



**GREEN TRANSITION**  
DENMARK

# Air quality measurements in Malta & Benefits of the Northern European Emission Control Area

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# Health effects of air pollution in Malta

- Around 250 people die from air pollution every year in Malta (EEA, 2020). That is 6.5% of all deaths (3,800).
- In 2020+2021 air pollution killed more people in Malta (500) than COVID-19 (460). No vaccine against pollution.
- Diseases from air pollution: Cardiovascular (incl. strokes and heart diseases) and airway diseases, cancer etc.
- These diseases are the main causes of death in Malta.
- It is very cost effective to reduce air pollution from shipping due to saved health costs.

# Soot from shipping (pictures from Genoa, Italy)



# Measurements of air quality in Malta

- Measured ultrafine exhaust particles.
- Particles smaller than 100 nm consisting of soot (black carbon) coated with PAHs and heavy metals.
- Ultrafine particles are deposited in the finest parts of the lungs (alveoli) and transferred into the blood.
- Clean air in Europe contains 1,000-3,000 particles per cm<sup>3</sup>.



# Good news: There is clean air in Malta



**Fort St.  
Angelo**  
Oct. 19<sup>th</sup>.  
Wind from  
east: 6 m/s.



# Bad news: Small ships pollute locally



**Valletta**

Oct. 19<sup>th</sup>.

Wind from east: 6 m/s.

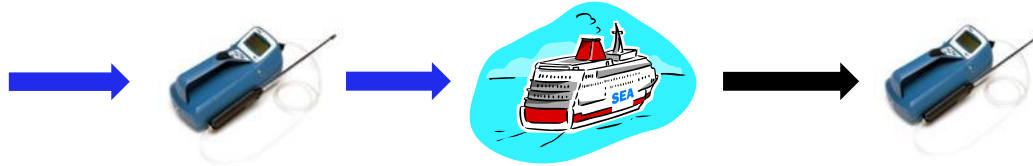
# Bad news: Large ships pollute whole cities



**Grand Harbour**

Oct. 20<sup>th</sup>.

Wind from east: 3 m/s.



# Valletta up and down-wind small cruise ship



Up-wind: Before ship



**Grand Harbour**

Oct. 24<sup>th</sup>.

Wind from south-west: 6 m/s.

