

Figures from Countdown Newsletter

Assessing proposals to meet the 2023 IMO GHG Strategy

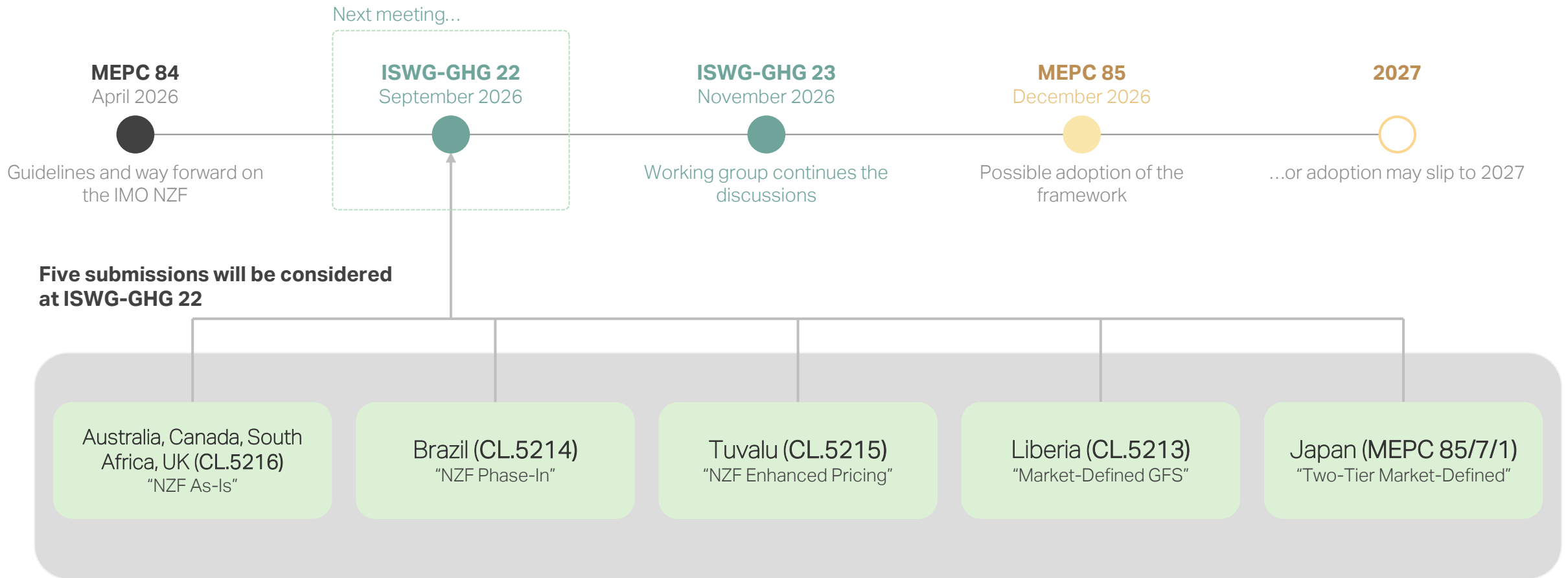
August 2026



Mærsk Mc-Kinney Møller Center
for Zero Carbon Shipping

Five amendments were proposed ahead of a fall working group

Fig 1



Slides are derived from our internal understanding and analysis of the status of the IMO NZF and do not represent an official IMO position or the views of our partners.

Drawing on the 2023 IMO GHG Strategy, we assess the proposals along four dimensions

Table 1

Four principles from the 2023 IMO GHG Strategy

1

Reduce total emissions
Indicative checkpoints · § 3.3.4
2030: -20% 2040: -70% ~2050: net-zero
striving for -30% / -80%, vs 2008 levels

2

Scale zero & near-zero fuels
ZNZ uptake · § 3.3.3
≥5% of energy by 2030
striving for 10%

3

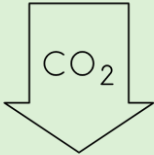
Promote the energy transition
Basket of Measures · § 4.5
Effective incentives to drive uptake

4

Contribute to a just transition
Basket of Measures · § 4.5
Fair for all states, incl. those most exposed



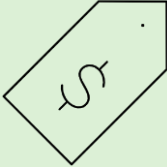
We assess proposals on three dimensions



Emissions reductions



Fuel Mix



Transport costs



Modelling across all proposals shares a common set of assumptions

Table 2

Framework Design Assumptions

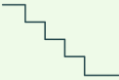
Increasing RU 2 prices

Tier 2 Remedial Unit prices rise from 2031 rather than staying fixed at 380 USD/tCO₂eq; we assume the RU always sits above the marginal cost of compliance



GFI targets extrapolated

Beyond the draft text, NZF targets follow a stepwise path to zero by 2050. Liberia and Japan's targets instead reflect commercially viable fuels.



Unrewarded ZNZ fuels

Rewards for zero and near-zero fuels are excluded, as the mechanism's design and eligibility criteria are still under development.



Internal LCA emission factors

Fuel emission intensities use the Center's internal LCA factors, as the IMO LCA Guidelines and sustainability criteria remain under development.



General Assumptions

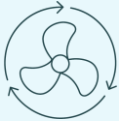
Onshore carbon capture

Carbon capture is limited to onshore (i.e., blue fuels). Onboard carbon capture and storage is not included in the modelling.



