

Nonmetallic

Renewables & Automotive Workshop

Business Opportunities

This presentation may contain certain forward-looking statements. All statements other than statements relating to historical facts are, or may be deemed to be, forward-looking statements. Forward-looking statements include, but are not limited to, statements related to future events or to the company's future financial or operating performance such as the company's expectations and projections regarding its growth, initiatives and strategies, capital expenditures and investments, customer and partner relationships, major projects and product development. These statements may generally, but not always, be identified by the use of words such as "target," "goal," "aim," "believe," "expect," "commit," "anticipate," "intend," "estimate," "should," "will," "shall," "may," "likely," "plan," "strategy," "initiative," "project," "outlook" or similar expressions, including variations and the negatives thereof.

Forward-looking statements reflect the company's expectations, beliefs, estimates, forecasts, projections and assumptions, only as of the date such statements are made, and are subject to known and unknown risks, uncertainties and other important factors beyond the company's control that could cause the company's actual results, performance or achievements to be materially different from the expected results, performance, or achievements expressed or implied by such statements. Factors that could cause actual results to differ materially from the company's expectations include, among other things, the following: global supply, demand and price fluctuations of oil, gas and petrochemicals; global economic conditions; competition in the industries in which the company operates; climate change concerns, weather conditions and related impacts on the global demand for hydrocarbons and hydrocarbon-based products; risks related to the company's ability to successfully meet its ESG targets, including its failure to fully meet its GHG emissions reduction targets by 2050; conditions affecting the transportation of products; operational risk and hazards common in the oil and gas, refining and petrochemicals industries; the cyclical nature of the oil and gas, refining and petrochemicals industries; political and social instability and unrest and actual or potential armed conflicts in the MENA region and other areas; natural disasters and public health pandemics or epidemics; the management of the company's growth; the management of the company's subsidiaries, joint operations, joint ventures, associates and entities in which it holds a minority interest; exposure to inflation, interest rate risk and foreign exchange risk; risks related to operating in a regulated industry and changes to oil, gas, environmental or other regulations that impact the industries in which the company operates; legal proceedings, international trade matters, and other disputes or agreements; and other risks and uncertainties that could cause actual results to differ from the forward-looking statements in this presentation, as set forth in the latest periodic reports filed by the Saudi Arabian Oil Company ("Aramco") with the Saudi Exchange. For additional information on the potential risks and uncertainties that could cause actual results to differ from those presented please see Aramco's most recent annual periodic report filed with the Saudi Exchange and any subsequent filings thereto.

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Workshop Agenda

No.	Title of the Investment Opportunity
-	Introduction
1	Carbon Fiber Wind Blades
2	Fuel cells
3	Fuel cells subcomponents
4	Composite Battery Enclosure
5	Tires
-	Closing remarks

iktva Program Overview (1/2)

The In-Kingdom Total Value Add (iktva) program is designed to drive increased investment, economic diversification, job creation, and workforce development within the Kingdom

Saudi Aramco aims to achieve 70% local content




iktva in Procurement

2000+ Service contracts	290+ Corporate purchase agreements
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Business Opportunities

12 Sectors	200+ Business Opportunities	\$28 bn Annual Market Size
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Anchor Projects

6 Anchor projects

IMI	SPARK	Tuwaiq
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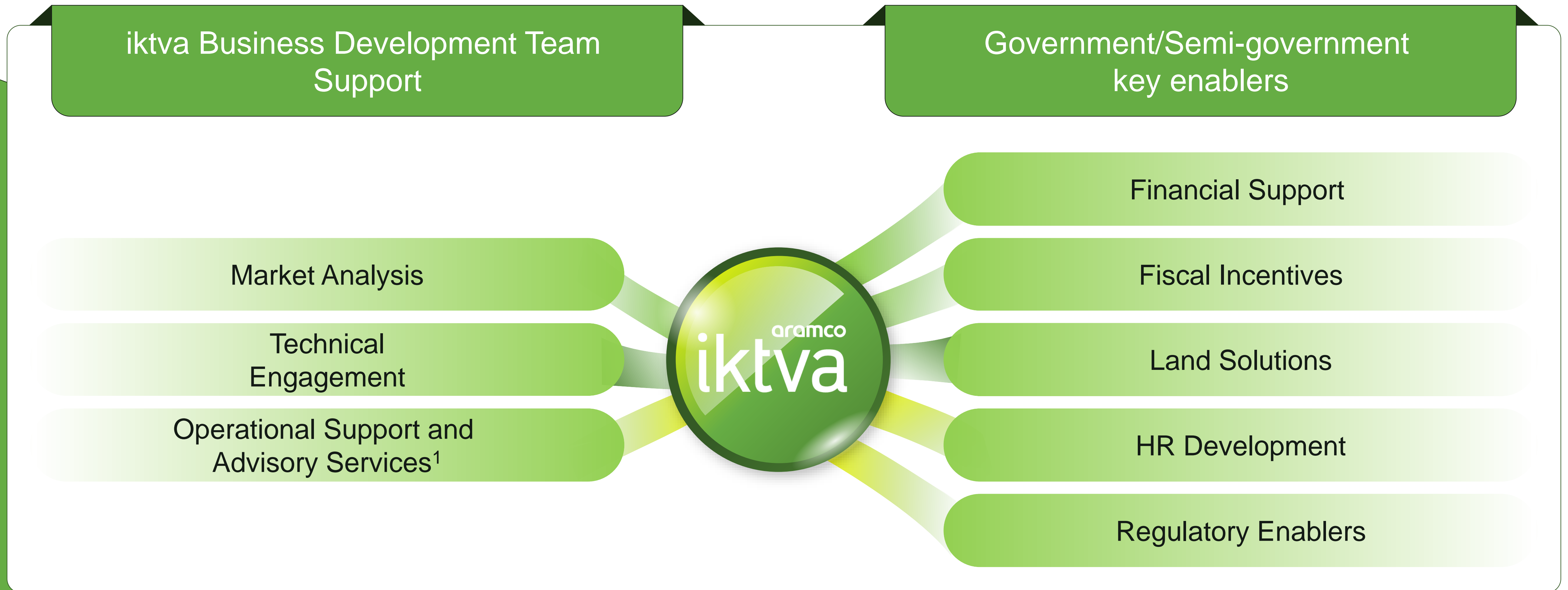


Local Workforce Development

16 National training centers	90+ Programs
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Driving Prosperity

Note: IMI = International Maritime Industries; SPARK = King Salman Energy Park











Driving Prosperity

1. Includes broad range of support services provided by the team: user requirements, advisory on available financial and fiscal incentives, guidance on localization process in line with local regulations and standards, action plan development etc.

Why invest in KSA?

