

## **Grup de Treball de Logística Multimodal**

El repte de la logística sostenible per a la  
internacionalització d'empreses agroalimentàries

Presidit per Port de Barcelona  
TENALACH Consulting. Membre.

Centre d'innovació Gastronòmica Industrial - Foodlab  
15 març 2023

# MULTIMODAL MULTIPRODUCT MULTICLIENT LOW EMISSIONS LOGISTICS



**in-move** *by Railgrup*  
Cluster de Movilidad y Logística Multimodal

# MULTIMODAL MULTIPRODUCT MULTICLIENT LOW EMISSIONS LOGISTICS Circular Logistics?

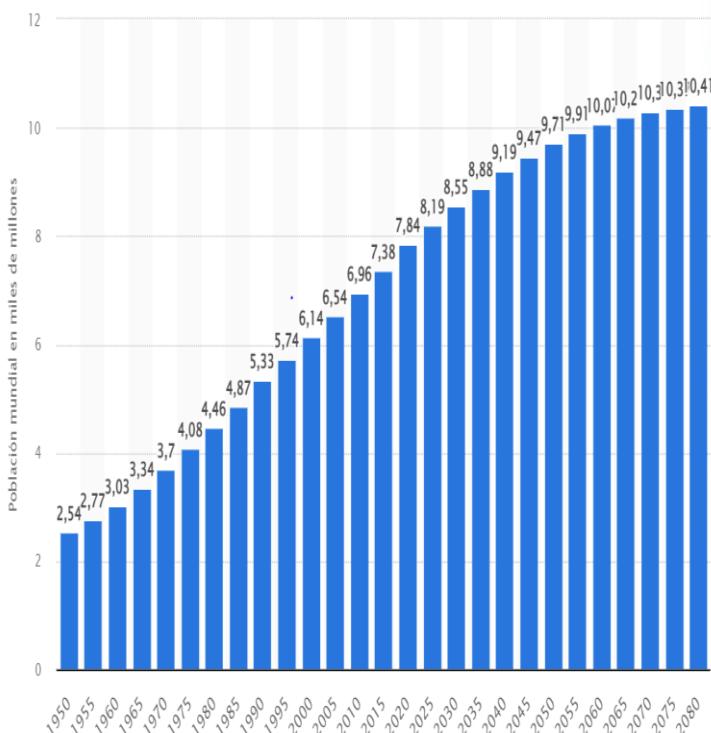
**in-move** by Railgrup  
Cluster de Movilidad y Logística Multimodal



Las ventas mundiales del sector agroalimentario en 2020 ascendieron a 6,6 billones de dólares, un aumento del +0,5% frente a 2019, con las exportaciones de los países emergentes en aumento.

(Carlos Moreno. La Revolución de la Proximidad. Univ. Paris. Catedràtic. IAE de París - Universidad Panthéon Sorbonne )

78% de Producció de CO2 associat a Ciutats.  
13% Població Mundial en 34 ciutats.  
50% en Ciutats fins a 500.000 habitants



Energia – Serveis – AgroAlimentaris – Sol Cultivable

Impermeabilització substracte  
Motors Tèrmics vs Sostenibles  
Biodiversitat  
Cotxes – Vaques - Serres Mecànics. (James Lovelock. Gaia: A New Look at Life on Earth)

Oportunitats:

Nous disseny de Ciutats ...  
Low Emission Logistics, a la Supply Chain Actual

# EUROPEAN (WORLD?) GREEN DEAL

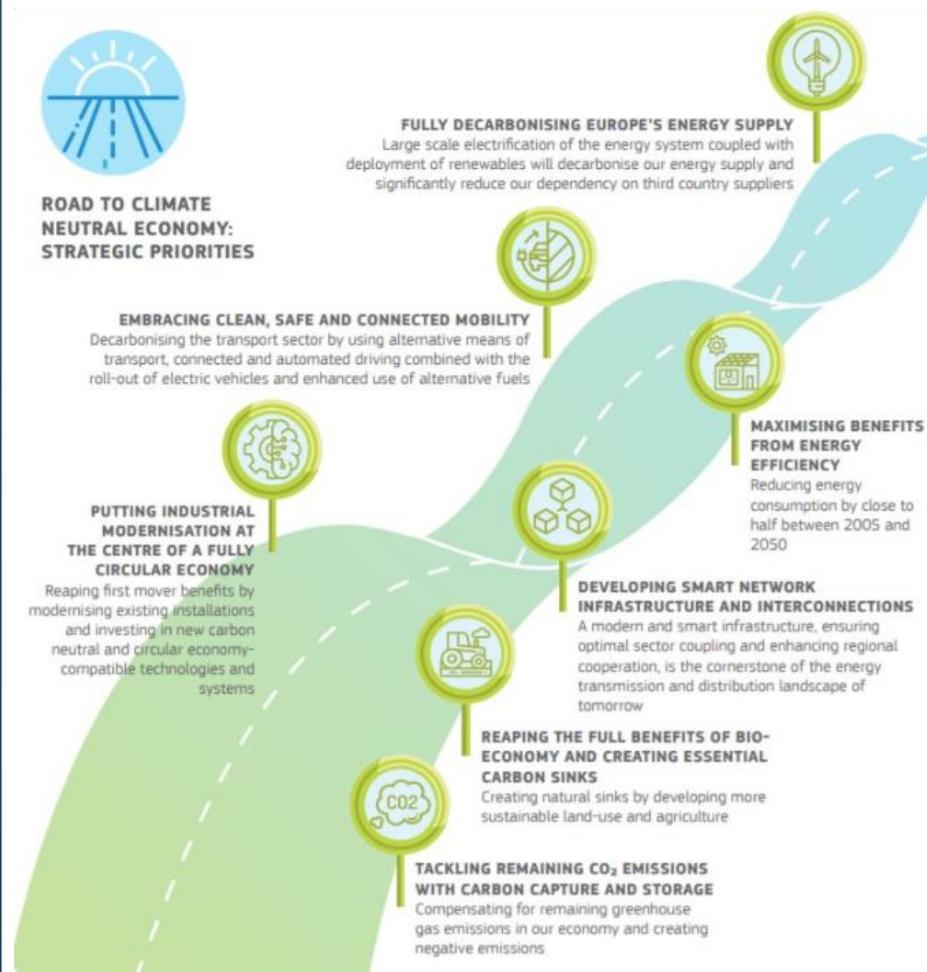


ILUSTRACIÓN I: Objetivos de la Estrategia para el año 2030.

- Reducir en un 30 % el consumo nacional de materiales en relación con el PIB, tomando como año de referencia el 2010
- Reducir la emisión de gases de efecto invernadero por debajo de los 10 millones de toneladas de CO<sub>2</sub> equivalente
- Mejorar un 10 % la eficiencia en el uso del agua
- Incrementar la reutilización y preparación para la reutilización hasta llegar al 10 % de los residuos municipales generados
- Reducir la generación de residuos un 15 % respecto de lo generado en 2010
- Reducir la generación de residuos de alimentos en toda cadena alimentaria: 50 % de reducción per cápita a nivel de hogar y consumo minorista y un 20 % en las cadenas de producción y suministro a partir del año 2020, contribuyendo así a los Objetivos de Desarrollo Sostenible (ODS)

# Environmental Sustainability and Carbon Free Mobility

As the railway is the cleanest mode of transport, promoting modal shift towards rail will support the reduction of emissions. But this is not enough, and rail will implement new light materials, new technical solutions for non-electrified lines and further increase its energy efficiency. **Improving the integration of transport systems in populated areas by reducing noise, vibration and carbon emissions** will be essential to increase social acceptance in urban environments and beyond. Indeed, rail systems are contributing to mitigating the climate change challenge.

Additional research and innovation actions will improve the current situation from the environmental perspective. For instance to develop smart energy infrastructure. On board and line-side energy storage technologies and charging technologies will make it possible to recover a big amount of the braking energy and will support balancing the flow of energy. Electricity supply using SMART Grid technologies coupled with increasing the residence and variety of supply resources (e.g. main grid, local renewable, recovered, etc.), can be applied not only for rail traction systems but also for road usage and stations. Another example is the

necessity of work from an early phase on the adaption of regulation and standards to consider (and even favour) the use of the cleanest technology being developed.



