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The role that biomass can play to decarbonize major organizations in Namibia - An introduction to Debmarine Namibia's carbon neutral ambitions

BIOMASS FAIR

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DEBMARINE NAMIBIA

LOCATION & STRUCTURE

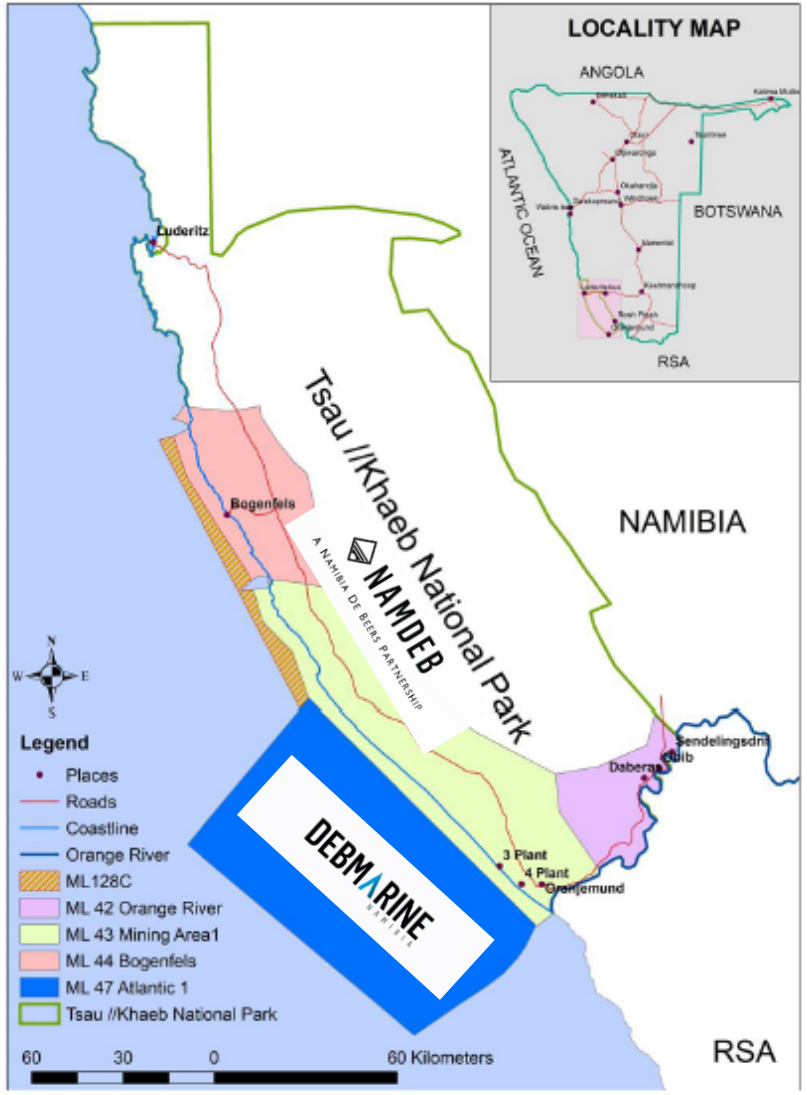
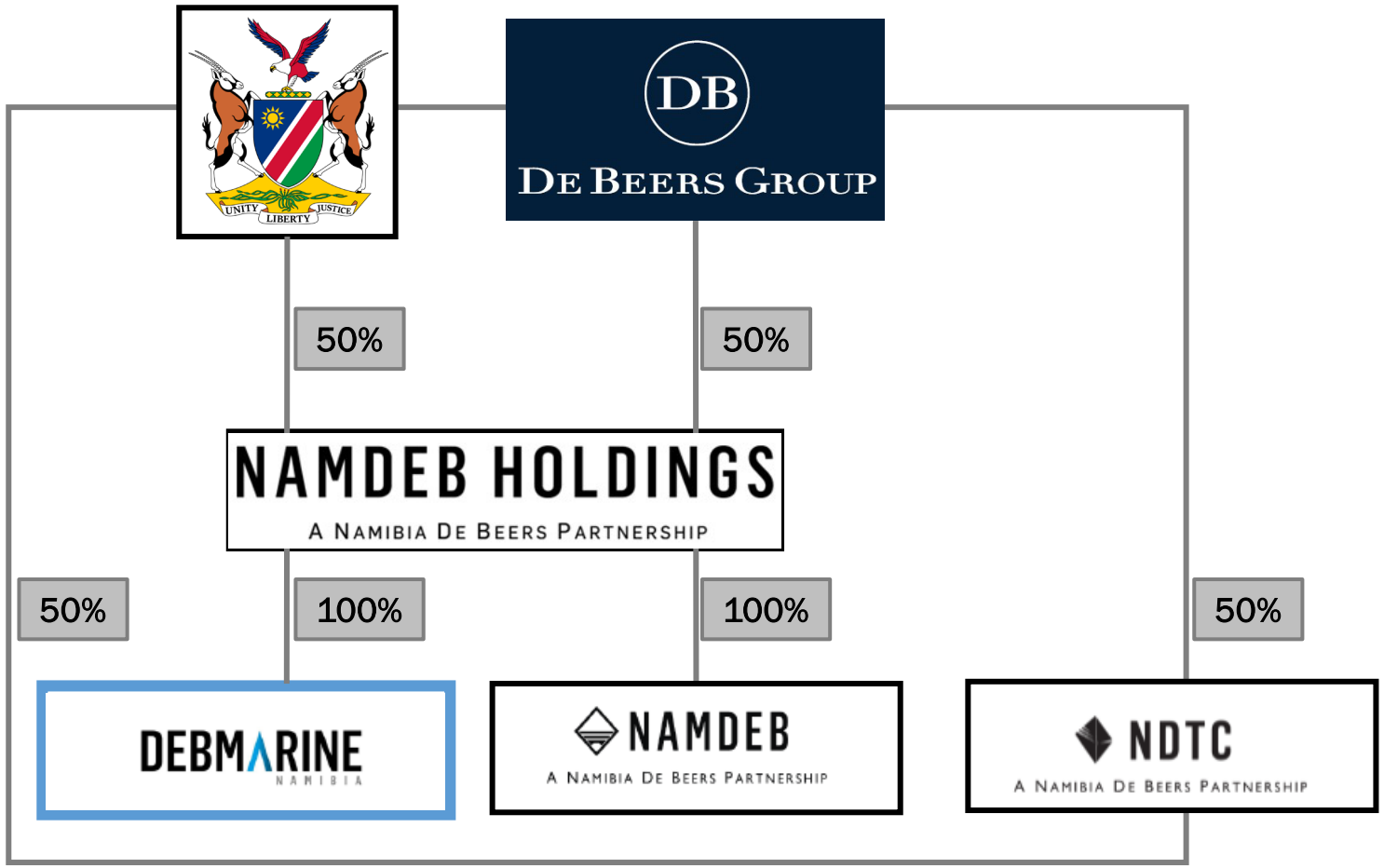