Dynamic energy efficiency

Fleet-wide energy efficiency is modelled to improve dynamically as the cost of compliance rises.



Waste-based biofuels

Navigate does not yet include first-generation biofuels. We expect them to play a role and are working to add them.



Unsubsidized costs

Fuel cost assumptions do not include national or regional subsidies for low-emission fuels and technologies, which could improve the competitiveness of alternative fuels.

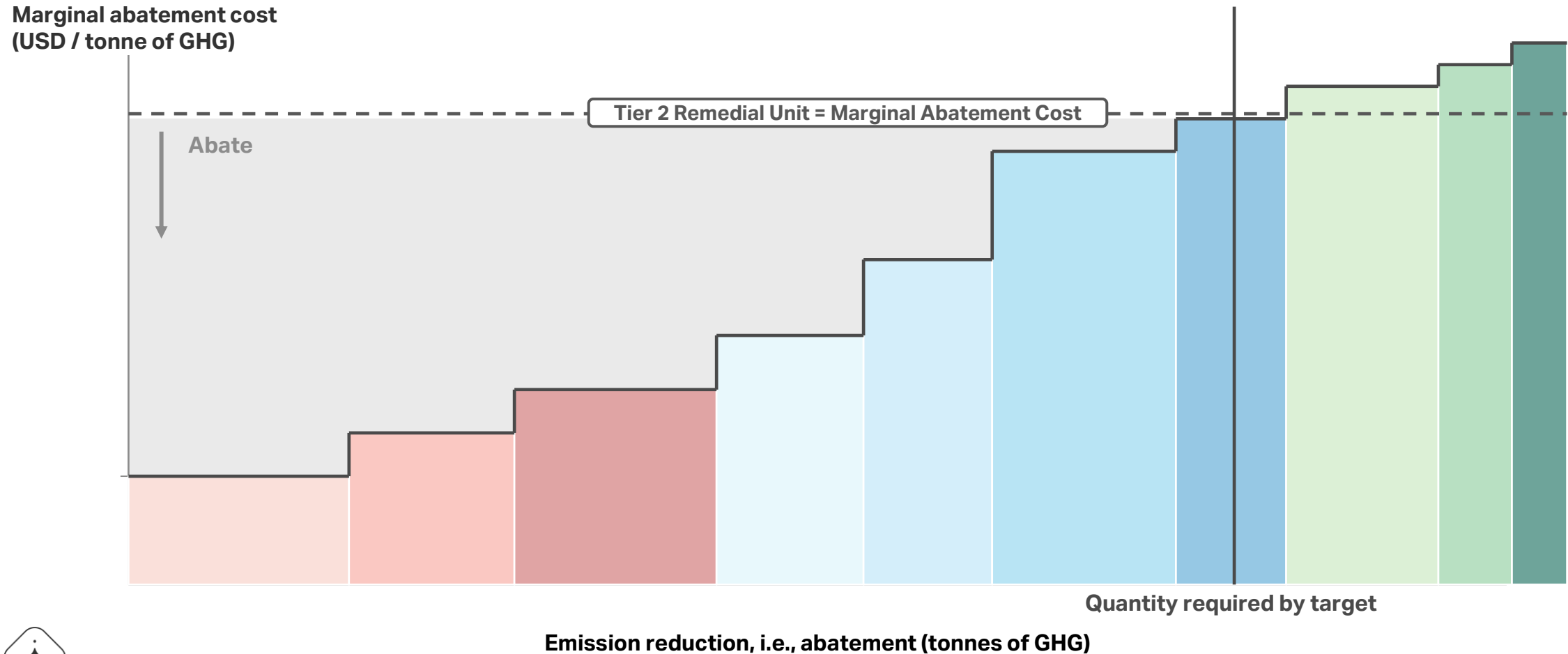




We assume the Remedial Unit is equal to the Marginal Abatement Cost

Fig 2

Illustrative marginal abatement cost with Remedial Unit



While all proposals use fuel standards, there are distinct approaches to architecture, flexibility, and revenue