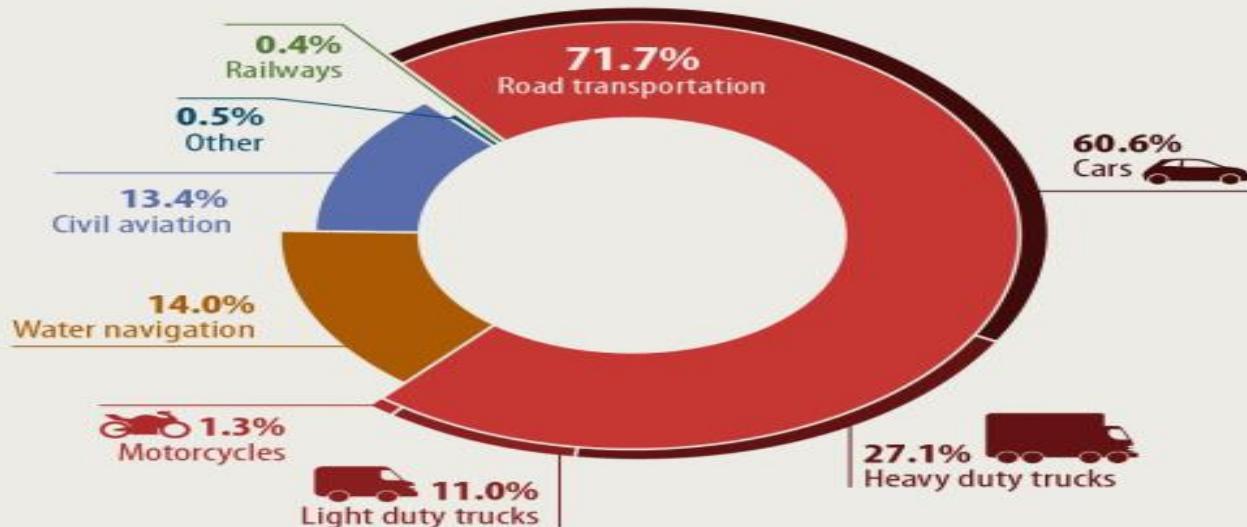
**RAIL IS 9X LESS CO<sub>2</sub>**  
intensive than road for freight  
and air travel for passengers.



# 0 EMISSIONS LOGISTICS – COST OF OPPORTUNITY

## TRANSPORT EMISSIONS IN THE EU

Greenhouse gas emissions breakdown by transport mode  
(2019)



Source: European Environment Agency (2022)

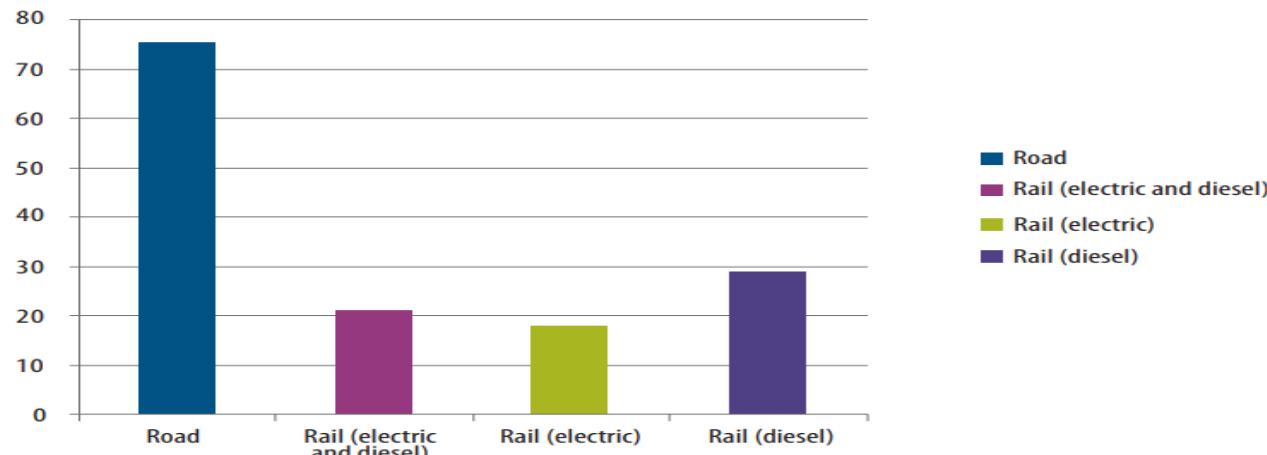


<https://www.europarl.europa.eu/news/es/headlines/society/20190313STO31218/emisiones-de-co2-de-los-coches-hechos-y-cifras-infografia>

# 0 Emissions Logistics – Cost of Opportunity

Figure 1

## CO<sub>2</sub> emissions per tonne-kilometre in the EU in 2012



Source: European Court of Auditors based on European Environment Agency data.