Figure 1.4: Location of licensed areas of Namdeb Holdings in Namibia (Source: DBMN, 2021).



PRODUCTION PIPELINE & RECOVERY METHODS

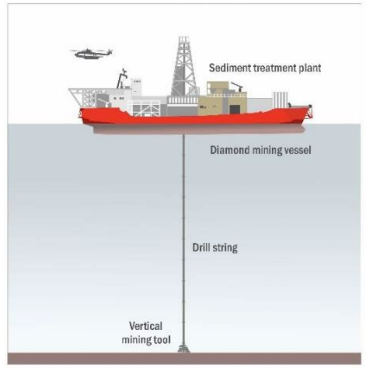
DEBMARINE NAMIBIA

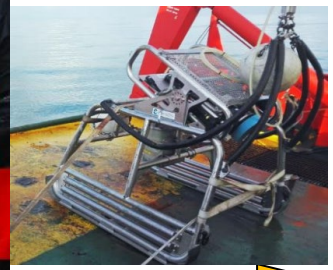
GEOPHYSICAL SURVEY

SAMPLING

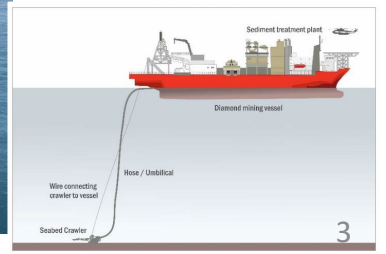
PRODUCTION

Vertical Recovery System





Horizontal Recovery System

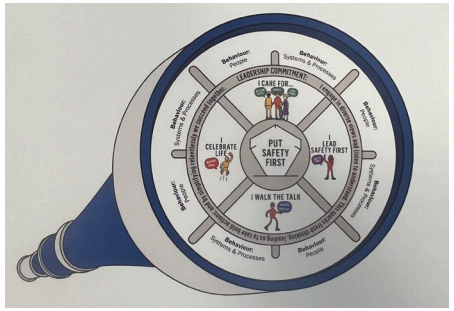


LOGISTICS

- Vessels remain at sea on average for 3 years before in-port maintenance
- 24 / 7 / 365
- Vessels supported via launch and helicopter operations
- Refuelling conducted at sea
- Freshwater produced on-board (desalination)
- Crew of ~ 60 people
- Crew rotates 28 days on, 28 days off
- Crew change via helicopter
- Crew work 12 hour shifts
- Diamonds flown off by helicopter

STRATEGIC FOCUS AREAS

Moving towards Safety Resilience



- Resilient mindset
- Ready to respond
- Psychological safety
- Impossible to get injured

Reinventing Resource Delivery & Mining

- Effective technical solutions to gain information rich resource knowledge
- Autonomous efficient operations where real-time decision making is possible based on data
- Fit-for-purpose mining tools that will grow the minable reserve

