Countries and regions initiatives supporting zero emission road freight and logistics

Workshop 3

Zero emission mobility in Piedmont and Italy - challenges and opportunities for companies and operators in the logistic sector

National framework: the Italian challenge on zero emission

Andrea Appetecchia

Online meeting, 19 October 2022

Summary

1. National & European new rules purposes
2. Ecological & Digital transition
3. Sustainability Cost and Components
4. Medium and Long Term Goals

Emission Reduction: European Strategies and New Rules

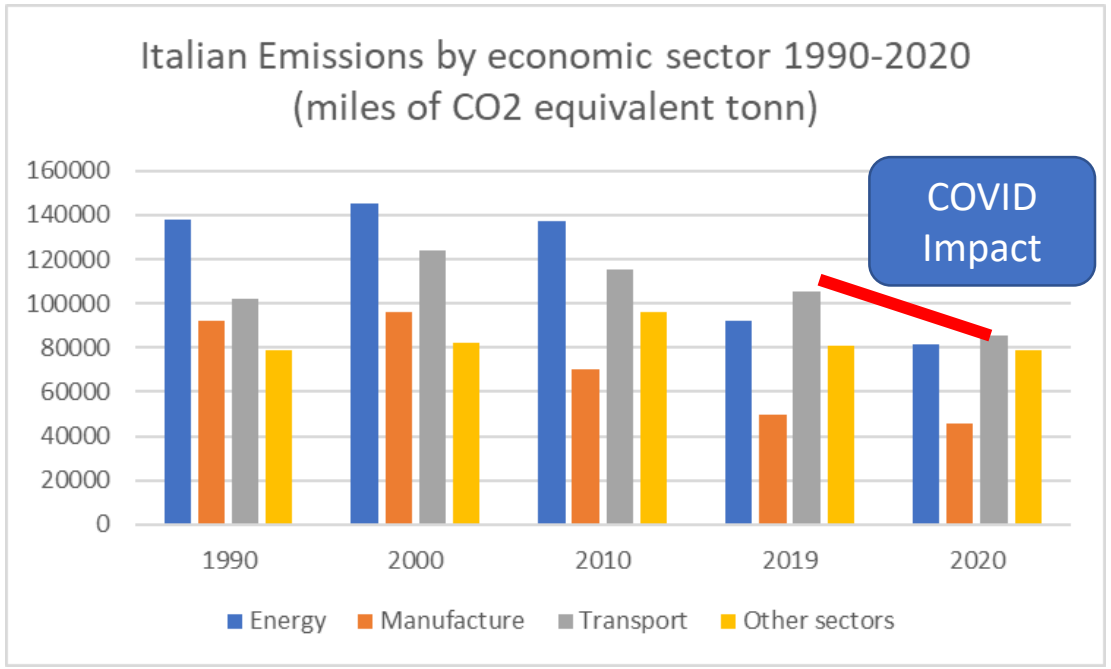
Goals & Strategies	Problems to be solve
Within 2050 Europe shall be the first emission-free continent	Trucks powered with alternative fuel (renewable and 0 emissions) are still few and cover a small part of the whole road freight market
Last year 2021, the Transport sector emitted 30% of European CO^2 total emissions (In Italy, only 5% arose from road freight transport)	We have a lot of money available to find out technological solutions for «0» emission transport, but still few solutions ready for the market
Within 2030 road freight transport should be ready to reduce 55% of CO^2 emissions (emission 1990)	The road freight transport sector is ready to work on finding solutions to fight climate damage, not to be uniquely responsible for the bad emission