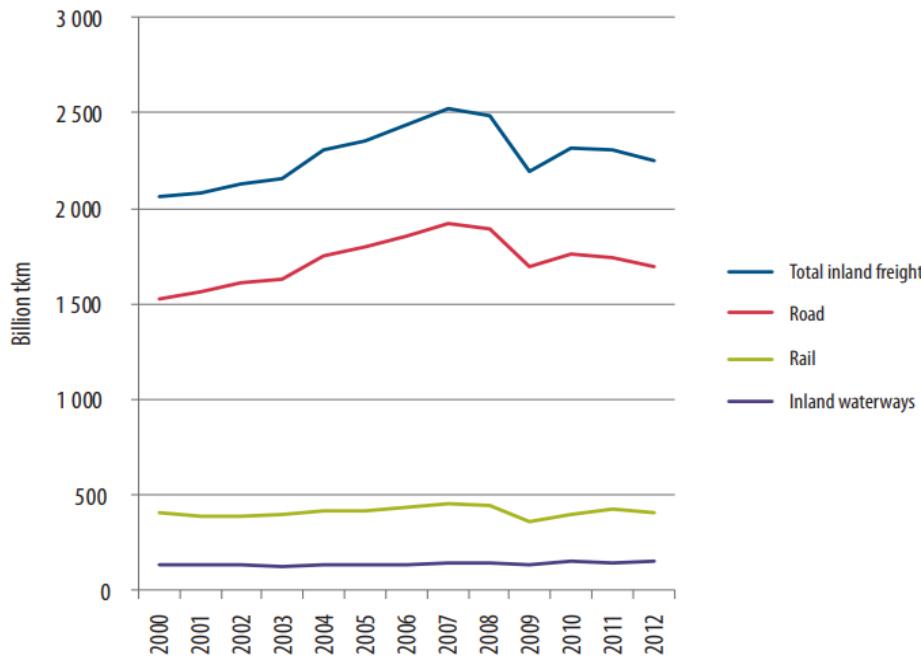
## Comparación de emisiones por viaje\*



# ELS VOLUMS a AGROALIMENTARIS van MAJORITARIAMENT per CARRETERA – OPORTUNITAT en SOSTENIBLE

Figure 4

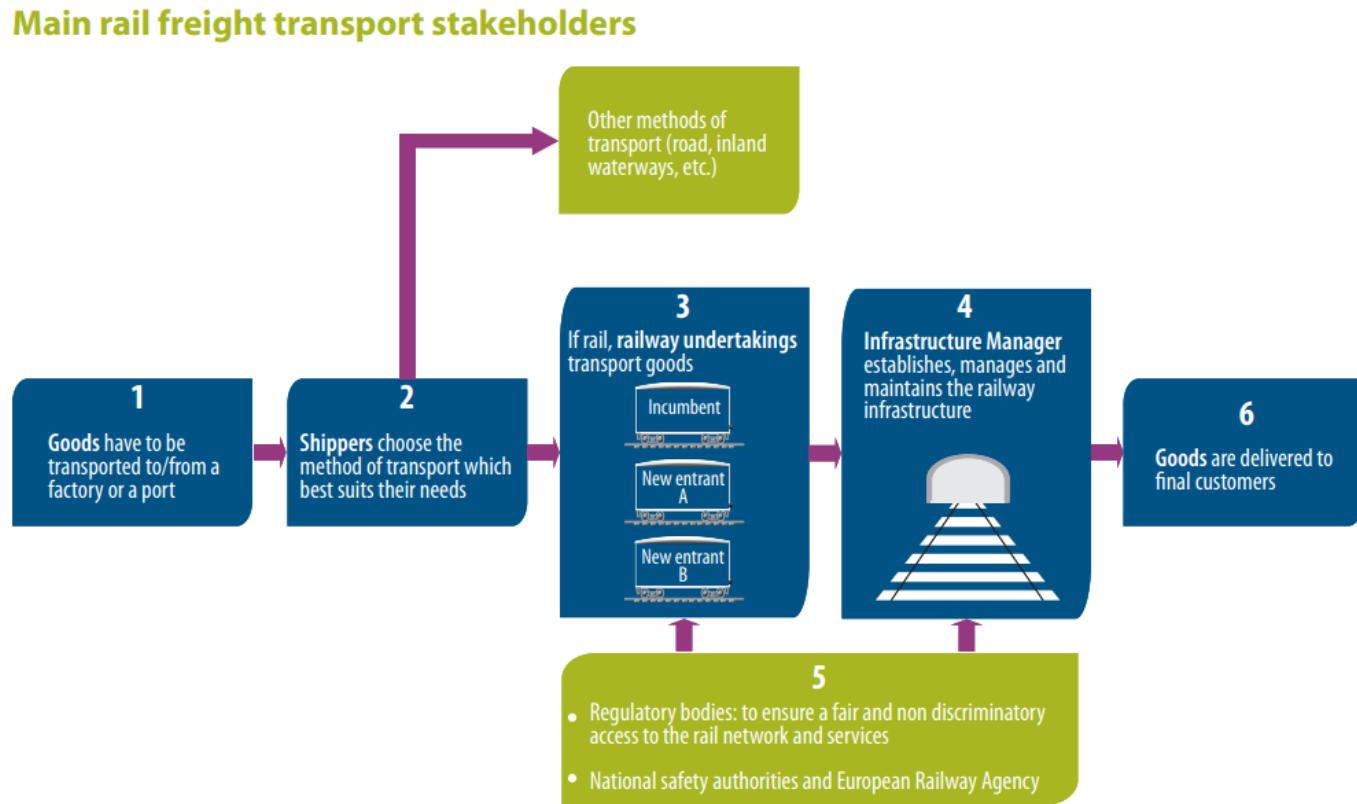
Inland freight transport in the EU,  
in billion tonne-kilometres



Source: European Court of Auditors based on latest available Eurostat data.

# FOCUS to SHIPPER

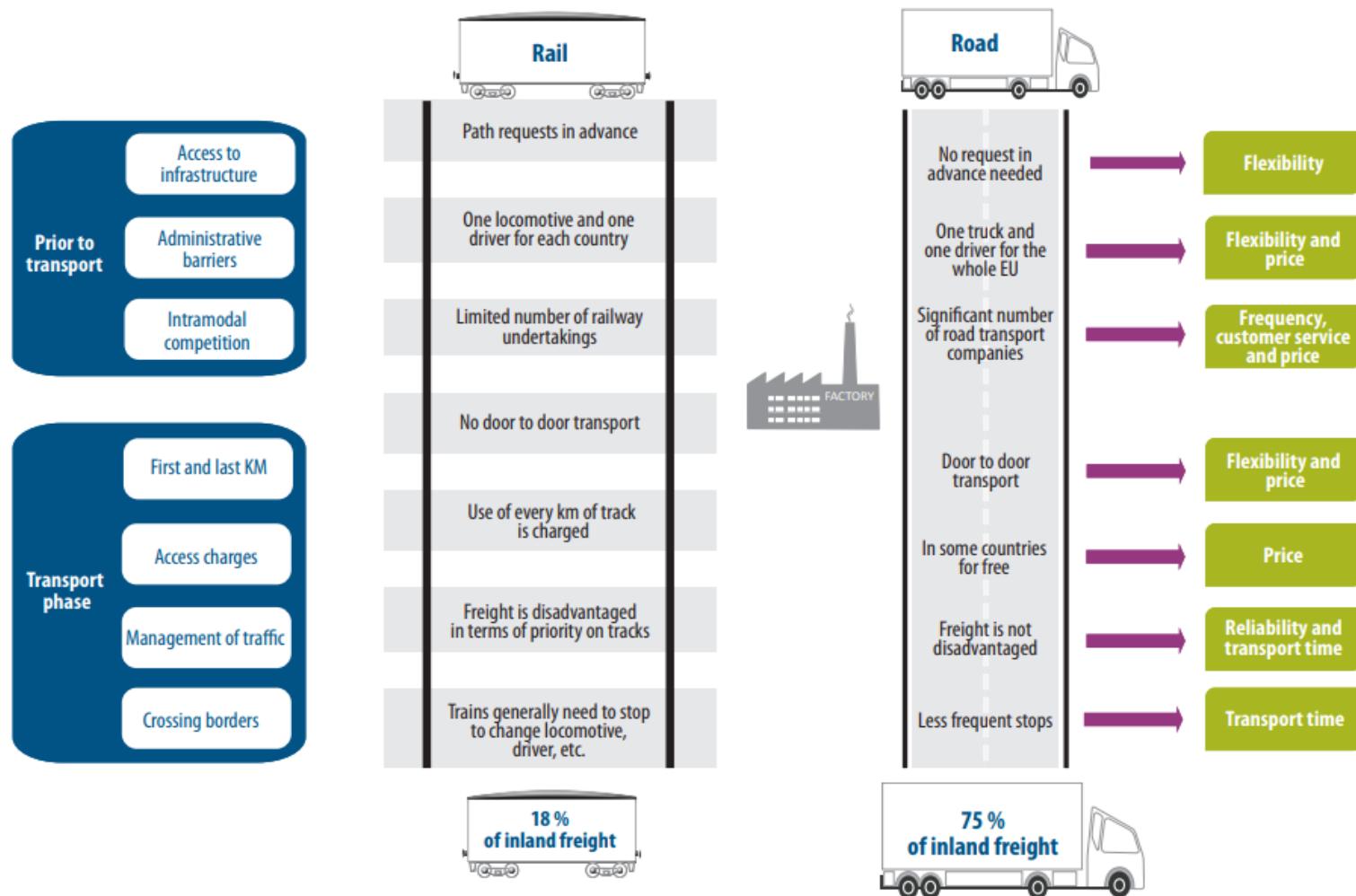
Figure 2



Source: European Court of Auditors.

**Figure 6**

## Comparison of some of the challenges faced by rail freight transport compared to road



Source: European Court of Auditors.