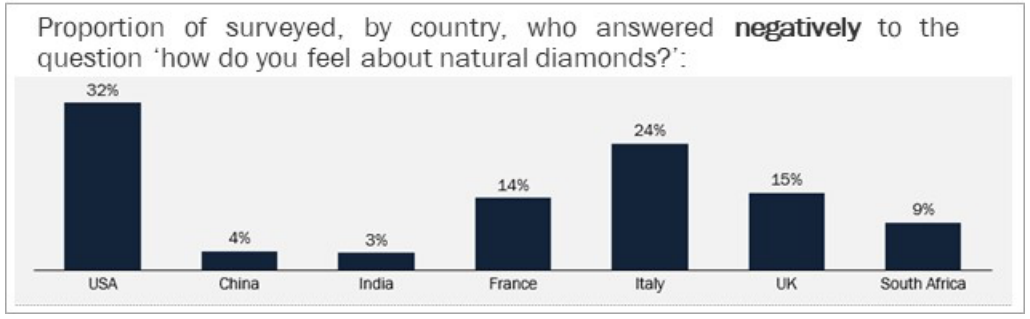
Building a long-term Positive Legacy

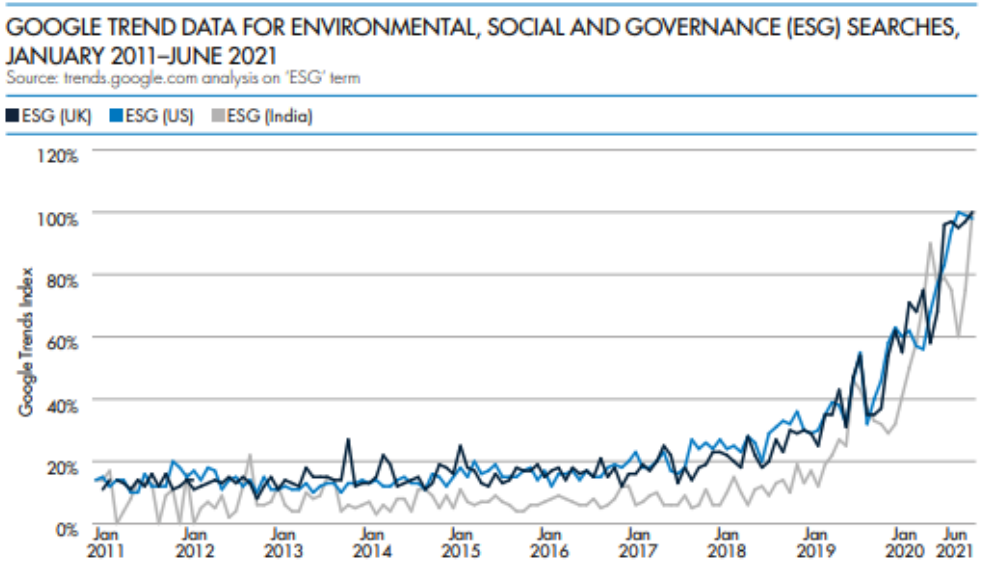
- Net positive environmental impact
- A true Namibian legacy that will live beyond LOM

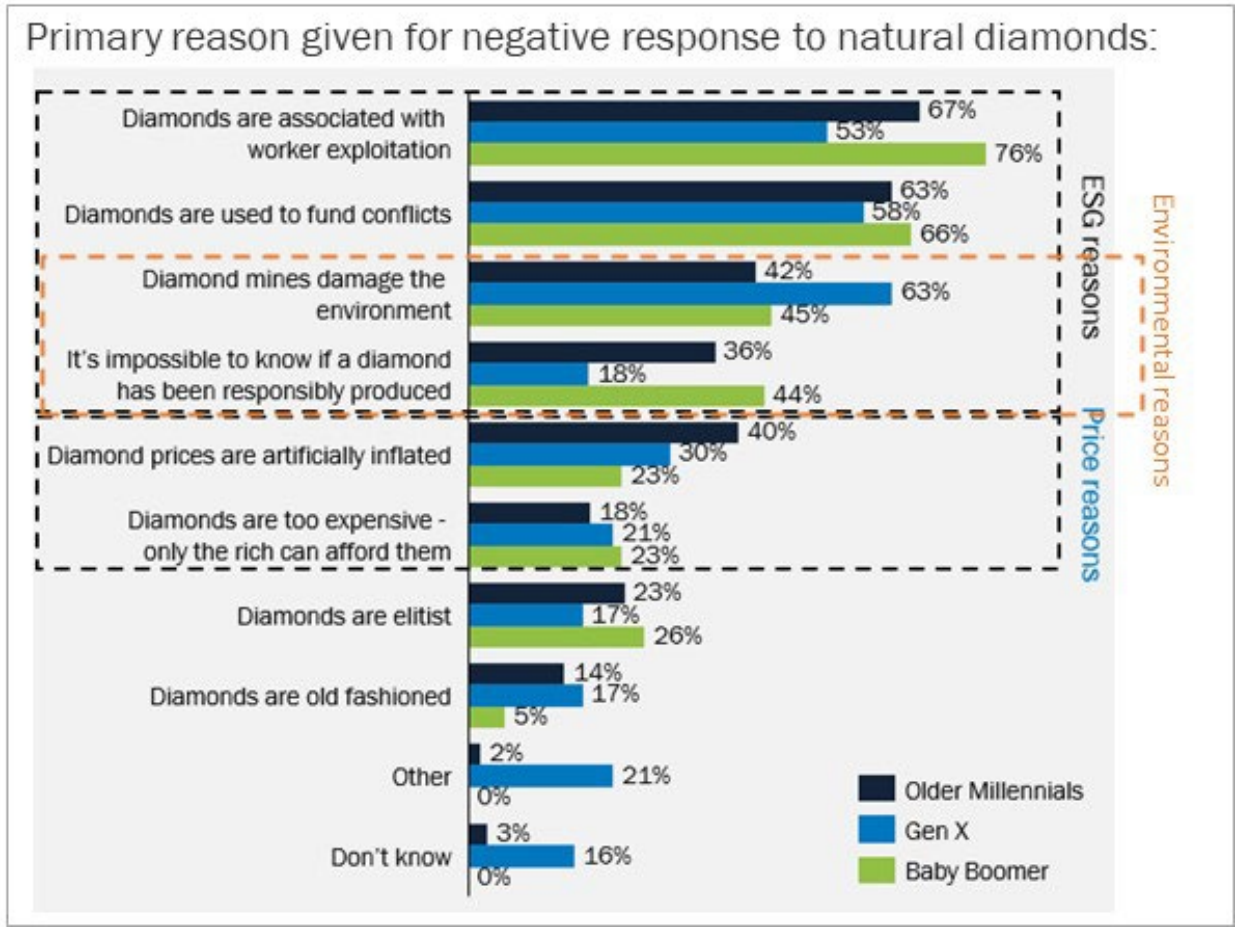
Why? The rise of the conscientious consumer

Consumers are challenging current diamond consumption patterns.

It is important to understand that unlike other commodities, diamonds are not a basic daily need. Our diamonds consumers are across the world, with USA and China accounting for over 65% of the consumer base. These international consumers are very particular about the products they buy and say sustainability is part of their decision-making process and could influence whether they buy diamond jewelry.