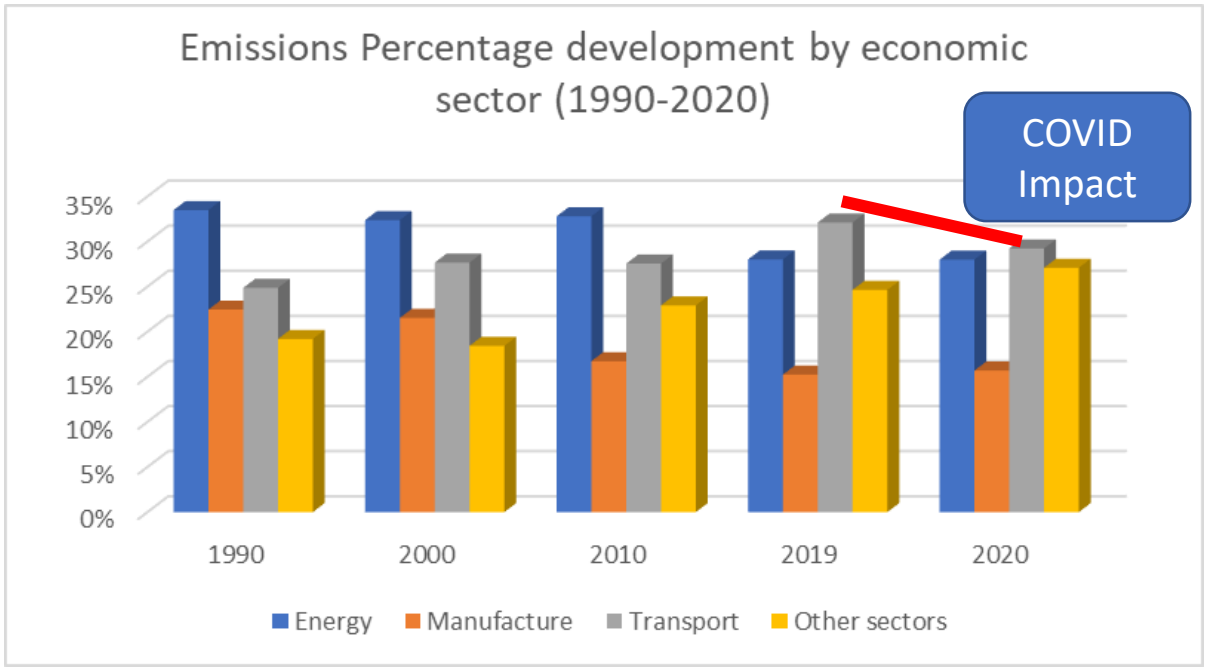
Last update

- 2027 ETS transport involvement (*Emission Trading Scheme* – EU Emission volumes trading scheme);
- Opportunity for European Countries with a current national *carbon tax* to introduce ETS exemption until 2030;
- Stop for diesel trucks from 2035, with a possible revision in 2026 taking into account biofuel and synthetic fuel development.

Ecological transition challenge

Logistics and transport sector Emissions are hard to abate (Italy's case)