Non-exhaustive

 Strong GDP growth and healthy economy	 Big market and game-changing opportunities	 Government incentives and enablers	 Ease of doing business	 Strategic global location	 Favorable demographics
Top 20 economies globally	5 Special Economic Zones drive innovation	\$1.3T+ invested in private sector by 2030	 one of world's most rewarding tax systems	12-15% of global trade passes via Red Sea	17% population growth from 2013-2023
GDP growth among highest projected in 2025 in top economies	6 giga projects driving urbanization and industry	5.7% contribution of FDI to GDP by 2030	Top 5 in the MENA region for ease of doing business	 KSA container ports are among the most efficient globally	67% of population below the age of 35

Driving Prosperity

Note: FDI = Foreign Direct Investment
 Source: IMF; MISA; Vision 2030 Key Performance Indicators; Shareek Program; World Bank

Non-exhaustive

3 Industrial Zones and Economic Cities

Industrial zones like KAEC provide specialized infrastructure and logistical services essential for packaging products and services

4 Customs and import duty reductions

MoCI offers zero import duties for localization of selected raw materials, machinery, & equipment

5 Visa and legal support

Streamlined visas for investors and skilled workers, with legal support via MISA for fast business setup and compliance

2 Tax incentives and exemptions

Tax exemptions for earnings from exports and up to 50% tax credit on Saudi nationals' payroll and training costs for 10 years

1 Subsidies and financial programs

Loans financing up to 75% of the industrial project provided by SIDF to foster industrial development



Support for localization provided by KSA through wide array of initiatives

Driving Prosperity

Note: SIDF - Saudi Industrial Development Fund; MoCI = Ministry of Commerce and Industry; MISA = Ministry of Investment Saudi Arabia
 Source: SIDF; ZATCA; KAEC; MoCI; MISA

How do we define what is an opportunity?



Growing market

High growth high spend markets



**Limited local players
& import driven**

*Markets with few local contributors
and high import resilience*



**Technological
& labor feasibility**

*Markets with accessible or
standardized technology and
available skilled labor*

Nonmetallic

Renewables workshop

Business Opportunities Review

Key demand drivers for the KSA nonmetallic renewables market

Driving Prosperity



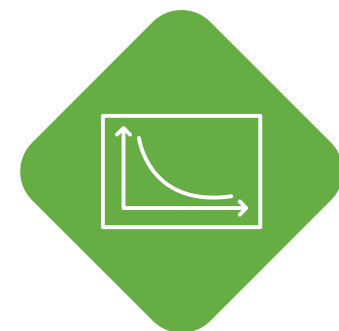
Clean energy initiatives are driving the demand for wind blades and fuel cells, as KSA aims to source at least 50% of its power from renewable energy by 2030 and as KSA invests heavily in green hydrogen projects



Technological advancements in carbon fiber wind blade manufacturing, such as automation and 3D printing, and in fuel cell development, make both more economically viable and adoptable low carbon energy solutions



Environmental regulations such as the Saudi Green Initiative and the adoption of the Circular Carbon Economy concept support the ambition to reach net zero emissions by 2060




Job creation and industrial growth as the development of the renewable energy sector is expected to create numerous job opportunities and contribute to economic growth

Nonmetallic Renewables Market Overview

Nonmetallic Renewables market snapshot

Three opportunities to be discussed today



\$126MM
51% CAGR¹

2024 KSA market size for opportunities
in today's workshop

1

Carbon Fiber Wind Blades

2

Fuel cells

3

Fuel cells subcomponents

Carbon Fiber Wind Blades

Opportunity profile – Carbon Fiber Wind Blades

1

Carbon Fiber Wind Blades needed to meet 2030 renewable energy targets



Carbon Fiber Wind Blades

2

Substantial growth forecasted for Carbon Fiber Wind Blades market



Estimated 2029 KSA market size

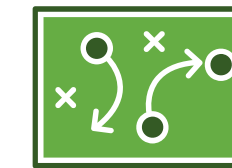


Forecasted 5-year CAGR

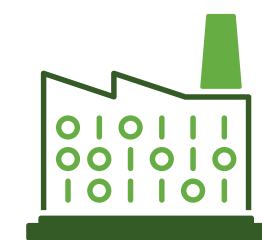
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Attractive investment opportunities in Carbon Fiber Wind Blades value chain

KSA value chain opportunities



Intermediate processes



Manufacturing

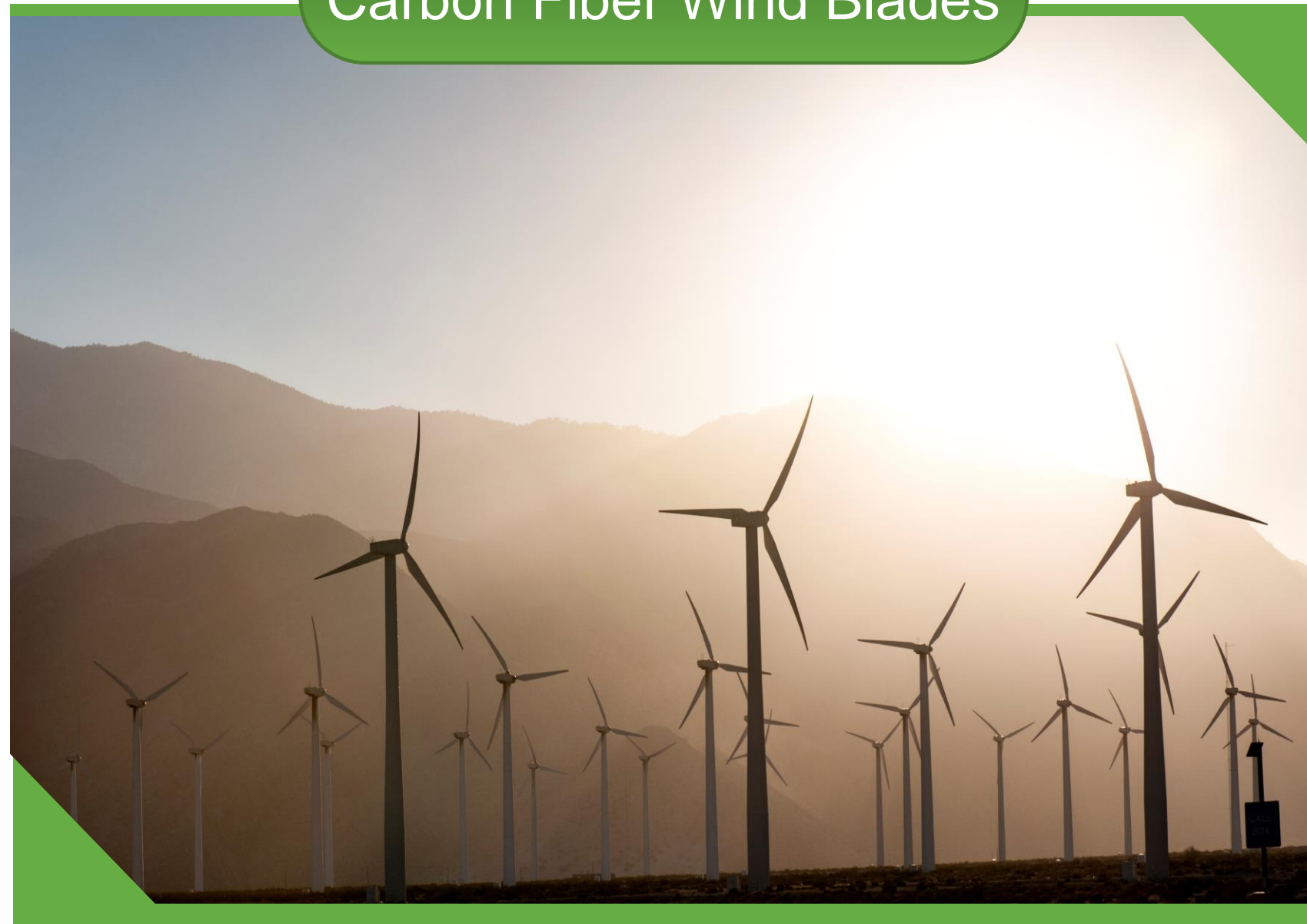
KSA enablers

- Tax credits on R&D investments
- Streamlined visa processes
- Quality certification funding

