


# Carbon Fiber

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	Product	Non captive volume, KTA	Total volume, KTA	Location	Key Driver
<b>Key metrics</b> 	Carbon fiber	7	7	Jubail	KSA demand growth for CF expected to be driven by Renewable Energy, Automotive sector and upcoming Aviation production
	Oxidized PAN	0	13		
	<b>Total</b>	<b>7</b>	<b>20</b>		

## Value chain



Integrated case
x Raw Materials
 end products
→ Sold to market
 xx Captive capacity
 xx Non-captive capacity

### Raw Materials

### DS End-products



## Exemplary players

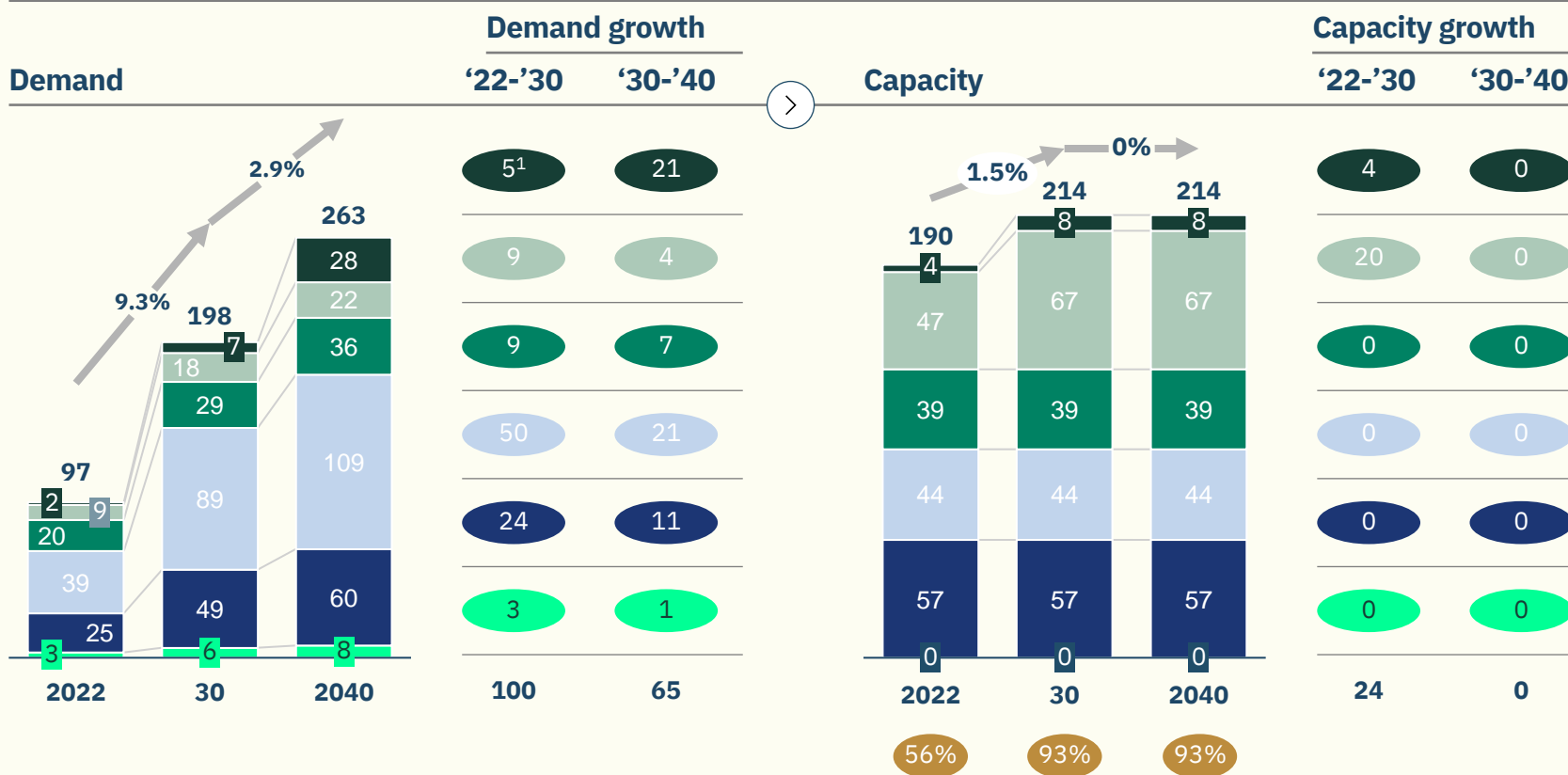


# Global demand for CF is expected to grow faster than capacity in 2022 - 2040

xx% Estimated Utilization rate, %

- Middle East<sup>1</sup>
- Europe
- North America
- Asia<sup>2</sup>
- China
- RoW

