



Sustainability

EGOS – Cagliari Conference

February 2023

Agenda



- 1 General information on ferries
- 2 What is the best option for EGOS participants? Five scenarios
- 3 Other recommendations Air + Hotel
- 4 Conclusion

General information on ferries

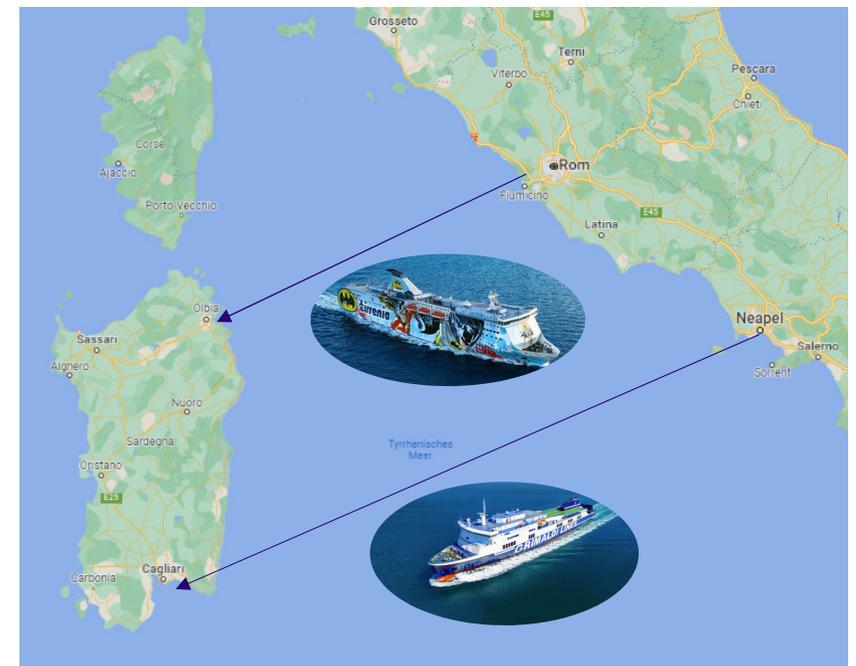
✓ The 2 main ships linking Sardinia to Italy are:

- The **Tirrenia Sharden**, cruising between Civitavecchia and Olbia, 5.5 hours during the day, or 7 hours at night. Can carry 2900 passengers and 850 cars.
- The **Grimaldi Corfù**, cruising between Naples and Cagliari, 15 hours overnight. Can carry 900 passengers and 180 cars.

✓ In addition to CO₂ emissions, large ships in general contribute to biodiversity loss through pollutants and waste. They also emit fine particles.

✓ Of course, unlike cruise ships, ferries are a necessary means of transportation (of people, and goods) for island locations. Furthermore, less polluting technology alternatives are more readily available for ferries than for airplanes.

✓ In most scenarios, taking the car on the ferry is equally polluting as taking a flight, even if four people share a car.



Emissions from ferries to Sardinia

Name	Port of Registry	Annual average CO ₂ emissions per transport work (pax) [g CO ₂ / pax · n miles]
GIUSEPPE SA	Cagliari	3958,04
MOBY NIKI	Napoli	1804,9
MOBY BABY TWO	Napoli	1660,66
MOBY DADA	Napoli	1648,01
BITHIA	Cagliari	1353,34
GNV CRISTAL	Napoli	1259,98
SNAV ADRIATICO	Napoli	1248,98
JANAS	Cagliari	1190,53
CORFU'	Bari	1048,71
GNV ALLEGRA	Genoa	1037,27
MOBY ZAZA'	Livorno	994,73
MOBY WONDER	Napoli	990,67
MOBY AKI	Napoli	989,44
GNV AZZURRA	Napoli	986,77
RHAPSODY	Genoa	947,45
VINCENZO FLORIO	Napoli	910,14
NURAGHES	Cagliari	855,69
RAFFAELE RUBATTINO	Napoli	850,9
SHARDEN	Cagliari	845,06
MOBY DREA	Napoli	780,94
MOBY OTTA	Napoli	752,74
STENA HORIZON	Bari	720,07
MOBY VINCENT	Napoli	642,01
MOBY TOMMY	Napoli	555,48
MOBY CORSE	Livorno	453,37

✓ Those official emissions are mixing pax without cars and pax with cars.

