



TRANSITION TO ZERO FREIGHT EMISSIONS

Methodology presentation

as of 01/21

APPANION

OUR PART OF THE SOLUTION



Data intelligence for sustainable freight transportation.



Collaborative



Reliable



ML-supported

INTEGRATED ECOSYSTEM POSITIONING



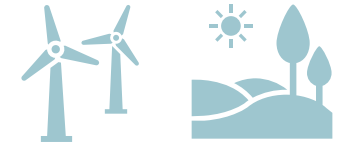
TOP USE CASES FOR RELIABLE EMISSION DATA



Sustainability reporting and disclosure



Risk management for climate costs



Zero-emission products and services



Developing decarbonization strategies and targets



Identifying effective CO₂ avoidance and reduction potentials



Planning of investment decisions (fleet, fuels, infrastructure)

HOW IT WORKS

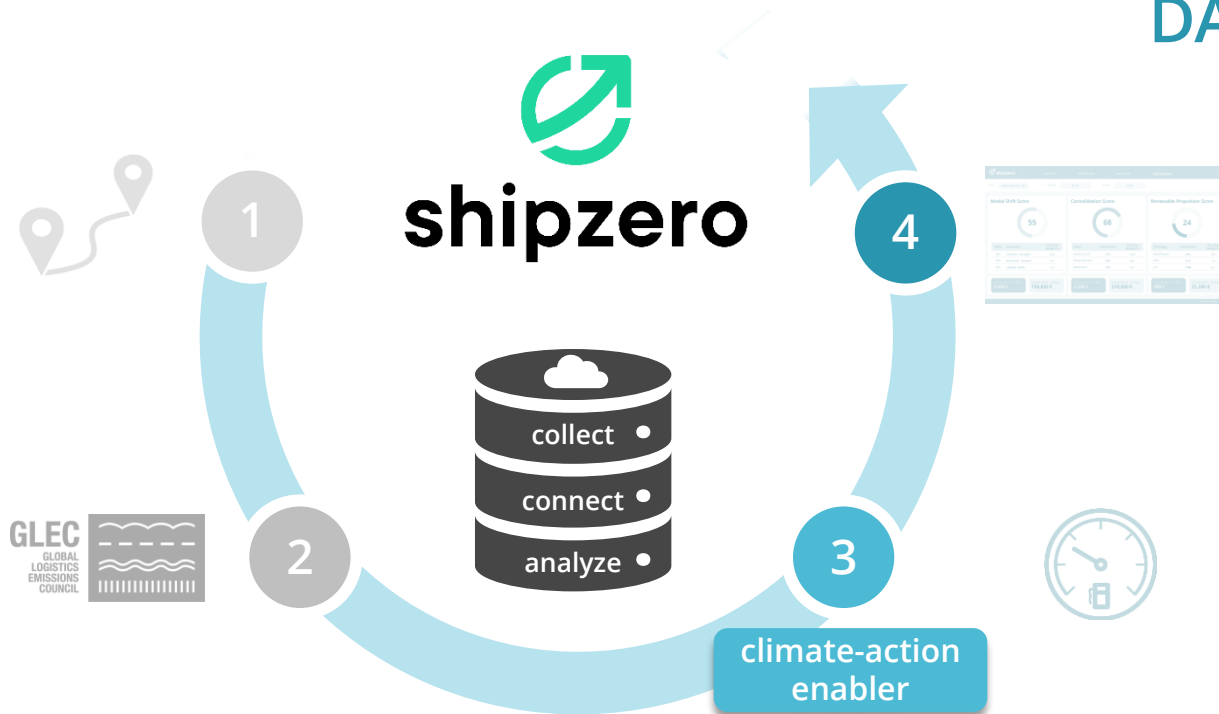
DATA SOURCES

Shipment order data

Start, destination, payload, mode, date

Calculation model

Multimodal, global, and compliant results



DATA CONSUMERS

Tangible insights

Continuous and precise reporting, identification of reduction potentials

Smart enrichment

External and primary telematics data from vessels/vehicles

OUR VALUE ADDS BEYOND CALCULATION

Process automation

Fully managed **data collection**,
gap-filling and **cleansing**

Mass calculation and
continuous monitoring

Automated reporting for
individual customers/entities

Smart enrichment

Integration of primary
consumption data

Environmental data from 3rd parties
(weather, routings, traffic)