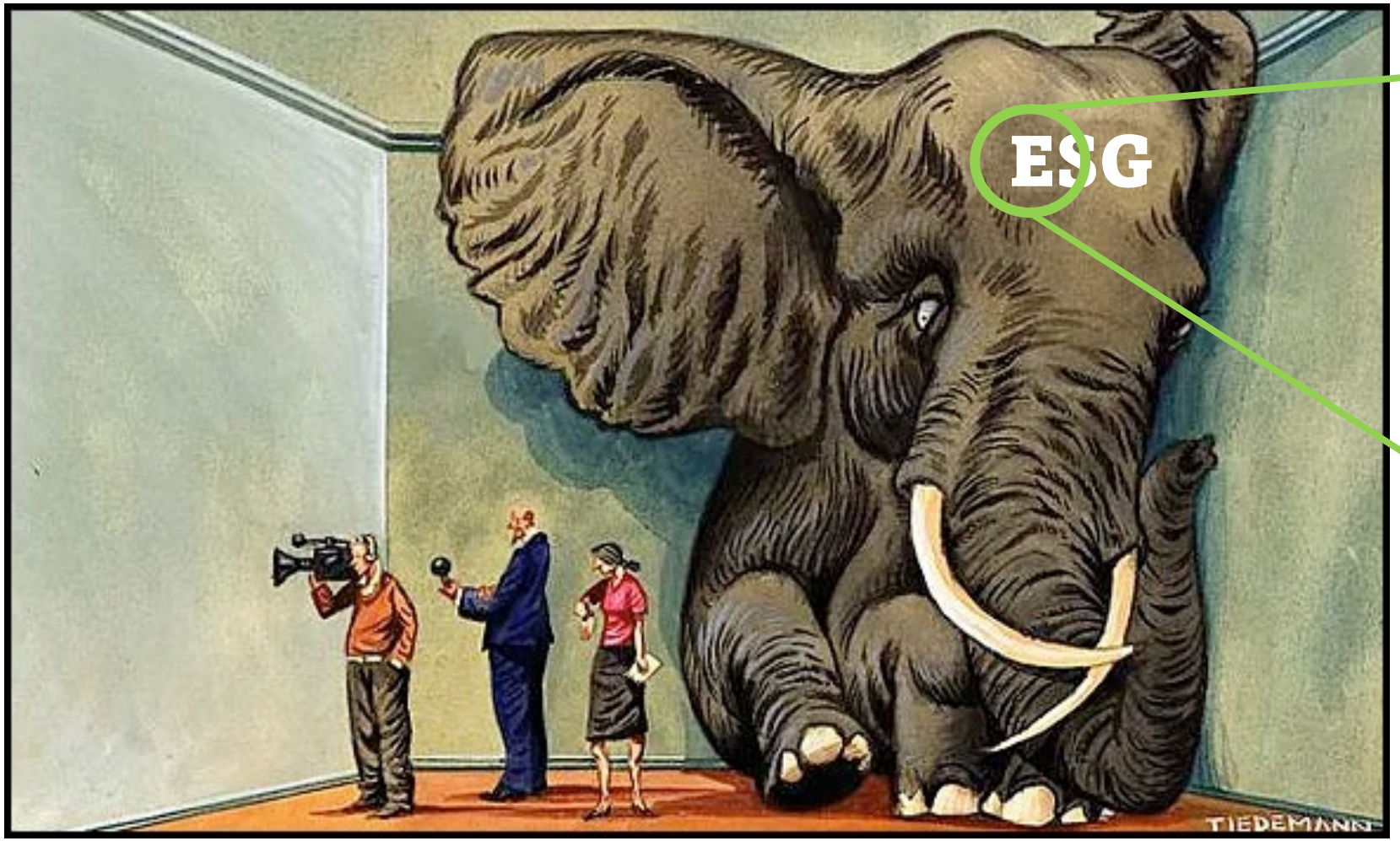






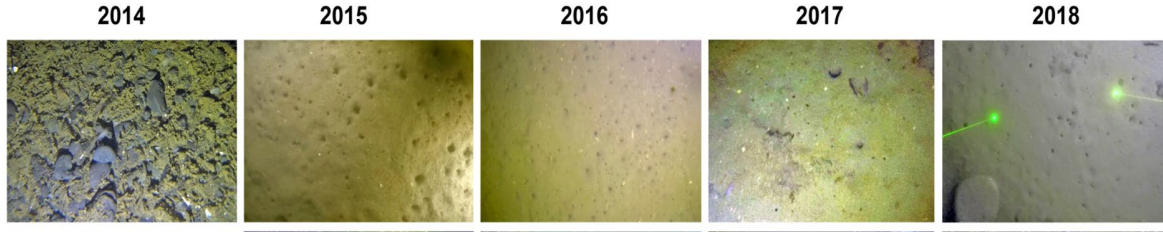
Source:2021 De Beers commissioned study of Consumers and Sustainability in the diamond Industry in support of the 2021 Diamond Insight Report.

ESG - The elephant in the room



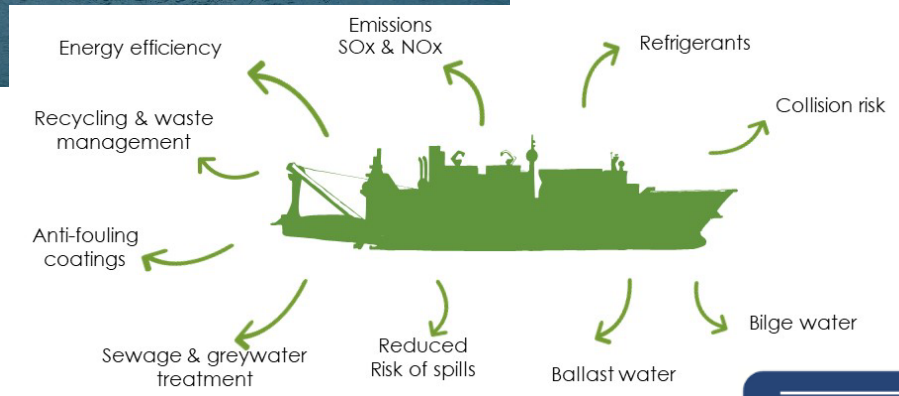
ENVIRONMENTAL STEWARDSHIP

- Atlantic 1 is part of the Benguela Current Large Marine Ecosystem (BCLME) that stretches for ~3 500km.
- There is no direct overlap between commercial fishing grounds, or known fish spawning, feeding or nursing areas and the mining license.
- 99% of the sediment mined that is on average 0.5m thick is discharged and settles back to the seabed.
- The seabed organisms are hardy and well adapted to the high natural variability and thus recover comparatively rapidly after being disturbed.
- Seabed recovery is defined as the re-establishment of the ecological function of the seabed.
- Where species composition has reached 80% similarity to equivalent undisturbed sites for a period 3 consecutive years.
- Functional recovery occurs within:
  - 3 years where abundant sediment occurs (close to River Mouth),
  - 3-10 years in sparser sediment areas, and
  - >10 years in rocky terrain (or no to very low sediment areas)
- Seabed monitoring programme guided by a committee that includes independent scientist from academia and industry .