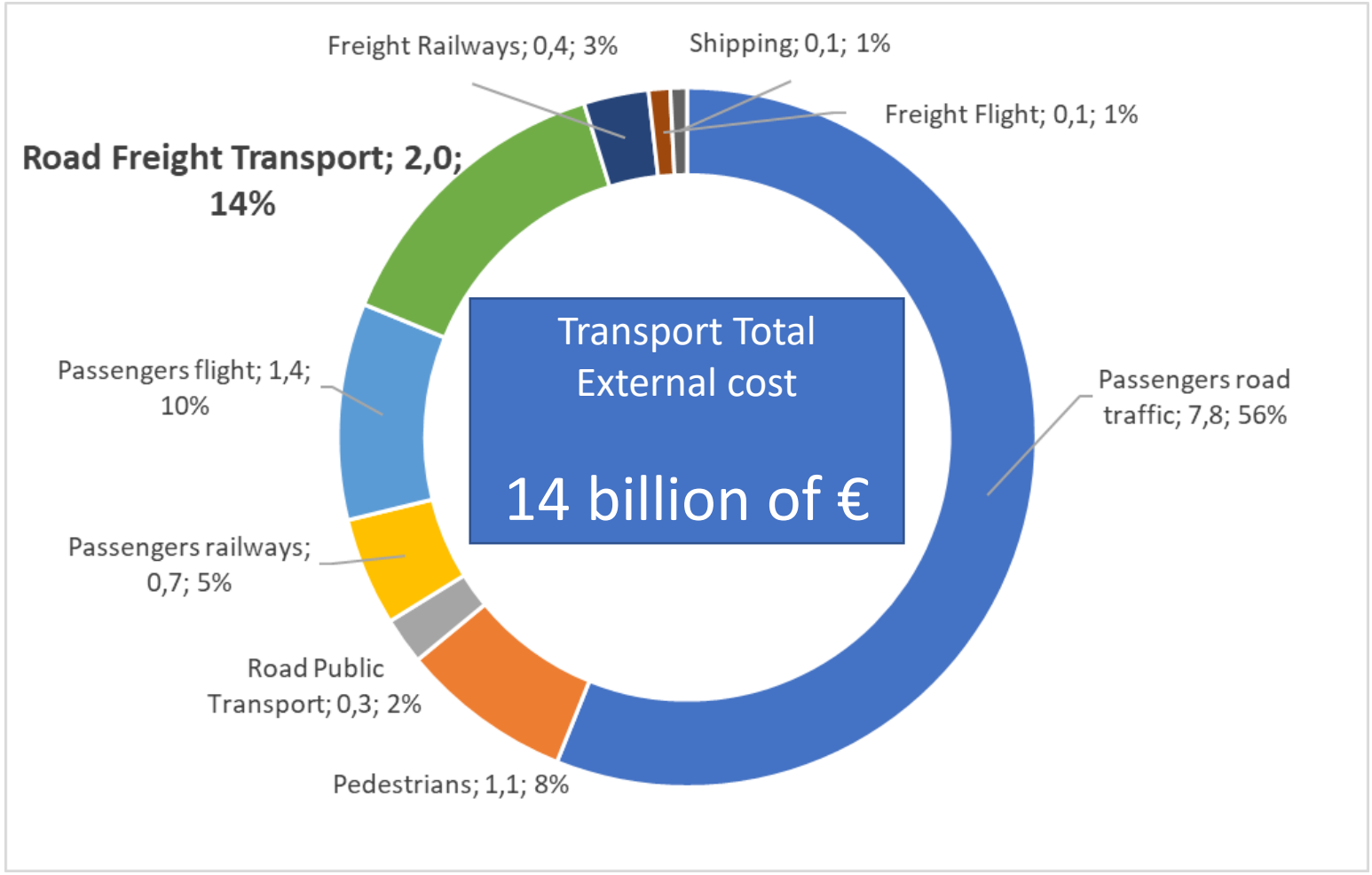




Source: ISPRA, 2022

Emissions Costs detail by type of transport

Assessment of indirect costs (social & environmental) carried out in Switzerland



Source: ARE, 2022

81% Passengers

19% Freight

Items to be considered to assess the indirect costs

Environment and landscapes

- Negative changes
- Negative emission
- Noise
- Accidents

Technological transition challenge

World fleet is still controlled by diesel powered truck

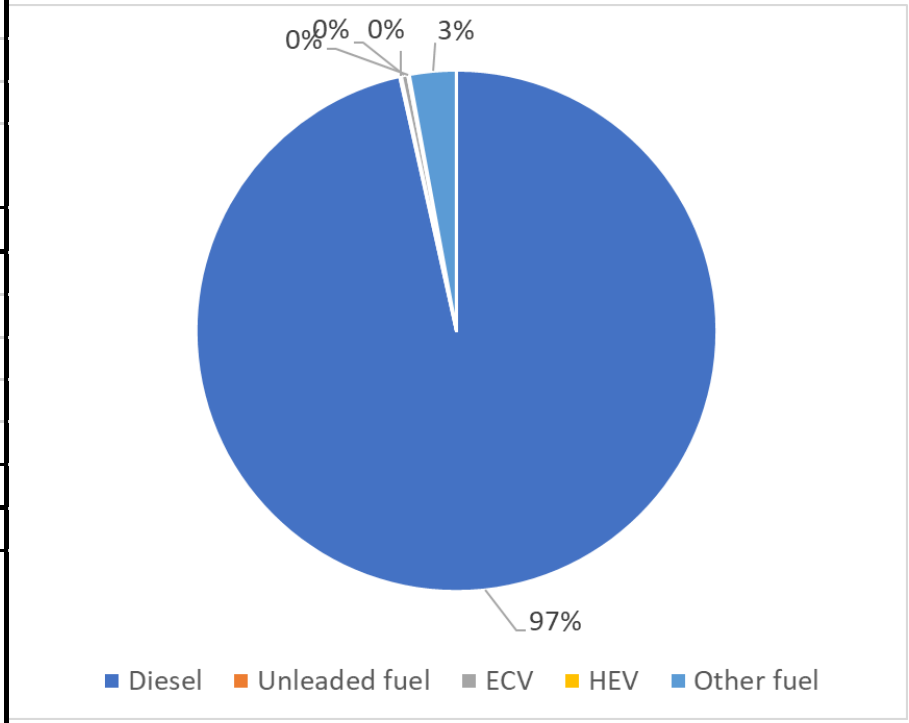
World fleet

	Light Commercial Vehicles (<3,5 tonn)		Medium duty trucks (>3,5<15 tonn.)		Heavy duty trucks (> 15 tonn.)		Total	
	Millions	%	Millions	%	Millions	%	Millions	%
Europe	28	19,4	2	5,6	4	14,8	34	16,4
Unites States	20	13,9	5	13,9	3	11,1	28	13,5
China	21	14,6	4	11,1	7	25,9	32	15,5
India	5	3,5	3	8,3	2	7,4	10	4,8
Other Countries	70	48,6	22	61,1	11	40,7	103	49,8
Total	144	100,0	36	100,0	27	100,0	207	100,0
Road Freight Transport Emissions (CO^2 Millions of tons)	596	25,2	587	24,8	1183	50,0	2366	100,0

Source: Deloitte, 2021

World number of Heavy trucks (>15 tons) is 10% and 50% of the whole road transport CO^2 emission

New registrations Italian Registrer 2020



Source: IRU, 2021

Technological transition challenge

Alternative solutions to trucks powered diesel still cover a small part of the market

BEV and FCEV are not ready for all the road transport movements