Driving Prosperity

Potential Carbon Fiber Wind Blades localization categories

Carbon Fiber Wind Blades

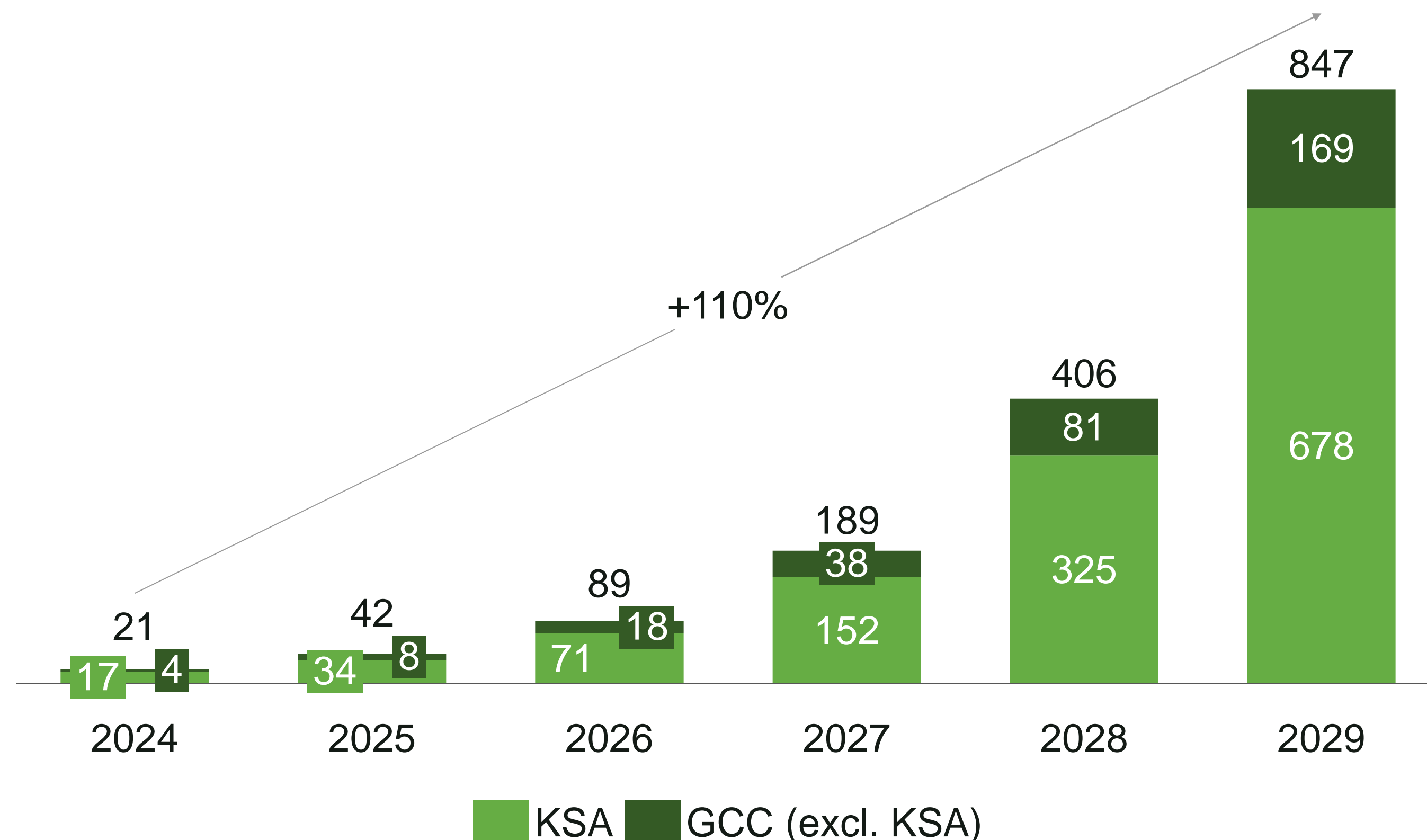


Advantages compared to regular wind blades



- **Lightweight:** High strength-to-weight ratio, allowing blades to be lighter yet stronger
- **Increased length:** Enables production of longer blades, which capture more wind energy and improve turbine efficiency
- **Superior stiffness:** High rigidity minimizes blade deflection under wind loads
- **Durability:** Carbon fiber is highly resistant to fatigue, corrosion, and environmental degradation, leading to longer operational lifespans and reduced maintenance costs
- **Enhanced performance:** Supports higher rotational speeds and energy output due to its ability to withstand dynamic loads

Carbon Fiber Wind Blades demand, customers, and drivers

Forecasted KSA and rest of GCC Carbon Fiber Wind Blades market 2024-2029 (\$MM)



Typical KSA customers

-  Wind turbine manufacturers
-  Upstream energy firms

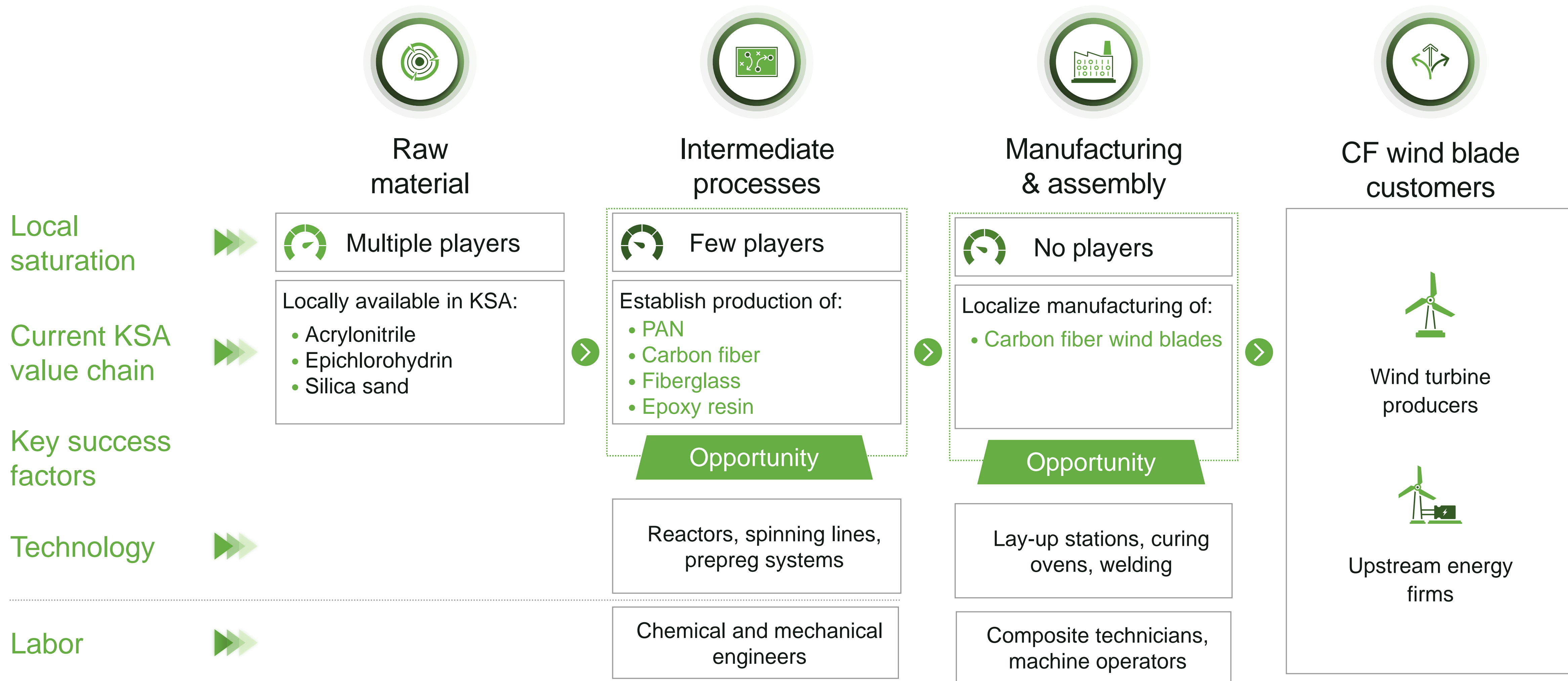
Key KSA demand drivers

- **Vision 2030 goals:** KSA aims to generate 50% of its power from renewable sources by 2030, with plans for 50 GW from wind energy
- **Offshore wind expansion:** Projects in Red Sea and Arabian Gulf drive demand for CF blades, as offshore turbines require longer blades for efficient energy capture