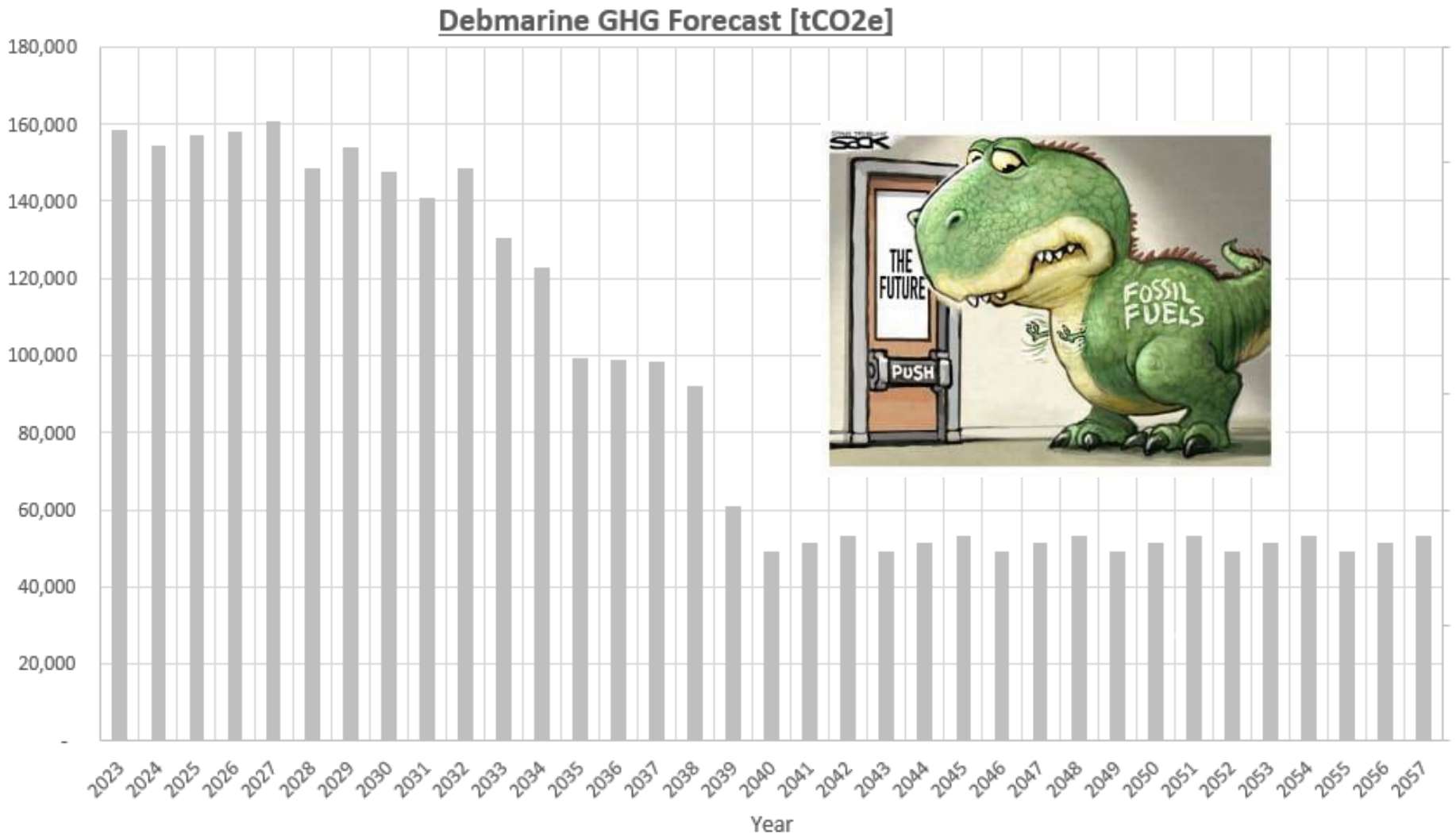
But what about our carbon footprint?

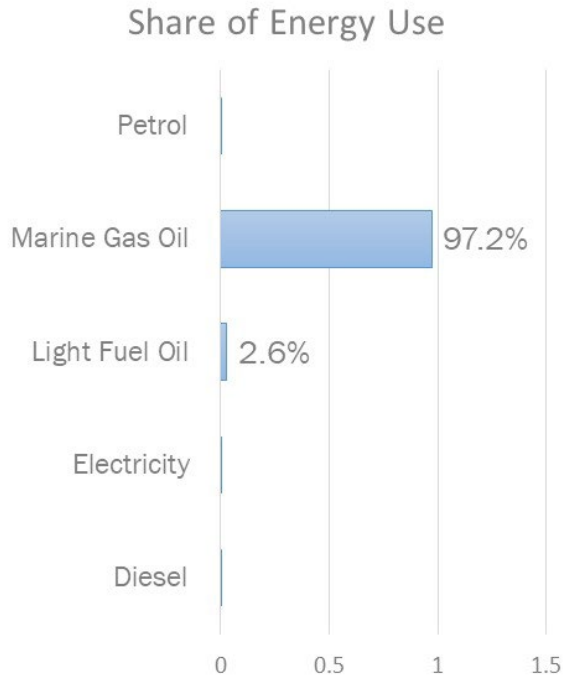
- Total system mass: 27.2t ≈ 4500 elephants
- Total installed power: 42MW ≈ 3500 homes (0.2 km^2 PV Plant)
- Total cables installed: 565km
- Daily Water Production – 72 tonnes/day
- 30 ktCO2e per annum



- Vessels operated according to **international legal requirements and best practice**
- **Going beyond compliance with eco-notation** - special environmental notation (certification) for environmental ship design, construction and operation.