# Traspassar a Low Emission Logistics -COST d'OPPORTUNNITAT ?¿¿¿

- **No Incrementa cost**
- **Transit Time igual**
- **Finestreta única**
- **Tecnologia**
- **Augment de la sensibilització Ambiental**
- **“Etiqueta CO2 al producte final”**
- **Economies d'escala poden obtenir millor preus**
- **Infrastructure driven - no és qüestió de tenir un port o un terminal per càpita...**
- **informació – mapping de serveis multimodals - market place**
- **Es pot fer!**

## **Grup de Treball de Logística Multimodal**

El repte de la logística sostenible per a la  
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Centre d'innovació Gastronòmica Industrial - Foodlab  
15 març 2023



## Port de Barcelona, aliat per a la internacionalització del sector agroalimentari

**Agroalimentari: 25% del tràfic d'import / export del Port de Barcelona**

Segment de producte	Volum 2022 (tones)	% total
Prod. càrnics i temp. contr.	2.074.006	23%
Fava de soja	1.348.917	15%
Alfals	1.322.158	15%
Olis i greixos	1.046.073	12%
Vins i begudes	815.654	9%
Cereals i farines	744.737	8%
Pesca congelada	656.013	7%
Cafè, cacau	436.565	5%
Fruites, hortalisses, lleg.	259.822	3%
Conserves	167.142	2%
<b>Total general</b>	<b>8.871.086</b>	<b>100%</b>

**Carn porcina i alfals, principals tràfics d'exportació del port que ja arriben en tren**

	TEU 2022	
Carn porcina	88.829	 + 
Alfals	66.236	

**Fava de soja i els cereals, importacions a granel que es distribueixen en tren i camió**

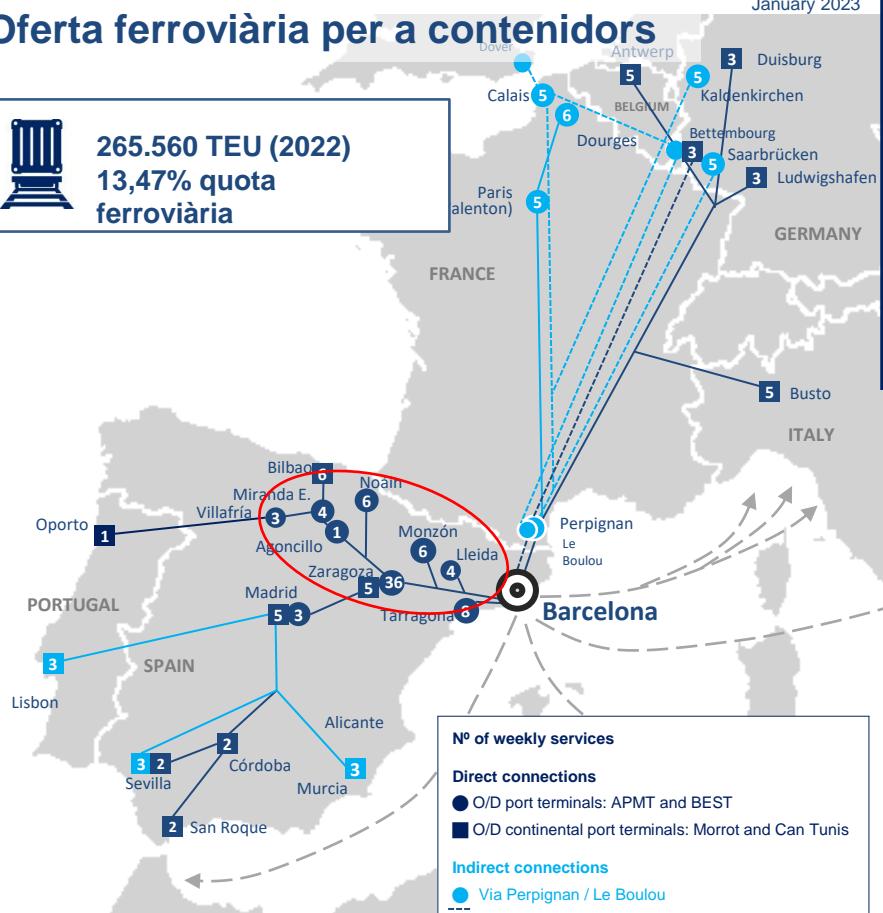
	Tones 2022	
Fava de soja	1.345.430	 + 
Cereals i farines	662.355	



### Oferta ferroviària per a contenidors



**265.560 TEU (2022)**  
**13,47% quota ferroviària**



From / to port terminals: APMT and BEST	TO / FROM	RAIL LOGISTICS OPERATOR	WEEKLY AVERAGE SERVICES
Lleida, Pla Vilanova	APMT Railway Dry + Reefer		4
Madrid, PSA Azuqueca	APMT Railway (Via TMZ)		3
Miranda de Ebro (Burgos)	Synergy		4
Agoncillo (La Rioja)	Synergy		1
Monzón TIM + AgroTIM (Huesca)	APMT Railway: Dry + Reefer MSC Dry + Reefer		6
Noán TIN (Pamplona)	Synergy Dry+ Reefer		6
Tarragona	TP NOVA		8
Villafría (Burgos)	Synergy		3
Zaragoza TMZ	APMT Railway: Dry+ Reefer SICSA		30
Zaragoza PLAZA (Noatum rail terminal and LTA)	SICSA / APMT Railway		6
From / to continental port terminals: MORROT and CAN TUNIS	TO / FROM	RAIL LOGISTICS OPERATOR	WEEKLY SERVICES
Antwerp (Belgium)	HUPAC Containers & semitrailers		5
Busto (Italy)	HUPAC		5
Ludwigshafen (Germany)	KOMBIVERKHER		3
Duisburg (Germany)	KOMBIVERKHER		3
Bettembourg (Luxembourg)	VIIA Lorry Rail		3
Oporto (Portugal)	MEDWAY (via Zaragoza PLAZA)		1
Córdoba, Sevilla, San Roque (Spain)	MULTIRAIL		2
Bilbao (Spain)	CONTINENTAL / SICSA		6
Zaragoza PLAZA and Madrid Abroñigal (Spain)	RENFE		5
Via Perpignan / Le Boulou	Services offered by VIIA (Bettembourg, Calais and Dover), DB CARGO (Saarbrücken), CARGOBEMER (Calais and Kaldenkirchen,), NOVATRANS (Paris-Valenton and Dourges), HUPAC (Antwerp) and other rail logistics operators.		
Via Madrid Abroñigal	To Murcia, Sevilla and Lisbon. Operated by Renfe: 5 weekly services		



## Terminals intermodals del hinterland del Port de Barcelona



● Terminals participades per l'Autoritat Portuària de Barcelona

TMZ  
Monzón (TIM + AgroTIM)  
Tamarite  
Azuqueca – PSA  
Coslada – PSM  
Vilamalla- TIE  
Perpignan - PSCCT

● Terminals participades per la Comunitat Portuària de Barcelona

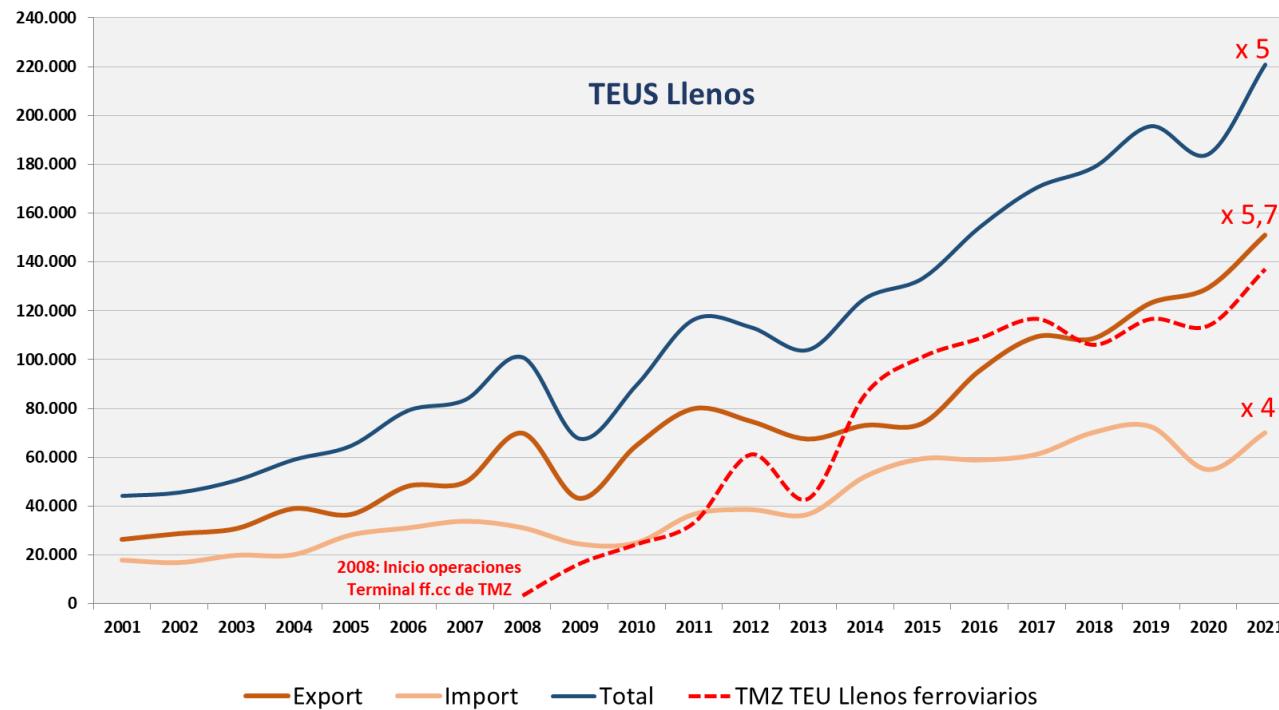
TMZ  
Tarragona Mercaderies  
Pla Vilanoveta (Lleida)  
Noáin (Pamplona)