✓ It's estimated than taking a car on the boat releases ca **7 times more emissions** that being alone on-board (more weight & space)

✓ Based on ships capacity (passengers + cars), we can deduct the following emissions factors (*NB: we assume no cabin is booked on-board*):

Tirennia Sharden:

Passenger without a car: **0,165 kg CO₂ / pax / km**

Passenger with a car: **1,155 kg CO₂ / pax / km**

Grimaldi Corfu:

Passenger without a car: **0,146 kg CO₂ / pax / km**

Passenger with a car: **1,026 kg CO₂ / pax / km**

✓ To be compared to flight: **0,167 kg CO₂ / pax / km**

Reminder: What is 1 ton (1000 kg) of CO₂?

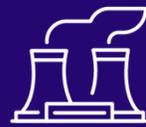
-> 2 tons/person/year is the recommended maximum



Taking a **one-way** economy flight from NY to London



Heating an 80m² home with gas for **120 days**



Burning **1,106** pounds of coal



Producing **218,341** A4 sheets of paper



Charging **121,643** smart phones



Traveling **578,035 km** by high-speed train



Producing **2,208** liters of bottled water



Traveling **5,181 km** by car



Manufacturing **194** cotton shirts



138 meals with beef



1,961 vegetarian meals



Manufacturing **7** laptops

Scenarios / Comparisons 1: Rome to Cagliari

<i>Scenario 1: Rome to Cagliari</i>	kg CO ₂ one way per passenger	Duration
Direct Flight	80,0	2h
Train from Rome to Naples and Ferry to Cagliari (no car)		
Train from FCO to Naples	3,8	2h
Train to Naples Port	0,1	
Ferry to Cagliari	71,5	15h
	75,4	17h
Train from Rome and ferry from Civitavecchia		
Train Rome-Civitavecchia	1,2	1h
Ferry Civitavecchia-Olbia	38,3	6h
Train Olbia-Cagliari	4,0	4h
	43,5	11h
Car with 4 pax from Rome and ferry from Civitavecchia to Olbia		
Train Rome-Civitavecchia	1,2	1h
Ferry Civitavecchia-Olbia	94,9	6h
Car Olbia-Cagliari	17,2	4h
	113,3	11h
Car with 2 pax from Rome and ferry from Civitavecchia to Olbia		
Train Rome-Civitavecchia	1,2	1h
Ferry Civitavecchia-Olbia	151,8	6h
Car Olbia-Cagliari	34,5	4h
	196,4	11h

✓ Taking **one's car on-board** makes emissions **increase a lot**, resulting in emissions higher than flying.

✓ Taking the **ferry with no car** "just" releases 38kg CO₂. Combining it with train makes it the **most interesting option** and is twice less polluting than flying.

Scenarios / Comparisons 2: Milan to Cagliari

<i>Scenario 2: Milan to Cagliari</i>	kg CO ₂ one way per passenger	Duration
Direct Flight	114,0	2,5h
Train from Milan to Naples and Ferry to Cagliari (no car)		
Train from Milan to Naples	11,7	4,5h
Train to Naples Port	0,1	0,5h
Ferry to Cagliari	71,5	15h
	84,2	20h
Train from Milan to Rome and ferry from Civitavecchia		
Train Milan-Civitavecchia	8,4	6h
Ferry Civitavecchia-Olbia	38,3	6h
Train Olbia-Cagliari	4,0	4h
	50,7	16h
Car with 4 pax from Milan to Rome and ferry from Civitavecchia to Olbia		
Train Milan-Civitavecchia	35,2	6h
Ferry Civitavecchia-Olbia	94,9	6h
Car Olbia-Cagliari	17,2	4h
	147,3	16h
Car with 2 pax from Milan to Rome and ferry from Civitavecchia to Olbia		
Train Milan-Civitavecchia	16,9	6h
Ferry Civitavecchia-Olbia	151,8	6h
Car Olbia-Cagliari	34,5	4h
	203,2	16h

- ✓ Taking one's car on-board **makes emissions increase a lot**, resulting in emissions higher than flying.
- ✓ The only alternative to flying would be a **train from Milan to Naples or Rome and then a ferry**. Emissions savings start to be significant (30-60kg per person).
- ✓ Of course, the increased length of the trip does not make this a feasible option for everyone.

