

# Port of Bergen - Presentation for Alianza Net-Zero Marine DEALING, 29/11-23

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# Port of Bergen

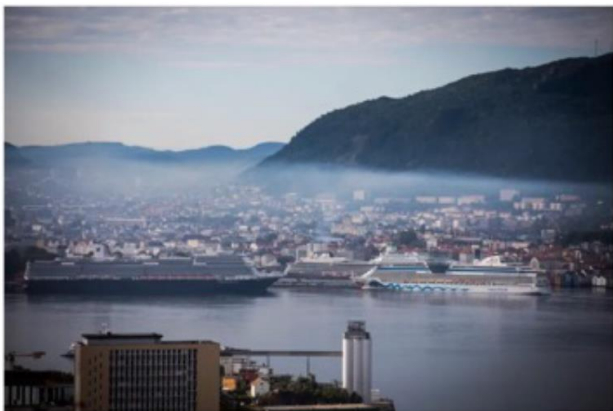


- **Cruise**
  - 340 cruise calls
  - 723.000 pax
- **Offshore supply vessels**
  - Serving around 10 ships a day
- **Regional hub for passengers (expressboats)**
- Ferries, ROPAX, RORO, container ships, research vessels, Fish farming vessels, etc.



## Utslipp gjør at NHO vil kutte kraftig i cruisetrafikken

Cruiseturister legger igjen minst penger på land i Norge og slipper ut mest CO2, kommer det frem i en ny rapport. Nå vil NHO gjøre kraftige cruise-kutt.



UTSLIPP: NHO Reiseliv ønske å kutte i cruisetrafikken etter ny rapport om utslipp knyttet til forbruk.  
FOTO: BJØRN ERIK LARSEN (ARKIV)

