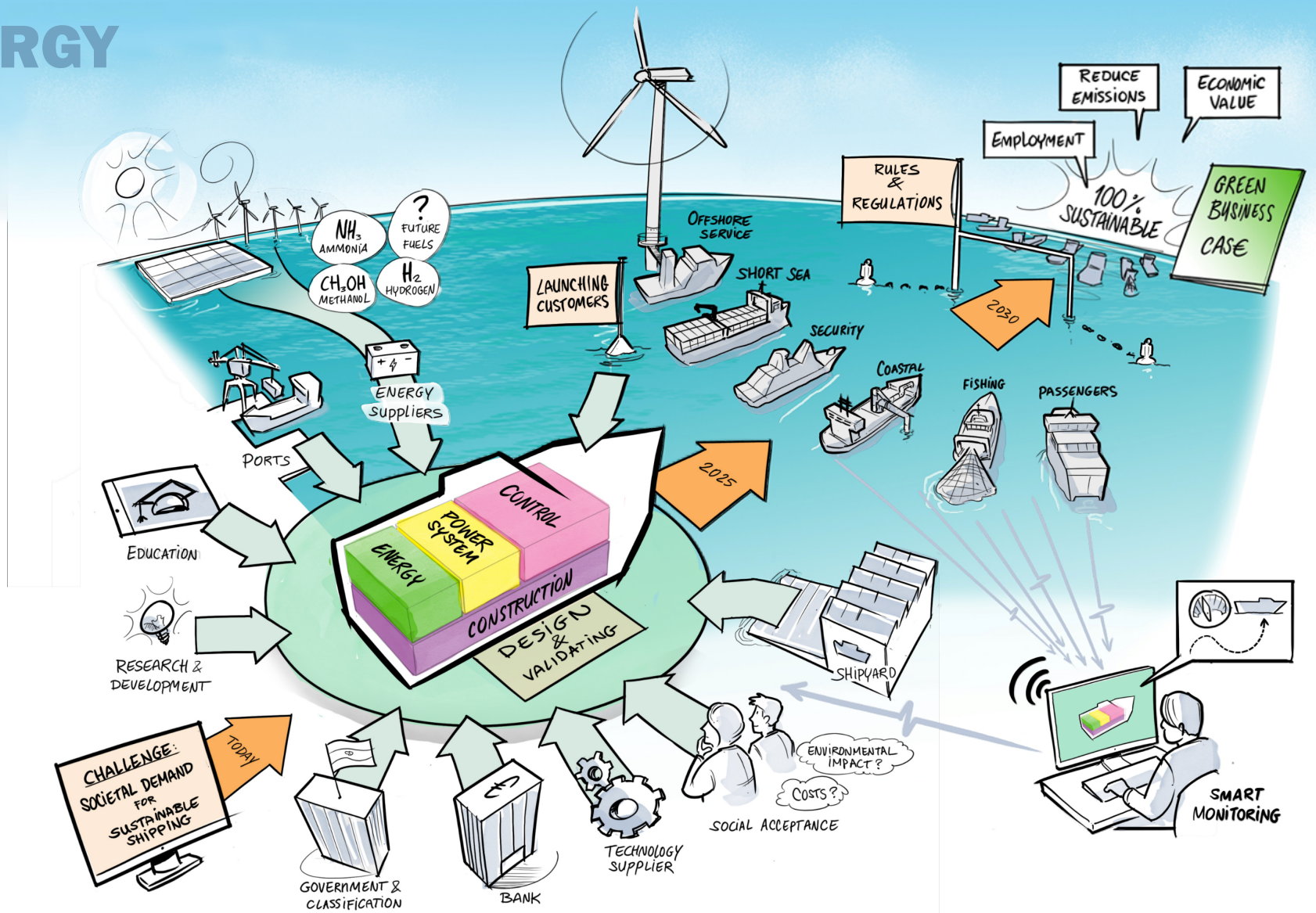
TNO innovation for life

DOTC
Dutch Ocean Technology Centre

ALTERNATIEVE ENERGIE DRAGERS
“VOORKOMEN DAT DE WAL HET SCHIP KEERT”