Scenarios / Comparisons 3: Vienna to Cagliari

	kg CO ₂ one way per passenger	Duration
Scenario 3: Vienna to Cagliari		
Direct Flight	210,0	3h
Train from Vienna to Roma and and ferry from Civitavecchia to Olbia		
Train from Vienna to Roma	18,1	16h
Train Rome-Civitavecchia	1,2	1h
Ferry Civitavecchia-Olbia	38,3	6h
Train Olbia-Cagliari	4,0	4h
	61,6	27h
Car from Vienna to Roma and and ferry from Civitavecchia to Olbia - 4 people		
Car from Vienna to Civitavecchia	71,5	16h
Ferry Civitavecchia-Olbia	94,9	6h
Car Olbia-Cagliari	17,2	4h
	183,6	26h

- ✓ In this scenario, **taking the train to Rome significantly decreases individual emissions** (ca 130kg CO₂).
- ✓ Taking a car with 4 persons from Vienna would **also decrease emissions** (ca 30kg CO₂ per person), but taking the car on such a long trip also raises **security issues**.
- ✓ Of course, the increased length of the trip does not make this a feasible option for everyone.

Scenarios / Comparisons 4: Brussels to Cagliari

Scenario 4: Brussels to Cagliari

	kg CO ₂ one way per passenger	Duration
Indirect flight via Frankfurt (no direct flight)	372,0	5h
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Train from Brussels to Roma and and ferry from Civitavecchia to Olbia		
Train from Brussels to Civitavecchia	24,1	20h
Ferry Civitavecchia-Olbia	38,3	6h
Train Olbia-Cagliari	4,0	4h
	66,4	30h
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Car from Brussels to Roma and and ferry from Civitavecchia to Olbia - 4 people		
Car from Brussels to Civitavecchia	96,1	16h
Ferry Civitavecchia-Olbia	94,9	6h
Car Olbia-Cagliari	17,2	4h
	208,2	26h

✓ In that scenario, **taking the train to Rome significantly decreases individual emissions** (ca 306kg CO₂).

✓ Taking a car with 4 persons from Brussels would **also decrease emissions** (ca 30kg CO₂ per person), but taking the car on such a long trip also raises **security issues**.

✓ Of course, the increased length of the trip does not make this a feasible option for everyone.

Scenarios / Comparisons 5: Barcelona to Cagliari

Scenario 5: Barcelona to Cagliari

	kg CO ₂ one way per passenger	Duration
Direct flight	166,0	2h
Ferry from Barcelona to Porto Torres and Car to Cagliari		
Ferry Barcelona - Porto Torres	77,4	15h
Train Porto Torres-Cagliari	3,6	4h
	81,0	19h



- ✓ There is no ferry from Barcelona to Cagliari, but there is one to Porto Torres, 250km from Cagliari.
- ✓ Taking the ferry divides emissions by two, but again, other environmental impacts of ferries may be considered.
- ✓ Of course, the increased length of the trip does not make this a feasible option for everyone.

Other recommendations: Air + Hotel

- + **Transatlantic flights:** Best airline is **Virgin Atlantic**. **Air France KLM** is also a good option. Be careful you need to check the airlines operating the flight (because Virgin can sell a flight operated by Delta – less efficient aircrafts)
- + **From Asia / Australia. Singapore Airlines and Etihad by far have the best fleet.** Emirates has one of the least efficient fleet worldwide (only A380 and B777). Yet it remains the best option in some cases (ex only carrier with just one stop from Australia)
- + From Europe, no airline clearly appears to be better. Check out **for most efficient aircrafts: A220 and the NEO series.**
- + Reminder: a **direct flight** is always better than a connecting flight. So if a direct flight is offered from an airport that is within a reasonable train distance, consider taking a train trip to that airport.
- + **Hotel:** there are no eco-certified properties in Cagliari. Our recommendation is to **avoid luxury properties and above all resorts** (large quantities of water used, up to 5,000 L per traveler per room night).

Choosing an efficient aircraft can make a difference

You can save 20-30% CO₂ by flying with an efficient aircraft

Learn the most efficient routes

- + Flying direct is more CO₂ efficient than flying indirect



Learn the best existing aircrafts

- + International: Take Airbus 350 & 330neo, Boeing 787. Avoid B747 & A380
- + Domestic Regional: Take A320 NEO, A321 NEO, A220 . Avoid E70, E90, very small aircrafts
- + New generation aircraft is on average 20 to 25% more efficient