GHG Emissions for DBMN





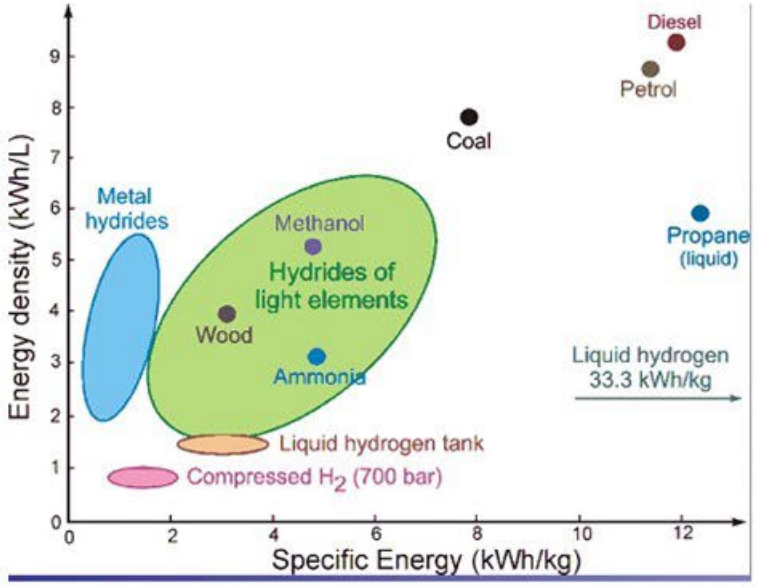
PROTECTING THE NATURAL WORLD

“Convert to green fuels” they said

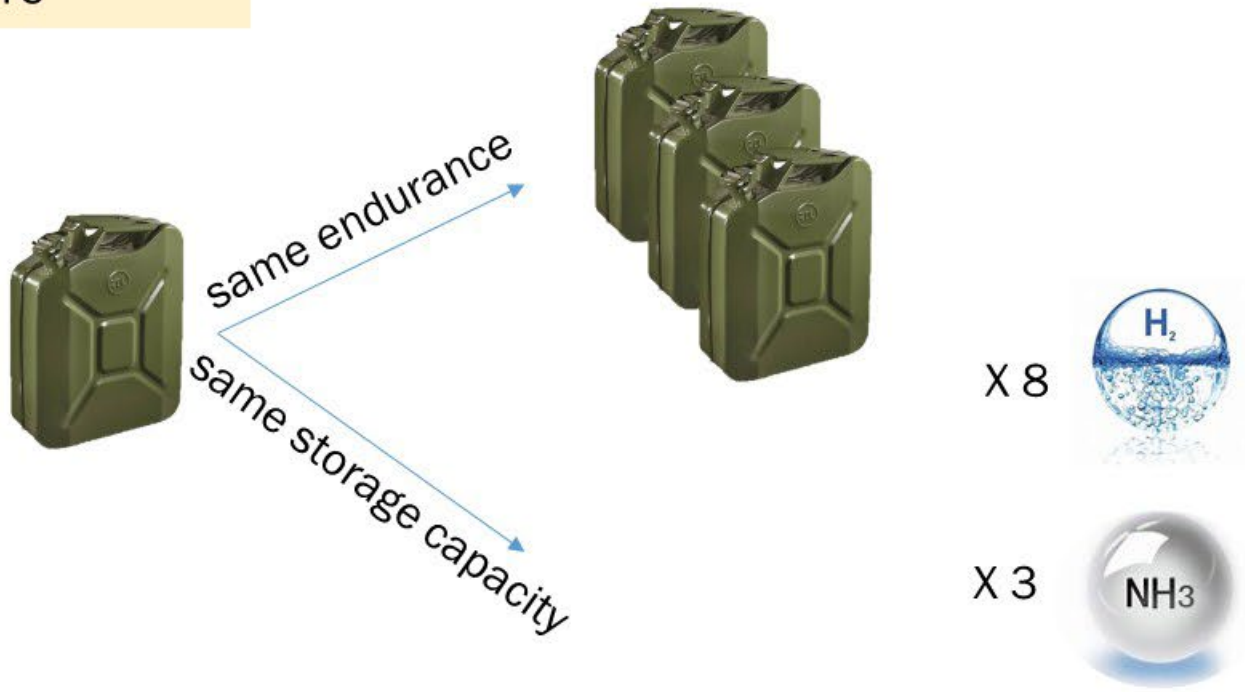
Easier said than done

Converting to “Green” Fuel

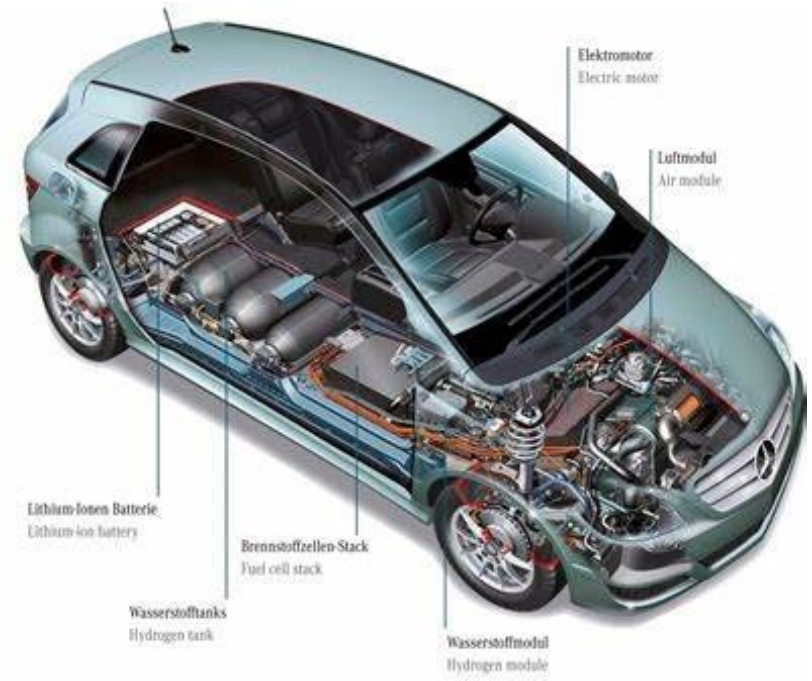
- Fuel type (energy density)
- Engine technology (size, weight)
- Tanks and piping
- Storage temperature / pressure