Table 3

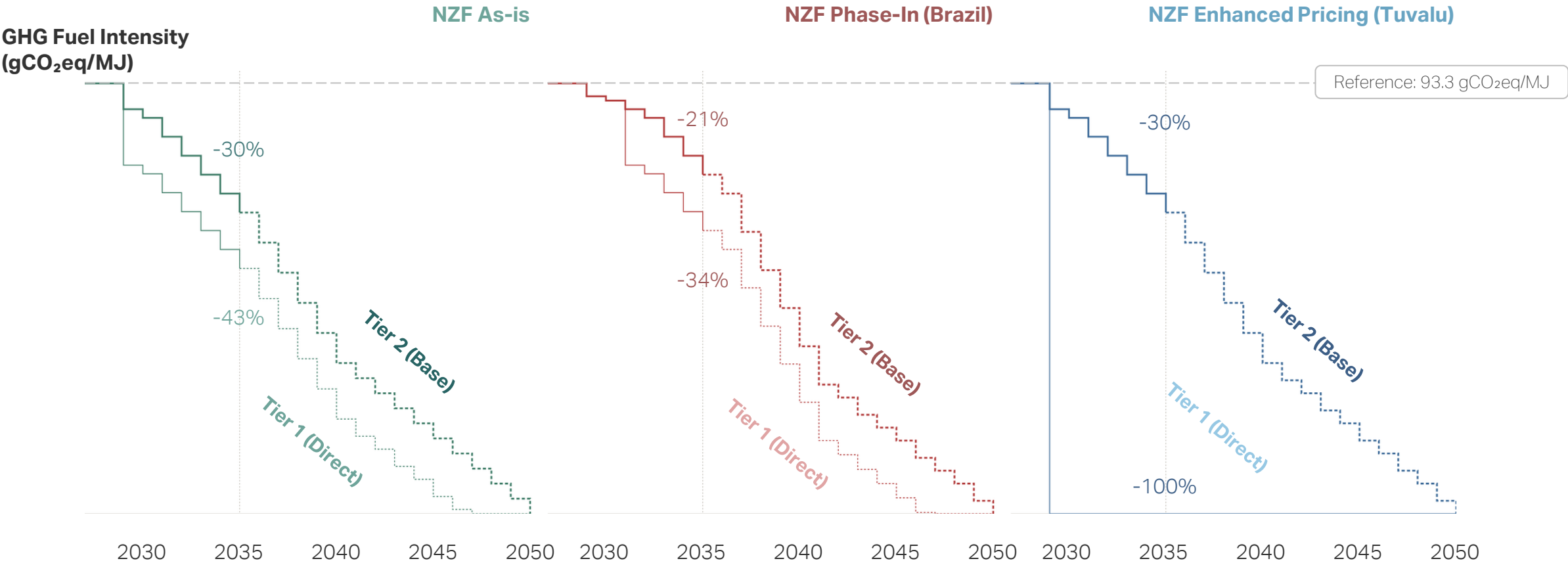
Shorthand		NZF As-Is	NZF Phase-In	NZF Enhanced Pricing	Market-Defined GFS	Two-Tier Market-Defined
Document ID and Member States		CL.5216 Australia, Canada, South Africa, UK	CL.5214 Brazil	CL.5215 Tuvalu	CL.5213 Liberia	MEPC 85/7/1 Japan
Architecture	Fuel standard	✓	✓	✓	✓	✓
	Fuel standard with GHG pricing	✓	✓	✗	✗	✗
	Pure levy	✗	✗	✓	✗	✗
Flexibility	Compliance trading and banking	✓	✓	✗	✓	✓
	Borrowing	✗	✗	✗	✓	✗
	Alternative compliance / remedial unit	✓	✓	✓	✗	✓
Revenue	Revenue for ZNZ and JET	✓	✓	✓	✗	✗
	IMO managed fund	✓	✗ / ✓	✓	✗	✗



NZF variants share similar Tier 2 trajectories; Phase-In eases near-term targets, while Enhanced Pricing changes Tier 1 to a pure tax

Fig 3

GHG Fuel Intensity Trajectories 2029 - 2050

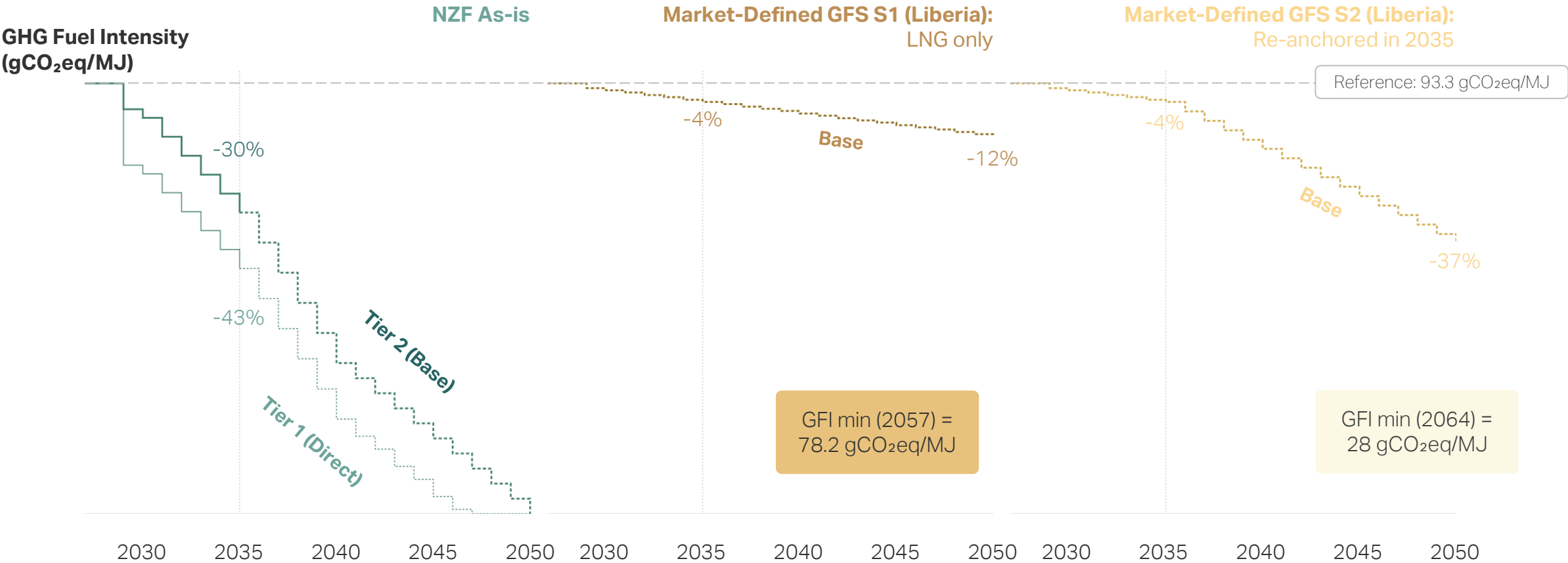


Solid = Targets set in the regulations; dashed = Targets extrapolated. **Note:** all include a 2040 target which is the basis of the extrapolation

