2025 Supply Chain Summit

Green Logistics & Energy Transition in Brazil

The PLVB Contribution

Márcio D´Agosto
Brazilian Green Logistic Program (PLVB)
September 4th, 2025 (10 to 11 BRT)

ABOUT US...

IBTS INSTITUTO BRASILEIRO DE TRANSPORTE SUSTENTÁVEL®

http://ibts.eco.br

Non-profit technical institution with the mission of promoting sustainability in mobility and logistics

COPPE UFRJ
Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia

www. coppe.ufrj.br

Marcio D'Agosto

Full Professor (Sustainability in Mobility & Logistics) at Transportation Engineering Program (PET) at COPPE/UFRJ, Freight Transportation Laboratory (LTC) Coordinator, President of the Brazilian Institute of Sustainable Transportation (IBTS) and Green Logistics Brazil Program (PLVB) Coordinator.

Programa de Engenharia de Transporte
COPPE -UFRJ

www.pet.coppe.ufrj.br

Laboratório de Transporte de Carga
PET
L T C
COPPE/UFRJ

http://ltc.coppe.ufrj.br

OSML OBSERVATÓRIO DE SUSTENTABILIDADE EM MOBILIDADE E LOGÍSTICA BRASIL

www.osml.eco.br

GREEN LOGISTICS AS A GREEN LOGISTICS PROGRAMM

- GUIDING QUESTIONS
- MISSION, VISION & VALUE
- FRAMEWORK
- TIMELINE & PRESENT SITUATION
- OUTPUTS
  - Services
  - Products

GUIDING QUESTIONS

PLVB PROGRAMA DE LOGÍSTICA VERDE BRASIL®

Can my company be efficient while multiplying social and environmental benefits?

How can I be more efficient even with the infrastructure limitations that the country faces?

Is it possible to reduce costs while protecting the environment and society?

MISSION, VISION & VALUE

MISSION

LEADING COMPANIES OPERATING IN DIFFERENT MARKETS AROUND THE WORLD MUST TAKE THE PROTAGONISM IN PROMOTING THE TRANSFORMATION OF LOGISTICS IN THE SEARCH OF EFFICIENCY AND SUSTAINABILITY.

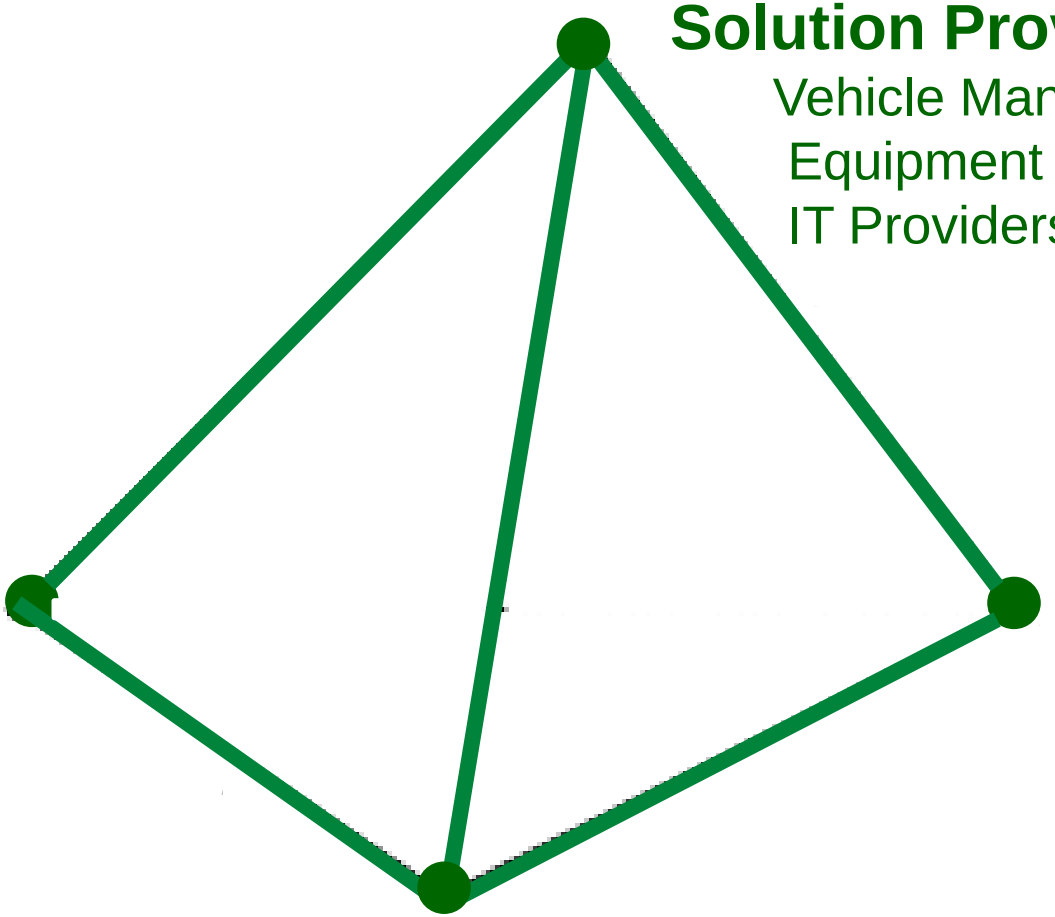
VISION

PLVB IS THE ONLY BRAZILIAN PROGRAM THAT BRINGS SHIPPERS, CARRIERS & 3PL TOGETHER TO PROMOTE EFFICIENCY AND SUSTAINABILITY IN LOGISTICS!

VALUE

FRAMEWORK

Solution Providers
Vehicle Manufacturers
Equipment Manufacturers
IT Providers



Support Institutions
NGO
Unions
Academy
Government

Member Companies
Shippers
Carriers
3PL

Program Coordination
Except Institution (Academy)

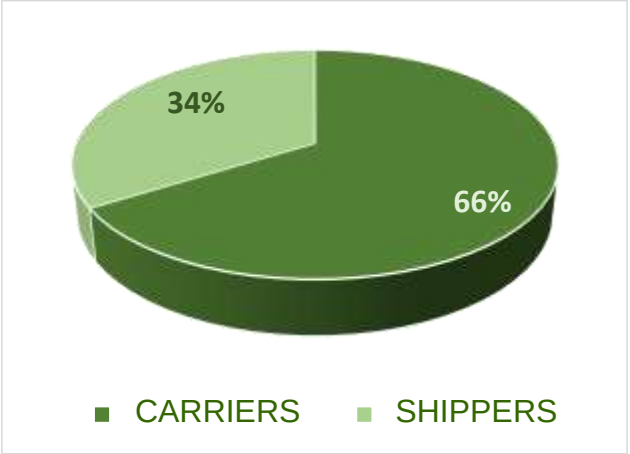
TIMELINE & PRESENT SITUATION

MORE THAN 100 COMPANIES... MORE THAN 200 PROFESSIONALS...

SETTING - UNDERSTANDING – TRAINING – RECOGNITION – CERTIFICATION– EVOLUTION – REVISION - EXPANDING

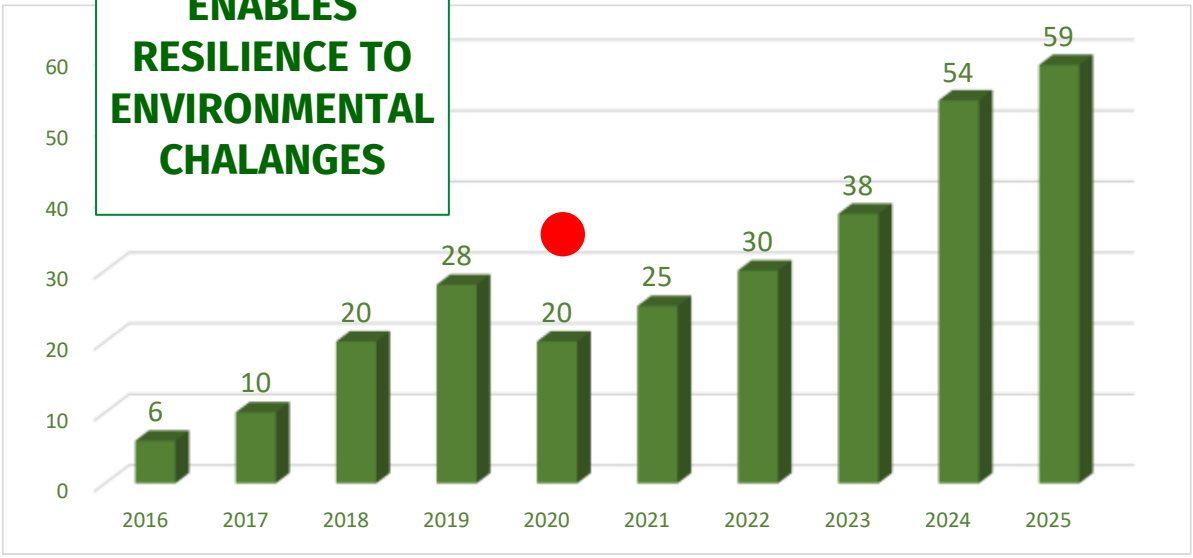
2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023/ 2024

TIMELINE & PRESENT SITUATION

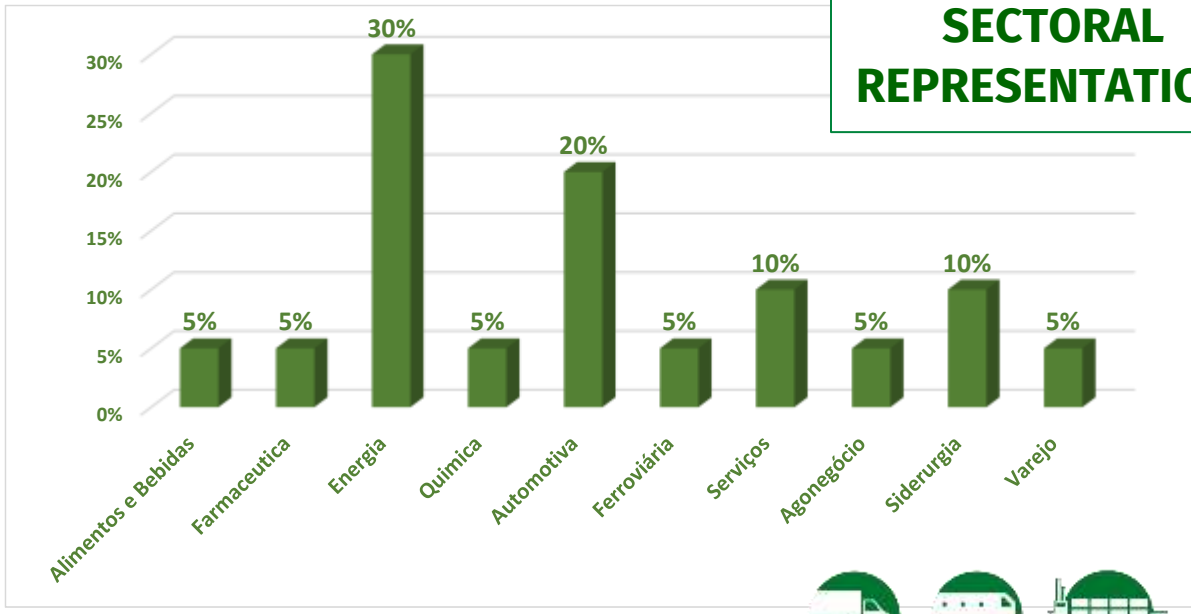


INTEGRATES LOGISTICS SECTORS

ENABLES RESILIENCE TO ENVIRONMENTAL CHALANGES



PROMOTES SECTORAL REPRESENTATION!



