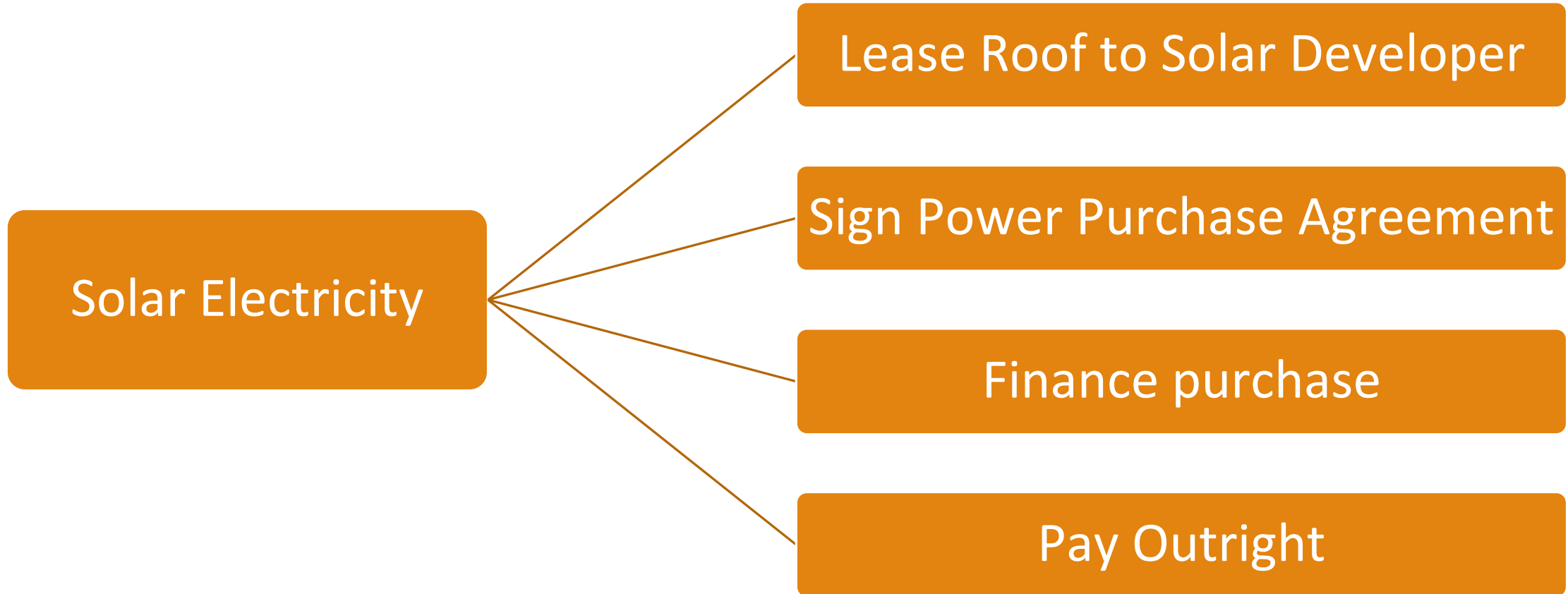


**Solar**

=

- ✓ **10-30% Cost Savings**
- ✓ **50 to 100% reduction in emissions**

**Given the escalating cost of electricity and the plummeting price of solar, warehouse owners can transform their roof into a moneymaker**





# Columbus needs to turn its warehouse roofs into money & electricity

If only 10% of square feet of Columbus warehouse rooftops were covered in solar it would be enough electricity to power 1.2M homes!

- Reducing reliance on fossil fuels
- Improving air quality
- Creating jobs
- Generating tax revenue

Ultimately, we need a Columbus and Ohio sustainability economic-development strategy to surf the sustainability tsunami



## If you are interested, can assist with

- **Green Packaging:**
  - Rightsizing, reusable packaging, plant-based dunnage and mailers
- **Network Optimization:**
  - Finding optimal routing and DC/inventory placement
- **Mode Optimization:**
  - Partial Truckload, Intermodal, Empty-Mile Avoidance
- **Energy Efficiency:**
  - Energy audits, LEDs, HVAC, etc.
- **Solar Energy:**
  - Community Solar, PPAs, financing, etc.
- **Hydrogen Forklifts**
- **Alternative Fuels and Fleet Electrification**

# Please reach out to with any questions you have!

Scan to give feedback or  
connect with me



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[LinkedIn](#)

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**Lean & Green!**  
The Sustainability &  
Profitability Newsletter