● Resta



## Exemple TMZ – Factor clau per a la internacionalització de l'economia d'Aragó

Evolució del comerç exterior marítim d'Aragó en contenidor i activitat de TMZ



L'inici el 2008 de les operacions de la terminal, que ha significat l'establiment de corredors de transport ferroviari vinculats als principals ports peninsulars, ha sigut un factor clau per a l'increment del comerç exterior d'Aragó.



## Estalvi en emissions de CO2 i altres externalitats del transport resultat de l'oferta intermodal ferroviària del Port de Barcelona, 2022

### Ferrocarril 92% estalvi emissions CO2

- 62,47 gr CO2 eq t/km – carretera
- 5,22 g CO2 eq t/km - FC

**Estalvi anual de 224 M€ en el cost de les externalitats negatives que generaria el transport del mateix volum de càrrega per carretera.**

- Pol·lució atmosfèrica
- Canvi climàtic (GEH)\*
- Accidents
- Soroll
- Congestió
- Cost d'infraestructura

### Càcul de l'estalvi d'emissions de CO2

TCO2 càrrega transportada en ferrocarril (cont+vehicles)

TCO2 càrrega transportada en ferrocarril si circulés per carretera

### Estalvi d'emissions de CO2

% Volums 2022 (tones)

3.660  
46.956  
**-43.296**

-92%

### Càcul de l'estalvi de totes les externalitats del transport

M€ d'ext. càrrega transportada en ferrocarril (cont+vehicles)

M€ d'ext. càrrega transportada en ferrocarril si circulés per carretera

### Estalvi d'externalitats

% Imports 2022 (M€)

9  
232  
**-224**

-96%

**170.000 camions retirats de la carretera**

Càcul realitzat pel Port of Barcelona. Metodologia validada i certificada per TUV Rheinland (2021)  
Càcul d'externalitats segons Handbook on the external costs of transport, CE. 2019

## INTERMODALIDAD FERROVIARIA

### Observatorio de servicios ferro-portuarios Contenedores

En colaboración con los puertos Valencia, Tarragona, Bilbao, Algeciras y Barcelona

## Mapa Observatorio de servicios ferro-portuarios

Contenedores. Junio 2022

By In-Move by Railgrup & Port de Barcelona



### Número de servicios ferroviarios/semana y puerto de O/D Contenedores

● Algeciras	● Alicante	● Barcelona	● Bilbao
● Sevilla	● Tarragona	● Valencia	

Conexiones directas, desde/a las terminales portuarias

## INTERMODALIDAD FERROVIARIA

### AUTOPISTAS FERROVIARIAS

Radiografía del sector y análisis de viabilidad de alternativas técnicas



### AF'S en servicio

Barcelona-Antwerp HUPAC P400
Perpignan-Calais CARGOBEMER Perpignan-Kaldenkirchen CARGOBE. Perpignan-Saarbrücken DB CARGO P400
Le Boulou-Bettembourg VIIA Lorry Rail Le Boulou-Calais VIAA Lorry Rail
Sete-Colonia CARGOBEMER Sete- Calais VIAA

### AF's proyectadas

Algeciras-Madrid-Zaragoza
Valencia-Madrid
Tarragona-Madrid
Barcelona-Zaragoza Barcelona-Europa

## INTERMODALIDAD FERROVIARIA

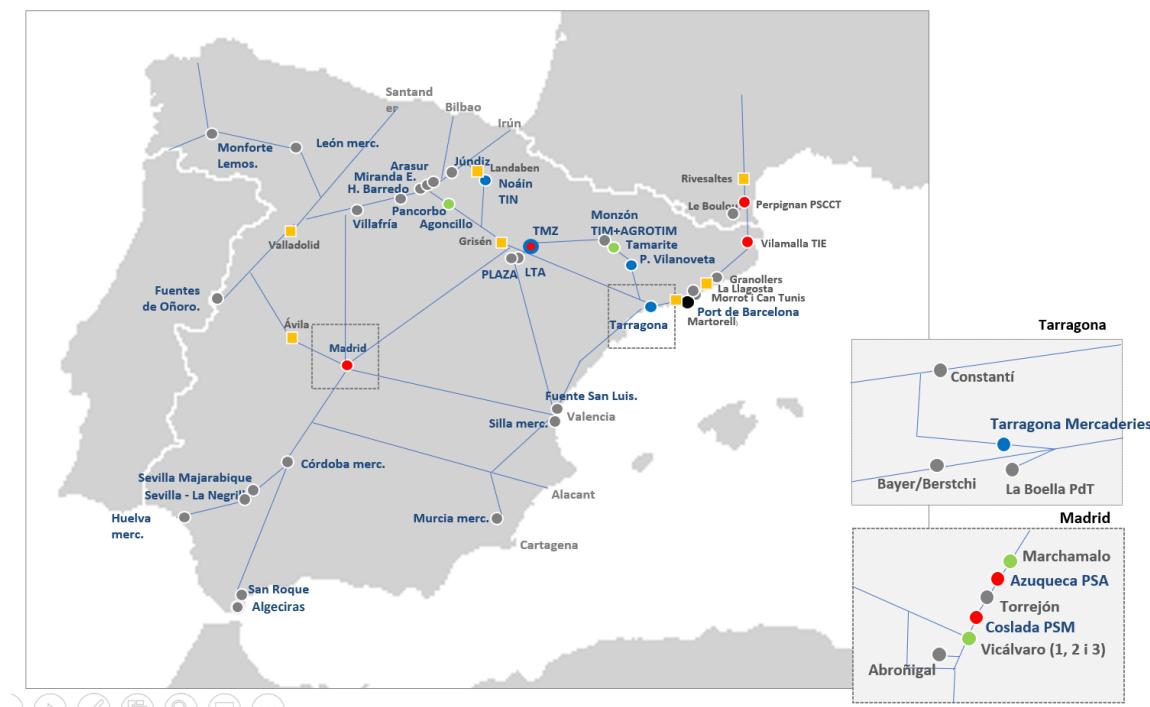
### TERMINALES INTERMODALES DE ESPAÑA Y TRANSFRONTERIZAS

**2022**

#### Mapa de terminales y servicios

Caracterización de la terminal tipo: instalaciones,  
servicios....