SERVICES

RECOGNITION & CERTIFICATION

THEMATIC WORKSHOPS

REFERENCE PUBLICATIONS

THECNICAL SUPPORT

TRAINING

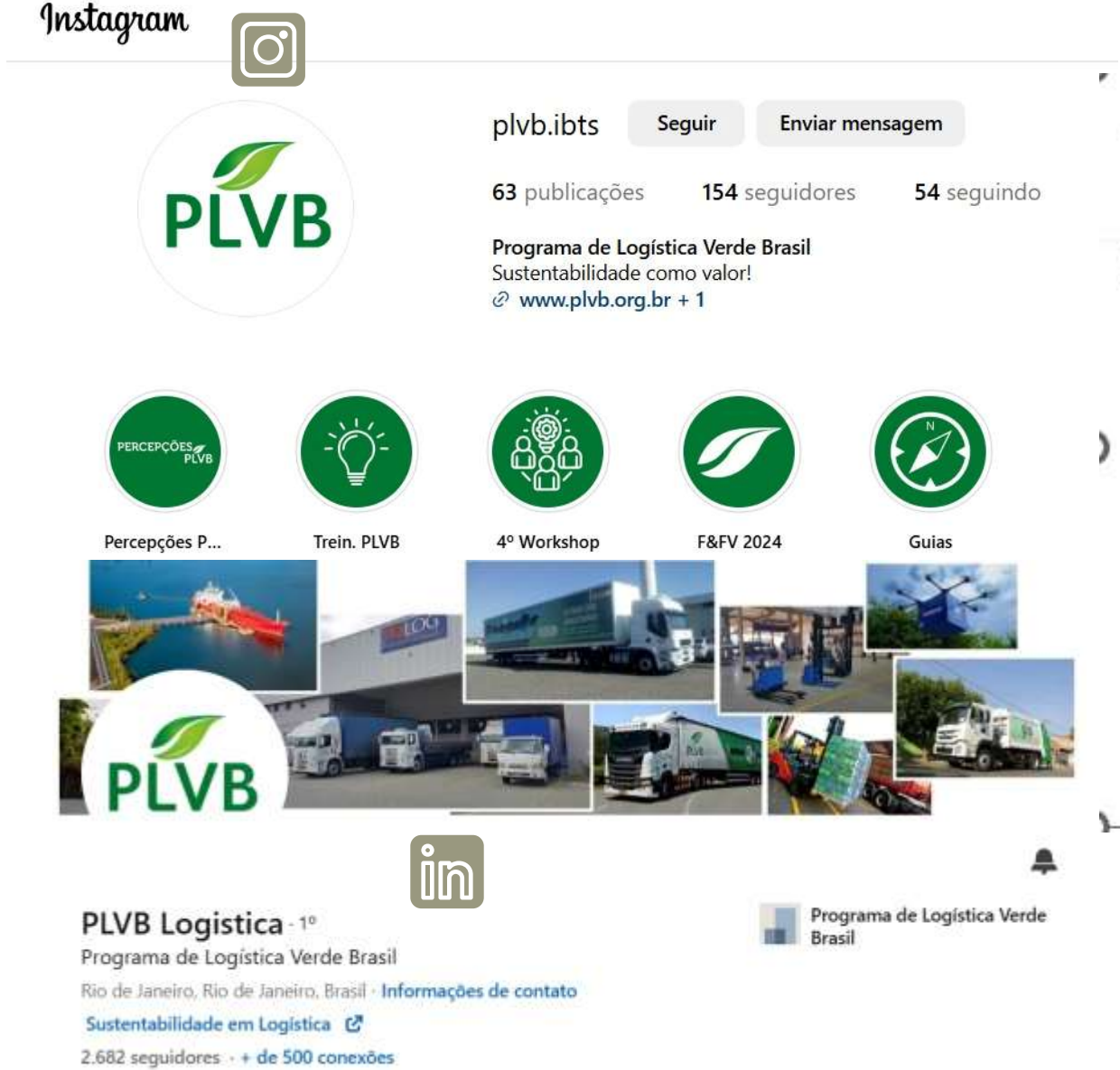
NETWORKING

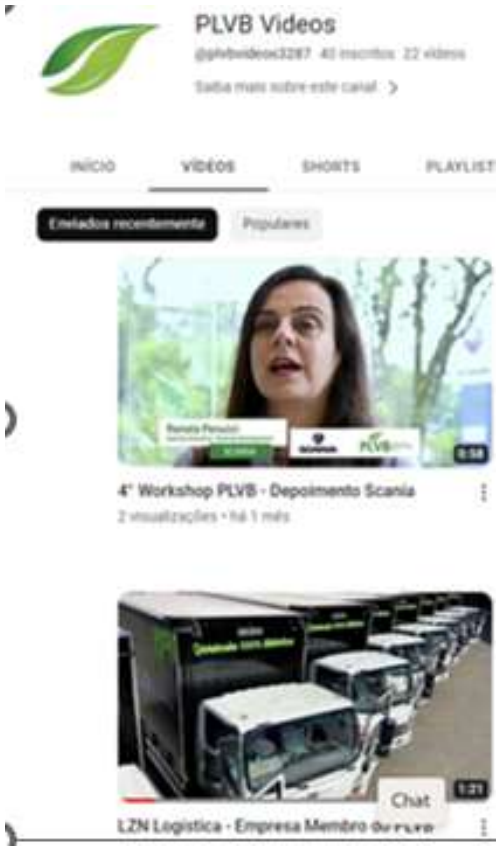
INTERNATIONAL COVERAGE

WORK MEETINGS

PRODUCTS - PUBLICATIOS

PRODUCTS – WEBSITE & NETWORK





SUSTANABILTY INTEGRATION

PLVB PROGRAMA DE LOGÍSTICA VERDE BRASIL®

=

PARTNERSHIPS FOR THE GOALS

THE PATH TO SUSTAINABILITY IN LOGISTICS

ROADMAP TO SUSTAINABLE LOGISTICS

LOGÍSTICA
(FLUXO DIRETO E REVERSO)
LOGISTICS
(DIRECT AND REVERSE FLOW)

- R$/NS
- *$/LS*

LOGÍSTICA DE BAIXO CARBONO
LOW-CARBON LOGISTICS

- CO_2 (GEE)
- *CO_2 (GHG)*

LOGÍSTICA VERDE
GREEN LOGISTICS

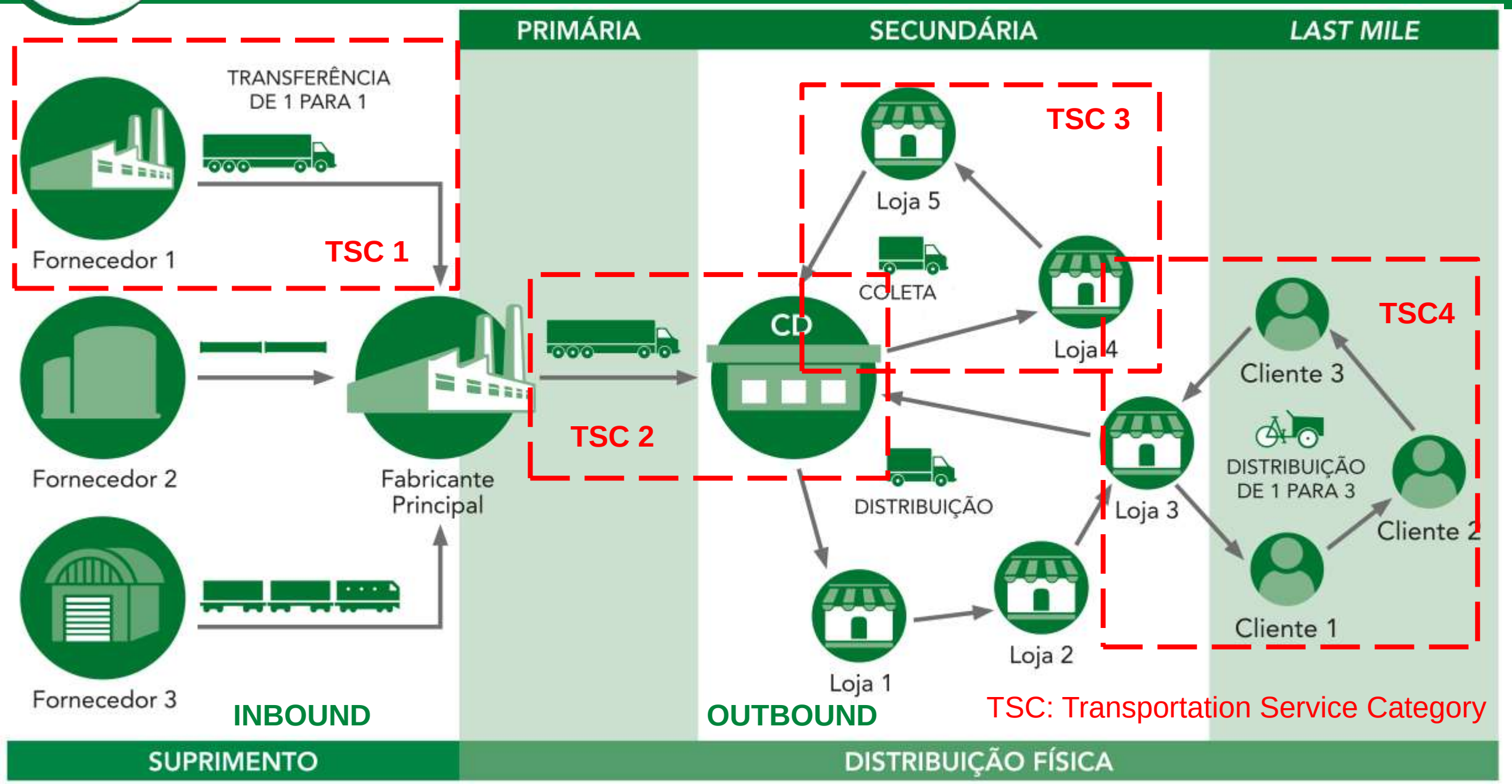
- Outros GEE;
- Poluentes atmosféricos;
- Descarte inadequado de resíduos;
- Utilização inadequada de recursos.
- *Other GHGs;*
- *Air pollutants;*
- *Inadequate waste disposal;*
- *Inadequate use of resources.*

LOGÍSTICA SUSTENTÁVEL
SUSTAINABLE LOGISTICS

- Geração de emprego;
- Distribuição de renda;
- Qualidade de vida.
- *Employment generation;*
- *Income distribution;*
- *Quality of life.*