Down-wind: After ship



# All newer road vehicles have filters

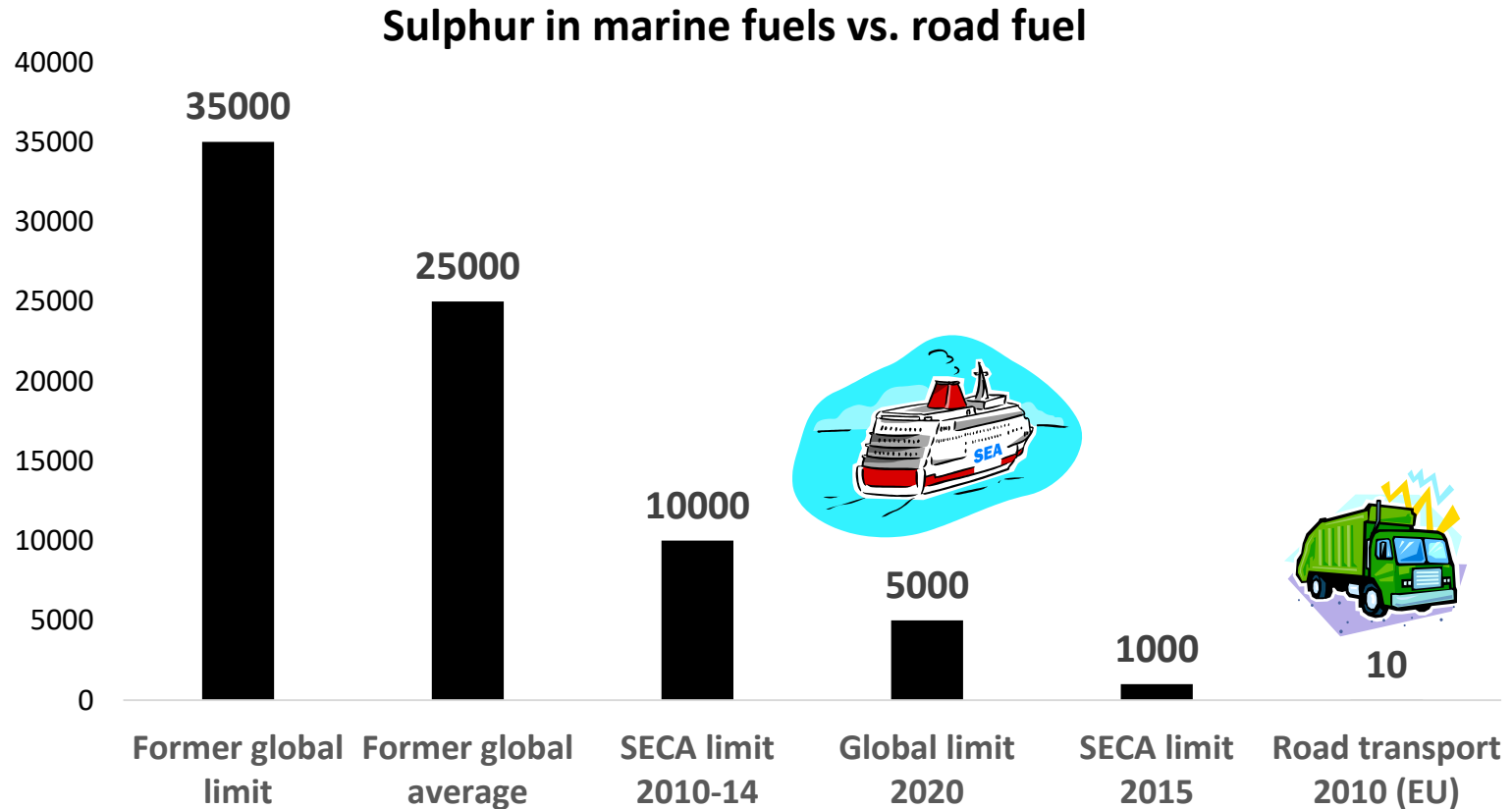


Ships have no filters. A cruise ship (4,000 p) at berth emits as many particles as 5,500 cars per second.

**Grand Harbour**  
Oct. 24<sup>th</sup>.  
Wind from south-west: 6 m/s.



# Shipping is poorly regulated



**2014: All new trucks in EU have SCR & particulate filters !**

# Solutions for ship pollution

## In ports:

Shore power for cruise ships, ferries, cargo ships etc.

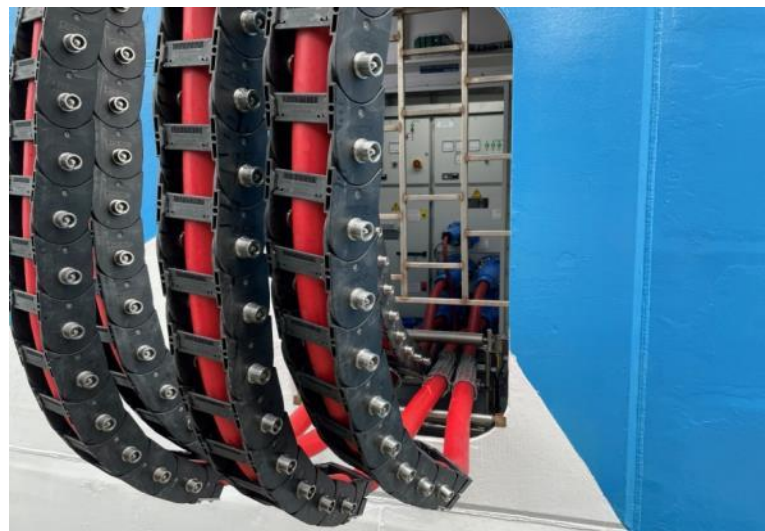
## On sea:

Electric ferries – Great potential in Malta.

Emission Control Areas (ECAs) limiting emissions:

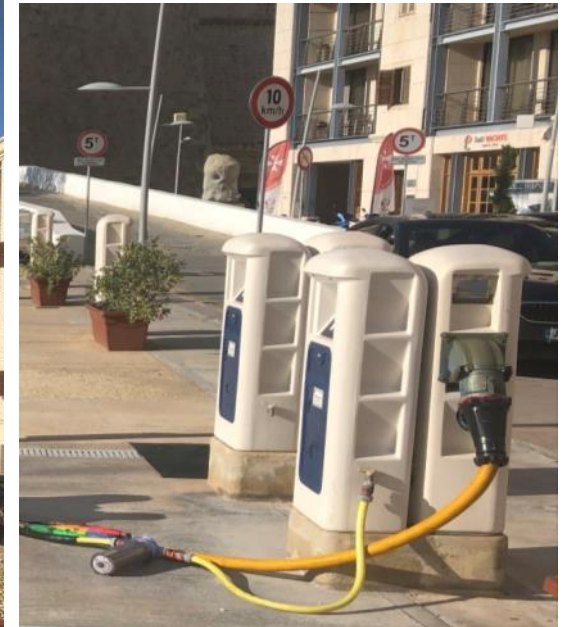
- SO<sub>2</sub> emissions will drop 80% immediately.
- NO<sub>x</sub> emissions will drop 80% over 20-25 years.
- Particle emissions will drop significantly and immediately.

