

The Road to Sustainability ...



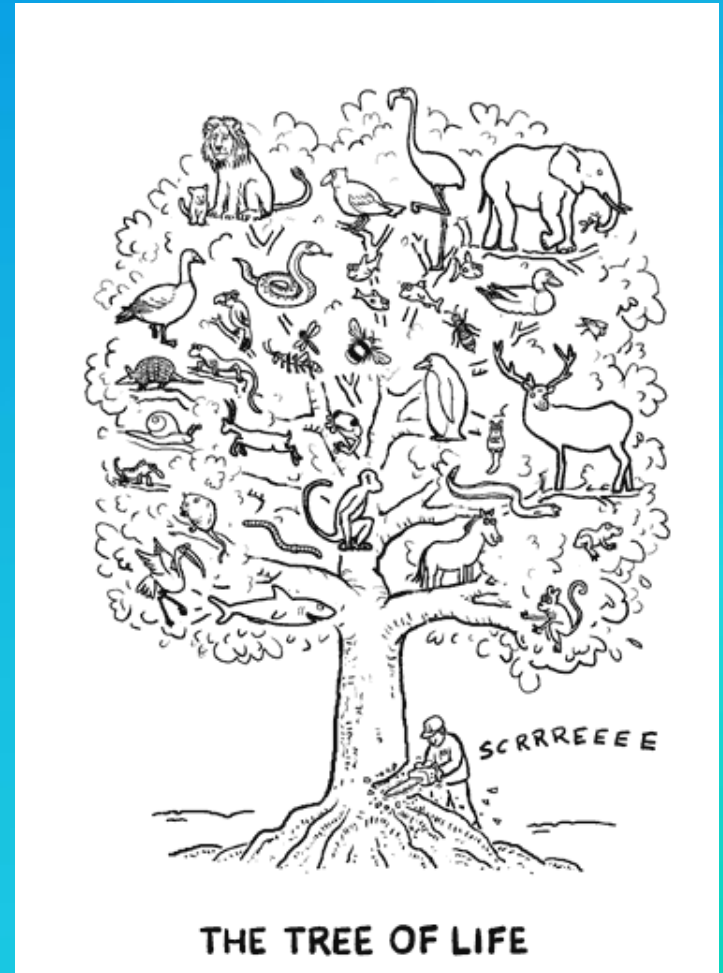
The Road to Sustainability ...

Public Awareness

Care for Nature

- Limited resources
- Vulnerable life forms

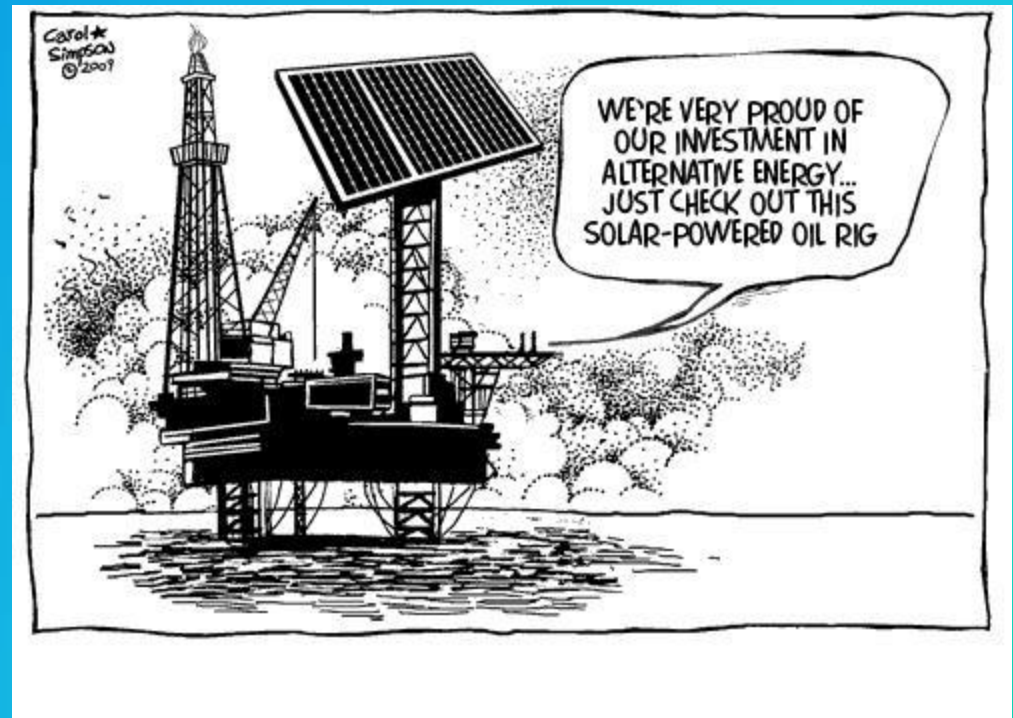
No more Pollution



The Road to Sustainability ...