PROGRAMA DE LOGÍSTICA VERDE BRASIL • PLVB® • MEMBRO CERTIFICADO

Supply chain approach & TSC



ROADMAP TO NET ZERO CARBON EMISSIONS

1st STEP

GHG INVENTORY

GHG Inventory Training

2nd STEP

BEST PRACTICES

PLVB Training

3rd STEP

COMPENSATION

GHG Inventory approach

Programa Brasileiro GHG Protocol

Corporate Inventory

Represents direct and indirect GHG emissions within an organization's domains

LOGISTICS

Services

Represents the direct and indirect GHG emissions of a service category

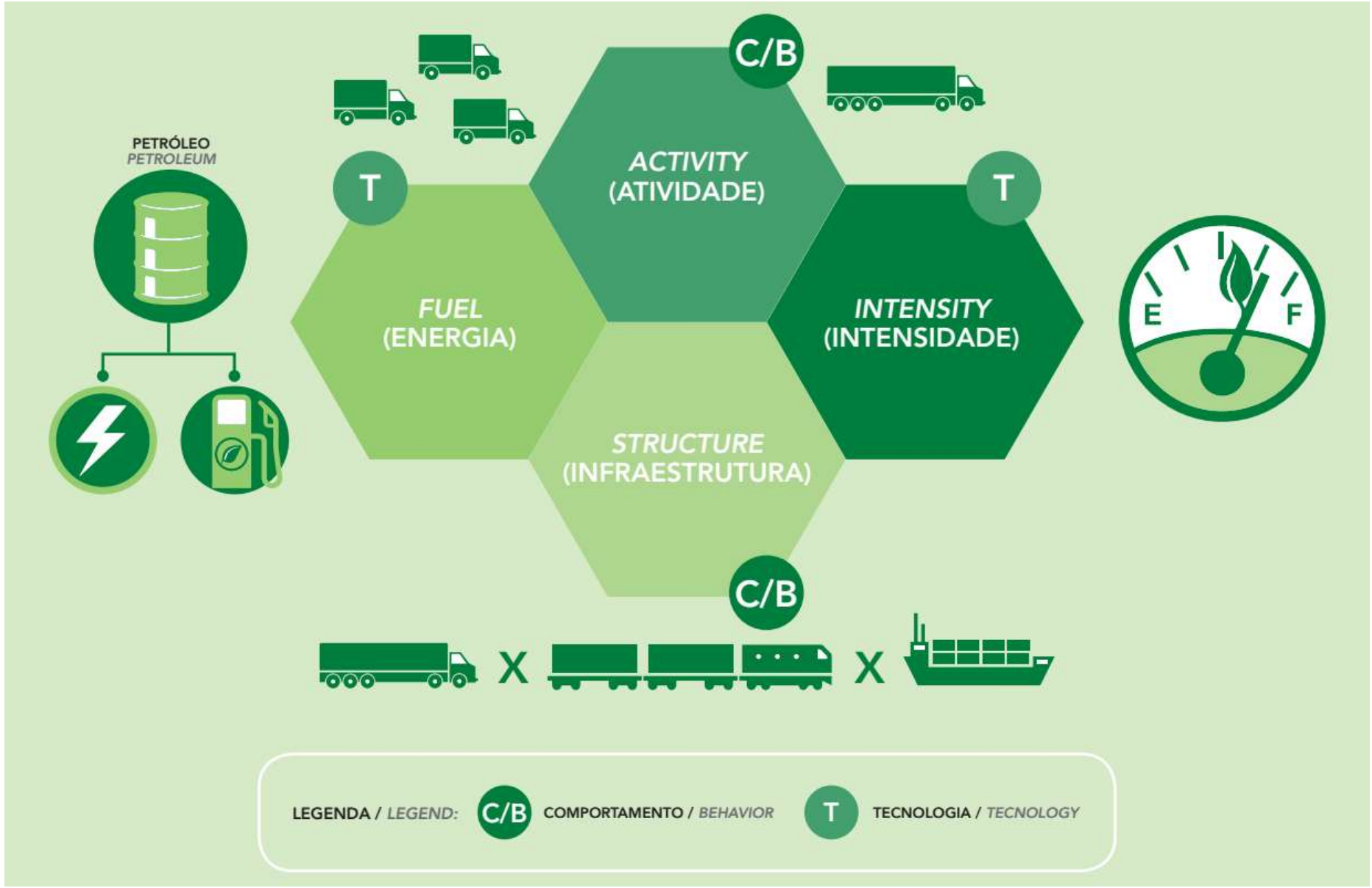
TSC

Facilities

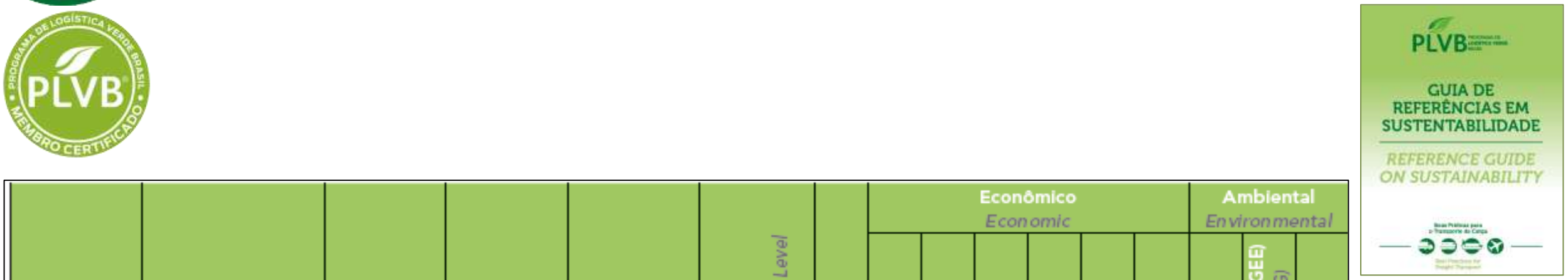
Represents the direct and indirect GHG emissions of a specific facility

LOGISTICS GHG EMISSIONS

BEST PRACTICES

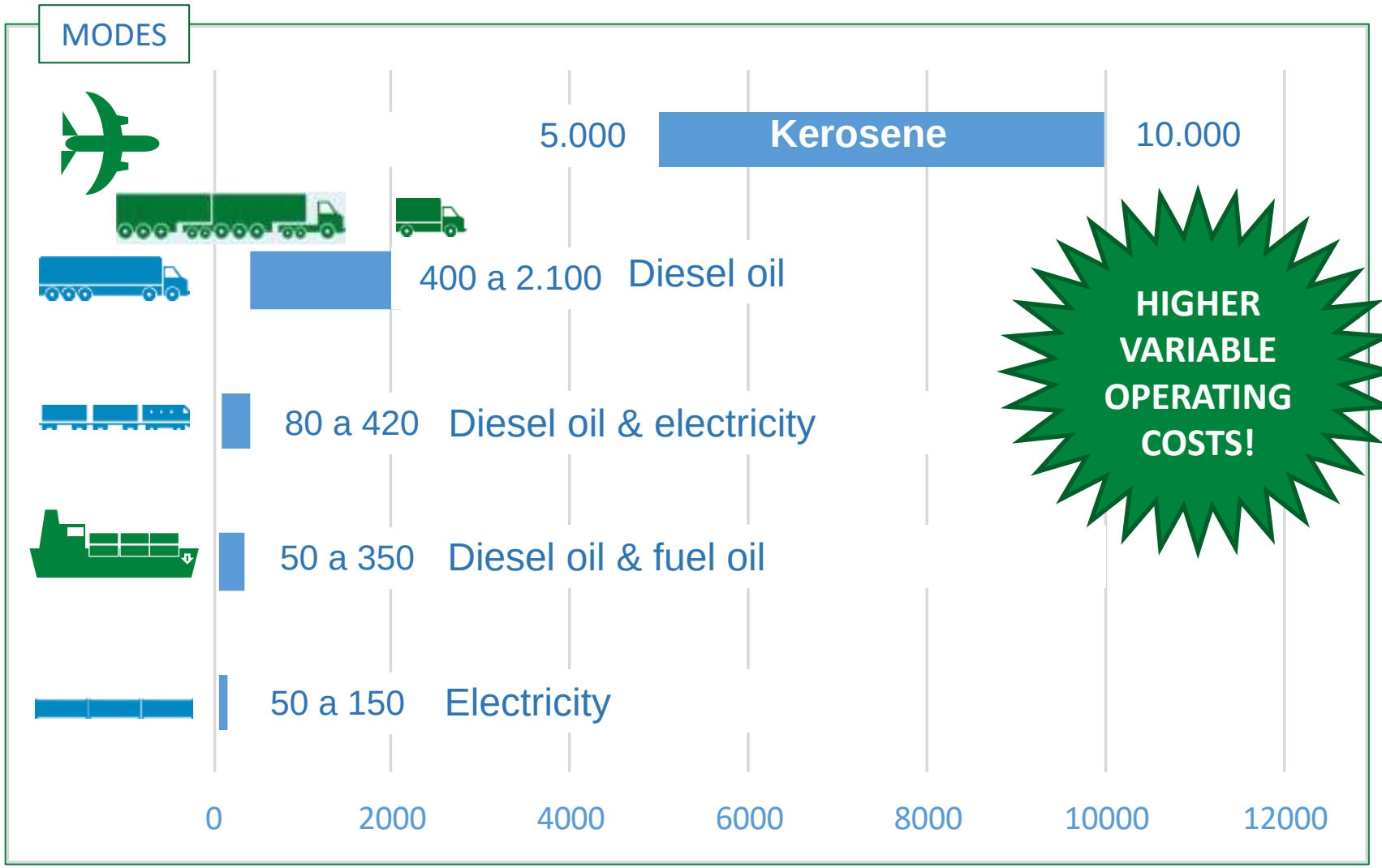


BEST PRACTICES



Linhas de Atuação - ASIF *Lines of Action - ASIF*	Boas Práticas Identificadas *Best Practices Identified*	Modo Transporte *Transport Mode*	Cadeia de Logística *Supply Chain*	Operação *Operation*	Nível de Planejamento Organizacional *Organizational Planning Level*	Investimento Inicial *Initial investment*	Econômico *Economic*						Ambiental *Environmental*		
							Custo *Cost*	Segurança *Security*	Confiabilidade *Reliability*	Tempo *Time*	Flexibilidade *Flexibility*	Capacidade *Capacity*	Consumo de energia *Energy consumption*	Gases de Efeito Estufa (GEE) *Greenhouse Gases (GHG)*	Poluição Atmosférica *Air Pollution*
Atividade *Activity*	Treinamento de motoristas (Eco-driving) *Driver training (Eco-driving)*	Rodoviário *Road*	Suprimento e Distribuição Física *Supply and Physical Distribution*	Coleta, Distribuição e Transferência *Collection, Distribution and Transfer*	Operacional *Operational*	↑	↓	↑	↑	–	–	–	↓	↓	↓