Colaboración de las terminales intermodales y puertos de  
Valencia, Tarragona, Bilbao, Algeciras y Barcelona



## Background: FOCUS TO MULTIMODAL OPERATORS

### Multimodal Pilots. Project e-FreightMed



**railgrup**

**Tomas**  
expediciones

Logística y Transport Multimodal

**Tomas**  
expediciones



Analysis of the different  
transport solutions for  
**SWEDEN**



**CONTAINER 45' / 20'**  
■ TRUCKING SWEDEN +  
■ TRAIN +  
■ TRUCKING SPAIN



**Tomas**  
expediciones

#### Conclusions:

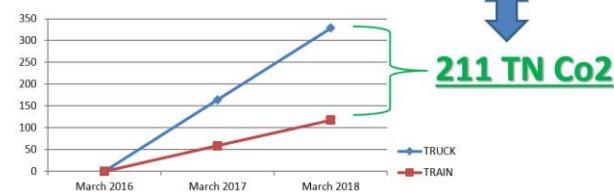


- 45' = reduction of 66% of emissions Co2 ( vs. truck )
- 20' = reduction of 64% of emissions Co2 ( vs. truck )
- In the 128 trips = Average: **65'2% CO2 savings**

#### TOTAL tones CO2 SAVED:

- CONTAINER: 118 Tn CO2
- TRUCK OPTION: 329 Tn CO2

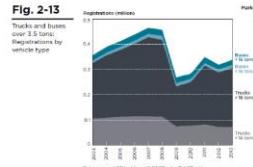
**WE HAVE SAVED** = 329 Tn - 118 Tn =



# Volume Gathering Strategy is VITAL

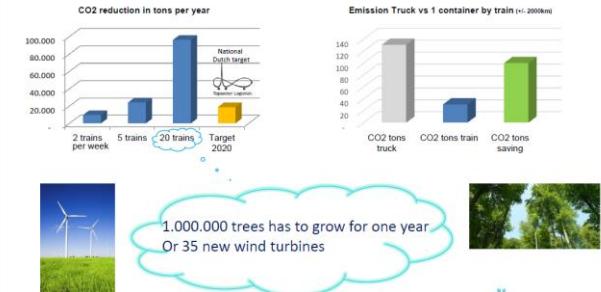
Switch to rail because lack of truck capacity

- Expectation in Europe is that a decrease of truck capacity will take place what will oblige a shift to other modalities as rail, barge or sea transport.



CSR, another good reason to switch

80%-90% CO<sub>2</sub> Reduction !



 COOLRAIL

A white shipping container with "COOLRAIL" printed on it in blue capital letters. The "C" is preceded by a stylized blue graphic. The container is sitting on a flatbed railcar. In the background, there are other railcars and some industrial buildings under a clear sky.

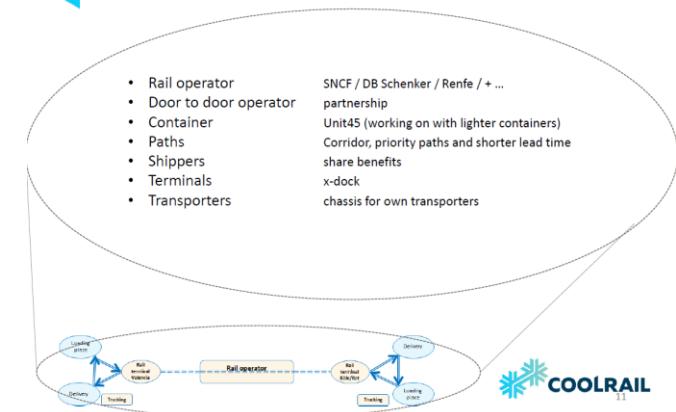
 COOLRAIL

## Shippers organization behind Cool Rail



Partner concept

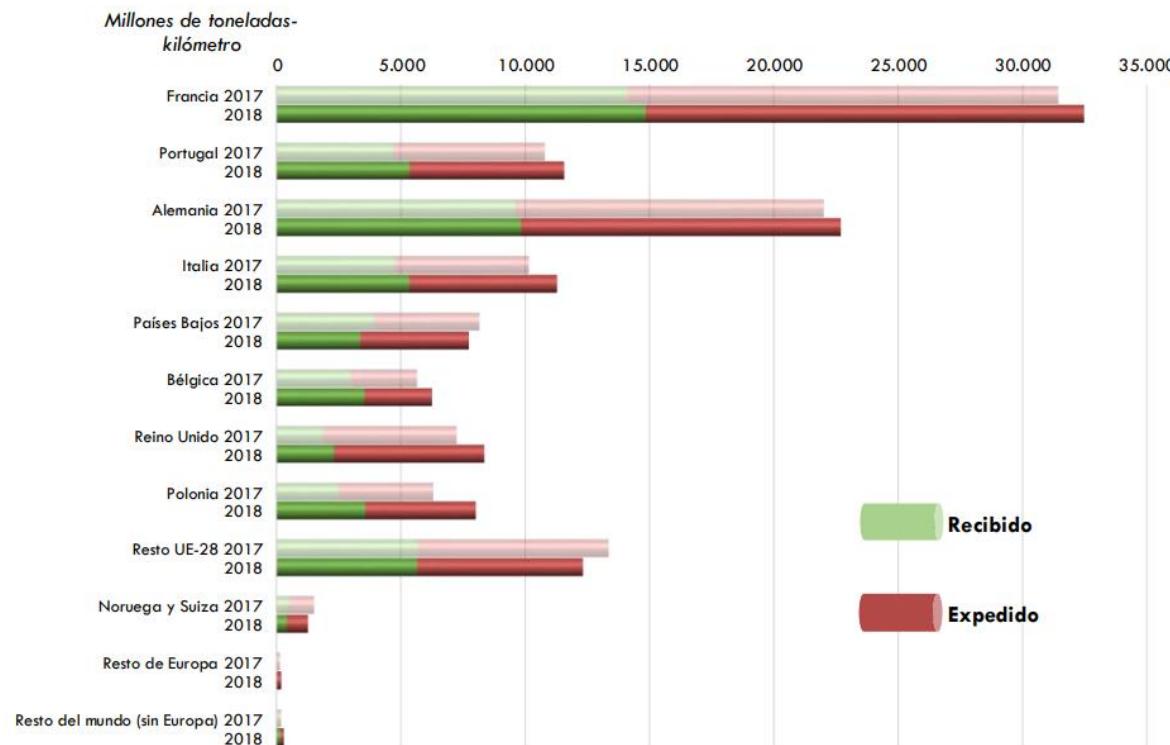
- Rail operator SNCF / DB Schenker / Renfe / + ...
  - Door to door operator partnership
  - Container Unit45 (working on with lighter containers)
  - Paths Corridor, priority paths and shorter lead time
  - Shippers share benefits
  - Terminals x-dock
  - Transporters chassis for own transporters



# CONTAINERS – VOLUMS ARE THERE!!!

## ROAD BASED...12000 TRUCKS SPAIN to FRANCE DAILY!.

Gráfico 24. Principales flujos de mercancías recibidas o expedidas en España por carretera (toneladas-kilómetro).  
2017-2018



Fuente: Elaboración propia del OTLE con datos de Eurostat

# *Wine Train – First MML Transit for the Sector in Spain. 2021*



# Specialization



# Adaptation



# Year 2009: Railway

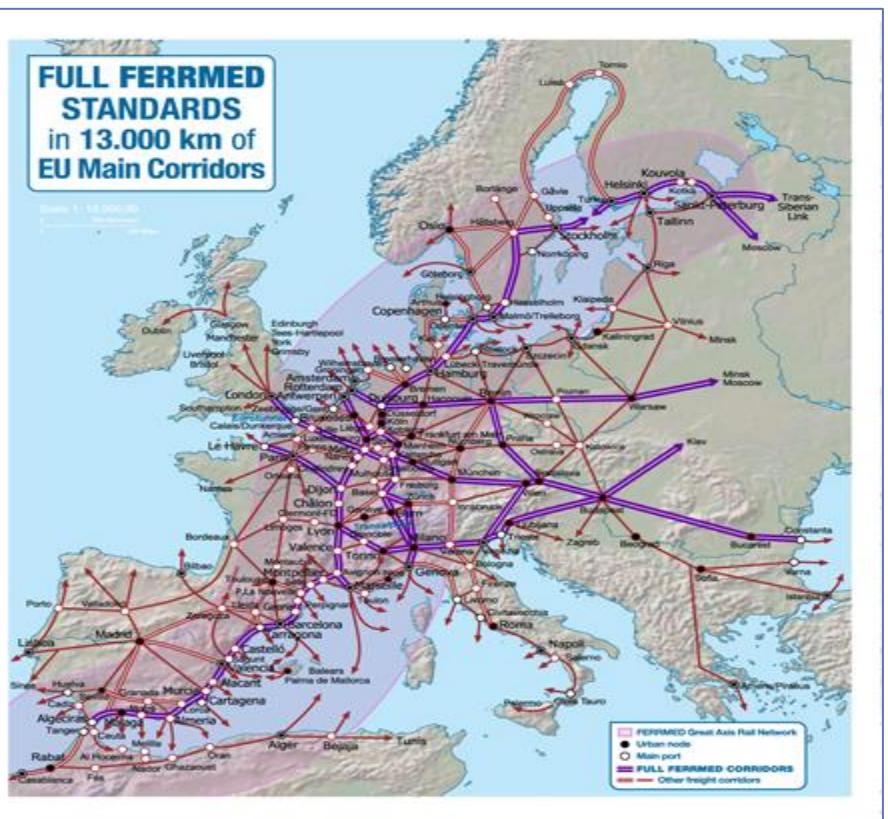


# Equipments



.45' reefer electric diesel.