Driving Prosperity

Note: CF = Carbon fiber
Source: Research and Markets; Global Wind Energy Council; Team analysis

Value chain and key localization opportunities



Driving Prosperity

Note: CF = Carbon fiber
Source: Team analysis

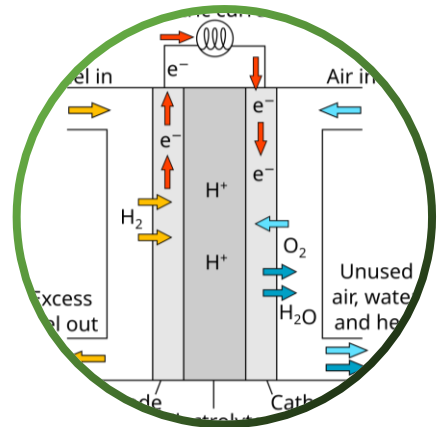
Fuel Cells

Opportunity profile – Fuel cells

1

Fuel cells needed for clean energy and achieving net zero

Types



Proton exchange membrane



Solid oxide

2

GCC fuel cell market is expected to grow rapidly in the coming years



Estimated 2024 KSA market size

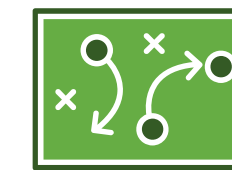


Forecasted 5-year CAGR

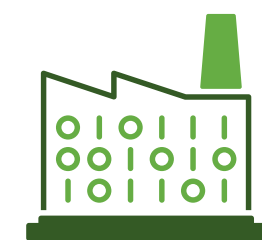
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Attractive investment opportunities in the fuel cell value chain

KSA value chain opportunities



Intermediate processes



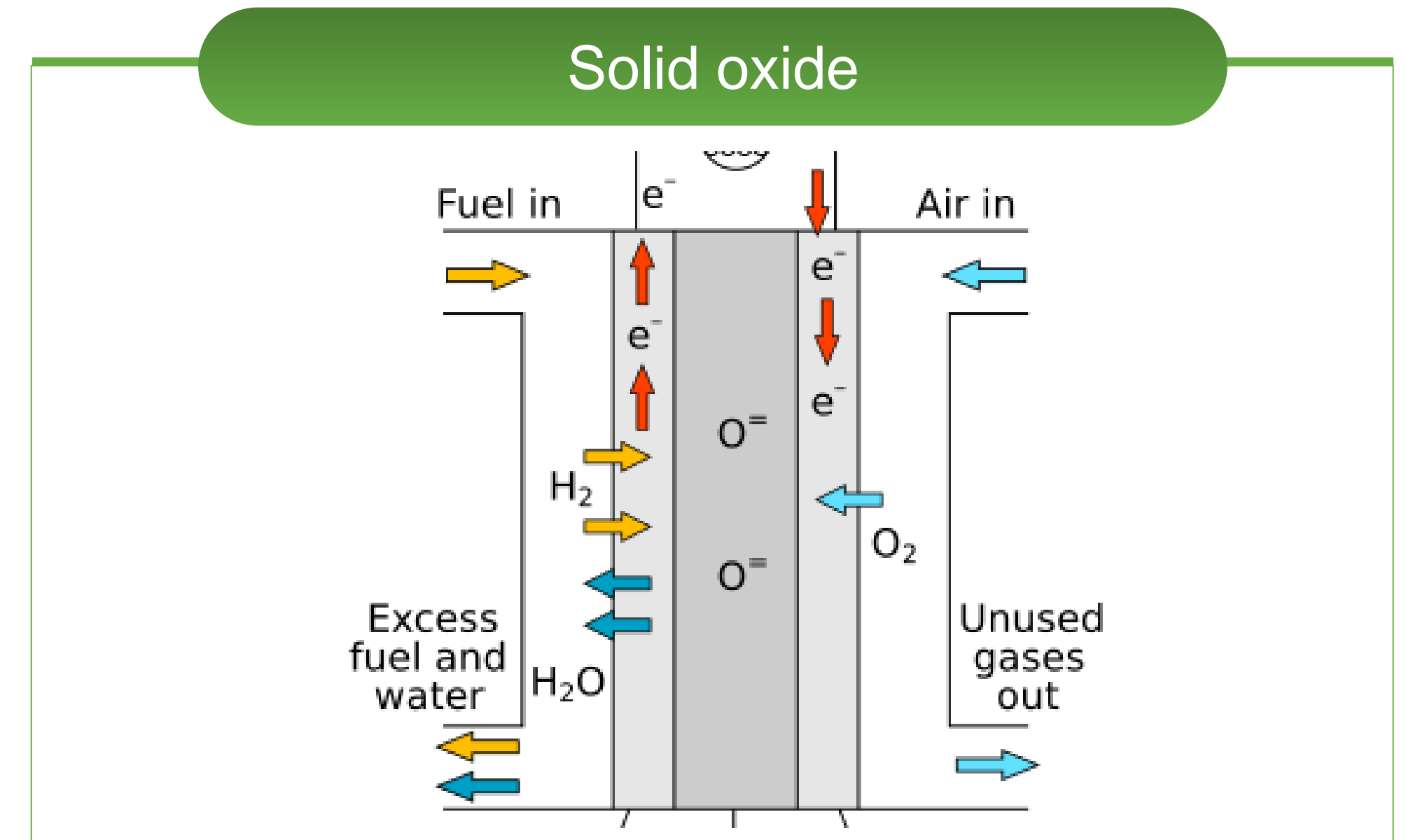
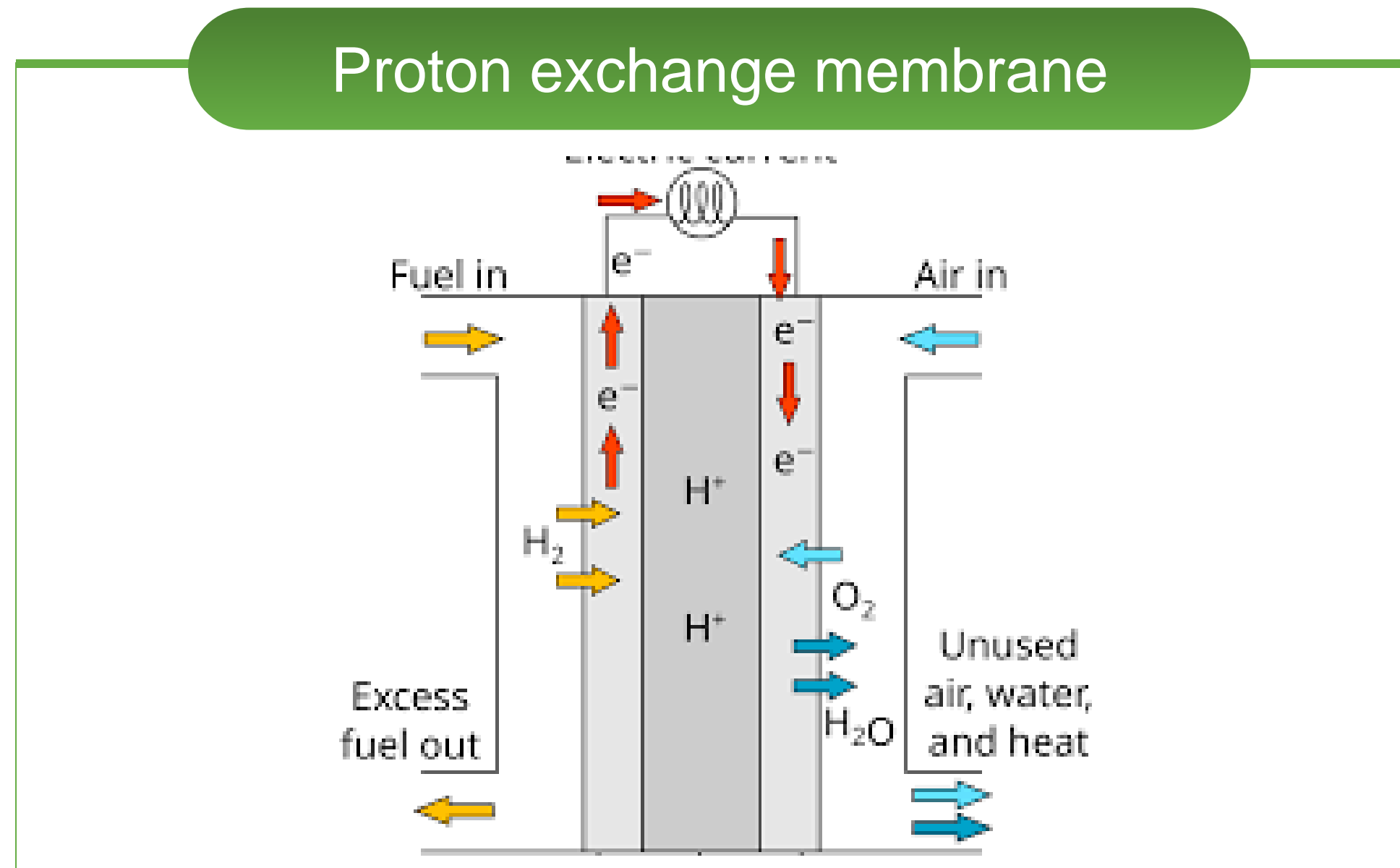
Manufacturing