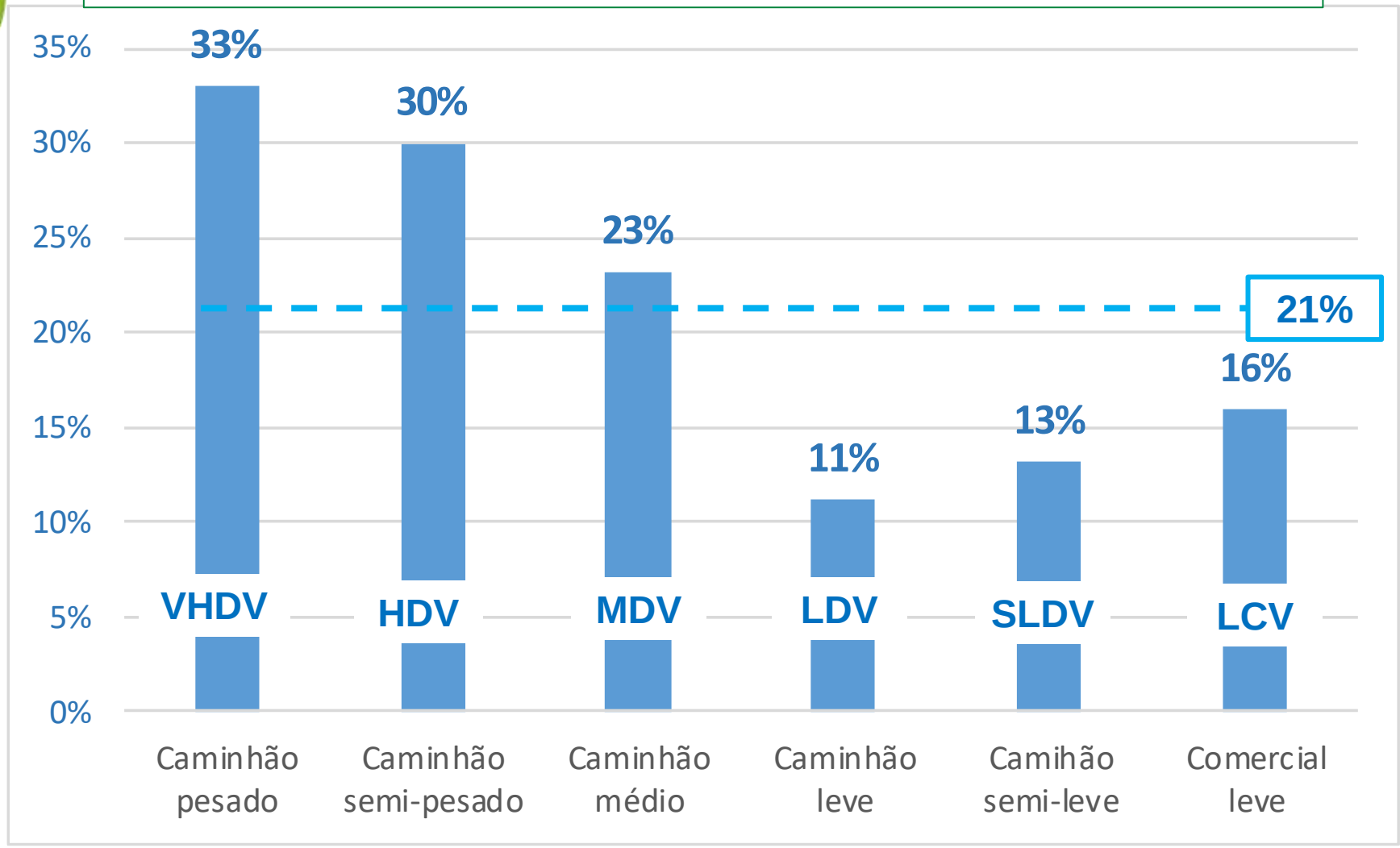
BEST PRACTICES



HIGHER VARIABLE OPERATING COSTS!

BEST PRACTICES

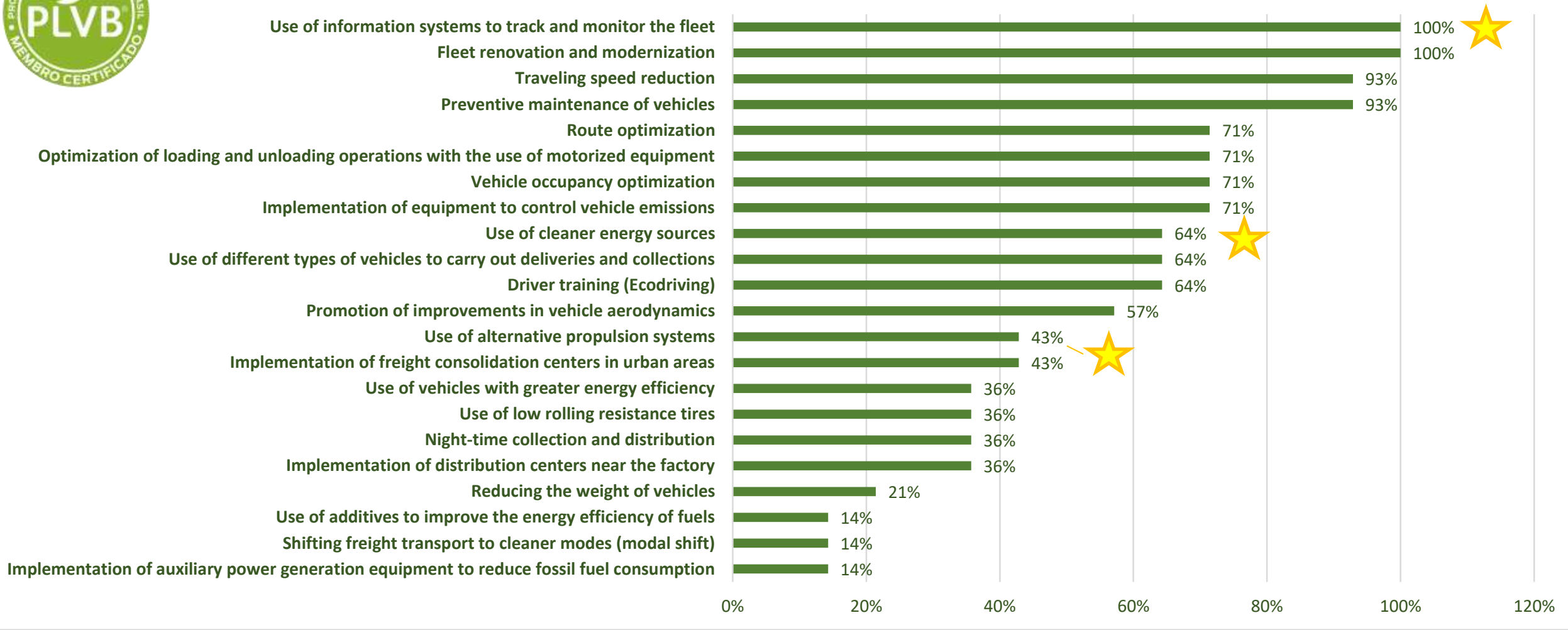
PESO DO CUSTO DO DIESEL NO CUSTO OPERACIONAL TOTAL



Semi-Light Truck (3,5t ≤ TGW < 6t)
Light Truck (6t ≤ TGW <10t)
MDV (10 ≤ TGW < 15t)
HDV (15 ≤ TGW < 40t)
VHDV (40 ≤ TGW)

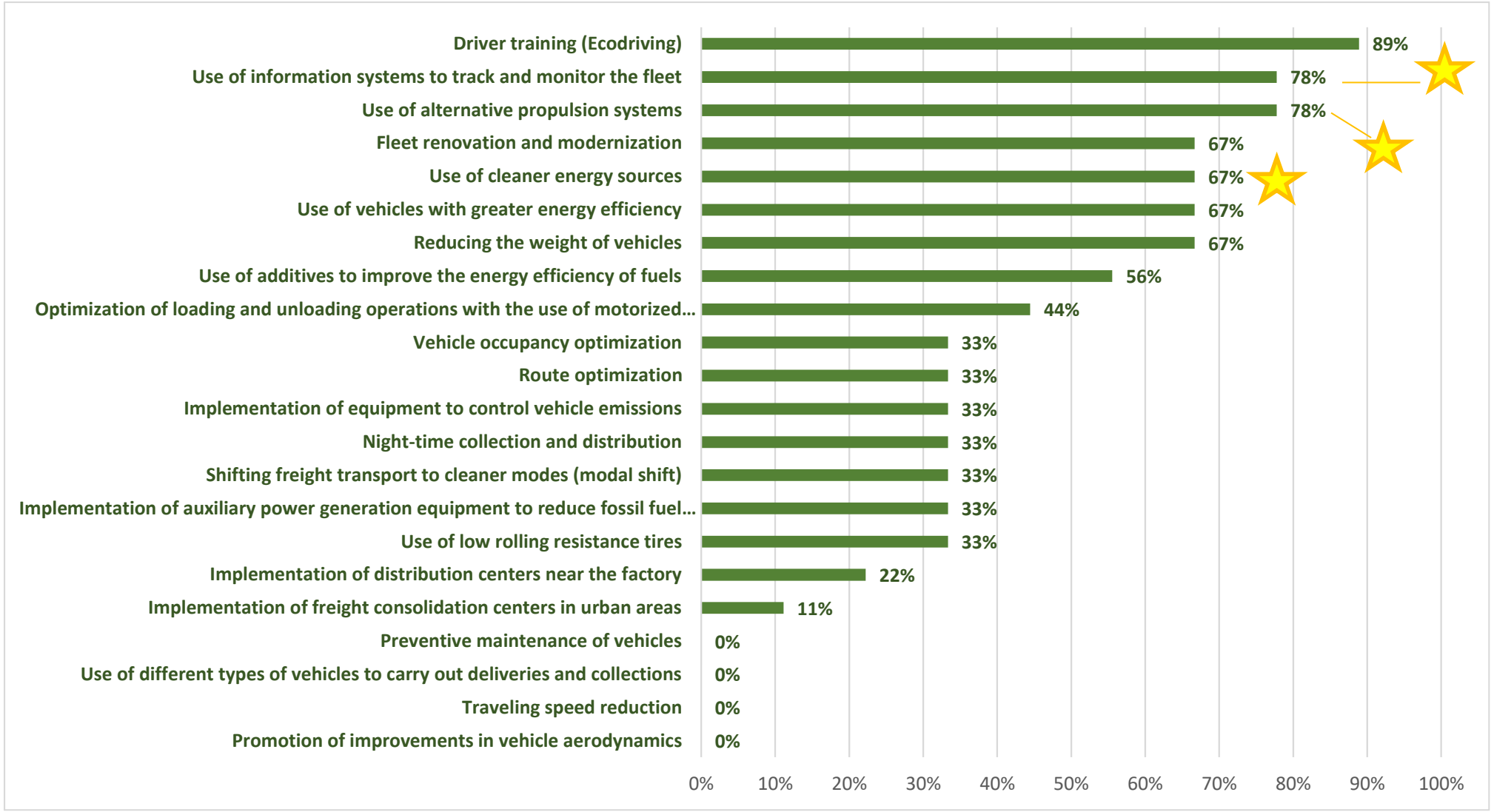
BEST PRACTICES

Summary of Best Practices & Results (Carriers)



BEST PRACTICES

Summary of Best Practices & Results (Shippers)



BEST PRACTICES

Figura 3: Representação gráfica da matriz de Análise SWOT.
Figure 3: Graphical representation of the SWOT Analysis matrix.

SUSTANABILTY INTEGRATION

CONCEPTUAL LESSONS

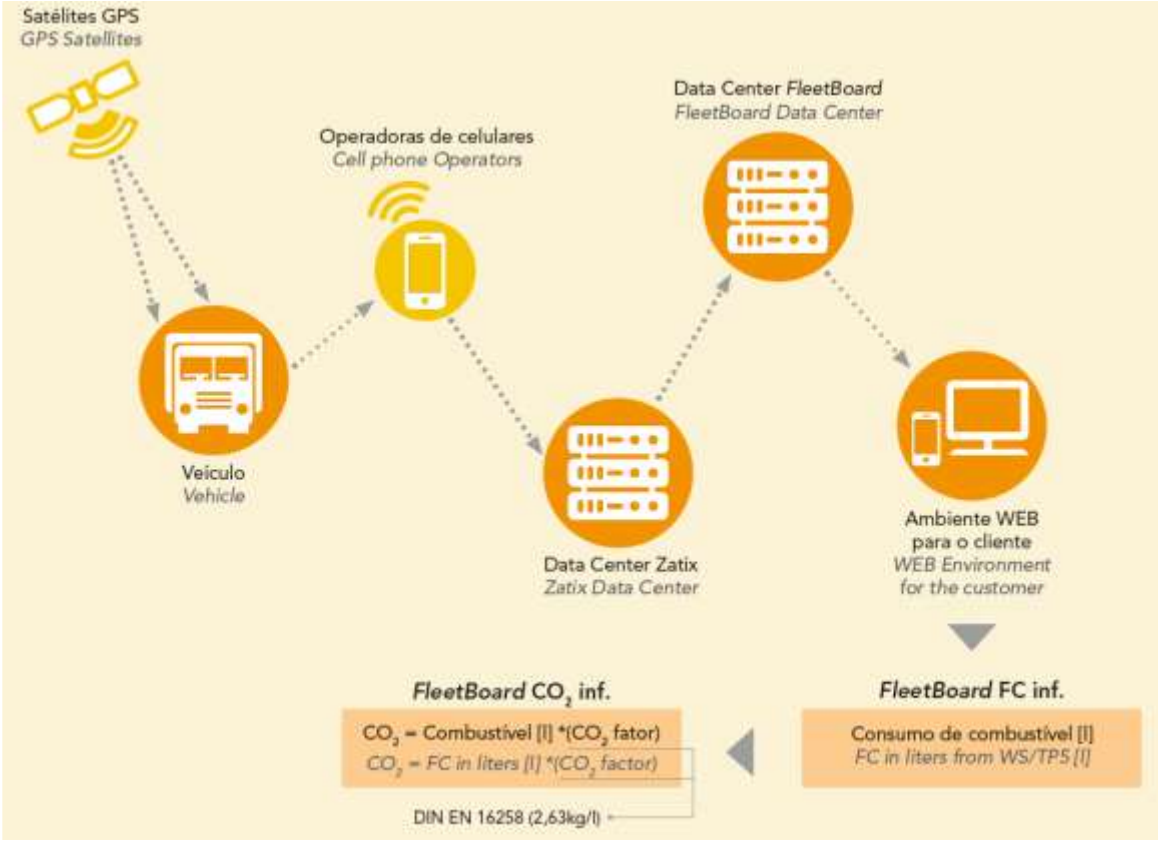
- **Strong conceptual & technical base (academy)**
  - Trustable information.
- **Decoding to the member company language**
  - Match expectations and use what is given.
- **Conquer adhesions (tetrahedron)**
  - Sharing roles.
- **Progressive evolution**
  - Step by step action plan.