# Road, Rail and Sea ways.



## AUTOPISTAS DEL MAR

La Comisión Europea diseñó en 2004 una red de grandes corredores en los que potenciar el transporte marítimo. Identificó cuatro mercados:

- A** Autopista del Mar Báltico
- B** Autopista de Europa Occidental
- C** Autopista de Europa Sudoccidental
- D** Autopista de Europa Suroriental



Fuente: Comisión Europea





# SUCCESS CASES AS ENABLERS

## TRAILS – MULTIMODAL LOW EMISSION LOGISTICS



Barcelona city

**Sector / Subsector of Applicability**  
**Sustainable mobility / Logistics**

**Technological area**  
**Digital society / Digitalisation / IoT / Sensors**

**Green challenges**  
**Sustainability of food production systems; Sustainable mobility; Climate change mitigation and adaptation**

**SDGs impact**



Generalitat de Catalunya  
Government of Catalonia

### Objective / Challenge

To reduce CO<sub>2</sub> emissions from the viticulture sector exports.

### Environmental impacts and benefits addressed

- ✓ To reduce greenhouse gas emissions from viticulture exports.
- ✓ To promote the use of railway transports for viticulture exports.
- ✓ To reduce viticulture exports time and costs.

### Solution's description

- ✓ The solution has developed a logistic model capable of delivering European viticulture exports through railway transport.
- ✓ The solution is based on the TrackOne Cloud Application, a software that enables the supply chain complete visibility through tracking, tracing and monitoring of the goods and assets exported.
- ✓ The technology employs sensors to analyse the conditions (speed, temperature, vibrations...) in which goods are transported.
- ✓ The sensors send the data to the IoT Cloud platform, thus enabling a real time tracking and monitoring of the cargo.

### Main constraint / Difficulty

Current Logistics Supply Chain are mainly (97% in Spain) by Road.

Lack of Market Places for Matching Available Volumes

+LINK



### KPIs

- CO<sub>2</sub> (%): 92% less emissions.
- CO<sub>2</sub> – Tons saved – 0,92 Tn/1 transits.
- PayLoad : more than 3%
- Longest distance by sustainable mode of transport (train): 1200Km.

### Partners



INNOVI  
Clúster Vitivinícola Català

DITECFER  
NGS srl  
New Generation Sensors



# INTERNATIONAL COOPERATION THROUGH CLUSTER FROM ERCI



# ASSETS in THE MULTIMODAL LOGISTICS STRATEGY, IN PRACTICE

## Unidad de transporte intermodal

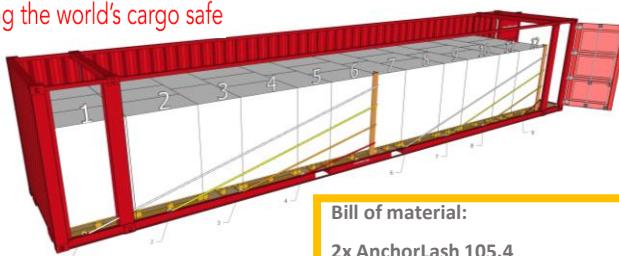


+1 palet!

## Aseguramiento de la carga

**cordstrap**

Keeping the world's cargo safe



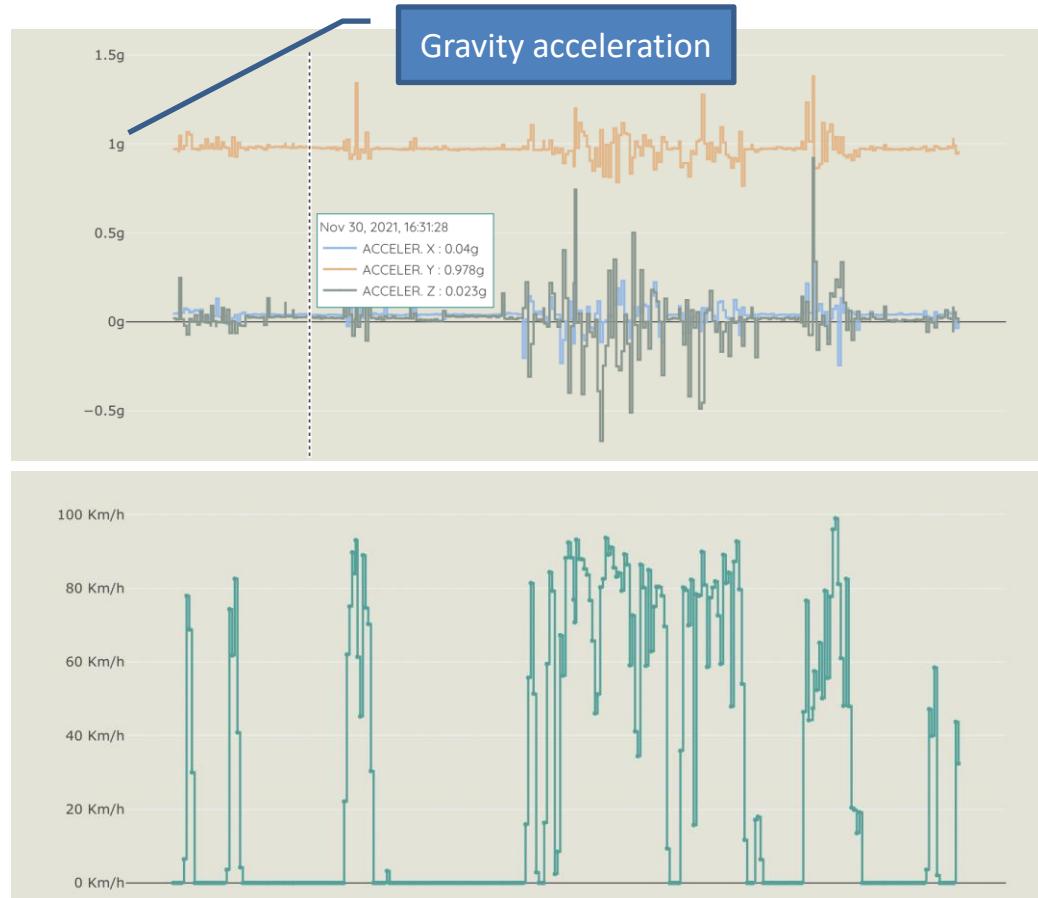
## Documentos electrónicos

A screenshot of the PIONIRA website homepage. The header features the PIONIRA logo and navigation links for HOME, SERVICES, ABOUT US, NEWS, RESOURCES, CONTACT, LOGIN, and SIGN UP. Below the header is a banner with the text 'E-DOCUMENTS AS A SERVICE FOR TRANSPORT &amp; LOGISTICS' and a blurred image of a city at night. Below the banner are five icons representing different services: e-COMPLIANCE, e-MOVE, e-CONTRACTS, e-IDENTIFICATION FORMS, and e-SOLES.