Dynamic reflection of climate action
and **allocation** of emissions

Action-oriented analytics

Trade lane efficiency

Freight consolidation

Renewable propulsion potential

INPUT DATA

Minimum required input

optional input

| Origin, destination, waypoints | Mode of transport | Load description | Primary consumption data |
|---|---|---|--|
| <ul style="list-style-type: none"> Geocoordinate (LAT/LONG) Postal address (city, state, building number, zip code) UN/LOCODE IATA code (air freight) Zip code + country City + country | <p>Single / main mode</p> <ul style="list-style-type: none"> Road Rail Maritime Barge Air <p>Multimodal</p> <ul style="list-style-type: none"> by pre-leg, main-leg, post-leg | <p>Load type (packaging unit)</p> <ul style="list-style-type: none"> TEU, FEU, pallet, IBC, bulk, RoRo <p>Load weight / volume</p> <ul style="list-style-type: none"> Metric + unit (e.g., 12t, 37kg, 400l) <p>Load specification</p> <ul style="list-style-type: none"> refrigerated, heated, hazardous | <p>All-modes:</p> <ul style="list-style-type: none"> Unique vehicle/vessel ID Fuel consumption / fuel level changes Type of fuel Mileage / travel distance Geocoordinates Timestamp <p>Mode-specific:</p> <ul style="list-style-type: none"> Vehicle/vessel speed RPM Capacity DWT/TEU Cargo load in t |
| Vehicle / vessel specification | Transport specification | Allocation information | |
| <ul style="list-style-type: none"> Truck type Train type Vessel type (or dedicated IMO) Aircraft type (or dedicated flight number) | <ul style="list-style-type: none"> Fuel / propulsion type FTL, LTL / FCL, LCL Load factor Empty run factor | <ul style="list-style-type: none"> Distinct carrier name and/or ID Distinct product name and/or ID Distinct business unit Classification as inbound/outbound | |

MODEL PARAMETERS

| Shipment parameters | Required information | Model assumption |
|---------------------|----------------------|-------------------|
| Start | X | |
| Destination | X | |
| Cargo weight | X | |
| Date/Time | X | |
| Mode of transport | X | |
| Waypoints / Drops | (X) | |
| Routing | | Mode-dependent |
| Load factor | | Industry-specific |
| Empty run factor | | Route-specific |
| Distance travelled | | Route-specific |
| Tour profile | | Route-specific |
| Average speed | | Vehicle-dependent |
| Propulsion type | | Vehicle-dependent |
| Vehicle/vessel type | | Cargo-dependent |
| Load type | | Cargo-dependent |
| Load specification | | Cargo-dependent |

| Consumption parameters | Required information | Model assumption |
|---------------------------------------|----------------------|-------------------|
| Unique vehicle/vessel ID | X | |
| Fuel consumption / fuel level changes | X | |
| Type of fuel | X | |
| Mileage | X | |
| Geocoordinates | X | |
| Timestamp | X | |
| Vehicle/vessel speed | | Mode-dependent |
| Capacity DWT/TEU | | Vehicle-dependent |
| Cargo load in t | | Vehicle-dependent |

CONNECTING TRANSPORT DATA SYSTEMS

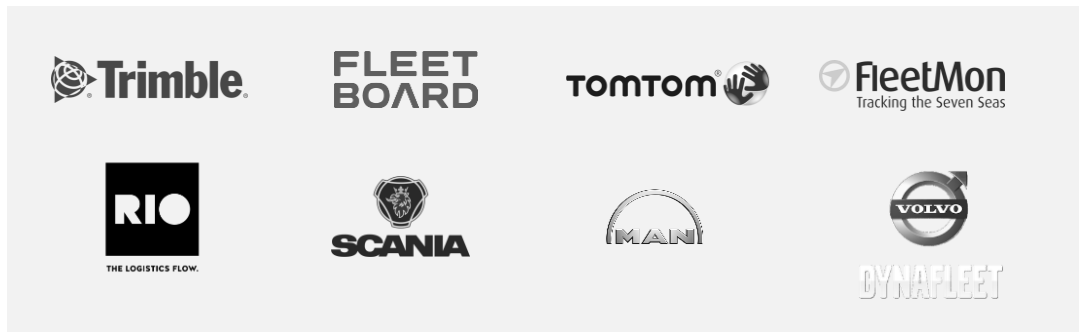
Transport information – typically shipper / LSP