Movement distance				
Area	City	Peri-urban	Regional	International
Radius	Within 150Km	Within 300Km	Within1.000 Km	Over 1.000Km
BEV				
CNG				
LNG				
FCEV				
Bio fuels				
Diesel				

 Trucks already available

 Trucks available in the next future

Fonte: Deloitte, 2021

Energetic transition challenge

Is there enough alternative energy for «0» emission trucks?

Road freight transport world energy consumption = 11 million of GWh. All made by diesel

Total energy used	11
Energy lost during combustion	7,2
Net Energy used for trucks movement	3,8

Alternative energy
Hypothesis of consumption

Truck fueled by hydrogen	
Total energy used	12,7
Energy lost during combustion	8,9
Net Energy used for trucks mouvement	3,8

Truck fueled by battery (BEV)	
Total energy used	6,3
Energy lost during combustion	2,5
Net Energy used for trucks mouvement	3,8

World renewable energy production = 6,7 million of GWh

Percentage of energy for Hydrogen Truck: 194%; for Truck BEV: 94%.

Social & Economic Sustainability, not only Environmental

Sustainability components

1. **Environmental**: Fight against GHG emissions
2. **Social**: Accidents reduction, working conditions
3. **Economic:** Freight Transport & Logistics are the National and continental backbone, but they cannot reduce their impact on the environment without the support of the rest of the supply chain (industries & families)