The “Market-Defined GFS” trajectory depends on the GFI min, ranging from -13% to -37% reduction by 2050 in our scenarios

Fig 4

GHG Fuel Intensity Trajectories 2029 - 2050

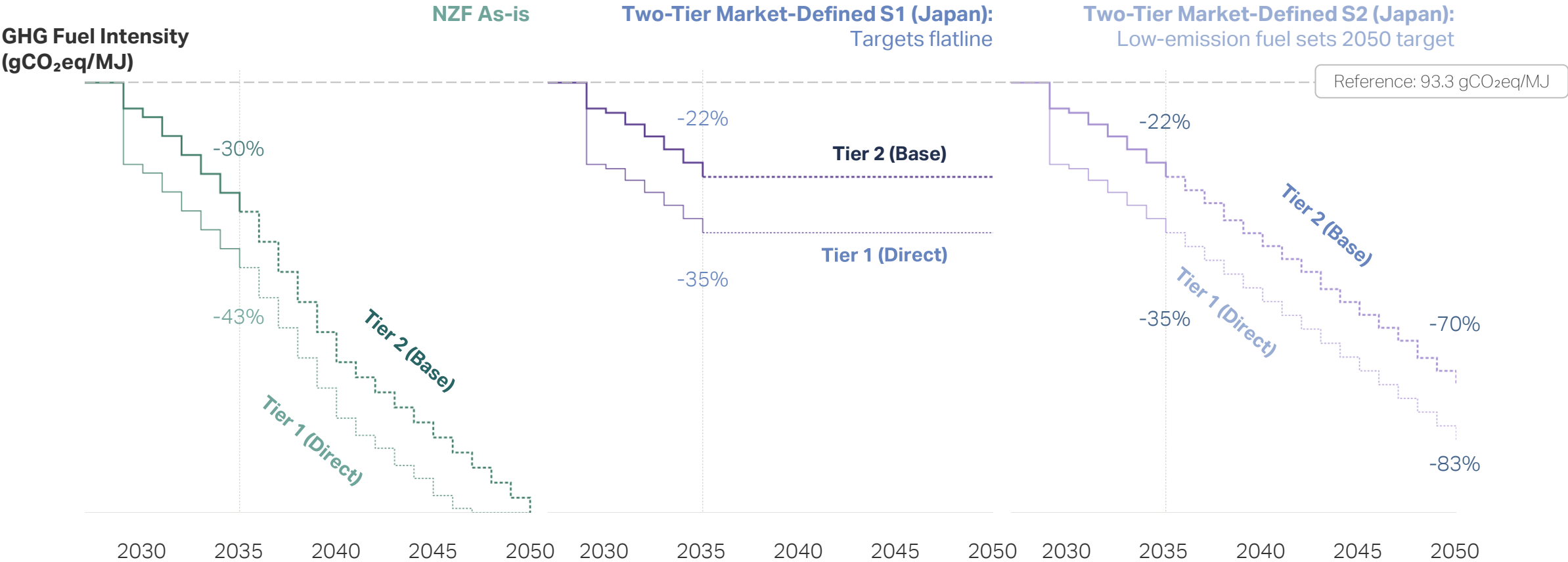


Solid = Targets set in the regulations; dashed = Targets extrapolated.
Scenario 1: LNG is the only fuel meeting all three criteria, so it sets the anchor: a GFI min of 78.2 gCO₂eq/MJ reached in 2057.
Scenario 2: Follows Scenario 1 until first review in 2034 when a lower-emission fuel sets the GFI min. From 2035 a new 30-year line is drawn to a GFI min of 28 gCO₂eq/MJ (–70% below ref).

"Two-Tier Market-Defined" proposal sets Base and Direct targets; post-2035 depends on viability of fuels – we use two scenarios