Best Practices & Results

CASE STUDIES Best Practices & Results

Use of information systems to track and monitor the fleet (main driver)
Fleet renewal and modernization
Improvements in vehicle aerodynamics
Eco-Driving

Fleel renovation and modernization
Use of information systems to track and monitor the fleet
Promotion of improvements in vehicle aerodynamics
Driver training (Eco- driving)



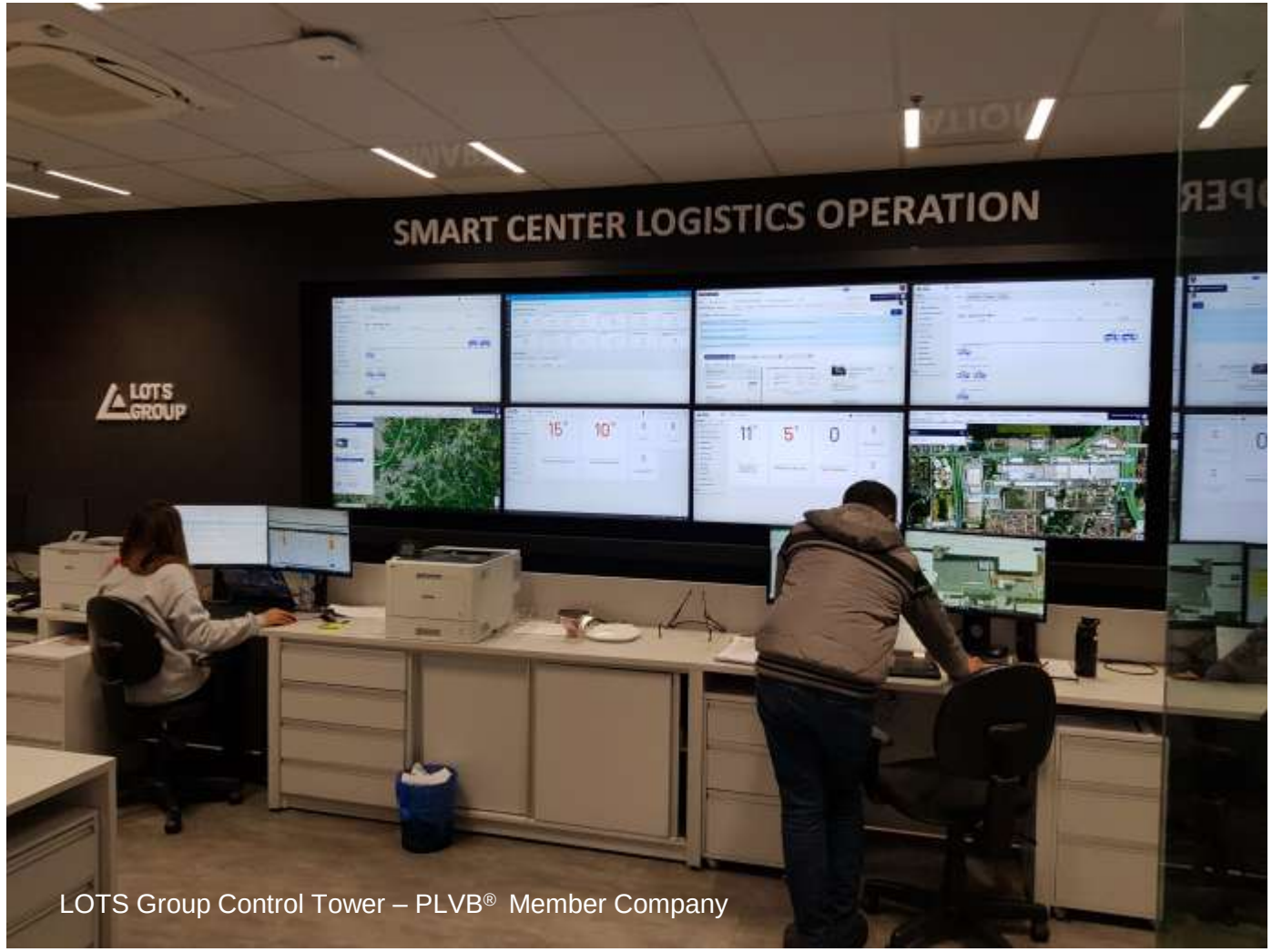
Extent:
6 months operation

Savings:
21% improvement
In fuel economy
and CO_2 emissions

1st Edition

CASE STUDIES Best Practices & Results

Aline Portugal is one of the Best drivers at LOTS Group.



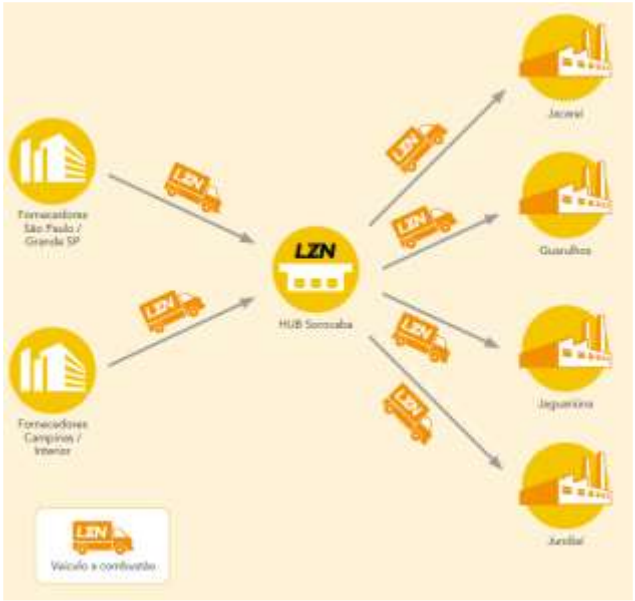
LOTS Group Control Tower – PLVB® Member Company

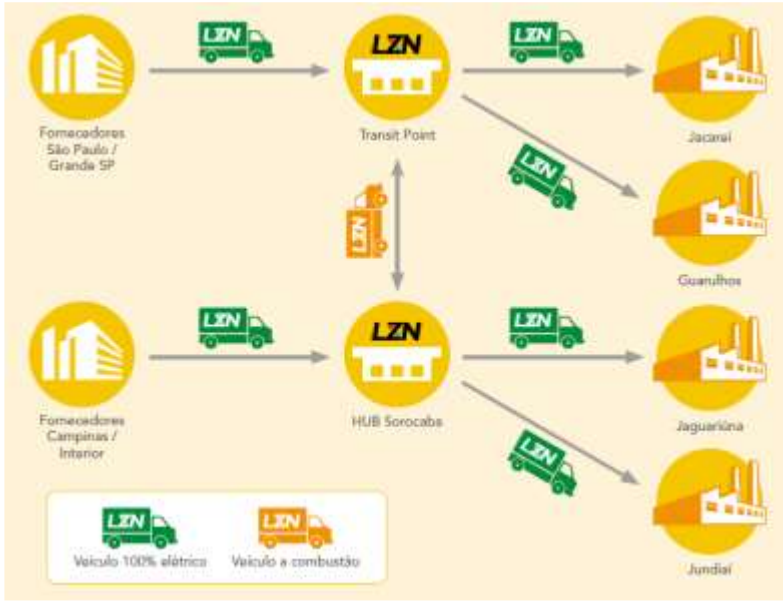
CASE STUDIES Best Practices & Results

Use of alternative propulsion systems and cleaner energy sources (main driver)
Use of alternative propulsion systems (power electrification)
Use of cleaner energy sources (electricity – “from the sun to the wheel” concept)

LZN logística

Implementation of freight consolidation centers in urban areas
Use of alternative propulsion systems
Use of cleaner energy sources