## Global CF demand / capacity, KTA



## Key takeaways

Addressable demand of ~86 KTA by 2030

Target demand<sup>3</sup> of ~13 KTA in:

- ME 5 KTA
- Europe 9 KTA
- RoW 3 KTA

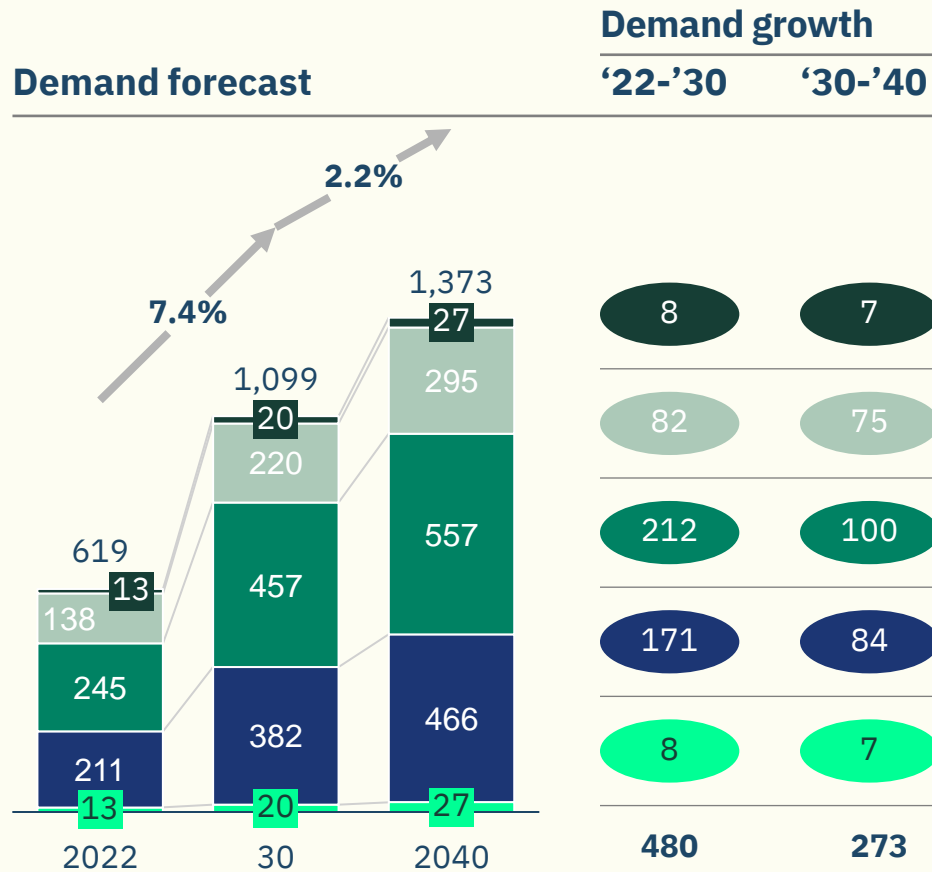
Additional **gap of ~65 KTA by 2040** if not addressed is expected considering projected growth, however it may be addressed by improved utilization rates

1. Includes Iran, Israel, Kuwait, Oman, Qatar, KSA, Syria, UAE, Turkey | 2. Excluding China | 3. Calculated as demand growth – capacity growth if demand growth > capacity growth, otherwise 0 (except for Middle East, where KSA growth can always be captured) | 4. Assuming Middle East can always be captured