KSA enablers

- Fiscal incentives
- Investment support
- Workforce development

Driving Prosperity

Potential fuel cell localization categories



Definition Energy generation using H₂. Lower operating temperature and faster start-up making compatible for:

- Applications**
- Mobility (e.g., FCEV)
 - Mobile backup power for remote locations

Energy generation using H₂ and HC. Higher efficiency and fuel flexibility for:

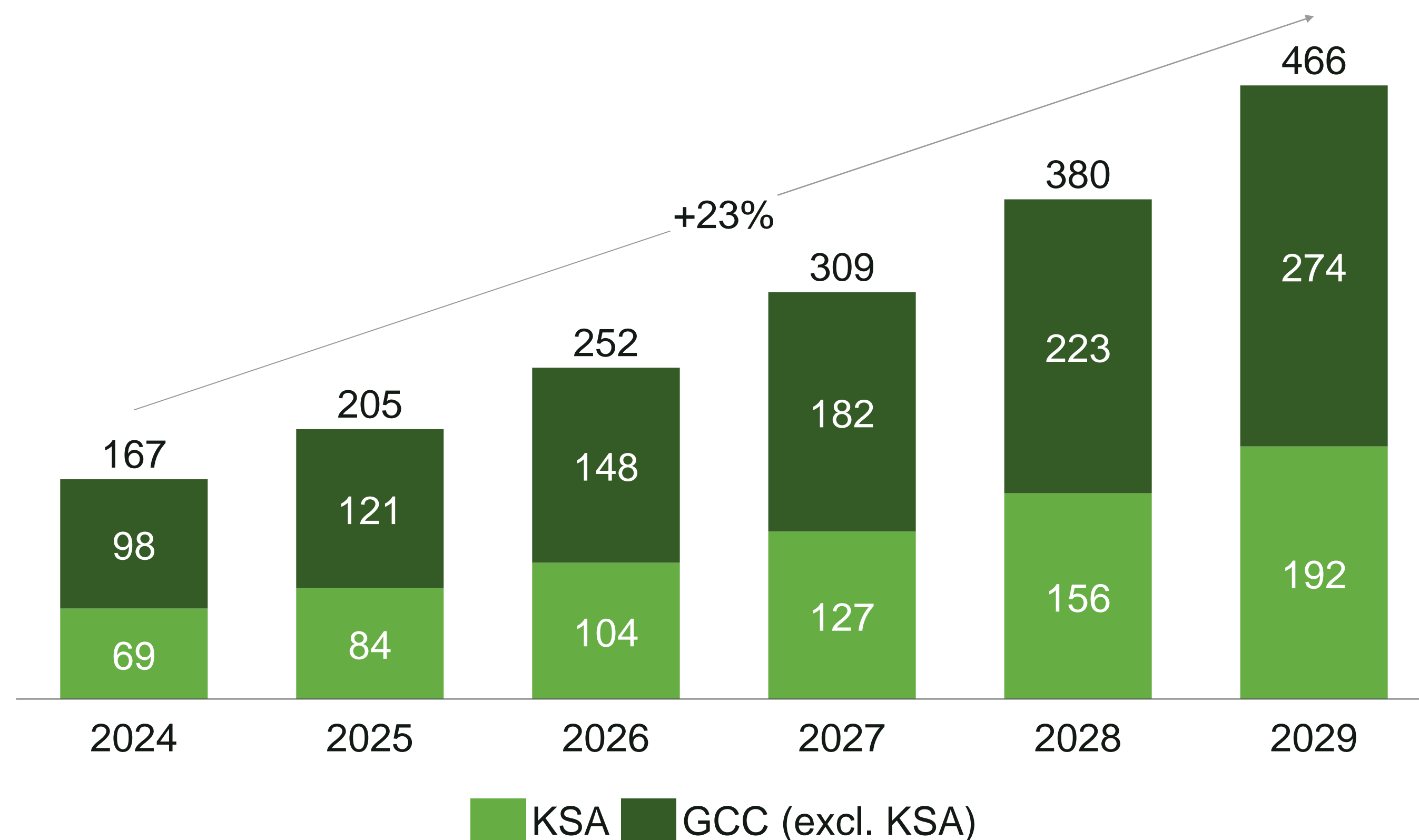
- Industrial energy systems
- Continuous power supply (large scale)

Driving Prosperity




Note: Non-exhaustive; HC = Hydrocarbons
Source: Team analysis

Fuel cell demand, customers, and drivers

Forecasted KSA and other GCC fuel cell market 2024-2029 (\$MM)