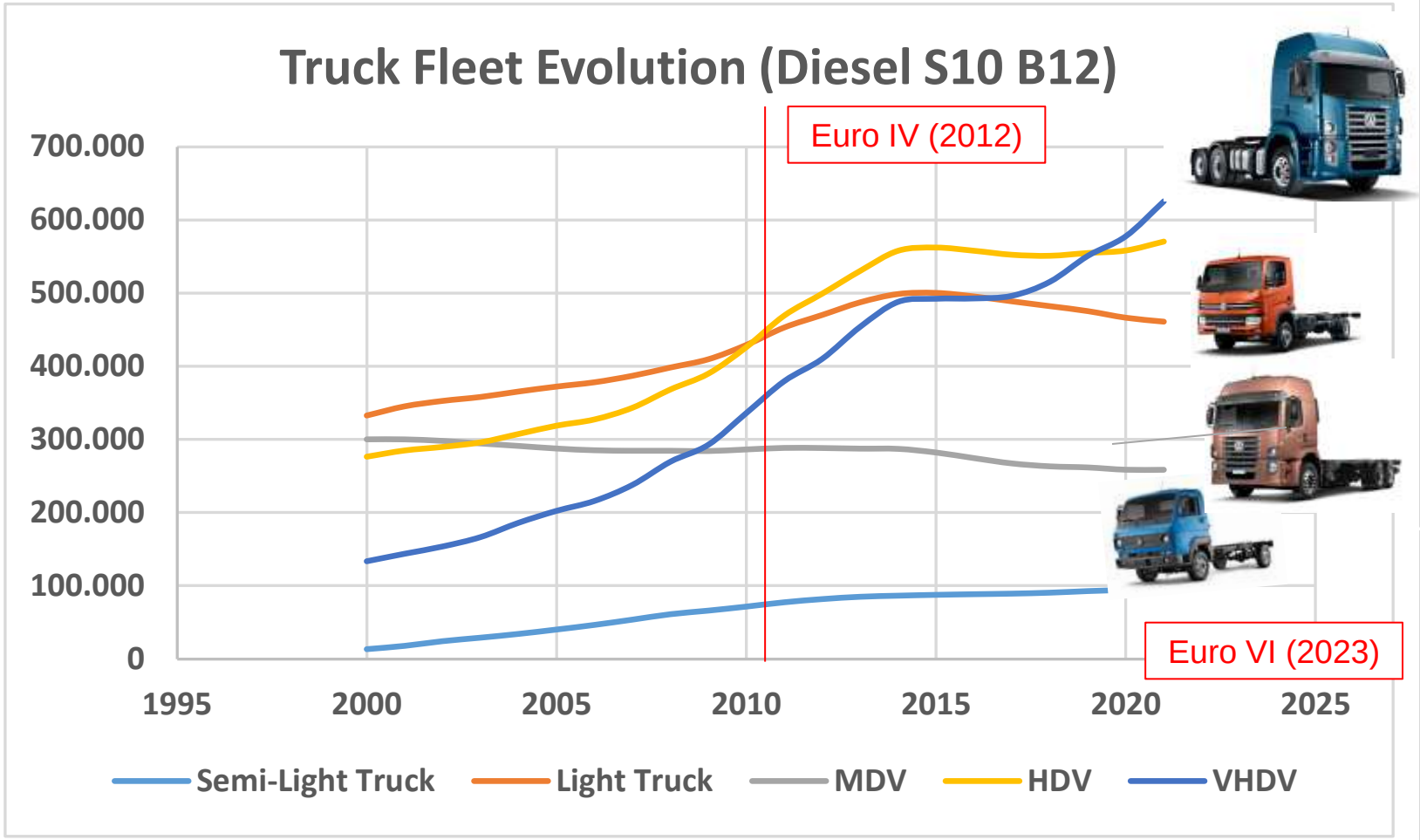




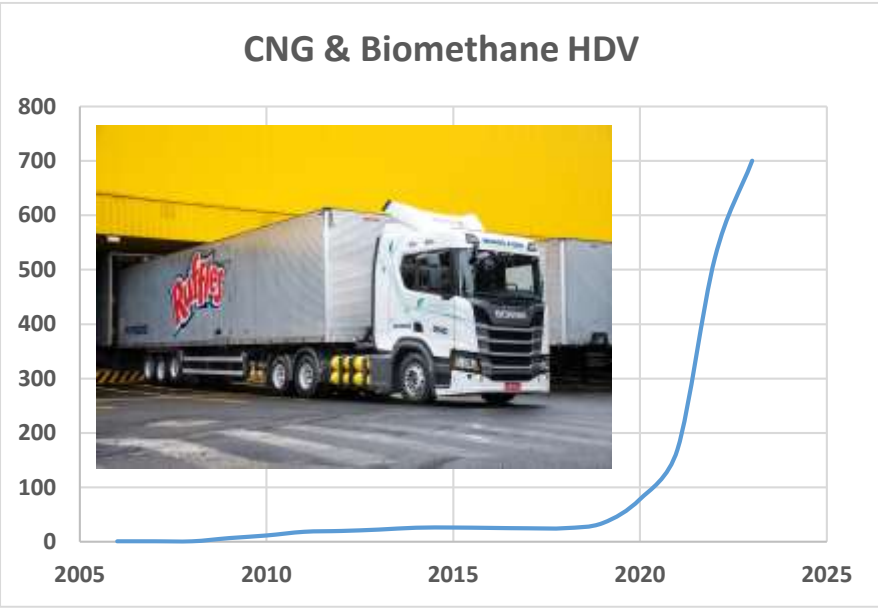
2nd Edition

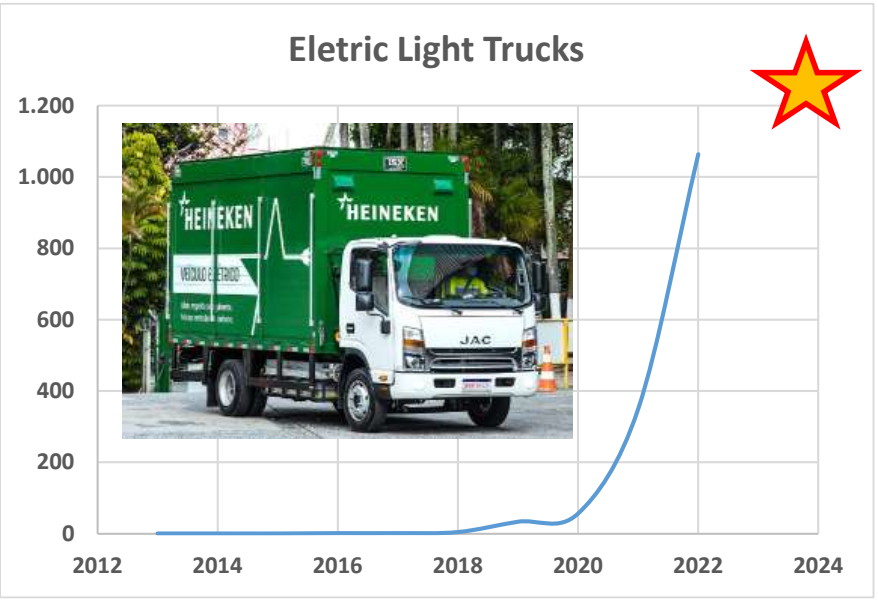
Savings:
195,000 km/year
120 tCO_2/year
51% CO_2 emission

FLEET EVOLUTION & TECHNOLOGY



Semi-Light Truck (3,5t ≤ TGW < 6t)
Light Truck (6t ≤ TGW <10t)
MDV (10 ≤ TGW < 15t)
HDV (15 ≤ TGW < 40t)
VHDV (40 ≤ TGW)





ALTERNATIVE FUELS IN BRAZIL

ALREADY BEING USED

BIODIESEL

MHDV
Mandatory (regulated by the government since 2005)
Blend of 15% in volume in low-Sulphur diesel (fossil) S10 B15.

CNG BIOMETHANE

LDV & MHDV
Compressed Natural Gas (CNG) - 90% methane
Biomethane – 95% methane from biogas
2005 to 2010: introduction – since 2011: growth

ETHANOL

LDV & MDV
Mandatory (regulated by the government since 1970)
Blend of 30% in volume in gasoline (fossil)
Use in flexible-fuel vehicles

TO BE INTRODUCED

HVO

MHDV (Drop-in)
Infrastructure set-up
Middle term (5 to 10 years)

Synfuel

MHDV (Drop-in)
Research stage
Long term (10 to 20 years)

H2V

MHDV
Research stage
Long term (20 to 30 years)

ALTERNATIVE FUELS IN BRAZIL - Infrastructure

BIODIESEL

- S10 B15 is blended at fuel suppliers.
- Distribution all over the country
- Biodiesel (FAME) produced from soil bean oil (most of it), cotton oil and beef tallow.

CNG

BIOMETHANE

- CNG distributed mostly near the coast (Southeast. South & Northeast Regions)
- CNG high flow refueling dispenser at “gas stations” – refueling in less than 20 min (very few).
- Biomethane from landfills, sewage treatment station & biomass (agriculture and livestock).

CASE STUDIES Best Practices & Results

Use of cleaner energy sources (CNG & biomethane)
Use of alternative propulsion system

3rd Edition

Fuel economy (average)
Diesel: 3,00 km/l
GNV/Biomethane: 2,86 km/m³

95,3%

Mileage:
617.516 km/year
1.350 round trips

Bled:
30% Biomethane (land fills)
70% Methane

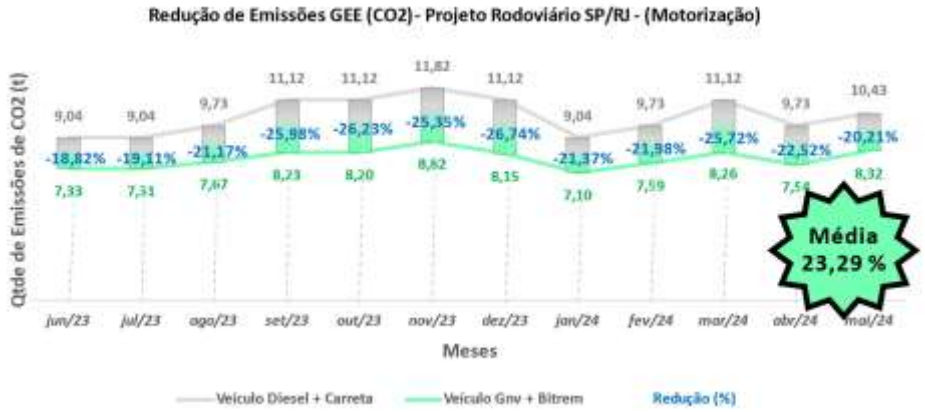
Savings:
34,90% CO_2 emissions
19,44% Costs
Balance reversed
in seedling planting.

CASE STUDIES Best Practices & Results

Use of cleaner energy sources (CNG)
Use of alternative propulsion systems
Optimization of vehicle capacity

5th Edition

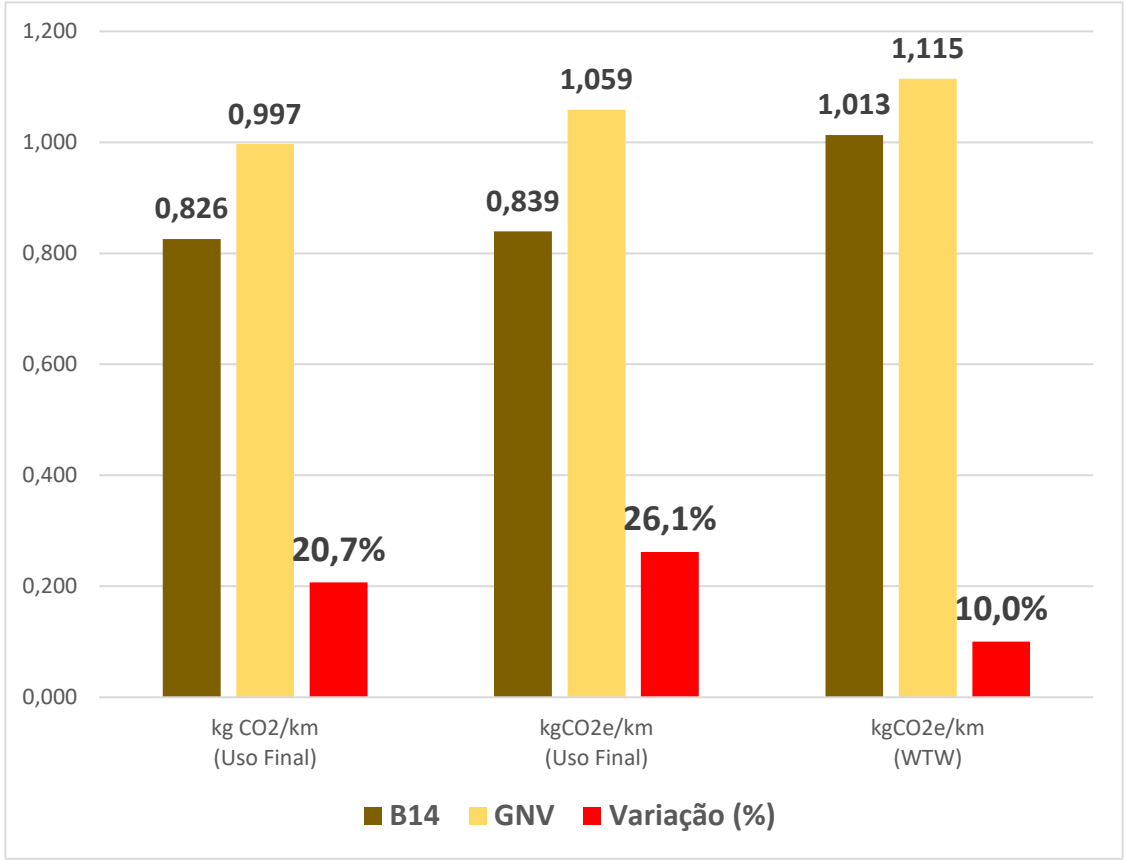
Período Jun/2023 a Mai 2024 - Análise Final				
Dados Entrega	Modelo Propulsão + Tipo		Resultado	
	Veículo (Diesel) + Carreta	Veículo (Gnv) + Bitrem	Rendimento	
Qtde Viagens	267	160	-107	-40,07%
Qtde Transportada (paletes)	16.000	16.000	0	0,00%
Km Rodado	213.600	128.000	-85.600	-40,07%
Emissões de CO2 (t CO2)	186	94	-91,21	-49,15%
Compensação (Árvores)	1.300	661	-639,00	-49,15%