ref; EuMat, European Technology Platform for Advanced Engineering Materials and Technology,Fuel Cells and Hydrogen, General Assembly Brussels, 27 October 2009 rapporter Marco Falzetti.



Converting to “Green” Fuel



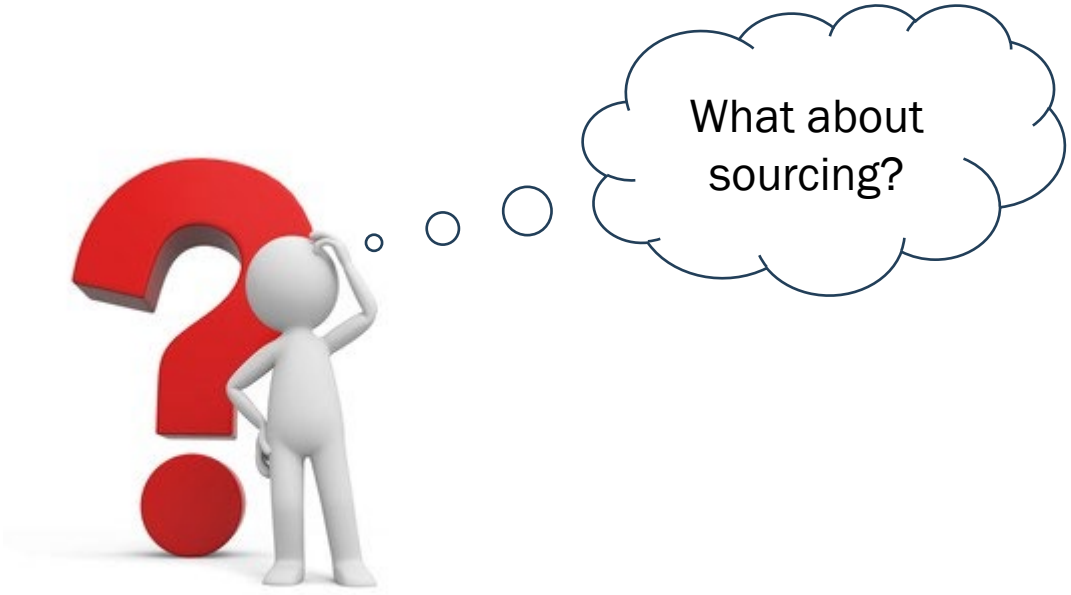
It must float

It must float!

It is like converting your VW built in 1980 to a 2023 Tesla

Vs.

Sustainable sourcing



Currently only 1-3 tanker servicing the West Coast of Africa with MGO

“Convert to green fuels” they said

Martin Luther King said:
“I have a dream”.

He didn’t say:

“I have a plan”

ADDRESSING GHG EMISSIONS CHALLENGE

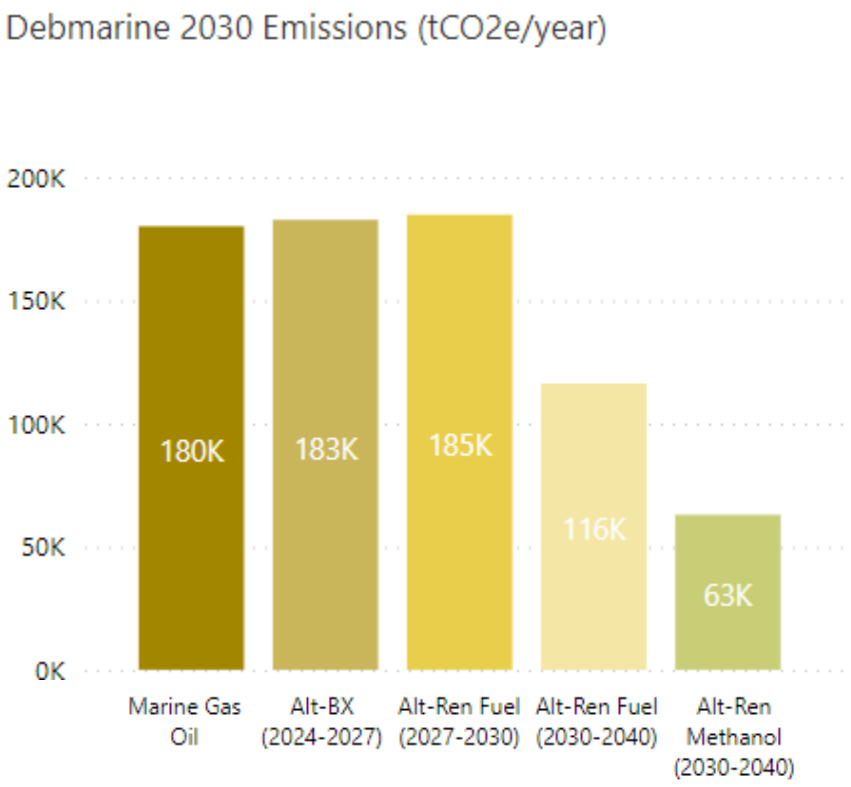
Strategic Thrust	Key Programs	Key Projects	GHG Reduction Potential
Efficiency Improvement	• System Optimization • Operations Digitization • Demand management	• Process optimization • Underwater visualization • Operating model roll-out • Energy efficiency program	5%
Renewable Electricity	• Solar photovoltaic solutions	• Shore facilities solar photovoltaic implementation	2%
Alternative Fuels *	• Oil crops to fuel • Biomass waste to fuel	• Alternative fuel suppliers assessments • Fuel development assessments • Feedstock opportunity assessments	15% - 75%
Emissions Capture and Sequestration	• Nature based removal solutions	• Kelp Blue program • Biochar opportunity assessments	75% - 100%