Collected from transport management systems or logistics ERP



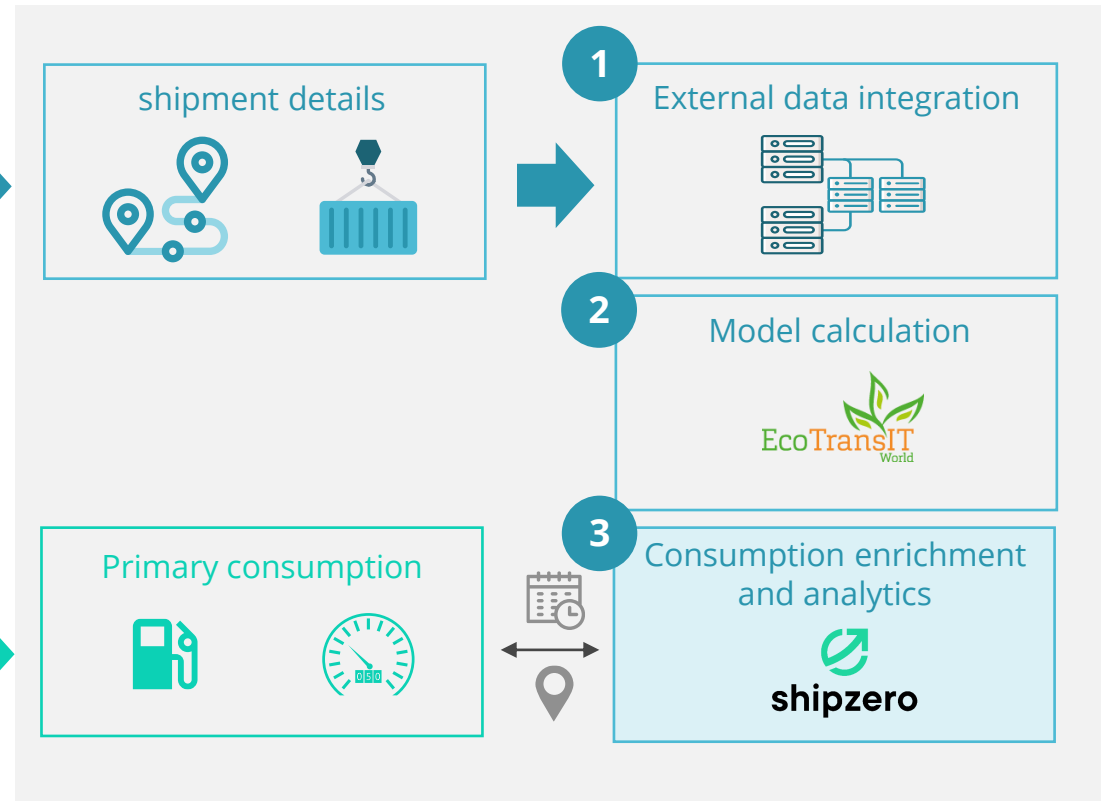
Movement and consumption information - typically carrier