Source: ARE, 2022

From linear to circular economy

Environment: Transport emissions are hard to abate

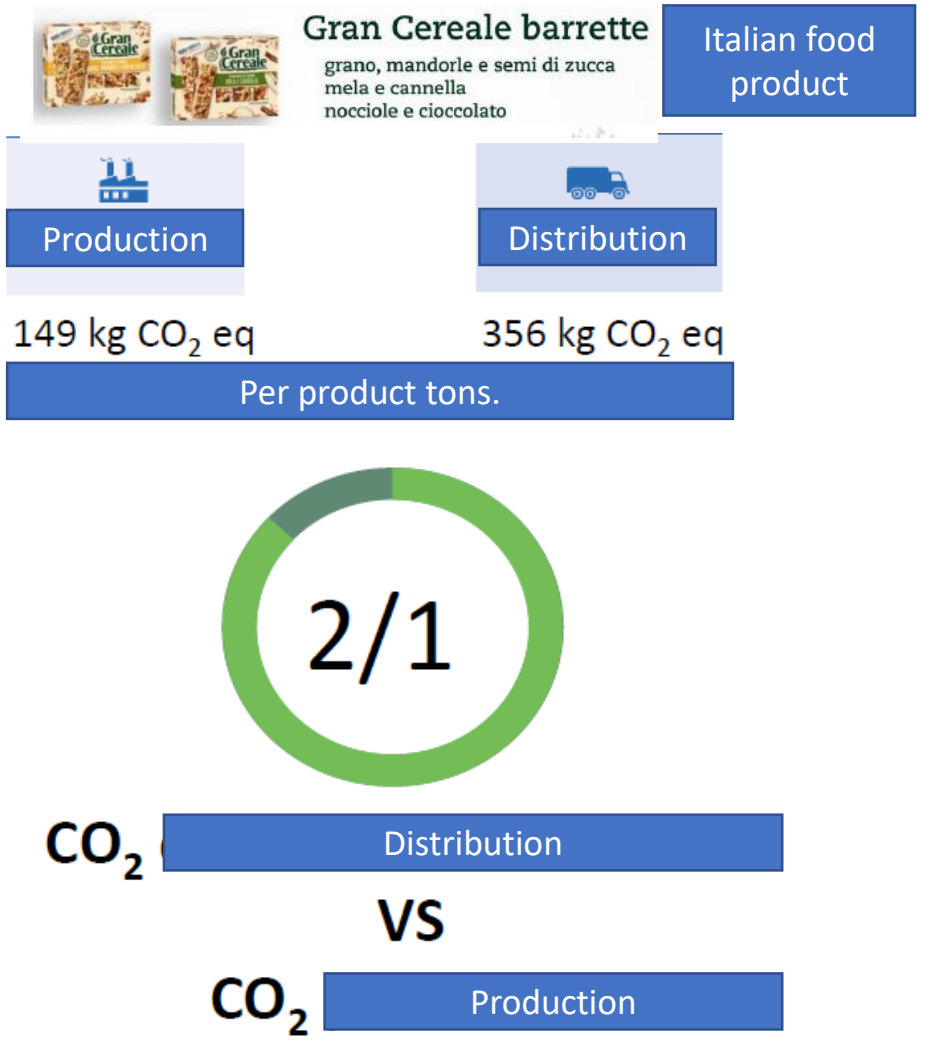
CO_2 Emissions share

- ✓ 64% : Passenger transport
- ✓ 36%: Freight transport (OCSE foreseen 50% within 2050)

World transport fleet

- ✓ 11% Road freight vehicles

Emissions during production & distribution



Fonte: E. Cascetta – Forum Conftrasporto, 2021

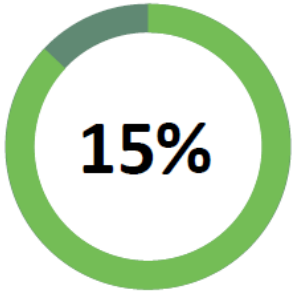
Social

People welfare & workers safety

Accidents risk

3310

Trucks accidents Victims in EU (2018)



Fatal injuries of transport and warehousing workers on total labour system

7%

Transport and warehousing workers share in the total labour system

Health damages

- The relationship between Pollution & disease is confirmed (heart problems, ictus, hypertension, asthma, etc.)
- The increase in pollution in Milan pushes up anti-asthma drugs medications

Unsafe working conditions (Illegal *phenomena*)

- In the last national report on work safety, Welfare Ministry stated that 72,7% of the transport and warehousing companies interviewed weren't respecting the government rules on work safety, the sector is the worst of the whole economy, the second is Construction sector with a percentage of non conforming companies of 63,7%.