Typical fuel cell customers in KSA

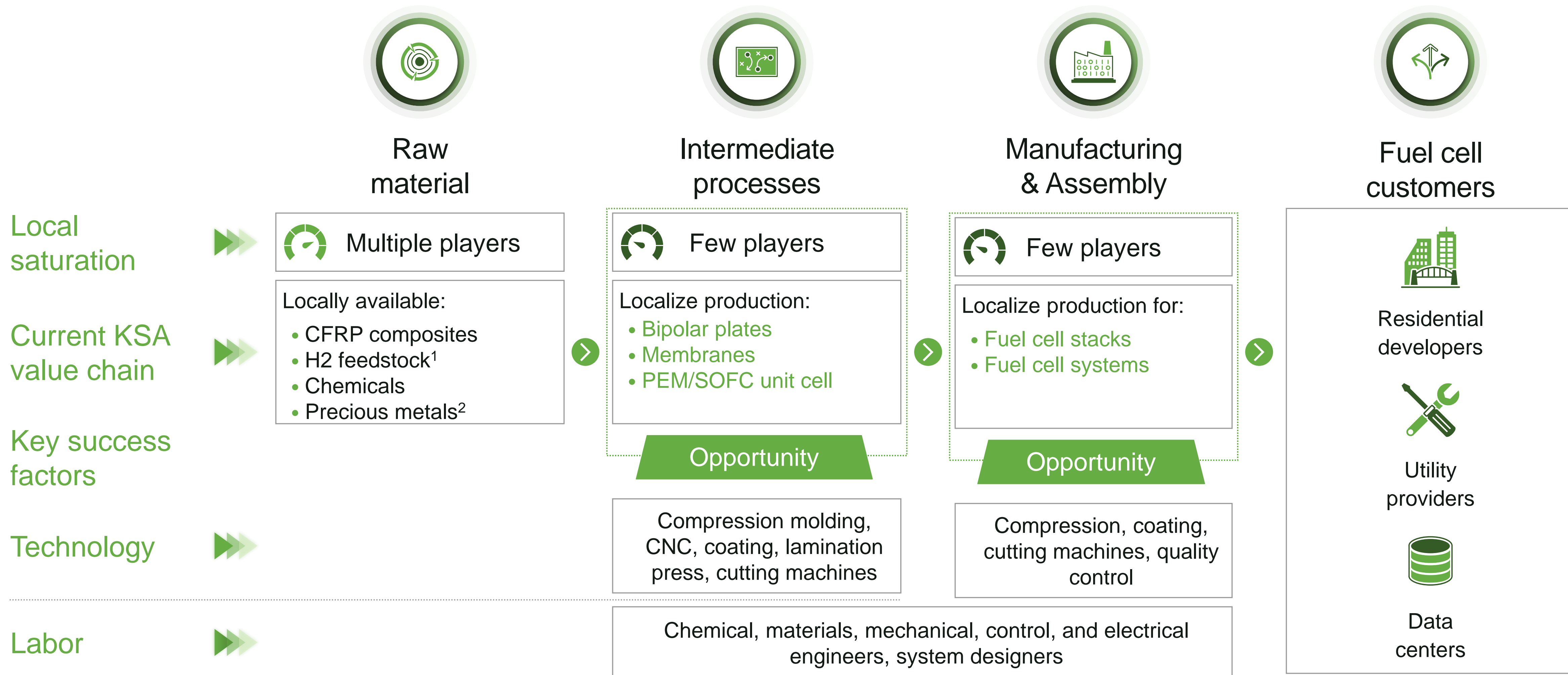
-  Residential developers
-  Utility providers
-  Data centers

Key KSA demand drivers

- **Technological development:** Improved fuel cell efficiency, durability, and cost reductions making them competitive with traditional energy sources
- **Hydrogen projects:** Ongoing development of hydrogen production facilities set to produce 650 tons of hydrogen per day by 2030 set to drive fuel cell demand

Driving Prosperity

Value chain and key localization opportunities



Driving Prosperity

1. Under development 2. For import
Note: Non-exhaustive; CFRP = Carbon Fiber Reinforced Polymer; PEM = Proton Exchange Membrane; SOFC = Solid Oxide Fuel Cell
Source: Team analysis

Fuel Cells Subcomponents

Opportunity profile – Fuel cells subcomponents

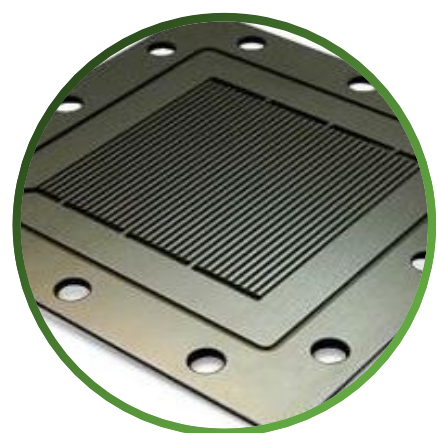
1

FC components needed to support ongoing fuel cell expansion

Types



Membrane electrode assembly



Bipolar plates

2

FC subcomponent market expecting rapid growth in coming years



Estimated 2024 KSA market size

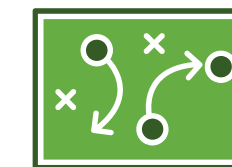


Forecasted 5-year CAGR

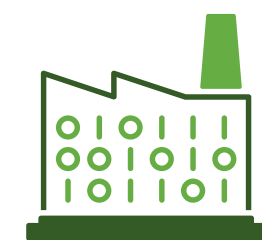
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Attractive opportunities in the FC sub-component value chain

KSA value chain opportunities



Intermediate processes



Manufacturing

KSA enablers

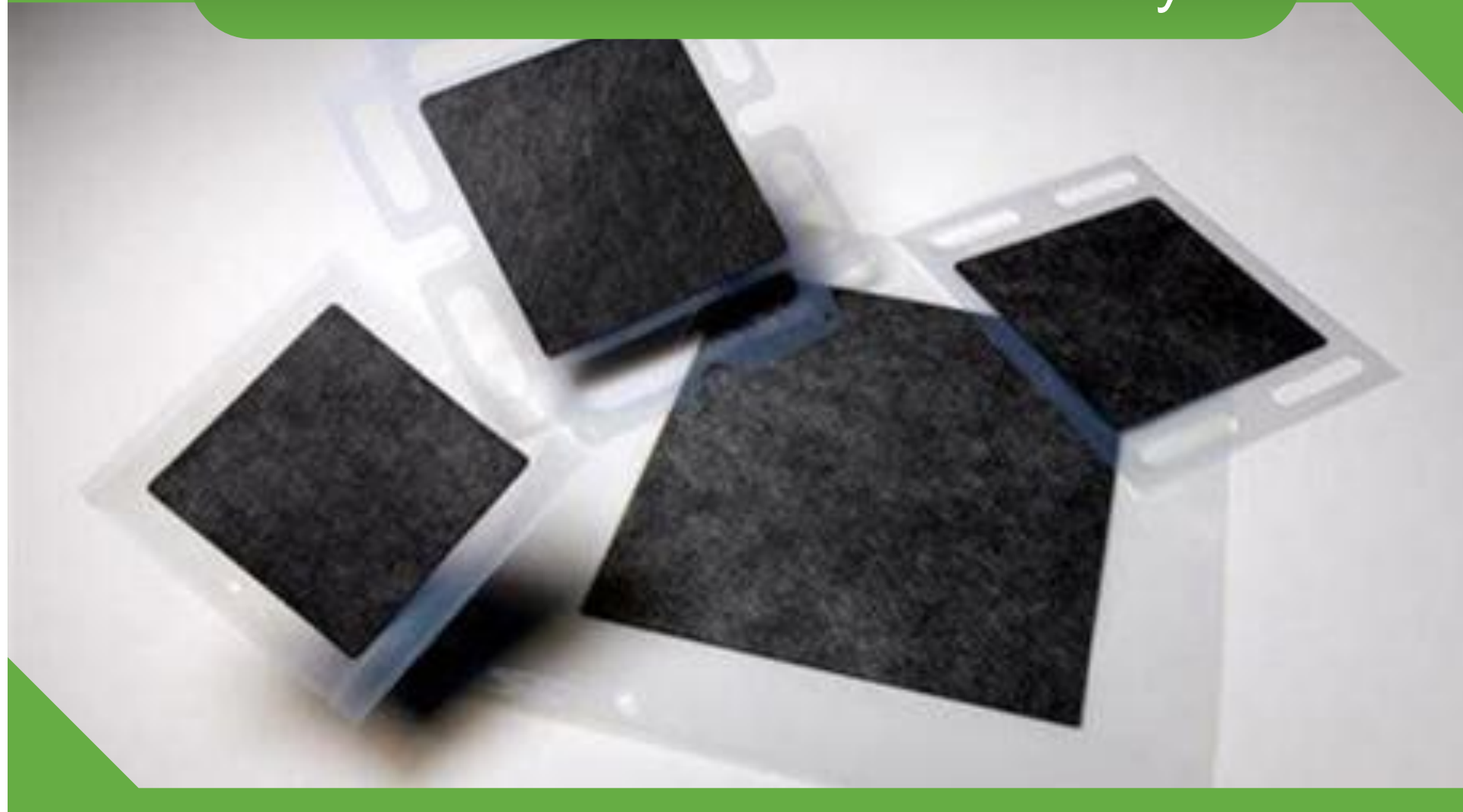
- Fiscal incentives
- Investment support
- Workforce development