# Global CFRP demand is expected to grow at 7.2% p.a., but growth is threatened by high costs

■ Middle East1 ■ Asia ■ Europe ■ North America ■ RoW

## Global CFRP demand / capacity, tons

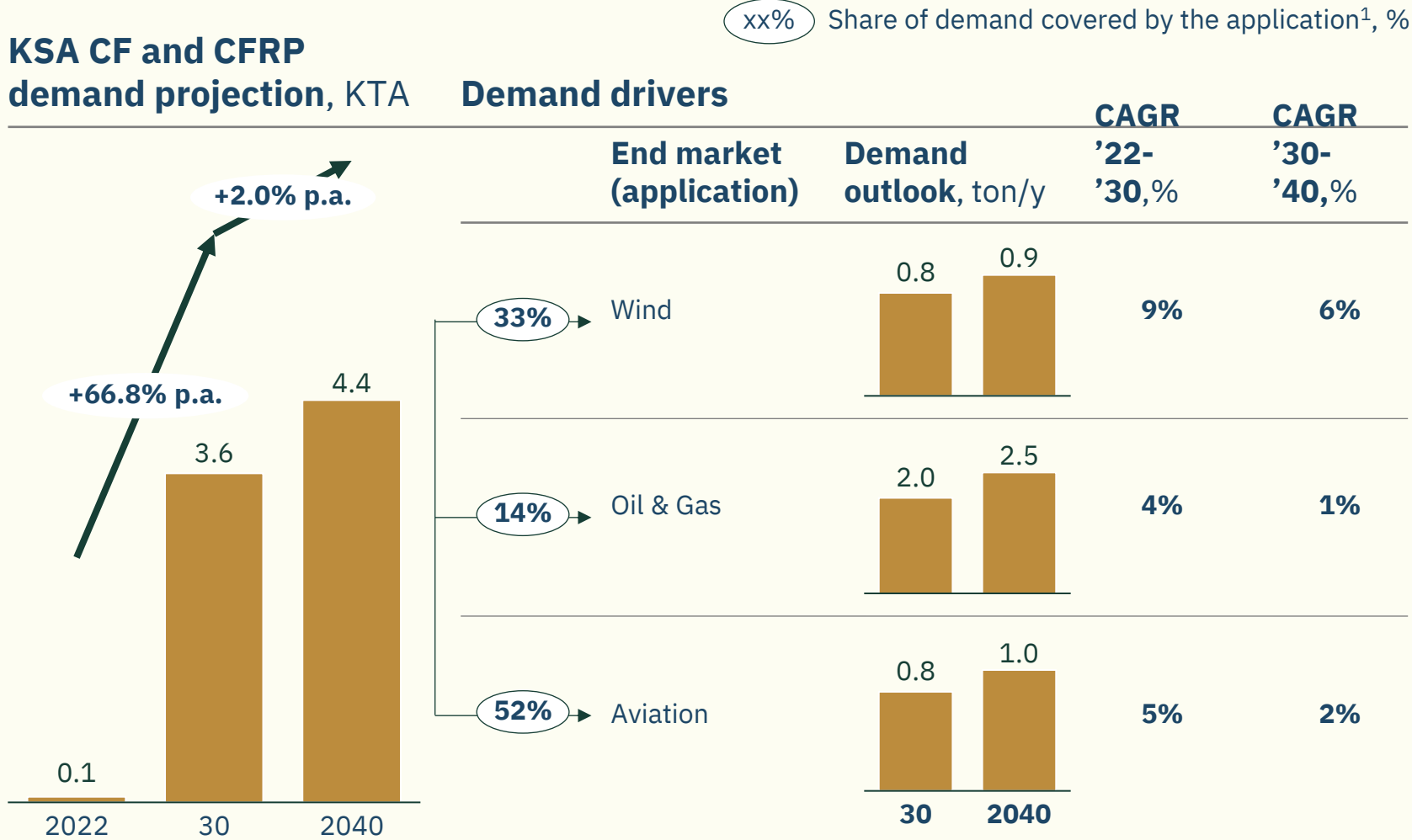


## Key takeaways

- Forecasted demand of 480 tons in 2030 for CFRP composite materials
- Demand might not materialize due to high costs of CF driving costs of CFRP beyond beneficial range for end users

1. Includes Iran, Israel, Kuwait, Oman, Qatar, KSA, Syria, UAE, Tukiye

# KSA demand growth for CF expected to be driven by Renewable Energy and upcoming Aviation production



## Key takeaways

**KSA represents <1% of global demand** and expected to grow at **67% CAGR by 2030**

**Afterwards** the growth can reach **24 KTA ~9%** of total global demand in 2040 due to anticipated aviation industry growth

**Key drivers** of growth in KSA are:

- **Renewable Energy** sector (consuming CF for wind blades) with a 6% CAGR between 2030-40
- **Oil & Gas** sector (CFC construction) with a 4% CAGR '22-'30
- **Aviation:** with a 2% CAGR between 2030-2040

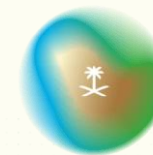
**Size of the local market makes CF a mostly local play. Most exports expected to be regional**

1. Middle East distribution

Source: Internal analysis

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MINISTRY OF ENERGY



**Thank You**