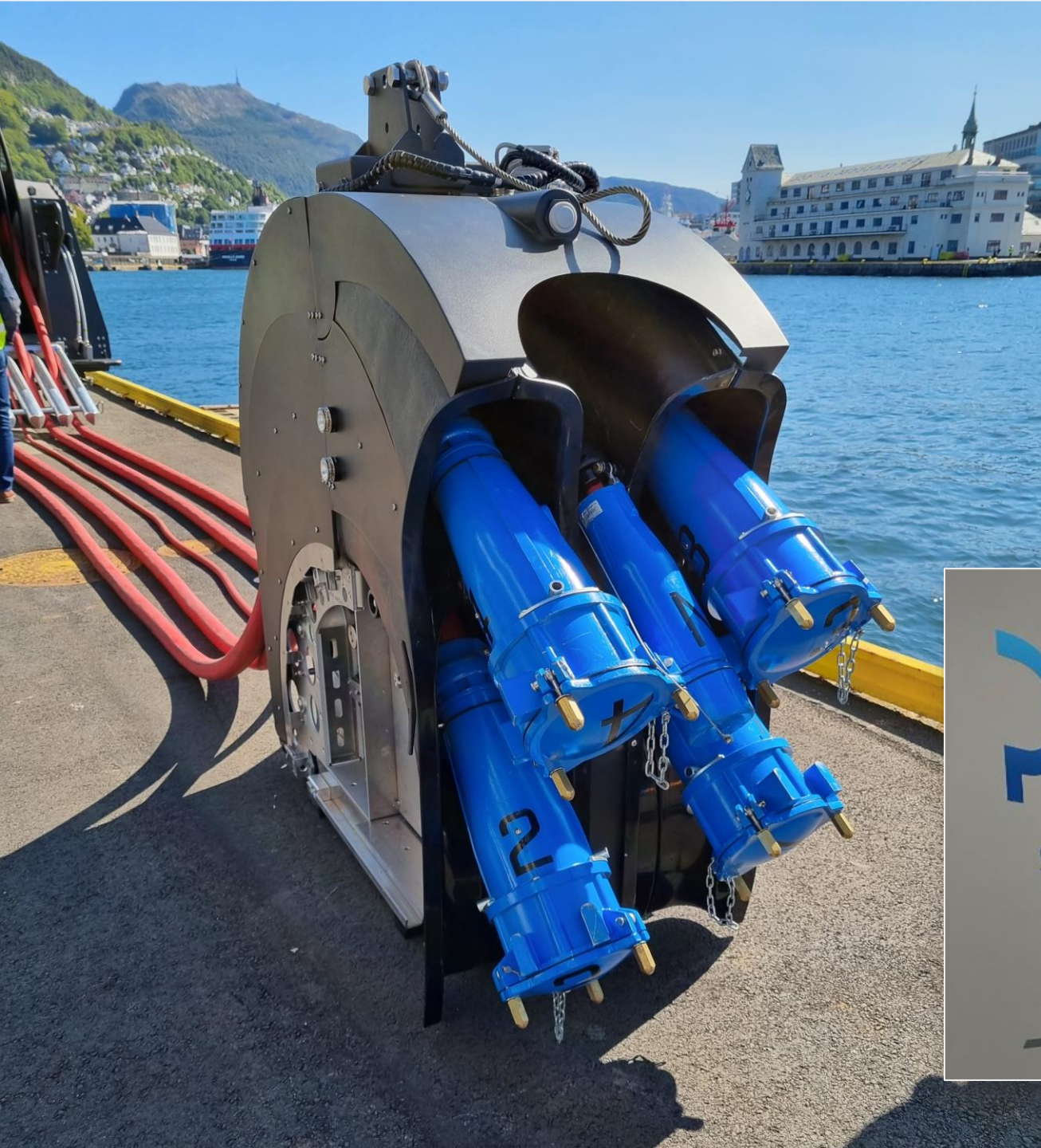


NATUR OG MILJØ REISELIV AURLAND NYHENDE

## Strengere krav gir færre cruiseanløp

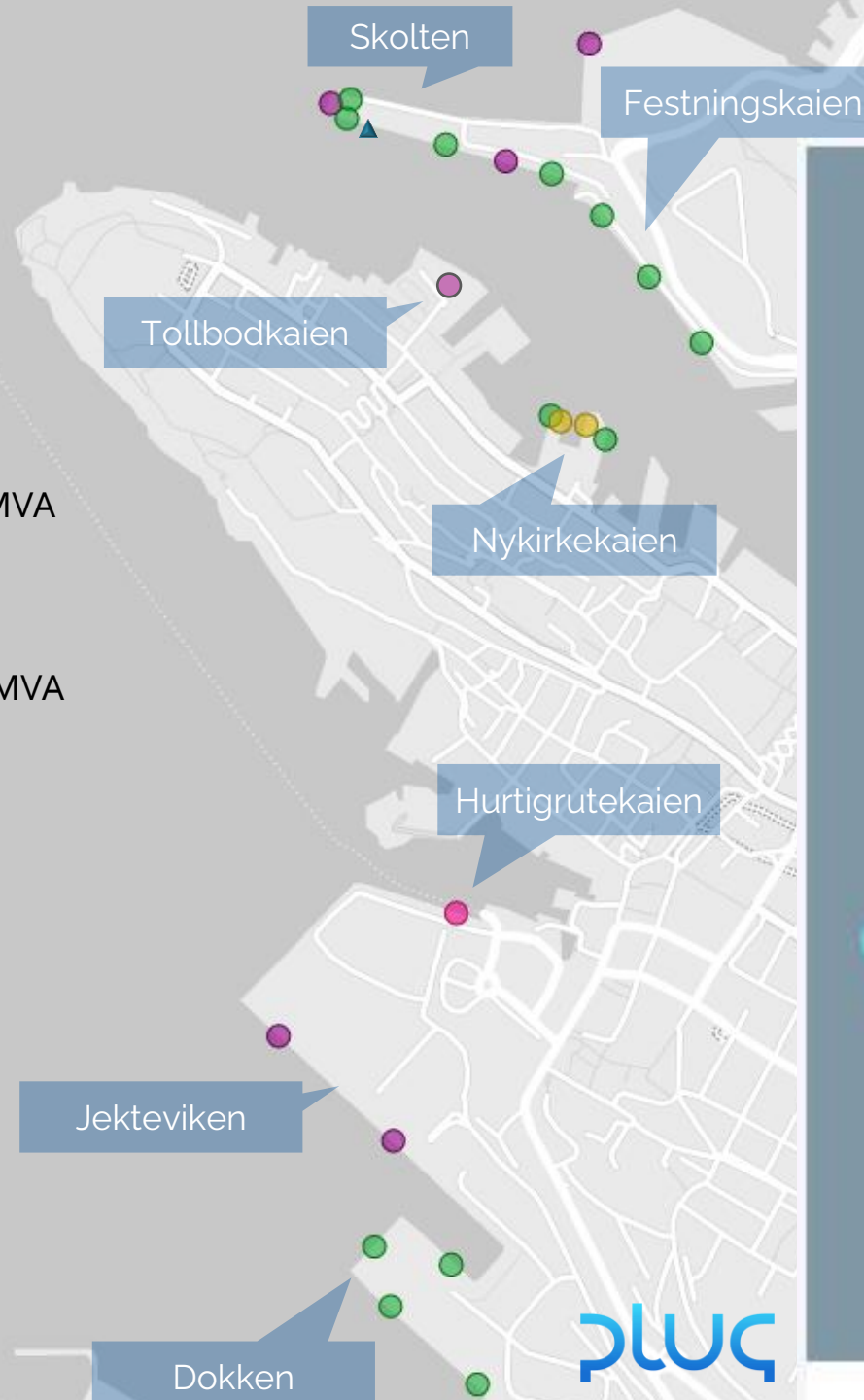


NYE KRAV: - Me kan risikera færre cruiseanløp, men me må få ned ureininga, seier Noralv Distad. (Arkivfoto)



# Shore power at Port of Bergen

- Offshore / low voltage (IEC 80005-3), 5,6 MVA
- Coastal Express / low voltage (not standard), 1,6 MVA
- Cruise / high voltage (IEC 80005-1) 48,0 MVA
- Small cruiseships / low voltage (IEC 80005-3), 1,6 MVA
- Research vessels / low voltage (not standard)



Plug facilitates zero-emission ports



Our onshore power facilities work to provide clean energy for eco-friendly vessel traffic

# The main challenges



GRID CAPACITY



STANDARDISATION



KNOWLEDGE/  
RESOURCES



CAPITAL/  
COST

# Practical experiences - Organisation



- To implement OPS is demanding for the port if you don't have the know-how
  - Need technical knowledge for planning, compilation of applications etc.
  - The marketplace concerning system acquisition is complex
  - External support for planning and operation is costly
- Our approach – Plug Bergen
  - A joint venture with Eviny – the energy company, through Plug AS (inc.)
  - Plug AS and Port of Bergen -> 50/50 ownership of Plug Bergen AS
  - Added value
    - Knowhow – technical, commercial and political
    - Economy of scale
      - Energy, Equipment, Software, Operation, Invoicing

# Standardisation – Different vessels, different needs

							
Offshore vessels	Coastal Voyage	Cruise	Bulk	Container	Ferry	High speed pax ferries	Work-/leisure boats
IEC 80005-3	NG3-plug	IEC 80005-1	IEC 80005-3 / IEC 80005-1	IEC 80005-3 / IEC 80005-1	All kinds	CCS/MCS	CCS
Low	Low	High	Low/High	Low/high	Low/high	Low	Low
200-600 kW	800-1 200 kW + charging	2 000-12 000 kW (+ charging)	50-2 000 kW	200-4 000 kW	500-9 000 kW charging	100-10 000 kW charging	0-350 kW
60 Hz (50 Hz)	50 Hz	60 Hz/50 Hz	50 Hz/60 Hz	60 Hz/50 Hz	DC/50 Hz	DC/50 Hz	DC