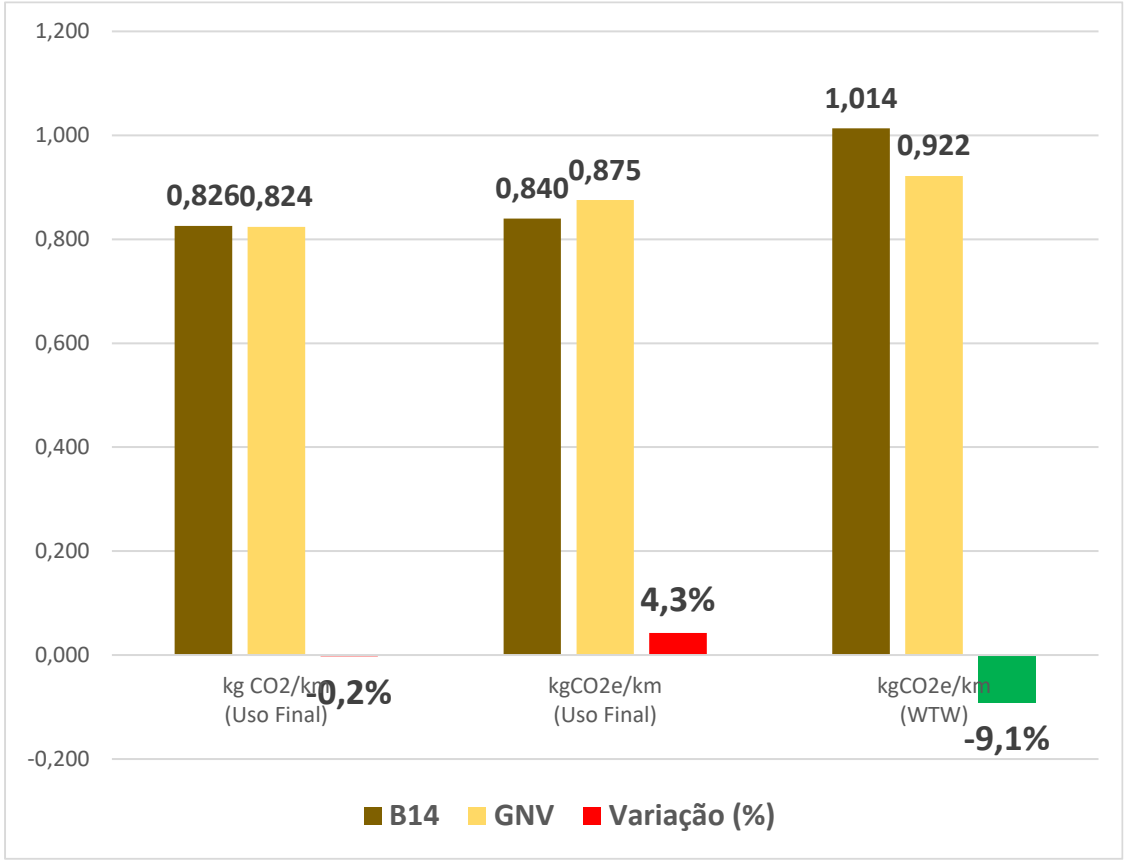
CASOS DE SUCESSO – S10 B14 X GNV

Uso de fontes de energia mais limpas (GNV)

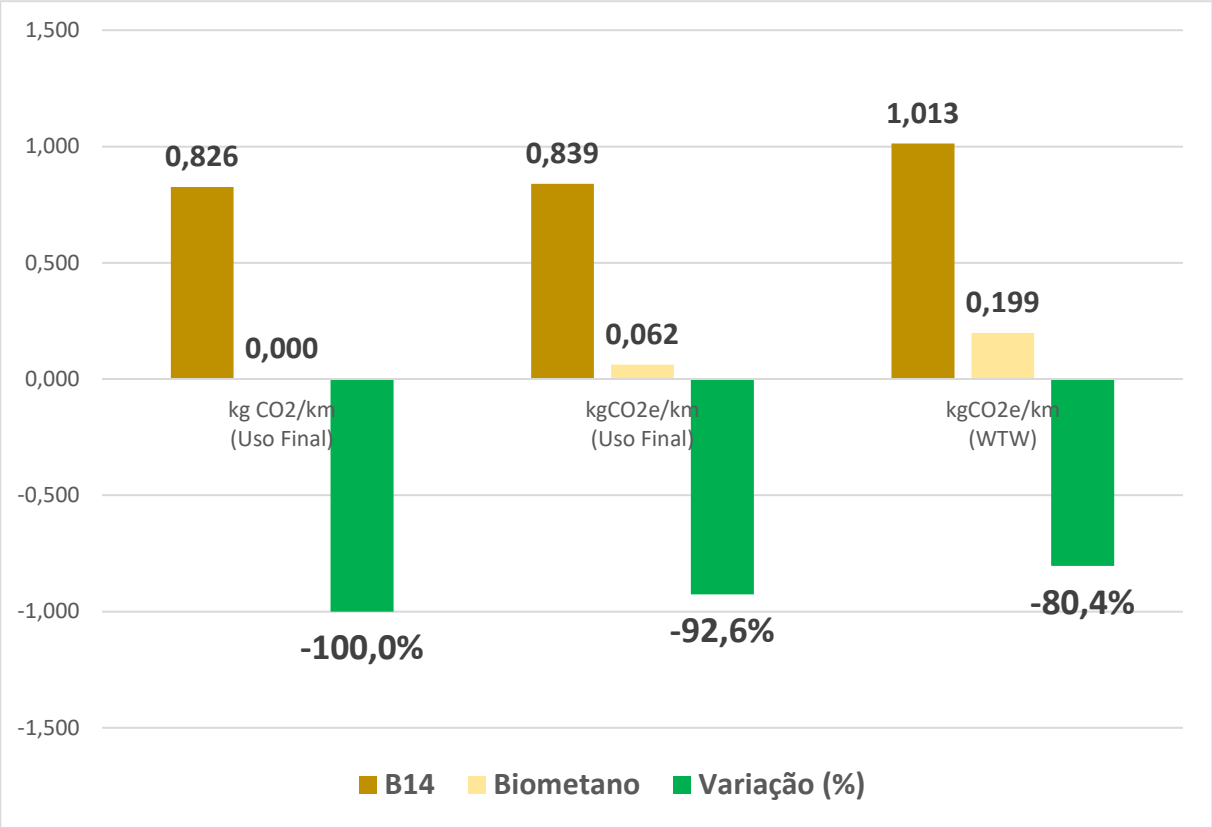
Combustível	Rendimento [km/l] ou km/m3	kg CO2/km (Uso Final)	kgCO2e/km (Uso Final)	kgCO2e/km (WTW)
B14	2,71	0,826	0,839	1,013
GNV	2,01	0,997	1,059	1,115
Variação (%)	74%	20,7%	26,1%	10,0%



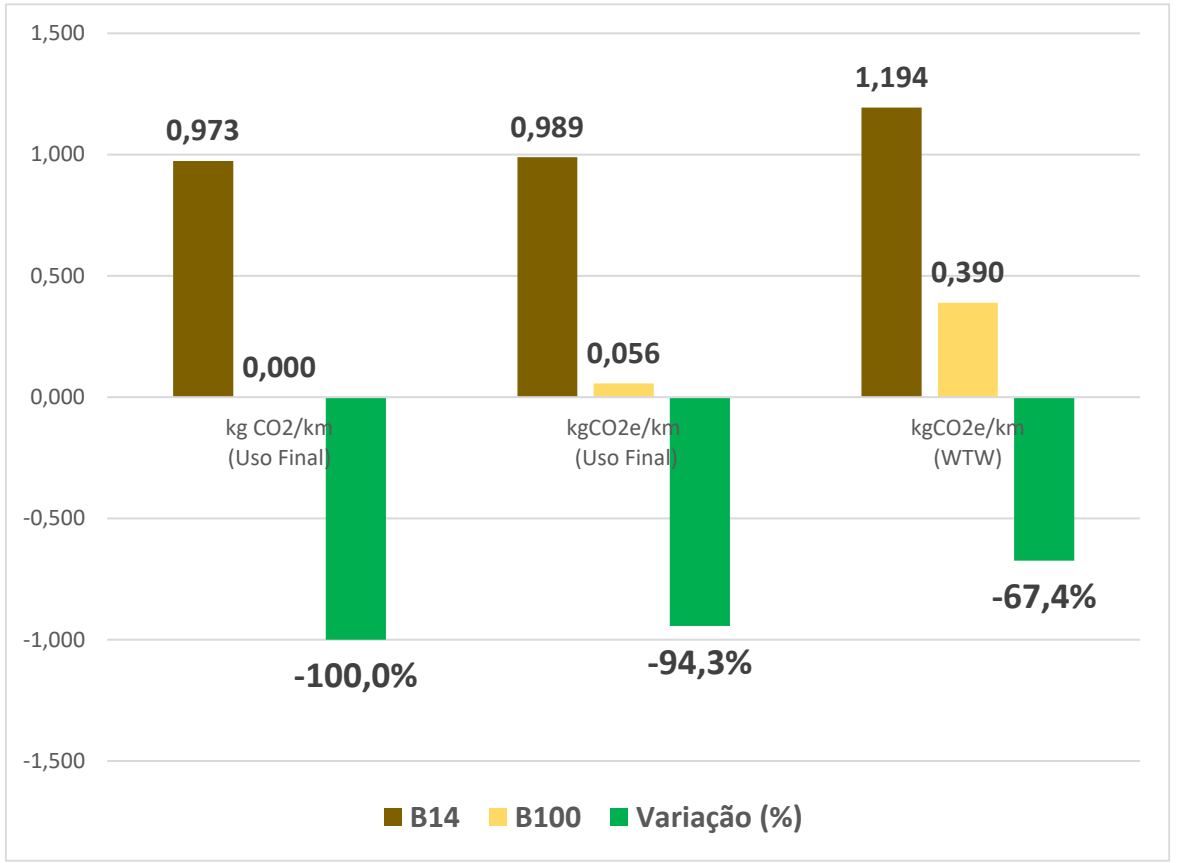
Combustível	Rendimento [km/l] ou km/m3	kg CO2/km (Uso Final)	kgCO2e/km (Uso Final)	kgCO2e/km (WTW)
B14	2,71	0,826	0,840	1,014
GNV	2,43	0,824	0,875	0,922
Variação (%)	90%	-0,2%	4,3%	-9,1%



Combustível	Rendimento [km/l] ou km/m3	kg CO2/km (Uso Final)	kgCO2e/km (Uso Final)	kgCO2e/km (WTW)
B14	2,71	0,826	0,839	1,013
Biometano	2,01	0,000	0,062	0,199
Variação (%)	74%	-100,0%	-92,6%	-80,4%

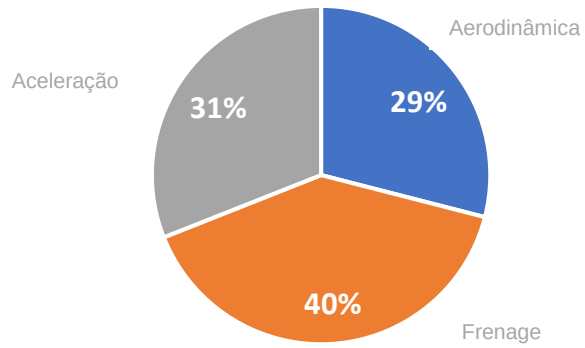


Combustível	Rendimento [km/l] ou km/m3	kg CO2/km (Uso Final)	kgCO2e/km (Uso Final)	kgCO2e/km (WTW)
B14	2,30	0,973	0,989	1,194
B100	2,20	0,000	0,056	0,390
Variação (%)	-4%	-100,0%	-94,3%	-67,4%



BEV TRUCKS, WHERE TO USE IT?