Fig 5

GHG Fuel Intensity Trajectories 2029 - 2050

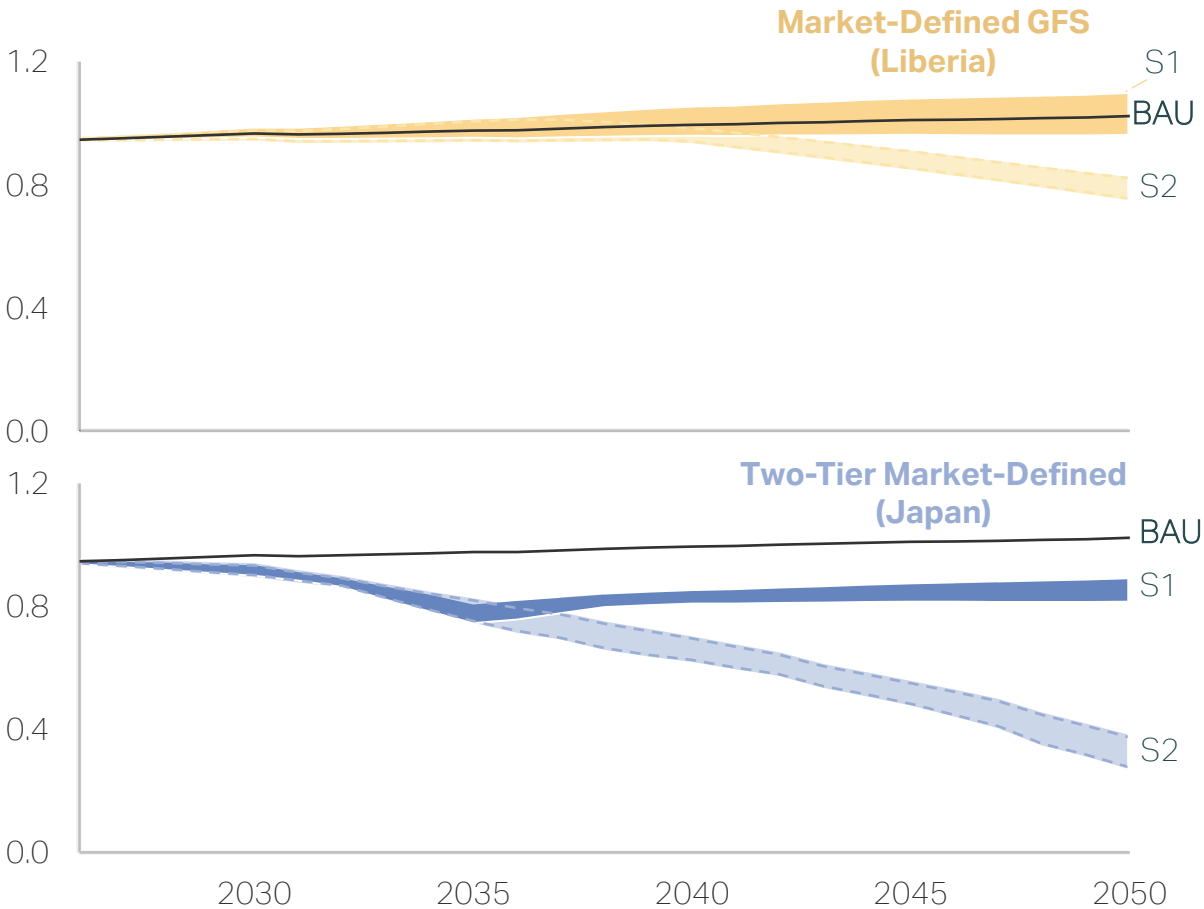
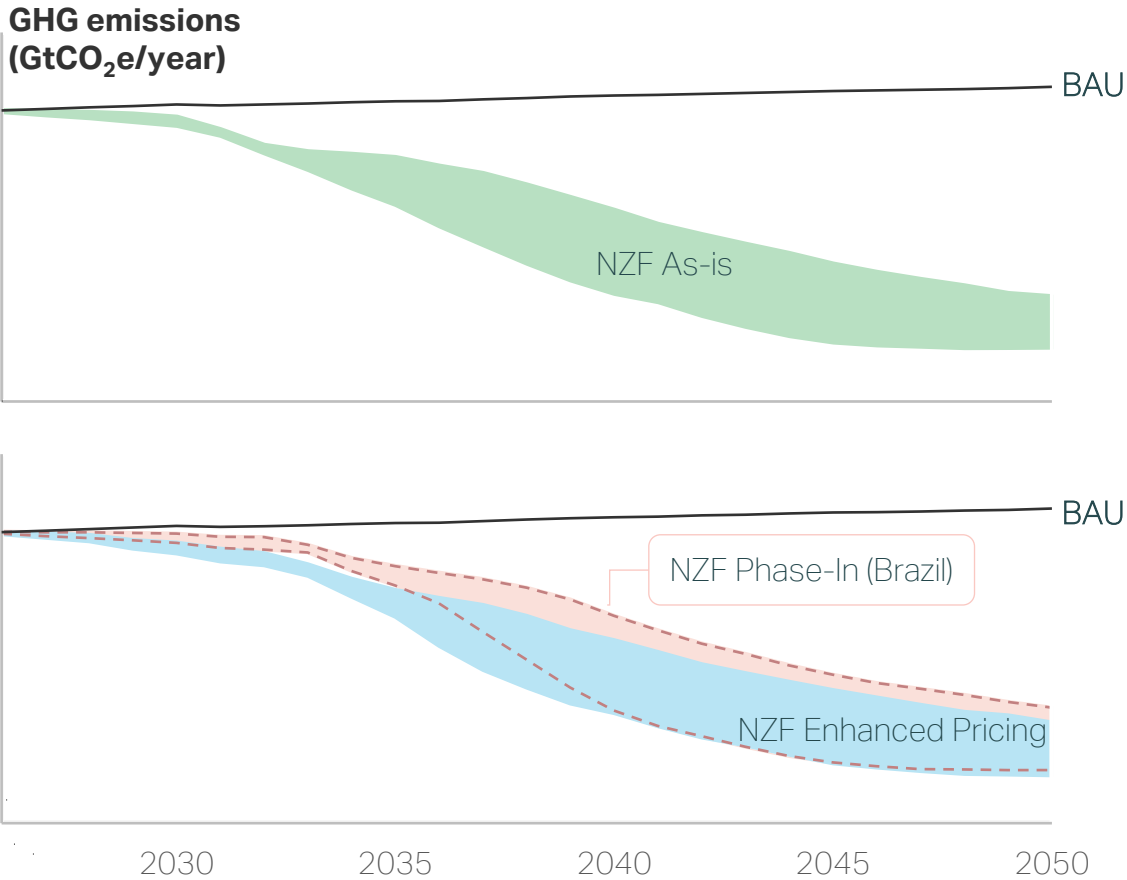