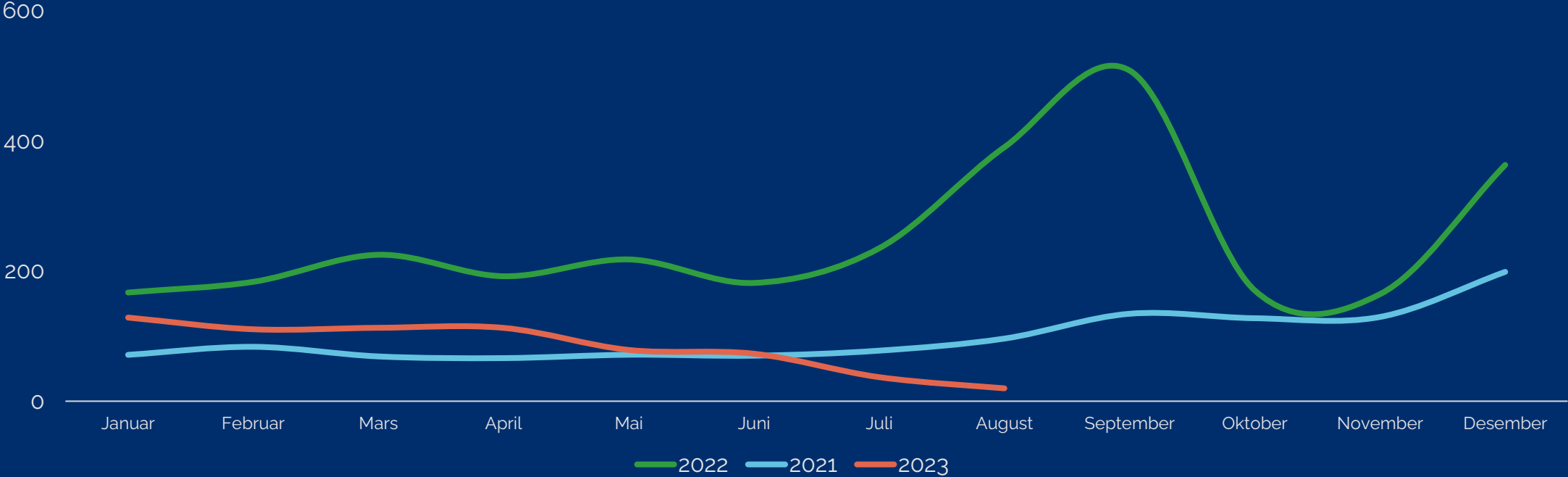


# Practical experiences

- 2023 season
  - 60% of individual ships have OPS interface
  - 25% of calls to Port of Bergen did connect to OPS
- Why not connecting?
  - Commissioning tests not completed
  - Energy price too high
- Responsibility sharing
  - The portside is not responsible for consequences of black-out (loss of power)
  - But both parties are expected to act in a responsible way

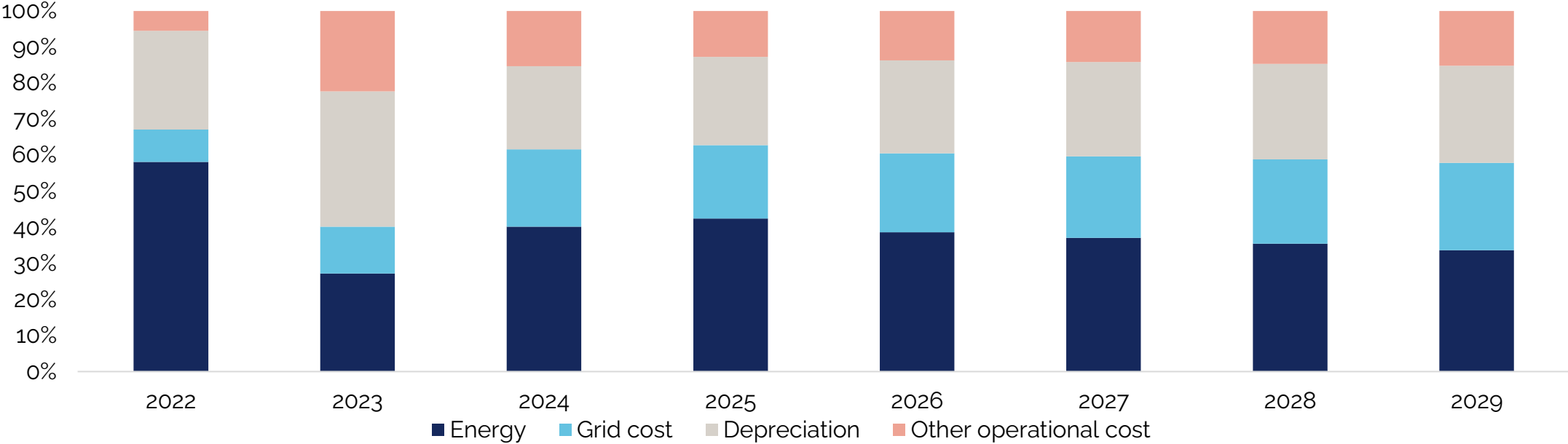
# Volatile power prices is a big challenge