URBAN FREIGHT TRANSPORT



STOP & GO OPERATION – ROUTES UP TO 250 km/day

Semi light trucks fleet increased 40% in 25 years

IMPROVE ENERGY SECURITY
REDUCE ATMOSPHERIC POLLUTION IN CITIES

BEV TRUCKS, WHERE TO USE IT?

Distribuição de bebidas

Coleta de lixo

Distribuição de comidas

Entrega e encomendas

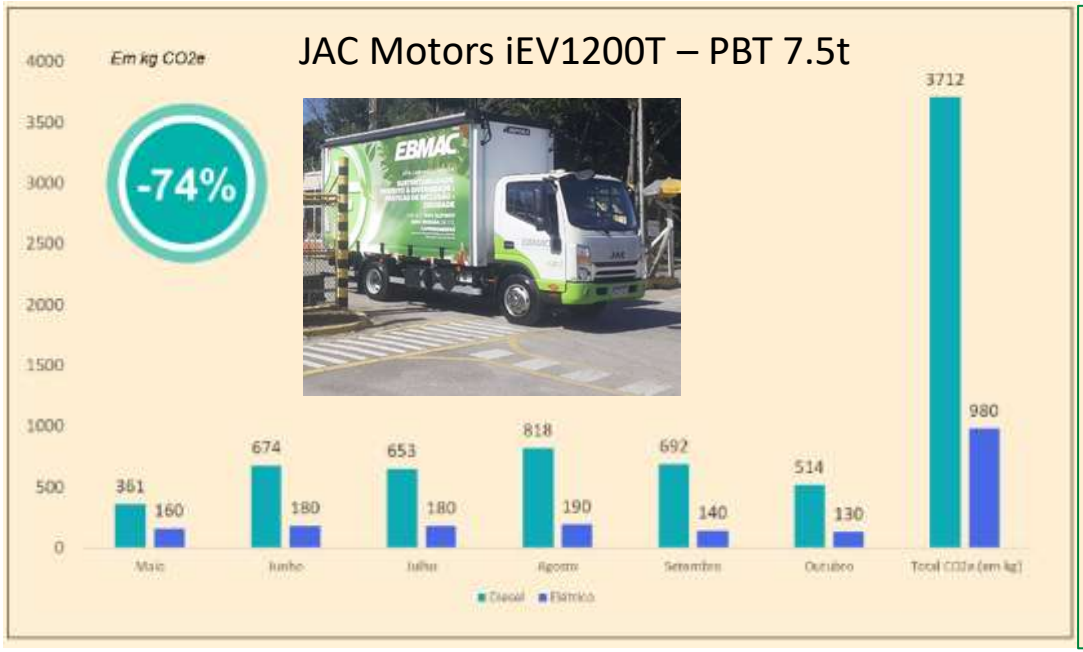
e objetos de valor

Varejo

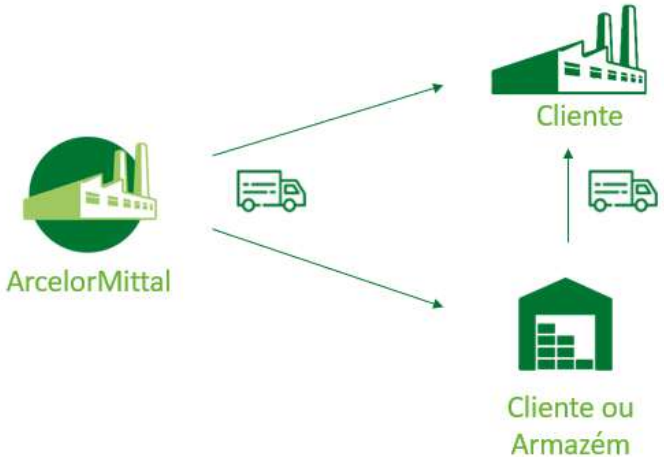
CASE STUDIES Best Practices & Results

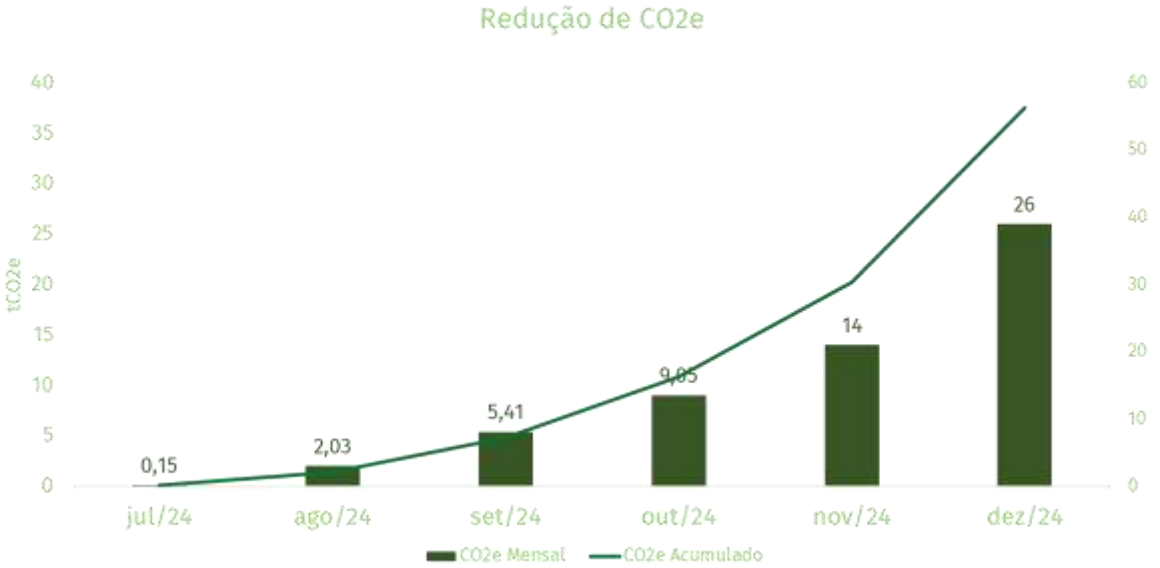
Use of alternative propulsion systems and cleaner energy sources (main driver)
Use of alternative propulsion systems (power electrification)
Use of cleaner energy sources (electricity)

I 4th Edition I



CASE STUDIES Best Practices & Results





2 vehicles(RS)

Expected reduction 58 tCO2e/year

4 vehicles (SC)

Expected reduction 800 tCO2e/year

Vega

7,16% vol/year

25% vol/year (2030)

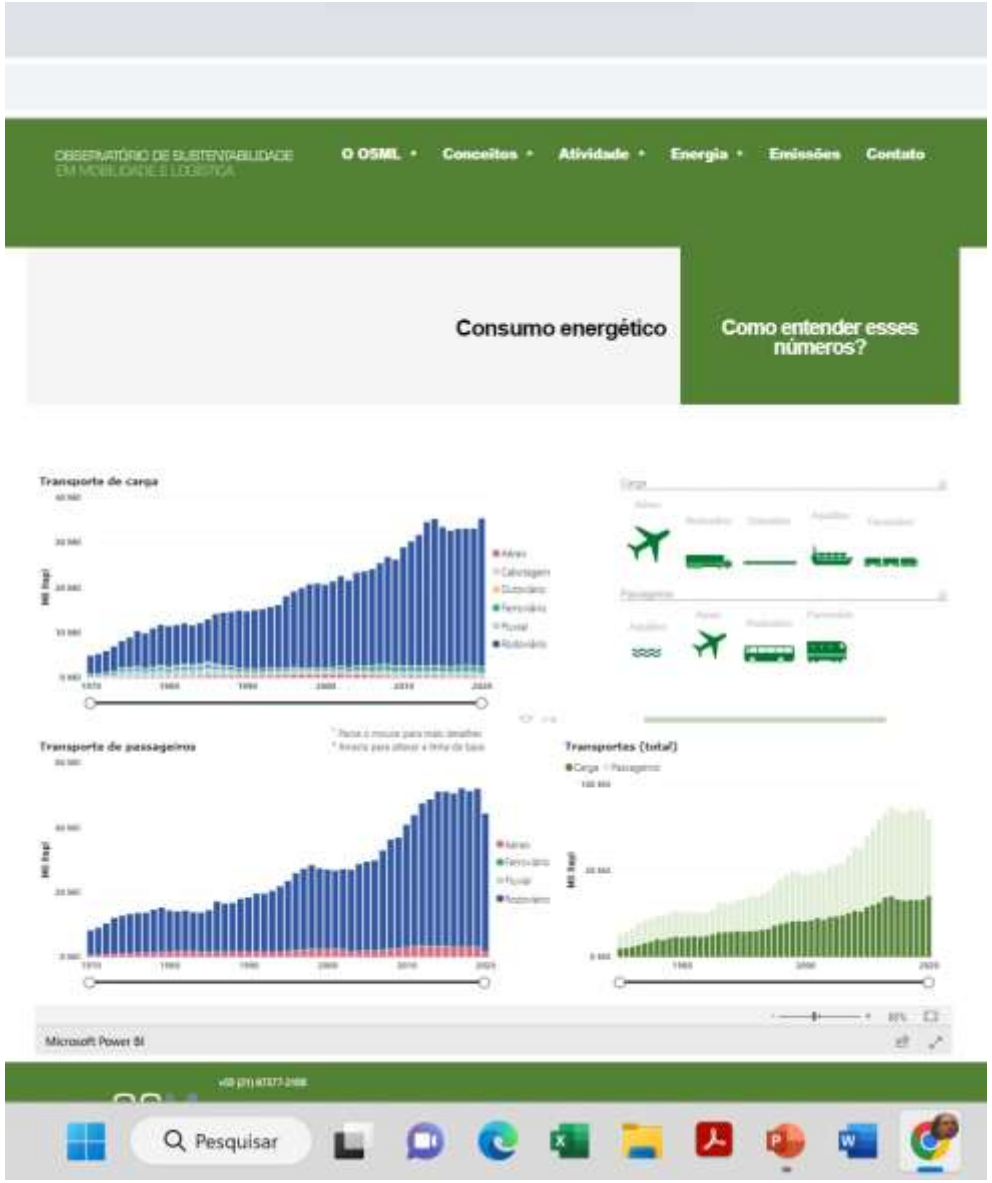
ArcelorMittal

5th Edition

LESSONS

- **Long haul (1,000 to 2,000): S10 B15 + HVO**
  - Most start HVO production infrastructure
- **CNG & Biomethane (FTL, 200 to 500 km/trip)**
  - Most consider high flow refueling dispenser
- **Electric trucks (LTL, urban freight transport)**
  - “Sun to Wheel” solution
- **Synfuel & H2V – to be developed**
  - Step by step action plan.

INVITATION – OSML – www.osml.eco.br



PLVB PROGRAMA DE LOGÍSTICA VERDE BRASIL®

coordenacao@plvb.org.br
Mobile: +55 21 99367-4494

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