Boeing B787



Airbus A350



Airbus A330neo



Airbus A321neo



Airbus A320neo

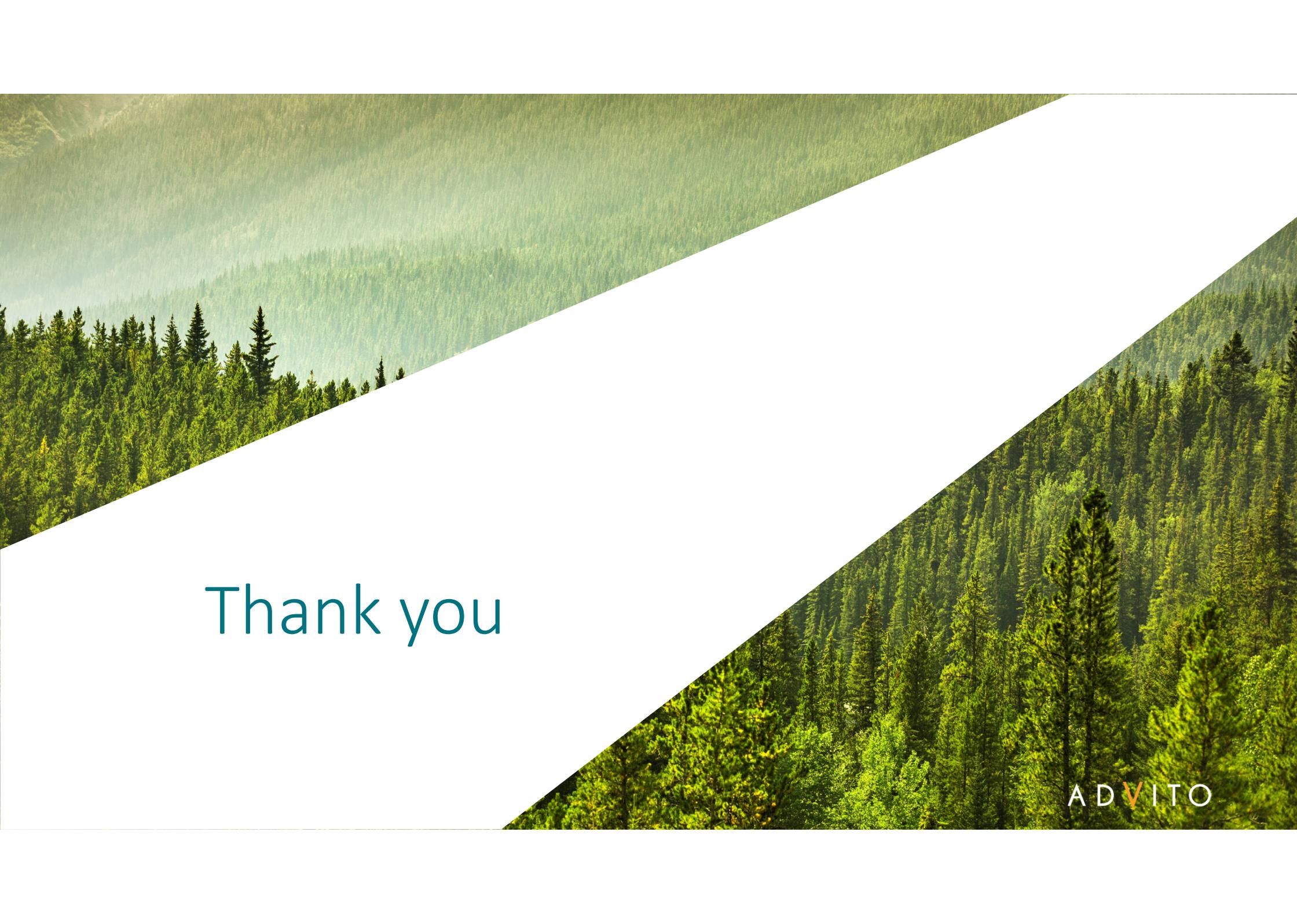


Airbus A220



Conclusion

- ✓ The advantage of taking a ferry vs flying exists **only if no car is used before and after the ferry trip, and on-boarding with no car. On-boarding with a car is often more polluting than flying**, even with 4 passengers.
- ✓ **The longer the distance, the more a combination train + ferry will save CO₂.** This option is **even more interesting when there is no direct flight** (for example from Brussels). Yet those trips are long and not feasible for everyone.
- ✓ Where taking a car on long distance saves CO₂, **security issues also need to be considered.**
- ✓ CO₂ can be saved with a ferry/train combination from many locations, yet those ships have other **environmental impacts (emission of fine particles and threat for biodiversity).**
- ✓ Significant individual emissions savings can also be generated by **choosing efficient aircrafts and opting for direct flights**, as well as from considering **virtual participation.**



Thank you

ADVITO