MARITIME ENERGY TRANSITION



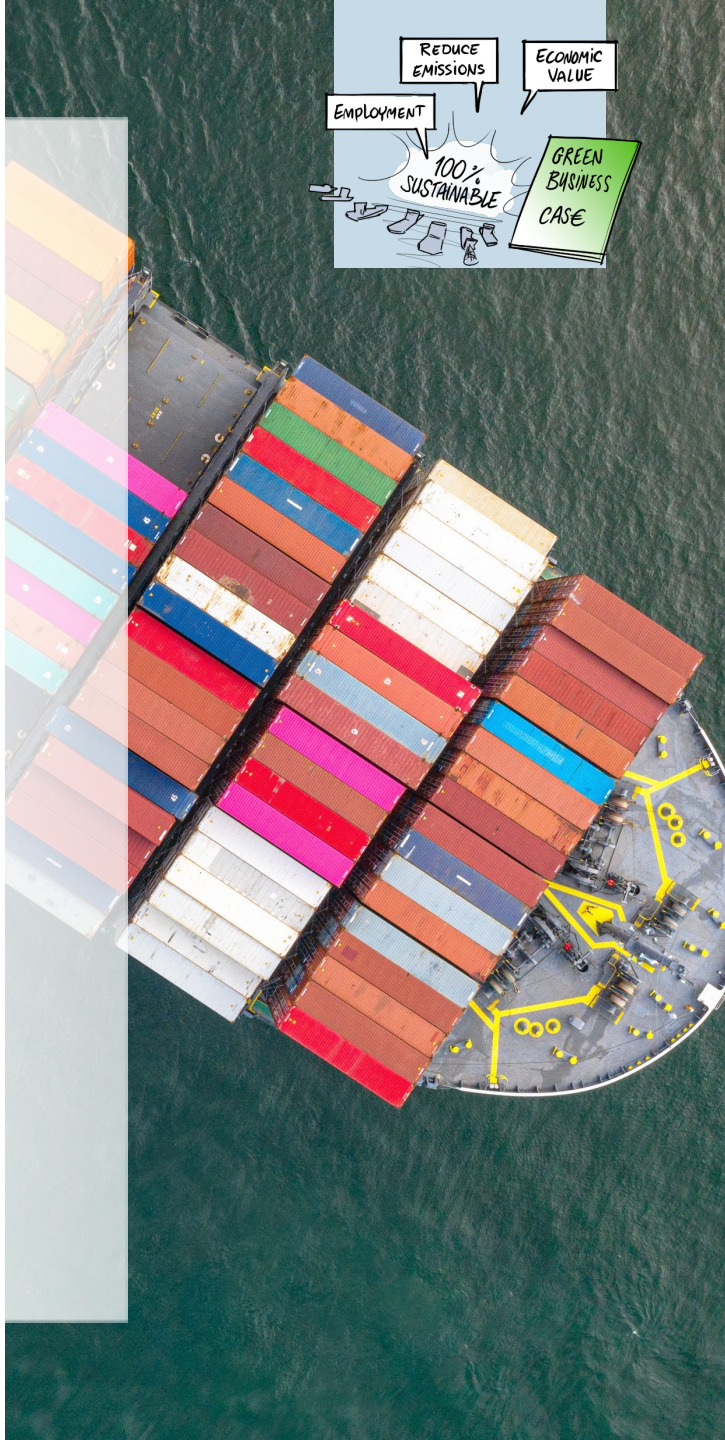
CHALLENGE
ZERO-EMISSION AS A NO-REGRET INVESTMENT

MOTIVE

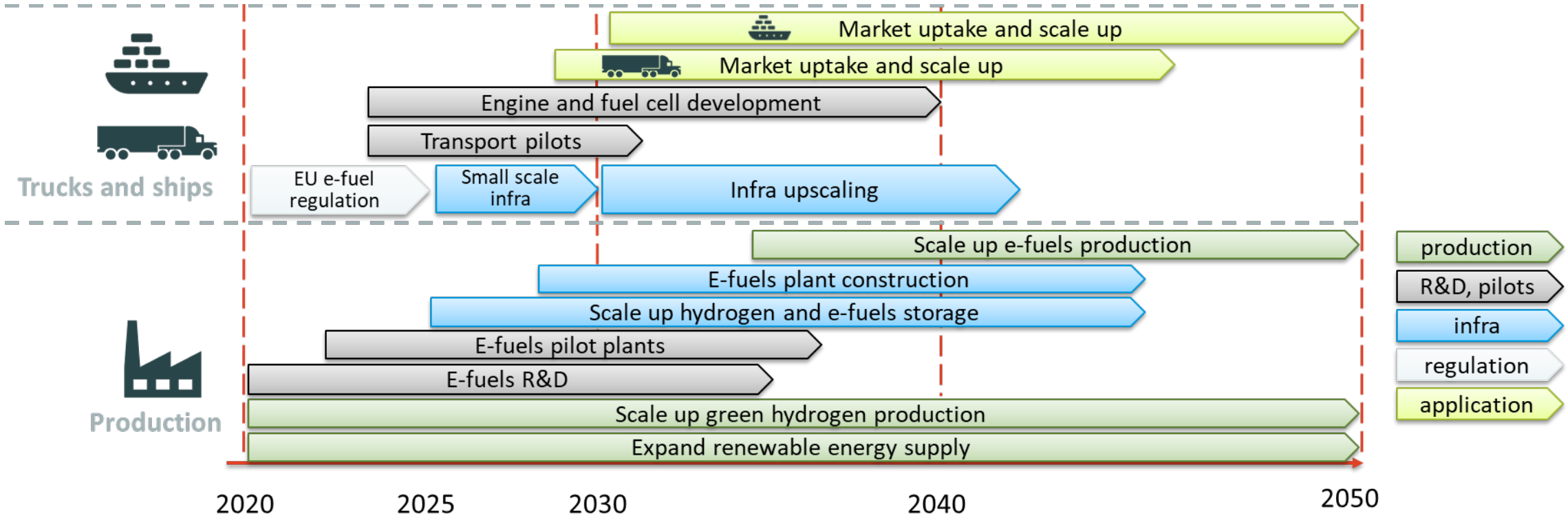
- Market Demand
- Regulatory requirements