Source: Inail, Ministero del lavoro e della Salute data, various years

Economic

Freight transport & logistics are National strategic assets……. But not the unique responsible for the negative impact of transport on the environmental system

Economic value

- Italian transport & logistics enterprises are more than 8 thousand, around 300 companies with a turnover of more than 10 million of € and a lot of small operators
- Logistics input to the national GDP is around 90 billion, with a share of 5,2%, but all the other services and productions buy services from this sector.

- Transport & Warehousing production factors

4,8%	Whole manufacture sector
19%	Mining industry
10%	Wood and Steel production
2%	Pharmaceutical industry
26,4%	Wholesale trade
12,2%	Retail trade

Source: Osservatorio Contract Logistics, POLIMI, 2022

How can we win the ecological, technological, and energetical transition challenge?

1. **Short term** - the only way to reduce emissions is the reduction of movements. The challenge: same quantity (or more) with less movements; During the pandemic crisis the decrease in pollution was a consequence of the reduction of the movement
2. **Medium term** – alternative fuel not renewable
3. **Long term** – Circular economy & Renewable energy, we need a deep and extensive change in our approach, lifestyle (general) & transport organization (particular)

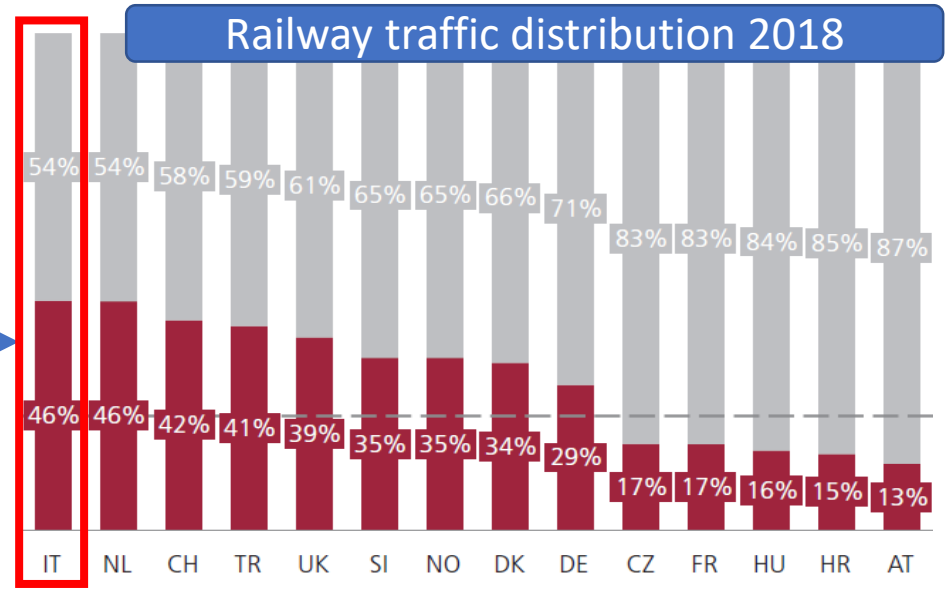
Short term: empowerment of intermodality