## Transporte ferroviario



# ASSETS in THE MULTIMODAL LOGISTICS STRATEGY, IN PRACTICE SPECIALIZED SENSORS - IoT



Vibration analysis  
(vs. speed)



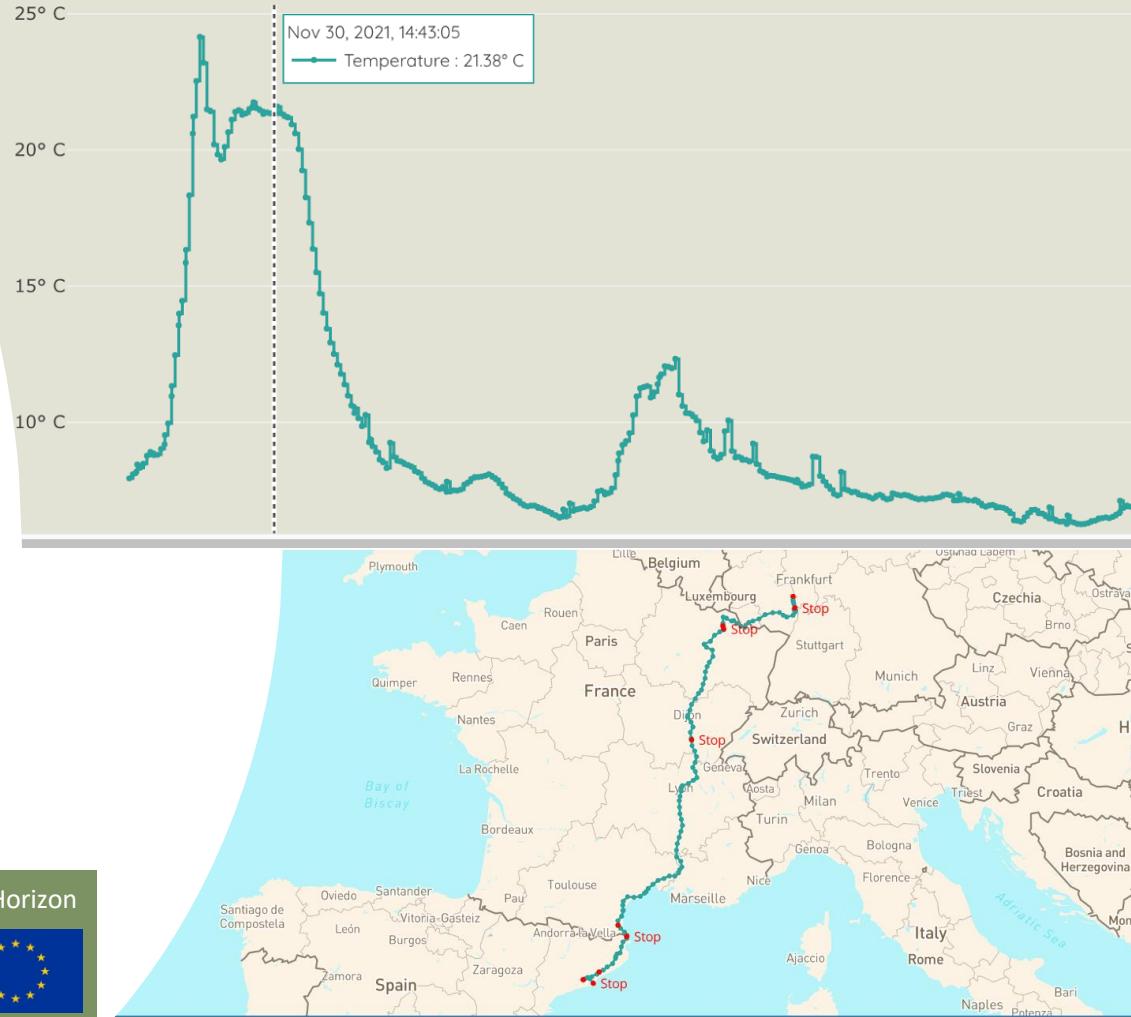
This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No. 860274



# ASSETS in THE MULTIMODAL LOGISTICS STRATEGY, IN PRACTICE SPECIALIZED SENSORS - IoT

## TrackOne Cloud Application

- Order and shipment management
- Access and users' management
- Track, Trace and Monitoring visualization
- Pdf generation and download



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No. 860274



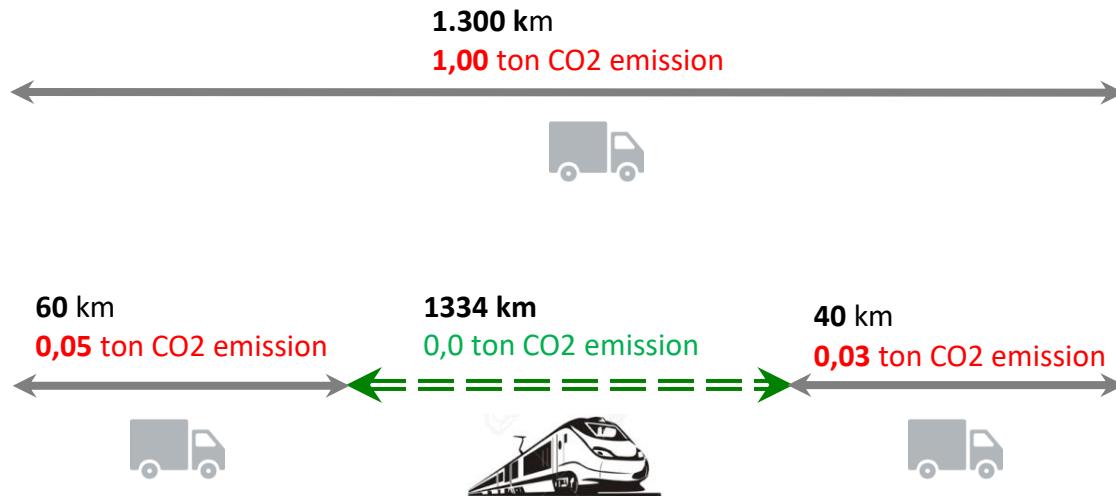
# ASSETS in THE MULTIMODAL LOGISTICS STRATEGY, IN PRACTICE GREEN DEAL DIRECT POSITIVE IMPACT



Impact test Freixenet Nov. 2021



Route from Sant Sadurní d'Anoia (ES) to Alsheim (DE)





## Modal shift outcome

- More than 3% extra payload
- 1.200 km shifted from road equal to 92%
- 0,92 ton CO2 saved (approx.)
- 92% less CO2 emission using the train
- <https://www.ecotransit.org/en/emissioncalculator/>

Conclusions based on calculation from EcoTransIT. Numbers are rounded and therefor we suggest to use more range. Certifications will be possible in the future.

# ASSETS in THE MULTIMODAL LOGISTICS STRATEGY, IN PRACTICE DIGITALIZATION ROLE



*INTEGRATE MODES of TRANSPORT*

*PROVIDE INTERMODAL RELIABLE / SAFE / SECURE / EFFICIENT TRANSFERS OF GOODS AND DATA*

*NO OTHER MEANS EXCEPT via DIGITALIZATION – IoT*



ALL WAYS ACTION S.L.



PEOPLE – PROCESSES – TECHNOLOGY

JUST CLUSTER IT!

THANKS SO MUCH FOR YOUR ATTENTION

# KEY WORDS

- L'Estratègia low emissions afegeix valor i posiciona en sostenibilitat
- No te per que incrementar el cost ni el transit time
- És “finestreta única”, ex-works
- Prova Pilot – 1 contenidor
- Preus = VOLUMS
- Girona molt ben posicionada en termes de Multimodalitat – Terminals
- Aristarco - Tenalach Consulting [atomas@tenalach-consulting.com](mailto:atomas@tenalach-consulting.com)
- [gerencia@railgrup.net](mailto:gerencia@railgrup.net)



**Gràcies per la vostra atenció**

**in-move** by Railgrup