UNCERTAINTY

- ‘Right‘ Energy carrier availability
- Technology availability and applicability
- Direction via strategic clarity



INDICATIVE ROADMAP

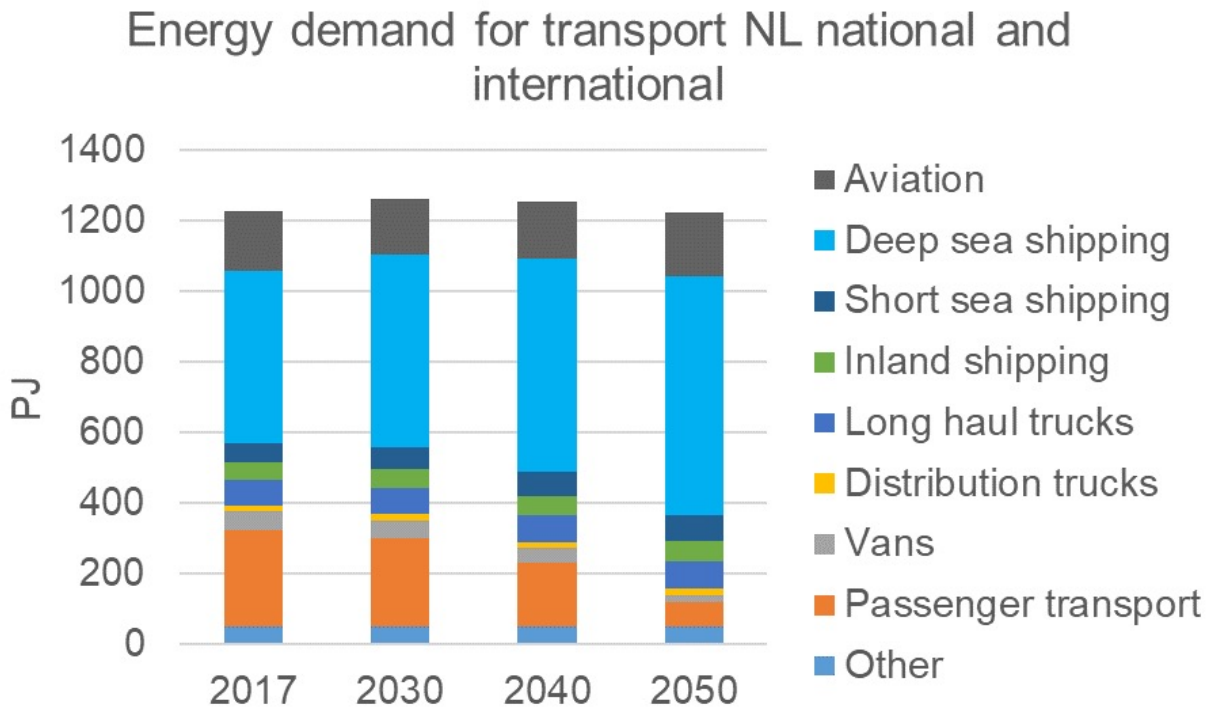


- **Structure of future 2030+ EU energy system is still very uncertain.**
- **Large scale market uptake of E-fuels is not to be expected before 2030+ as large quantities of sustainable electricity are needed.**

ENERGY DEMAND EU & NL

Energy demand inland shipping as part of transport & mobility:

- EU level: 2-3%
- NL: 7-8% of national mobility
- NL: ± 3%: of national plus international fuel bunkers



- **Inland shipping is a small market segment. For technology development, it is co-dependent.**

COMMERCIAL READINESS LEVEL INLAND SHIPS

Type	Examples	CRL fuel produc.	CRL drive line
Biofuels	biodiesel: HVO, FAME, FT diesel, Upgraded PO bio-LNG bio-methanol - DME bio-ethanol	High Low Medium Medium High	High High High Low
Electricity	battery-electric	Medium	High
P2Fuel	H_2 E-NH_3 E-LNG E-methanol - DME E-diesel	Medium Low Low	Low Low High Low High
Carbon recycling	LOHC, NaBo4, CCU on board	Low	Low

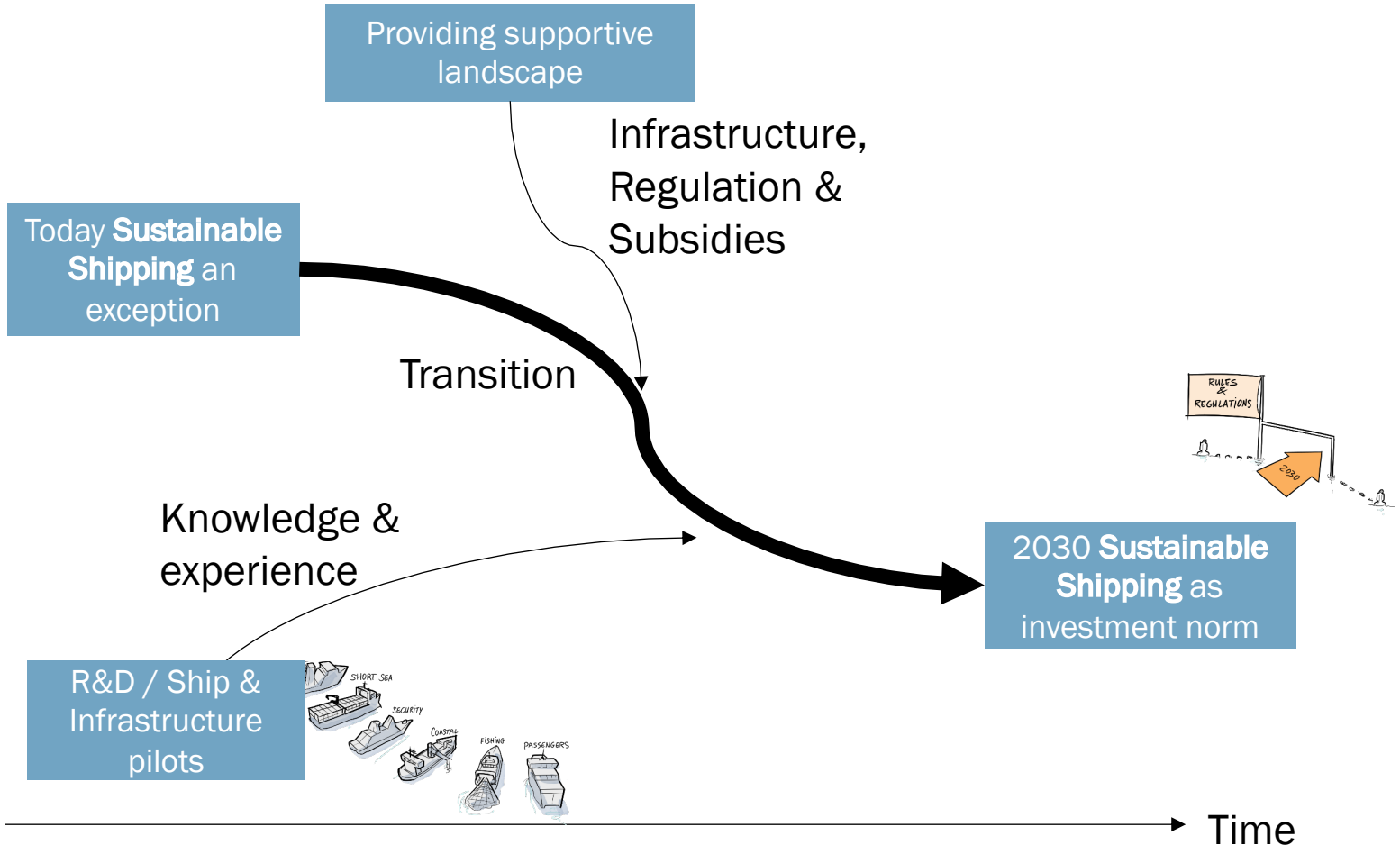
- **Only two or three sustainable fuel types can be supported. Limitation is necessary to:**

  a) develop efficient, high quality and cost-effective drivelines,
  b) to support the energy carrier infrastructure.