Public Awareness

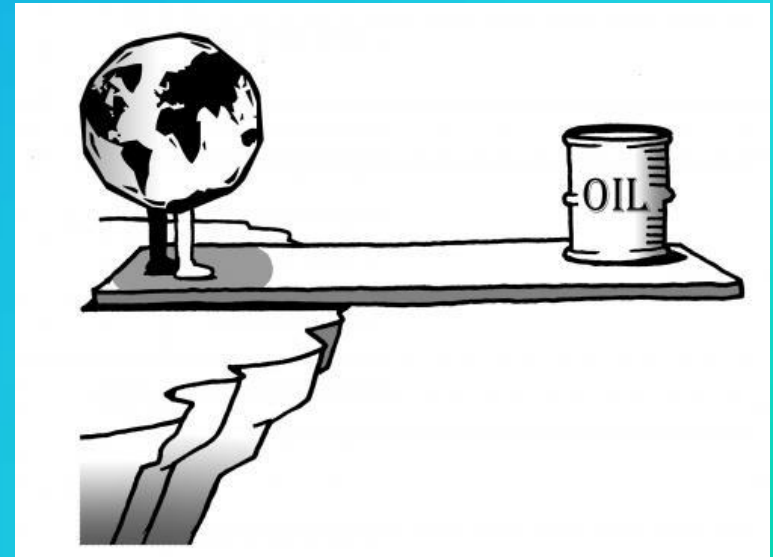
Active Environmental Protection



The Road to Sustainability ...

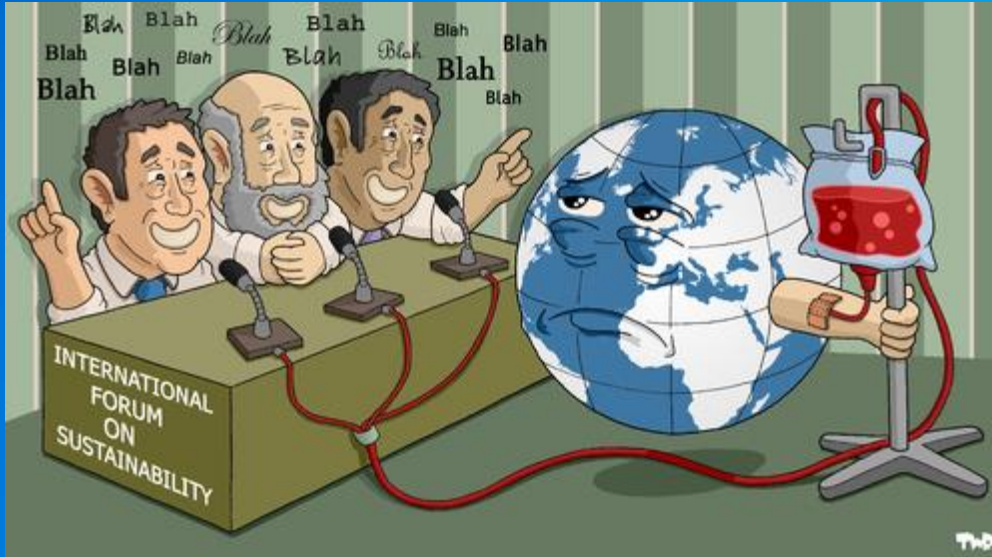
Regulatory Pressure

Aquatic Life
Water Quality
Clean Air
Climate Change



The Road to Sustainability ...

Regulatory Pressure



UNFCCC

Kyoto Protocol

Regional Measures



IMO

Marpol Annex I-VI

Some consequences for shipping

- Increasing fuel prices
- Large capital investments
- Increased workload due to new regulations

The Road to Sustainability ...