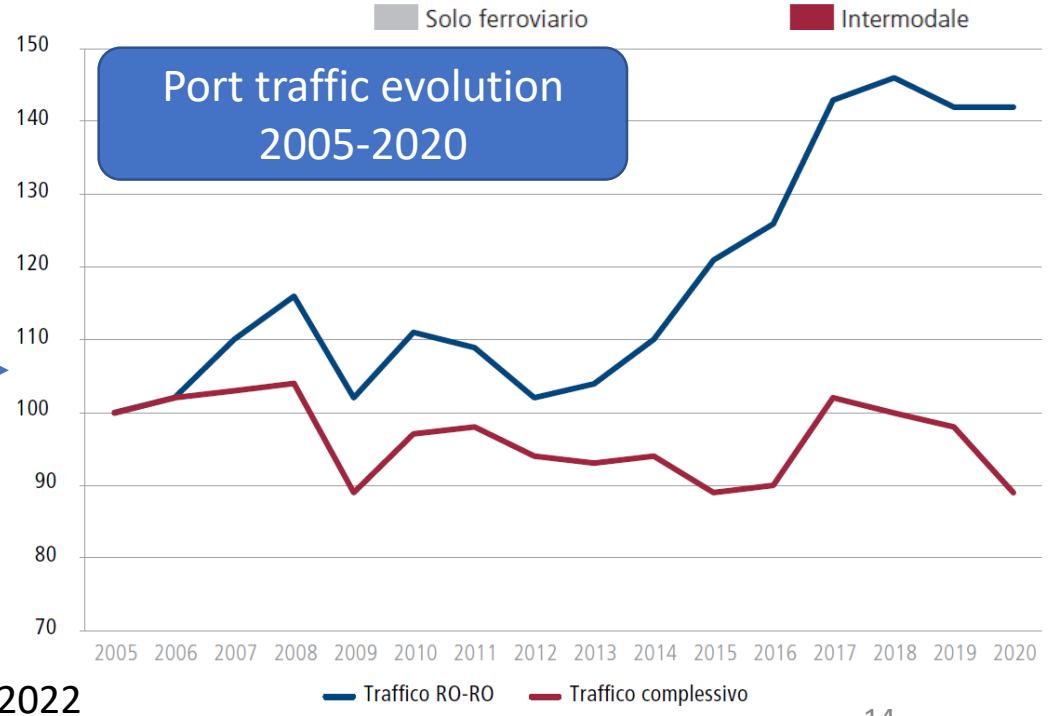
Move less, same quantity

Italian Best practices

Railway (combined transport): half of the railway traffic is combined (46%); Europe combined transport increased 50% between 2009 and 2018; traffic line Italy-Germany is the first continental line for transported quantities.

Highway of the Sea: since 2005, the Italian Highway of the sea traffic went up by 40%, the Government support «Marebonus» assists this transport system, but operators find it efficient and suitable for long-distance movements.





Source: Eurostat and Assoporti, 2022

Medium term: new transport challenges

Il Bio-LNG a WIN-WIN opportunity

- The benchmark of GHG emission between trucks fuelled with diesel GNL al Bio-GNL based on *'well to whell» approach*, shows the CO_2 low level of Bio-LNG.
- Bio GNL emissions reduction:
  - ✓ production (extraction, transport, refining, and distribution) capturing the emission of zootechnical products,
  - ✓ combustion (engine consumption) without hydrocarbons.
- The Bio GNL emissions are 121% smaller than the emissions of a diesel truck (Source: CNR-Istituto Inquinamento Atmosferico).
- If Rome's transport fleet (passenger and freight) is to be fuelled by BioGNL, the total reduction of GHG could be around 50 thousand tons of CO_2eq/year (Source: A circular economy model based on biomethane: What are the opportunities for the municipality of Rome and beyond, Università di Roma e del Tennessee - USA).
- High duty trucks fuelled GNL: advanced technology, 2019 registered 1.040 trucks with BIO-GNL with expected growth in the coming years.

Long term: new transport challenges

1) **Connected and Autonomous Vehicles**

- ✓ Electric roads: ongoing trials in Sweden, Germany e United States. BREBEMI (Italian Motorways) trials with Siemens e Scania as technical partners
- ✓ Advanced driver Assistance System (ADAS): Strong impact on security and transport costs

2) **Transport decarbonization**

Engine Transformation (alternative renewable energies), supply networks. Green Deal e Fit for 55 goals: Transport sector carbon-neutral in 2050

3) **New mobility services** (- owners + services) passenger and freight transport

Last challenge: New cultural framework

- **To share instead of To possess**, already active in freight transport and passenger urban mobility will grow thanks to the development of digital technologies and ICT;
- **Self-driving (autonomous),** passenger cars & freight trucks, but also vessels (*roboats*) or airplanes (drones) and more complex means of transport (like trains and big vessels);
- **Digital mobility (*Mobility-as-a-service* - MAAS),** Cars & Truck more as data banks and less as engines; the integration (thanks to software development) between digital technologies, transport demand, and data collected by cars & trucks, will change the traditional idea of transport and its role in our life.

National framework: the Italian challenge on zero emission

Thanks for your attention

For any comments or questions
Please contact me

appetecchia@isfort.it

Online meeting, 19 October 2022