Solid = Targets set in the regulations; dashed = Targets extrapolated. **Note:** all include a 2040 target which is the basis of the extrapolation
Scenario 1: Targets flatline. Lacking an incentive, no low-emission fuels meet the commercial viability criteria and targets remain through 2050.
Scenario 2: Low-emission fuel sets 2050 target. A low-emission fuel (-70% below baseline) meets criteria and sets the 2050 target, with direct targets remaining at 13% below.

NZF variants deliver significant emissions reductions, while the Market-Defined variants show a large range depending on how targets are set

Fig 6

GHG Emission Outcomes Across the Proposals 2026-2050



Key assumptions:

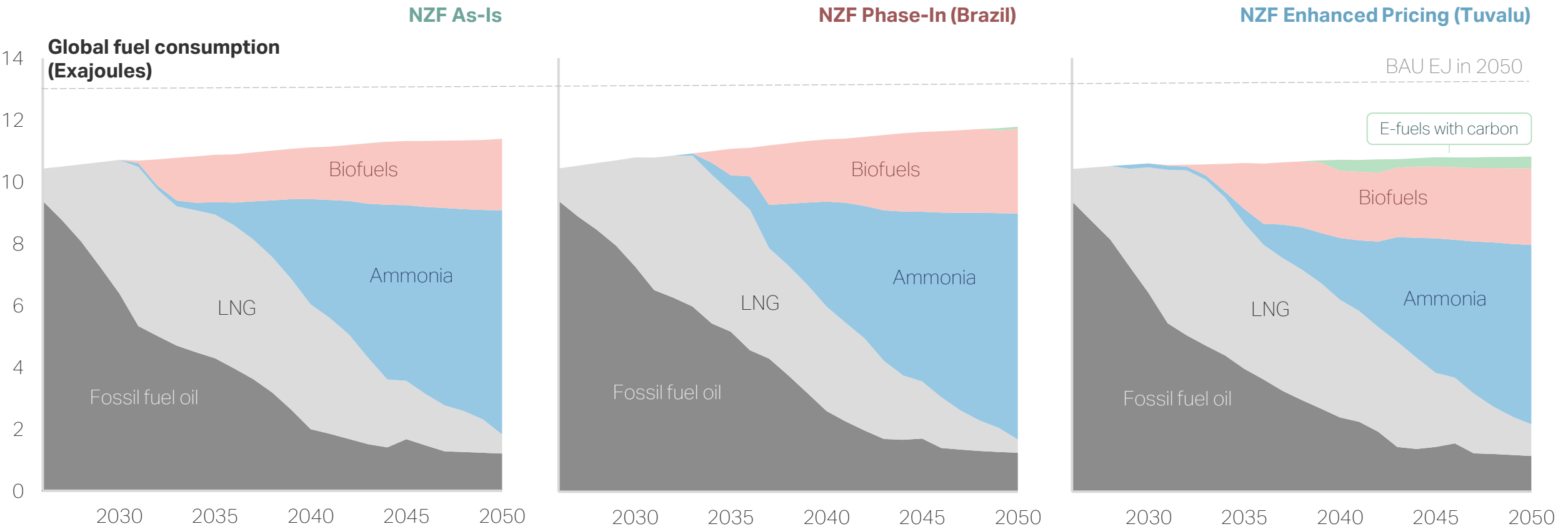


- Increasing RU 2 prices
- GFI targets extrapolated
- Unrewarded ZNZ fuels
- Internal LCA emis. factors
- Onshore carbon capt.
- Dyn. energy efficiency
- Waste-based biofuels
- Unsubsidized fuels

The NZF variants show a transition to alternatives, with scalable low-emission fuels playing a key role

Fig 7

Global Fuel Consumption Across the Proposals 2026-2050



Key assumptions:

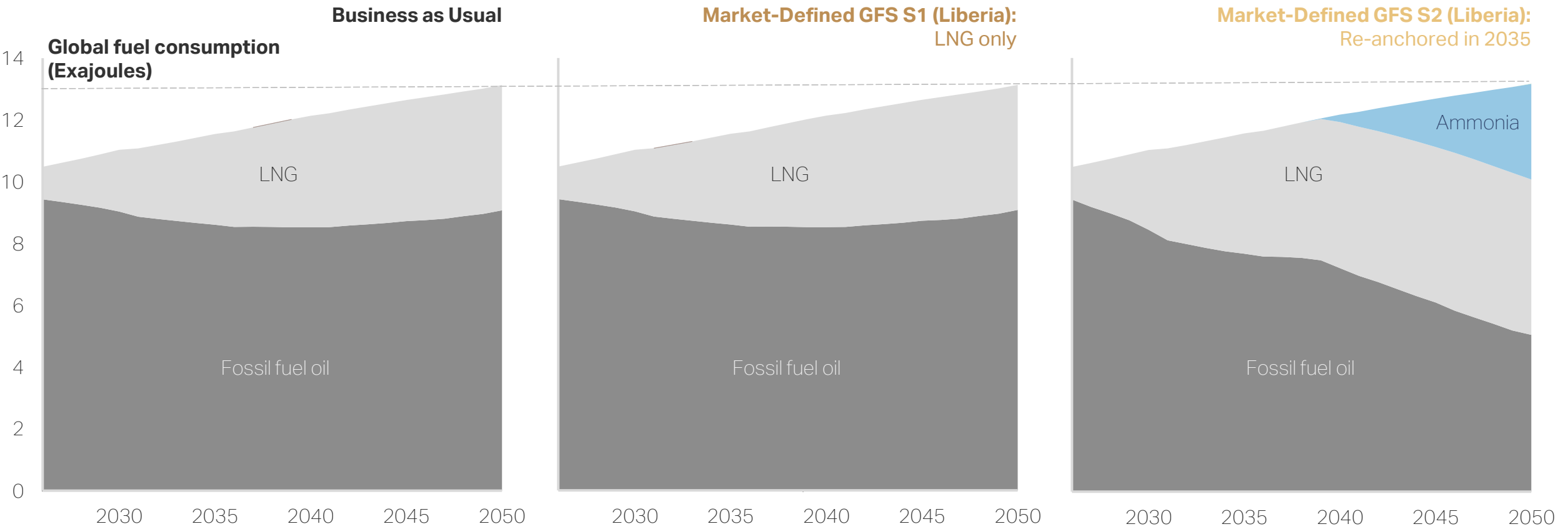


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- Waste-based biofuels
- Unsubsidized fuels

Both Market-Defined GFS scenarios remain fossil-fuel dominated, only the re-anchored variant seeing any ammonia uptake from 2040

Fig 8

Global Fuel Consumption Across the Proposals 2026-2050



Key assumptions:

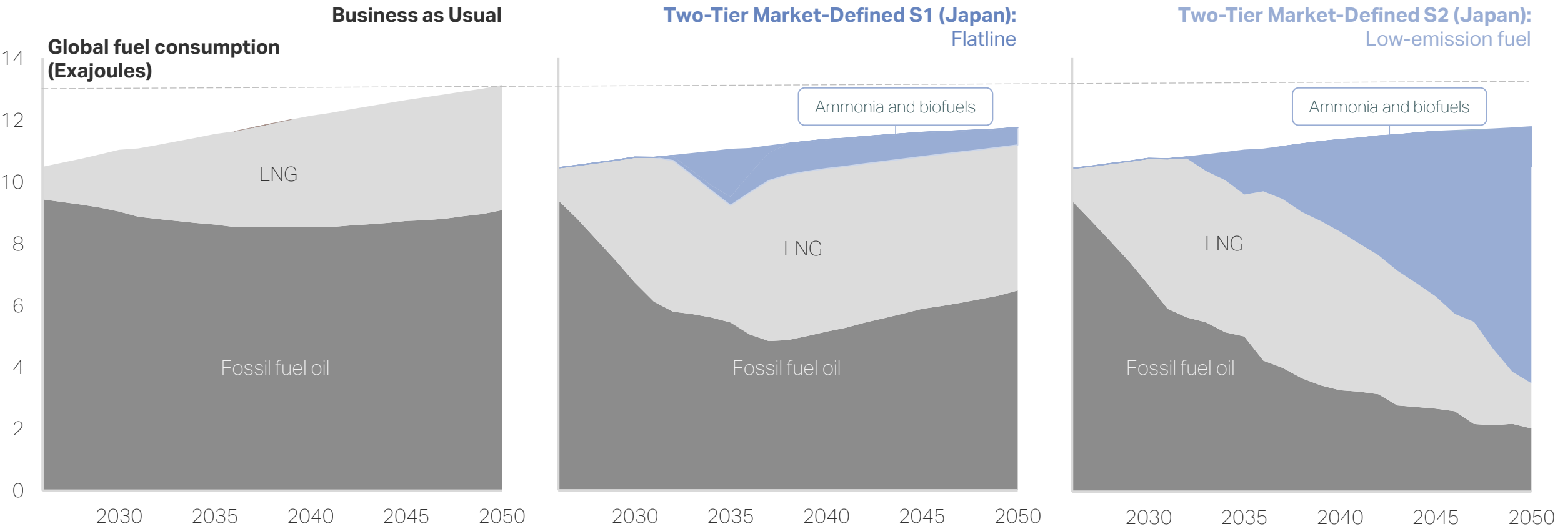


- Increasing RU 2 prices
- GFI targets extrapolated
- Unrewarded ZNZ fuels
- Internal LCA emis. factors
- Onshore carbon capt.
- Dyn. energy efficiency
- Waste-based biofuels
- Unsubsidized fuels

If a low-emission fuel meets the viability criteria, the Two-Tier Market-Defined could bring in significant shares of alternative fuel

Fig 9

Global Fuel Consumption Across the Proposals 2026-2050



Key assumptions:



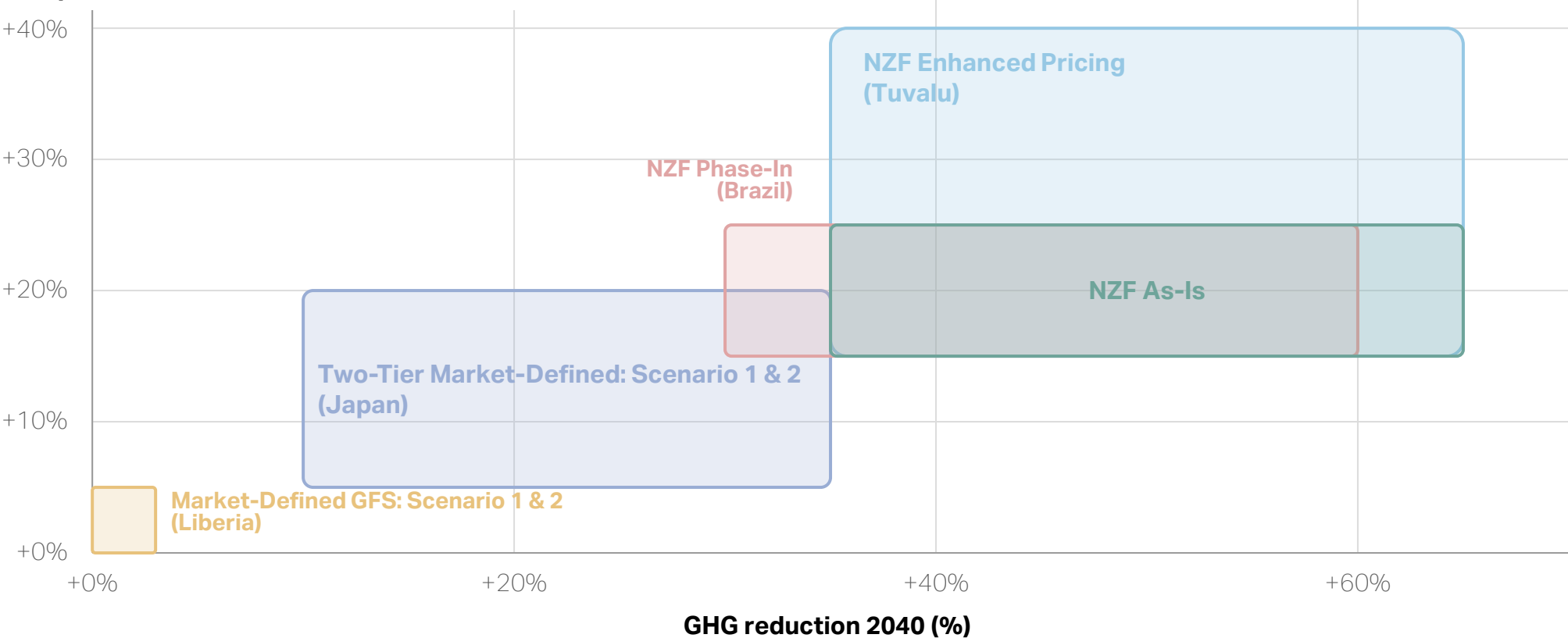
- Increasing RU 2 prices
- GFI targets extrapolated
- Unrewarded ZNZ fuels
- Internal LCA emis. factors
- Onshore carbon capt.
- Dyn. energy efficiency
- Waste-based biofuels
- Unsubsidized fuels

Each proposal carries a range of GHG reductions and transport costs

Fig 10

GHG Reduction and Transport Costs in 2040 (% vs BAU)

Increase in transport cost vs. BAU 2040 (%)



Key assumptions:

- Increasing RU 2 prices
- GFI targets extrapolated
- Unrewarded ZNZ fuels
- Internal LCA emis. factors
- Onshore carbon capt.
- Dyn. energy efficiency
- Waste-based biofuels
- Unsubsidized fuels

Transport costs reflect the costs of fuel switching and Tier 1 payments but do not include payments for Tier 2 Remedial Unit deficits

The three NZF variants deliver similar outcomes, while the Market-Defined proposals have greater uncertainty without fixed targets

Table 4

Outcome	Year	Units - scenario	NZF As-Is	NZF Phase-In (Brazil)	NZF Enhanced Pricing (Tuvalu)	Market-Defined GFS (Liberia): Sc 1 & 2	Two-Tier Market-Defined (Japan): Sc 1 & 2
1. Emissions — reduction below 2008 reference							
Indicative checkpoint –20%	2030	% - full range	2-5%	1-4%	4-7%	0%	1-5%
Indicative checkpoint –70%	2040	% - full range	35-65%	30-60%	35-65%	0%	10-35%
Net-zero	2050	% - full range	65-80%	60-80%	65-85%	0 -20%	5-70%
2. Fuel mix — zero and near-zero energy							
5% ZNZ (shown as % non-fossil)	2030	% non-fossil – median	0% (9% in 2032)	0% (7% in 2034)	1% (5% in 2033)	0%	0% (0 - 5% in 2034)
ZNZ in 2050 (shown as % non-fossil)	2050	% non-fossil – median	~85%	~85%	~80%	~25%	~70%
3. Transport costs							
Transport cost increase	2040	% above BAU – full range	15 - 25%	15 - 25%	15 – 40%	0 – 5%	5 – 20%
Transport cost + Tier 2 RU deficits	2040	% above BAU – median	40%	35%	50%	5%	20%



The Countdown newsletter covers the policies driving maritime decarbonization, from FuelEU to the IMO's GHG measures and energy efficiency regulations. Subscribe [here](#)

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