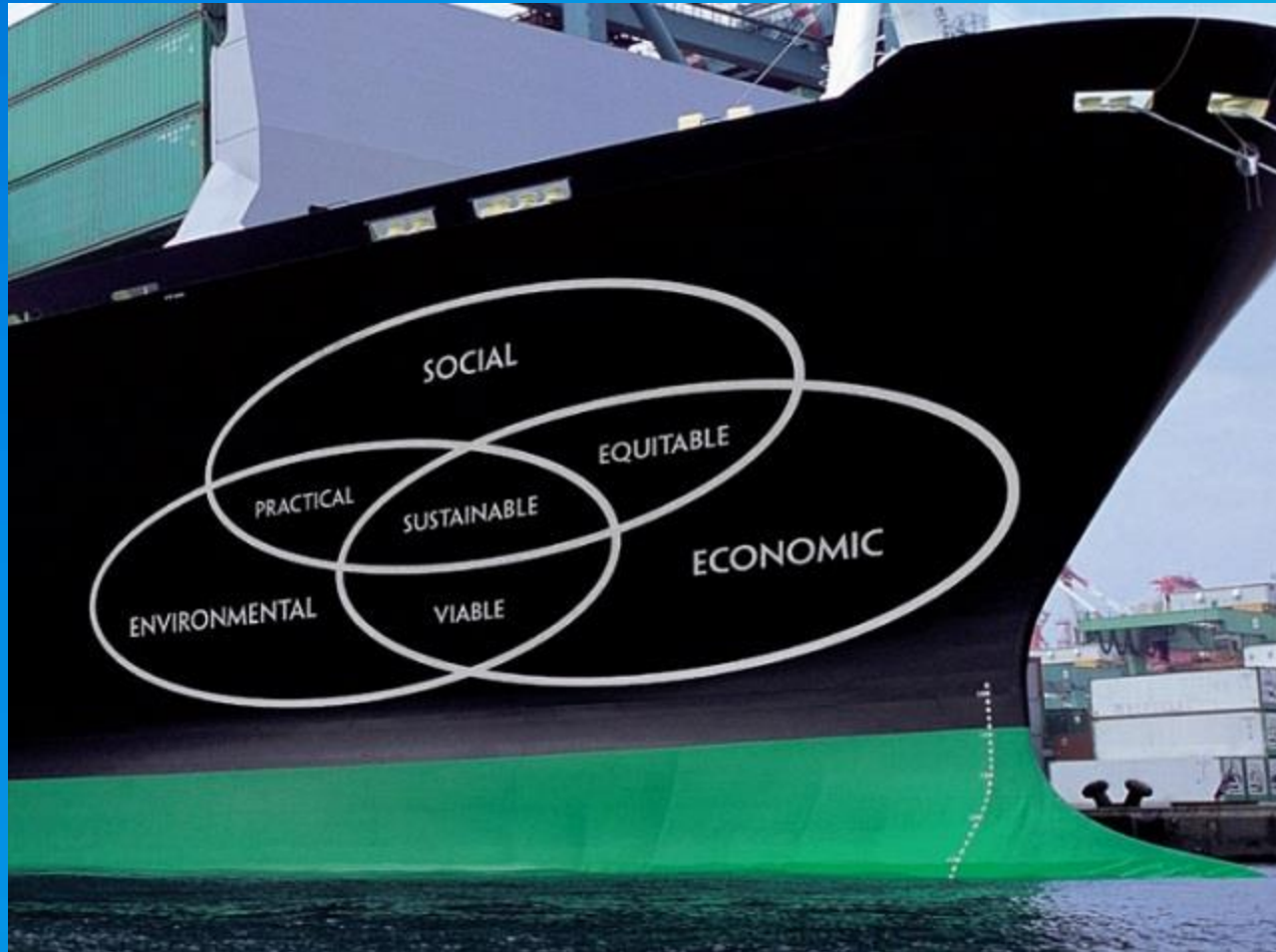
Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs

Brundland Commission 1987

Duurzaamheid – Durabilité – Održivost – Nirantarta

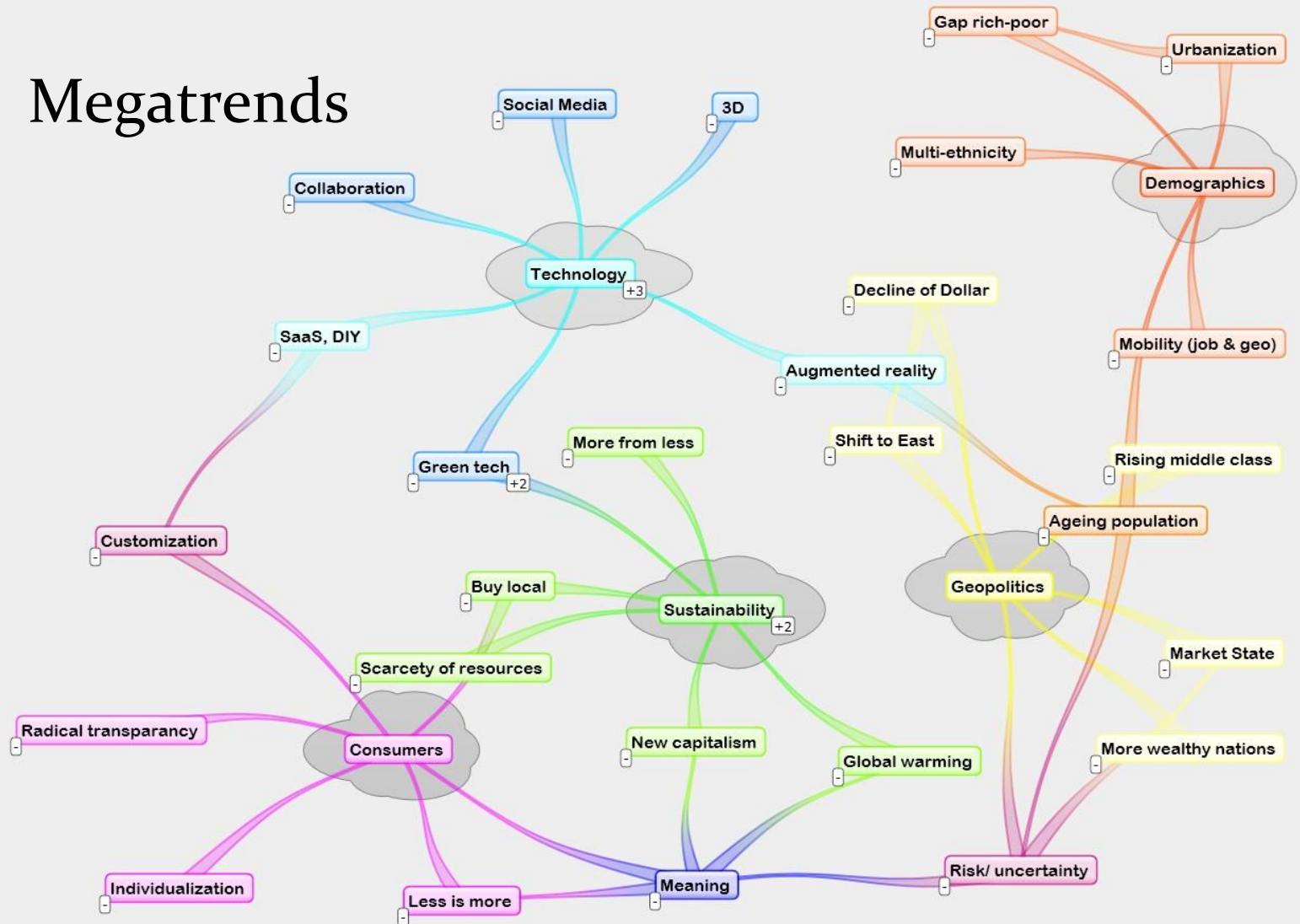


The Road to Sustainability ...



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Megatrends



The Road to Sustainability ...