Driving Prosperity

Note: FC = Fuel cells
 Source: Springer nature; AIP publishing; Expert interviews; Team analysis

Potential fuel cells subcomponents localization categories

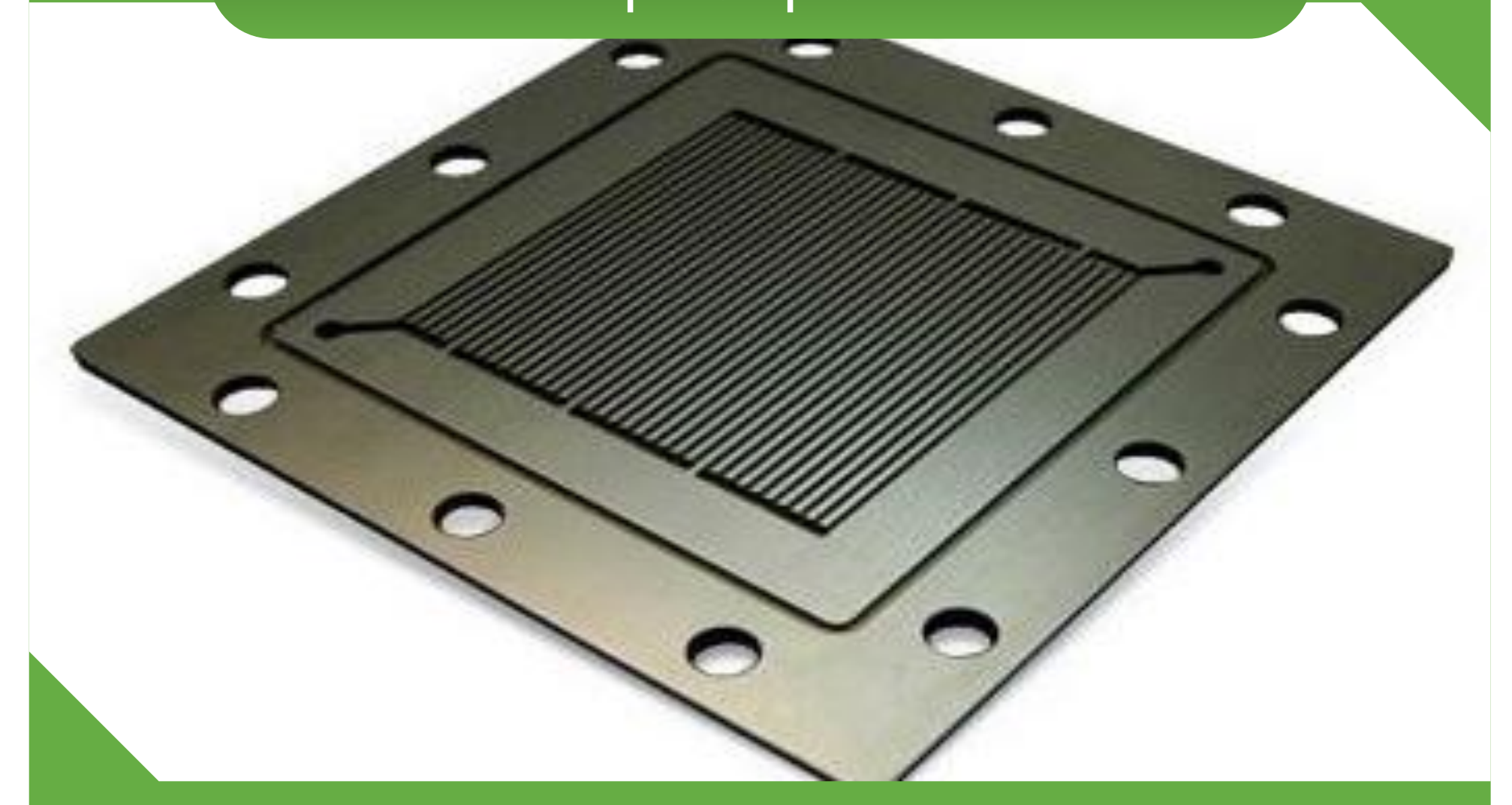
Membrane electrode assembly



Applications

- Converts hydrogen and oxygen into water, electricity, and heat by electrochemical reaction