## Example: Plug Bergen AS (NO5)



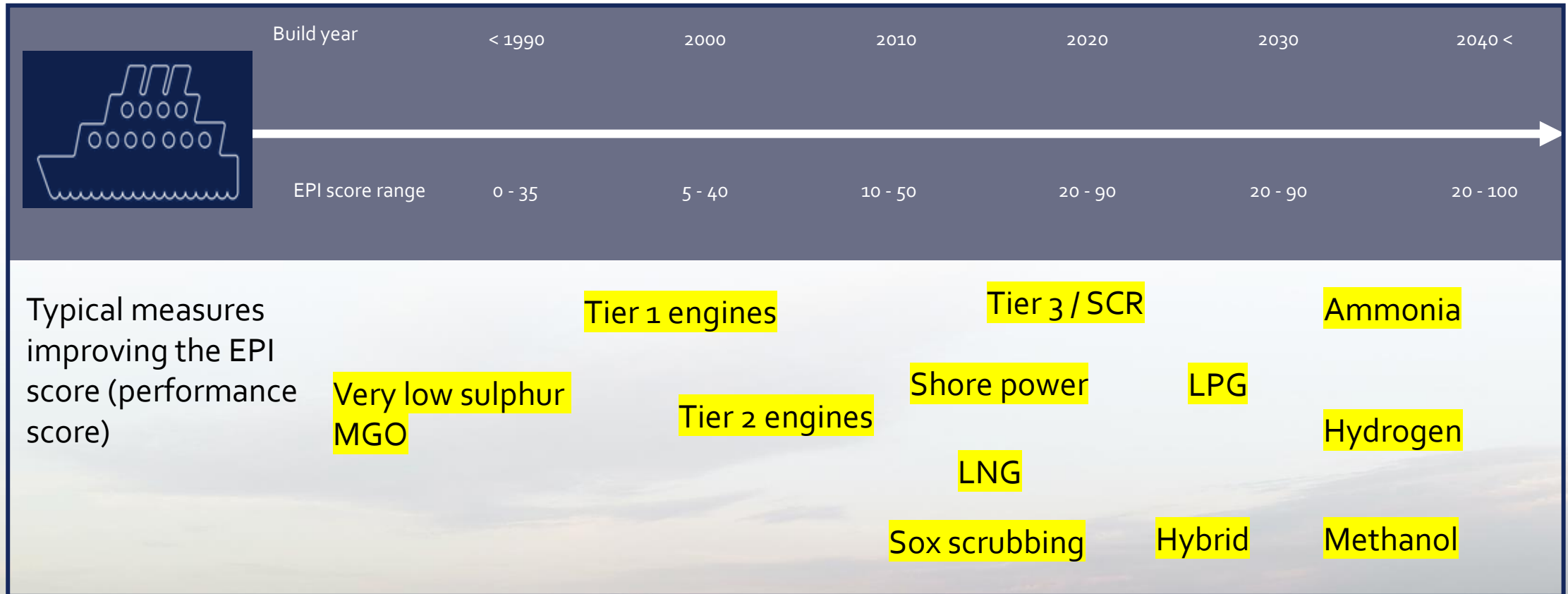
# The cost is much more than the price of kWh

## Cost distribution for OPS cruise in Bergen 2022-2029\* (percent)



\* 2022 and 2023 (YTD) are actual numbers, following months and years are Plug estimates

# Shore power is not the only answer



## No OPS : There is anyway a large improvement potential

- Large reduction potential, even without OPS
  - Reducing energy consumption
  - Using cleaner fuels
  - Improve exhaust cleaning
  - +++
- The cruise ports in the North Atlantic collaborate and invite other ports to join:
  - Environmental Port Index (EPI)
    - Documentation of ship performance
    - Incentives for the good performers

**Average reduction potential:**  
20% CO<sub>2</sub>  
10.5kg SO<sub>x</sub>/hour



# Thank you!

For more information concerning

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