MAERSK

WAL★MART



Opportunities

- Profit
- Going Green
- Protect your Future

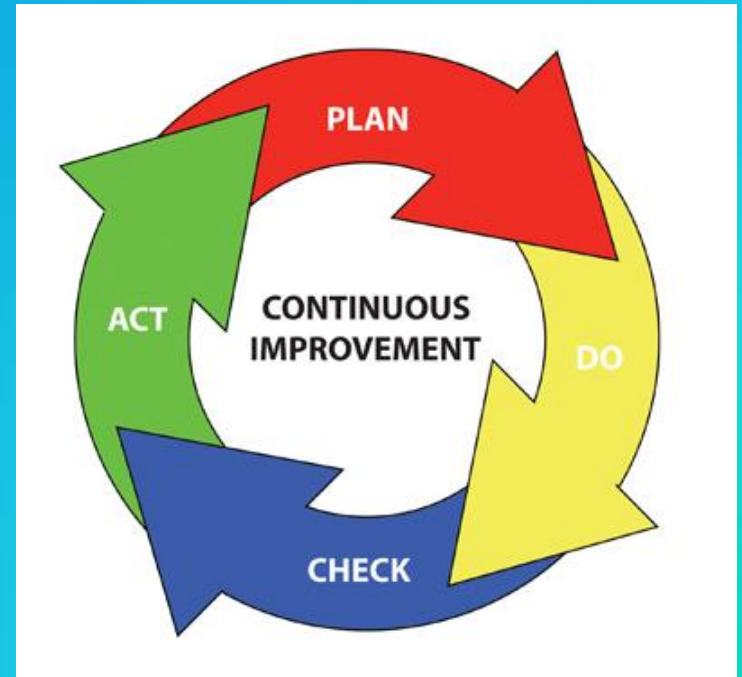


*Unless we change
direction, we are likely to
end up where we are
going.*

Chinese Proverb

Process Optimization and Energy Management

- Baseline – Where are we?
- Goals – Where are we going?
- Systematic Execution – How do we plan?
- Tools – How do we execute?
- Training – Who does what?
- Results – How are we performing?



How to make ship operations more fuel efficient ?

- Hull design
- Voyage performance
- Ship Technico-Operational Performance
- Training and Awareness

Voyage Performance

Planning and execution of voyages

- Avoid over speeding on certain voyage legs in order to create 'buffer' time (early arrivals)
- Select proper routeing (reduce mileage)

Optimization of vessel speed

- Optimize routeing through weather routeing

The Road to Sustainability ...

The Budget – Midsize LPG 5 years old

Crewing	1.645.000,00		
Technical Costs	574.000,00		
M&R		320.000,00	
Corrosion protection			25.000,00
Anchoring and mooring			10.000,00
Safety, security and pollution control			50.000,00
Cargo Equipment			25.000,00
Propulsion			35.000,00
Aux. Engines			35.000,00
Comm equipment/Nav equipment			20.000,00
Autom. And Electrical Plant			30.000,00
Pumping and Piping (fuel, ballast, fwater)			40.000,00
Transport and Warehousing			30.000,00
Others (compr. Air, lifting equipment, ...)			20.000,00
Stores		104.000,00	
Charts and library			18.000,00
Office supplies, computers, gen. Supplies			35.000,00
Accommodation supplies			14.000,00
Gases, Chemicals and Tools			37.000,00
Lub Oil		150.000,00	
Insurance	200.000,00		
Management and Admin	250.000,00		
Class			25.000,00
Communication			26.000,00
Management and Admin			175.000,00
Port disbursements			24.000,00
OPEX	2.669.000,00		
OPEX/Day (without dd)	7.312,33		
Drydocking (5 year)	750.000,00		

Ship Technico-Operational Performance



- Hull and Propeller condition
- Fuel System efficiency
- Propulsion (Main engine)
- Power Generation (Auxiliary engines)
- Cargo and ballasting system
- Pumping and ventilation optimization

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Training and Awareness

Energy saving & Environmental awareness sessions
(shore and sea staff)

Continuous performance review through reporting

- Dashboard performance reports (traffic light system) – KPIs (power consumption, sludge production, fuel efficiency (mt/nm), ...)
- Analysis of performance & communication of improvement measures

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The GREEN ship of the future ?

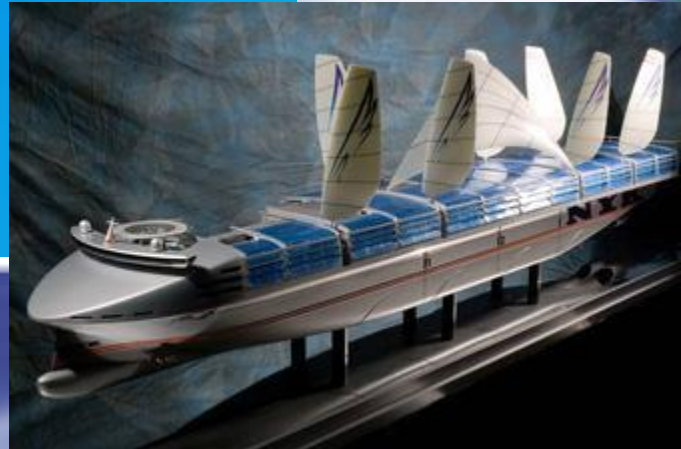
The Road to Sustainability ...



NYK Super Eco Ship 2030

Green Ship Design for the Future

TOTAL
CO₂
reduction
70%



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THANK
YOU

THANK
YOU