# Shore power in Northern Europe





# Shore power for small boats in Malta



**Grand Harbour**  
Oct. 20<sup>th</sup>.



# Shore power planned for cruise ships



# Shore power = Can be good business

- A cruise ship in port uses about 30 kWh per passenger.
- Positive business case if electricity can be sold for 0,23 €/kWh.  
No tax → EU notification.
- The ships produce electricity for 0.18 €/kWh.
- Extra costs per passenger per port:  $30 \text{ kWh} * 0.05 \text{ €/kWh} = \underline{\underline{1.5 \text{ €}}}$
- Cruise: 4 ports, 7 days: 670 € without shore power.
- Cruise: 4 ports, 7 days:  $670 \text{ €} + 4 \cdot 1.5 \text{ €} = \underline{\underline{676 \text{ € with}}}$  shore power.
- Will an increase of 1% or 1,5 € per port scare away passengers ?  
A cup of coffee costs 3-5 € in a cruise port.
- In Kristiansand cruise ships don't ask for the price of shore power.

# Electric ferries in Denmark



# Emission control area in Northern Europe

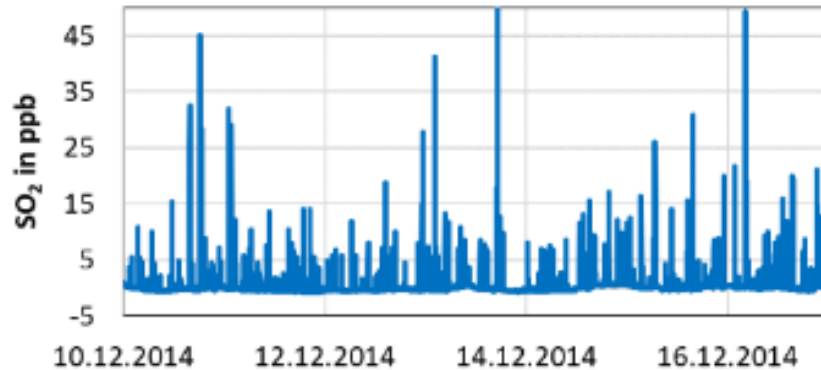
- SO<sub>x</sub> Emission Control Area from 2007 with the strictest sulphur limit from 2015.
- NO<sub>x</sub> Emission Control Area from 2021 for all new build ships.



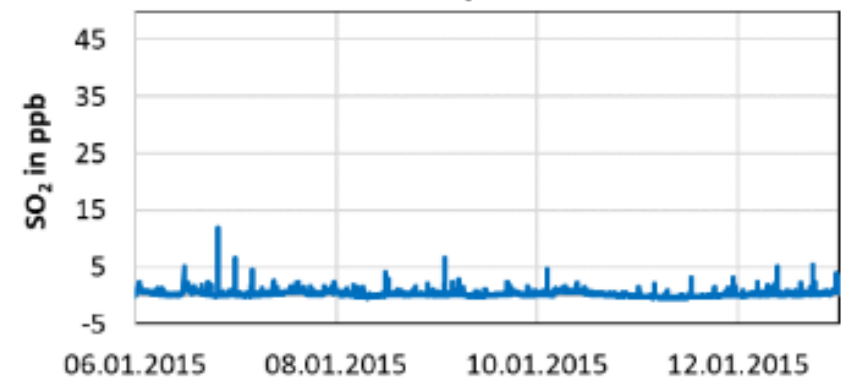
*Source: International Maritime Organization*

# Measurements from Northern Europe

## Before SECA



## After SECA



Measurements from Neuwerk (German island)

Concentrations of toxic SO<sub>2</sub> immediately dropped as expected after introducing the SECA



# Conclusions from Northern European ECA

- Plenty of distillate fuel (0.1% sulphur) available.
- High reduction in sulphur on land (50% drop in 2015).
- Significant health and economic benefits for society.
- No enforcement challenges (0.0067% violations).
- No cargo transfer from ship to road.
- No notable price increases for consumers ( $< 0.005\%$ ).
- No notable extra costs for ship owners or authorities.

# Three key work-shop questions

- 1) How do we get more shore-power connections for more ships in Malta (in Free Port as well) ?
- 2) How do we get electric ferries in Malta ?
- 3) How do we get a Mediterranean ECA ?

# With support from EU: LIFE4MEDECA

This presentation is a part of the EU LIFE project:  
*LIFE4MEDECA* with the purpose to designate a  
Mediterranean Sea Emission Control Area to reduce  
health hazardous and climate damaging emissions  
of air pollution from ships.