- **Biofuel (especially biodiesel) and green electricity are the primary feasible options suitable for large scale market uptake until 2030.**

VISION

SYNERGY BETWEEN TECHNOLOGY AND BUSINESS CASE



The rate of transition is dependent on the rate of the development 'sustainable business case'

WANT TO KNOW MORE?

GET IN CONTACT WITH US VIA

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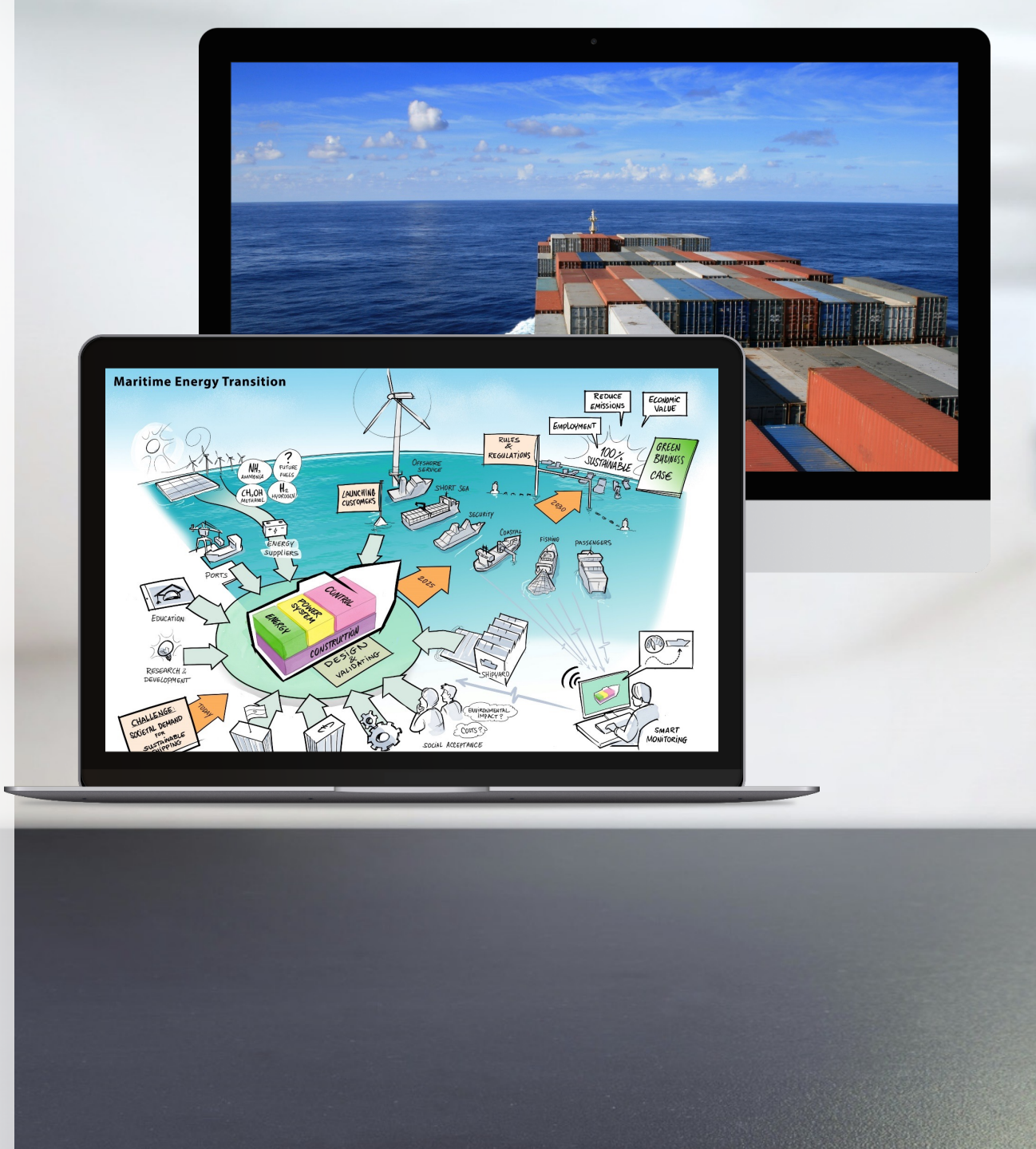

THANK YOU FOR YOUR ATTENTION

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