Collected from fleet telematics or standard reports

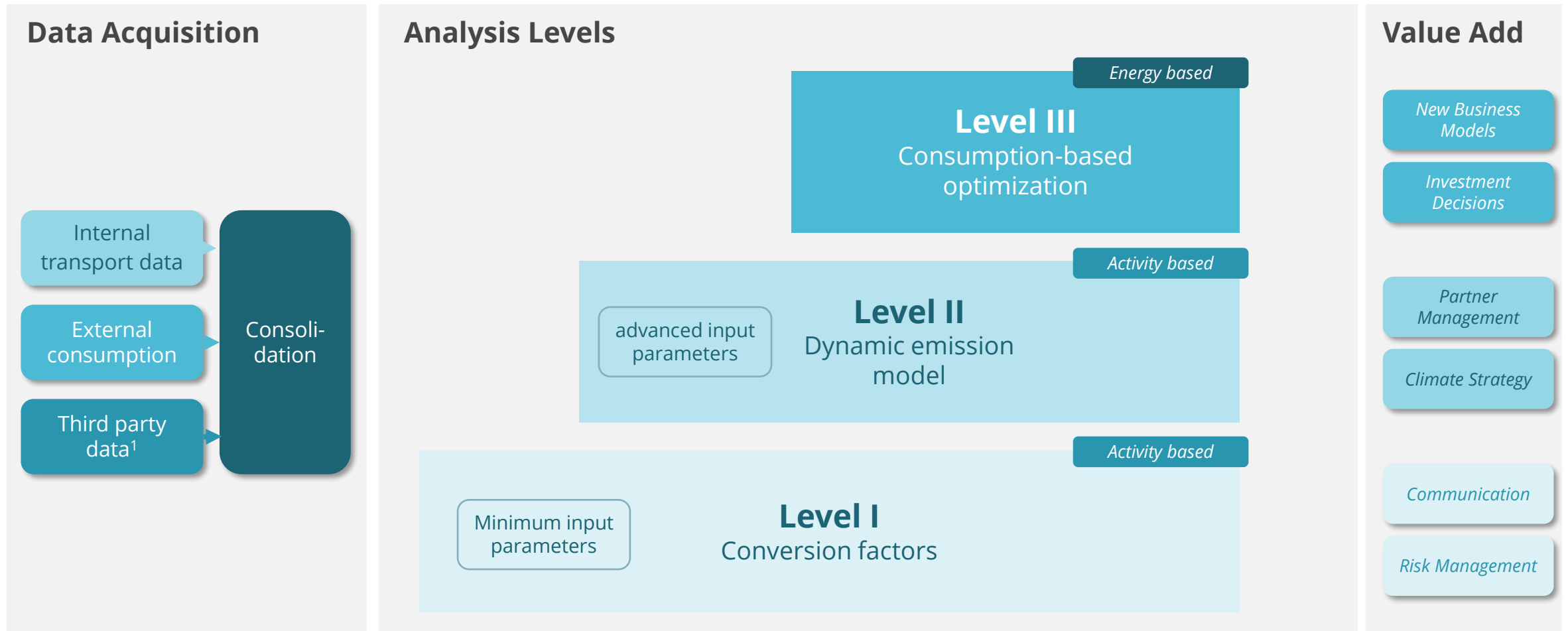


shipzero platform

Data integration, emission calculation, analytics

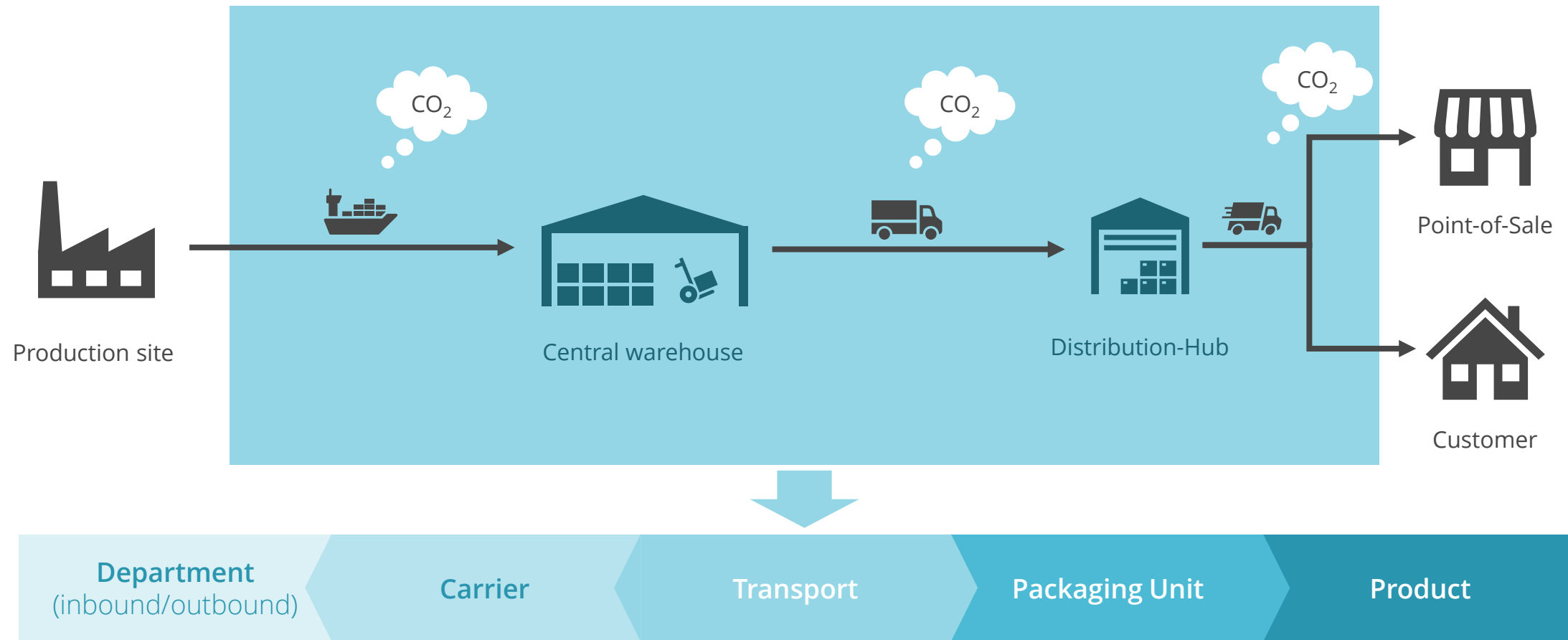


DATA INPUT DETERMINES INSIGHT-DEPTH



1) Amongst others: traffic, mapping services, weather data, or redundant track & trace information for quality assurance