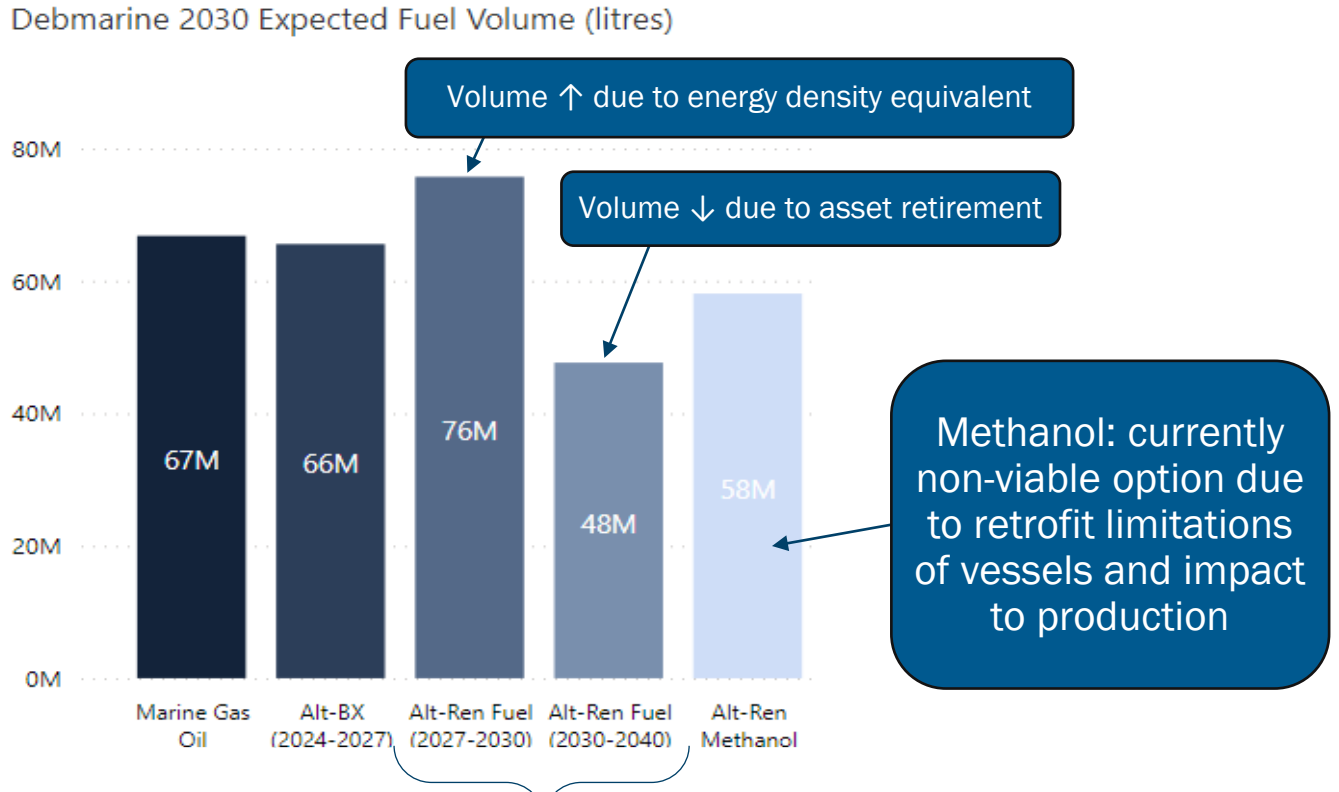
** Hard to abate emissions and opportunities for bush-encroacher and green economy for Namibia*

HIGH IMPACT FOCUS – KEY ISSUES

Project	Issue
Alternative Fuel • Feedstock opportunity assessments	• Evaluate biomass carbon cycle against sustainability requirements enabling fuel certification against reputable standards i.e. potential fuel carbon reduction factor based on life cycle assessment (well-to-wake/wheel) within Namibia • Establish credibility of biomass harvesting practices i.e. is there a best practice impact management and monitoring program in place that can be adopted? • Establish no regrets fuel development pathways given the existing biomass value chains within Namibia
Nature based solutions • Biochar opportunity assessments	• Establish biochar development requirements and related risks i.e. scale, bankability requirements, and framework of credits issuing within the national context

Fuel and emissions forecast: current - 2040





Methanol: currently non-viable option due to retrofit limitations of vessels and impact to production

	2022	2030	2035	2040
Energy GJ)	2,037,656	2,453,721	2,083,529	824,664

Drop in fuel volume:

76 – 48 ML pa

Locked in long term fuel and energy use req.

DEBMARINE POSITION

Program*	Feedstock Harvesting	Aggregation	Production	Use
• Biomass waste to fuel	• Ensure compliance with sustainability requirements	• Possible off-taker • Participate in R&D for upstream material handling and optimization of material flow	• Facilitate engagements with technology providers	• Off-taker of liquid fuel (Paraffinic diesel)** • Developer will be required
• Biochar development	-	-	-	• Off-taker of high value carbon credits • Developer will be required

** Additional fuel requirement to cater for Namdeb operations and possibly wider regional De Beers operations can be factored in as opportunities during developments*

*** Debmarine Namibia is a marine diamond company and the natural strategic position is to act as a facilitator in the value development of biomass as relates to fuel development and offset projects development i.e. these activities are not Debmarine Namibia's core business focus.*

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THANK YOU

For detail technical engagements please contact our carbon neutral support team…

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