WE ENABLE PRECISE EMISSION ALLOCATION



PARTNERS AND SOURCES

Certified calculation model with strong scientific background

Governance and standardization



Calculation partner

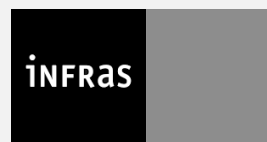


Compensation partner



Scientific methodology partners of the EcoTransIT World Initiative

Methodology



COMPLIANCE AND REPORTING STANDARDS

Full accordance with:



Usable for disclosure, offsetting and certification:



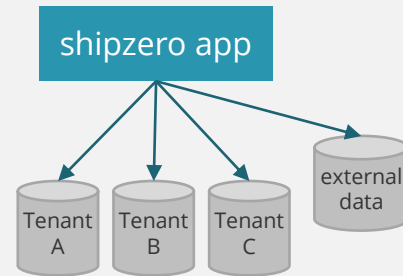
DATA PRIVACY AND SOVEREIGNTY

Secure data storage



- Non-financial, historical data
- No personal data (GDPR)
- All databases located in Europe West (AMS or FRA)
- Built-in Microsoft Azure Cloud Security

Multi-tenant data mgmt



- Individually managed subscriptions
- No unauthorized data sharing
- Transferability of results for self-service analytics

Encrypted data transfer



- Secure API management (TLS encrypted)
- Direct database connections via VPN
- Dedicated user rights management and authentication

Data sharing consent

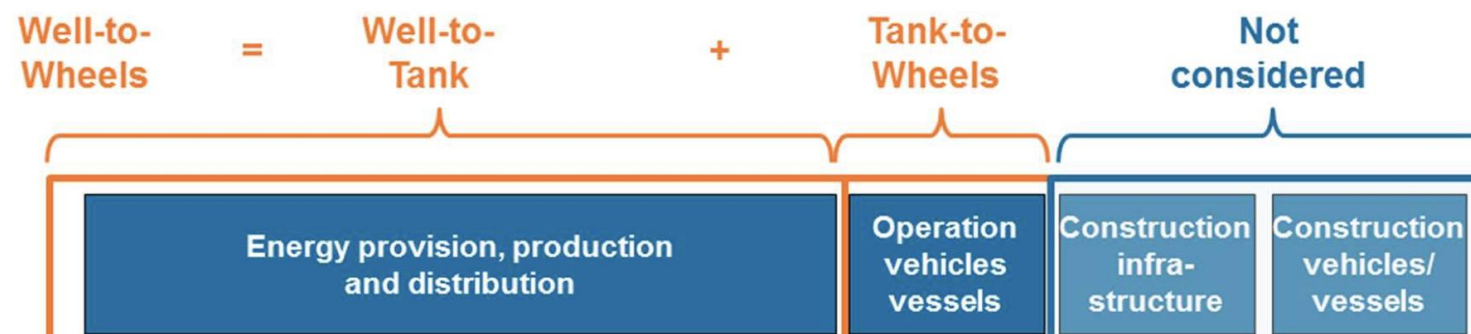


- Self-sovereign data management
- Opt-in to share the data with transport partners
- Opt-out at anytime, if commercial agreements change

PROPULSION ENERGIES AND SYSTEM BOUNDARIES

| Transport mode | Vehicles / Vessels types | Emission classes | Supported propulsion energy | Primary data available |
|----------------|--------------------------|------------------|---|--|
| Road | 15 | 17 | Diesel, CNG, LNG, Electricity, Hydrogen | Considers country-specific energy mix and bio-fuel share |
| Rail | 16 | 11 | Electricity, diesel | Considers country-specific energy mix and bio-fuel share |
| Barge | 6 | 5 | Electricity, diesel | Considers country-specific energy mix and bio-fuel share |
| Maritime | 49 | 3 | HFO, MDO, MGO, LNG | Considers emission control areas |
| Air | 263 | - | Kerosene | |

SYSTEM BOUNDARIES



FAQS AND CONTACTS



You have a product-related question?

shipzero.com/faq

You have a general question about emission management in freight transportation?

shipzero.com/climate-impact



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12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



17 PARTNERSHIPS
FOR THE GOALS