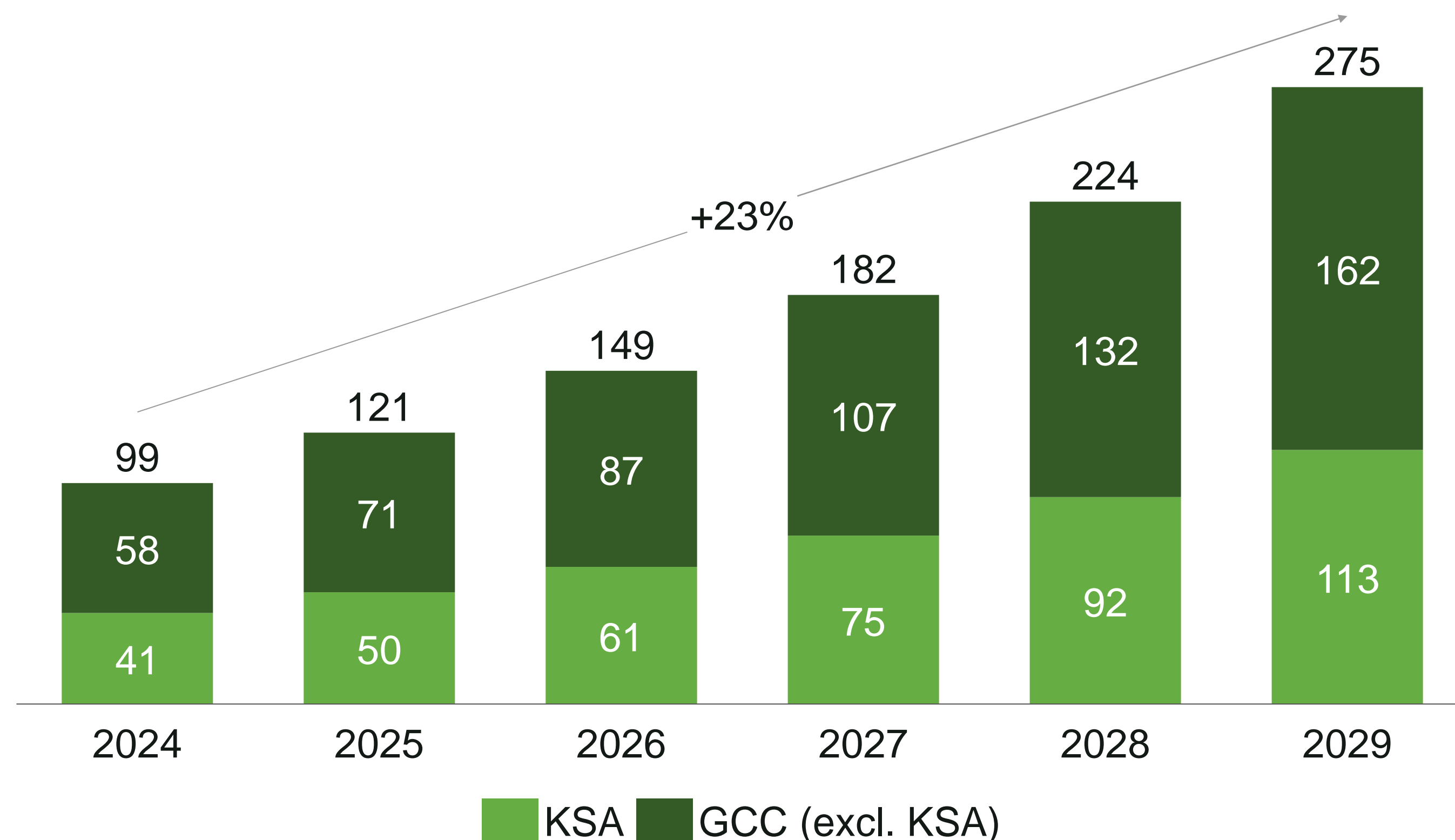
Bipolar plates



- Separate and distribute H₂ and oxygen evenly to the fuel cell
- Interconnect fuel cell unit cells and conduct electricity in a fuel cell stack

Fuel cells subcomponents demand, customers, and drivers

Forecasted KSA and other GCC fuel cell subcomponent market 2024-2029 (\$MM)



FC component customers

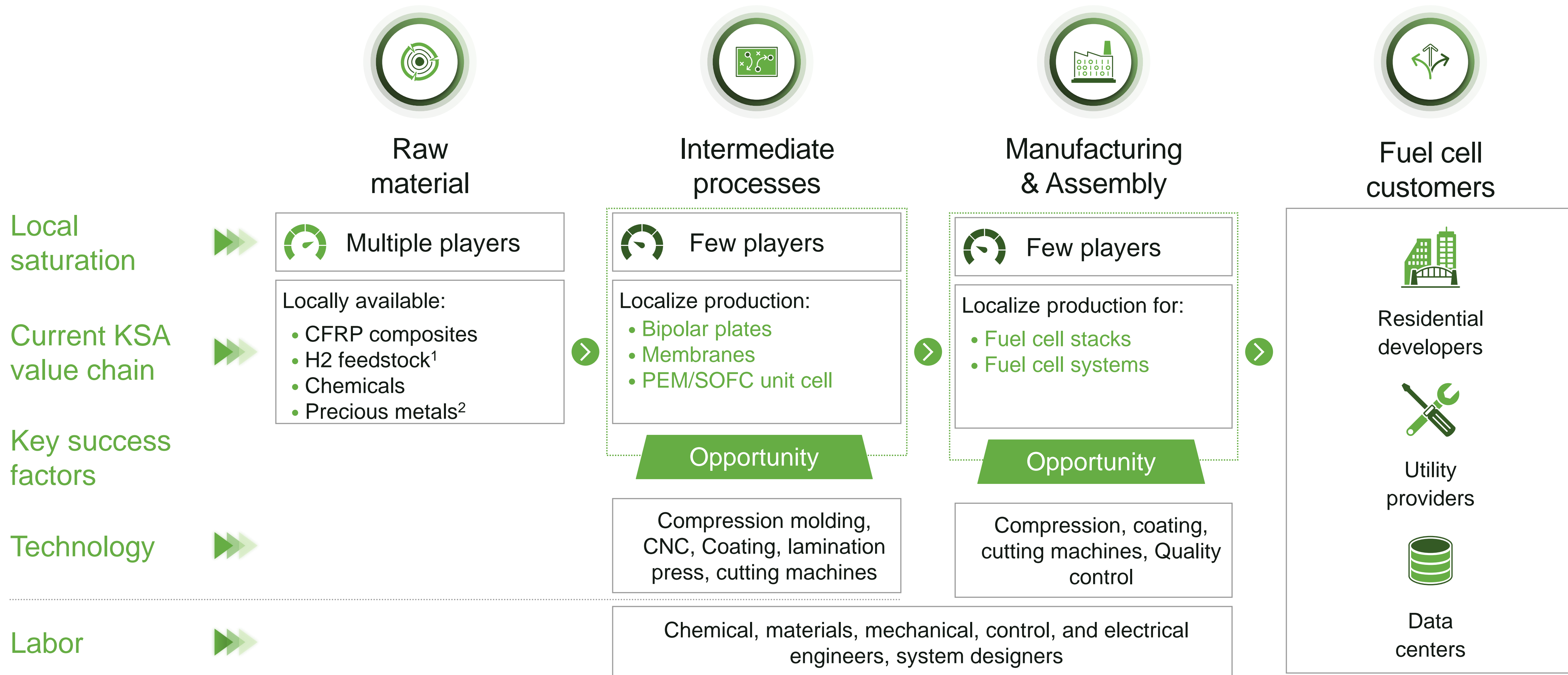
 Fuel cell manufacturers

Key demand drivers

- **Technological development:** Improved fuel cell efficiency, durability, and cost reductions making them competitive with traditional energy sources
- **Hydrogen projects:** Ongoing development of hydrogen production facilities set to produce 650 tons of hydrogen per day by 2030 set to drive fuel cell demand

Driving Prosperity

Value chain and key localization opportunities



Driving Prosperity

1. Under development 2. For import
Note: Non-exhaustive; CFRP = Carbon Fiber Reinforced Polymer; PEM = Proton Exchange Membrane; SOFC = Solid Oxide Fuel Cell
Source: Team analysis

Nonmetallic

Automotive workshop

Business Opportunities Review

Four key drivers in the KSA automotive market

Driving Prosperity



Consumer industry trends

- Large KSA automotive tire demand in 2024 (~24MM units)
- KSA aims to become an automotive hub, attracting OEMs, tier 1 suppliers, and autonomous vehicle technology



Technological advancements

- PIF is investing in EV and hydrogen technology, infrastructure, and high-tech manufacturing to localize a sustainable, innovative industry



Sustainability and environmental regulations

- Vision 2030 targets 30% EV penetration by 2030, driving EV manufacturing and charging infrastructure demand



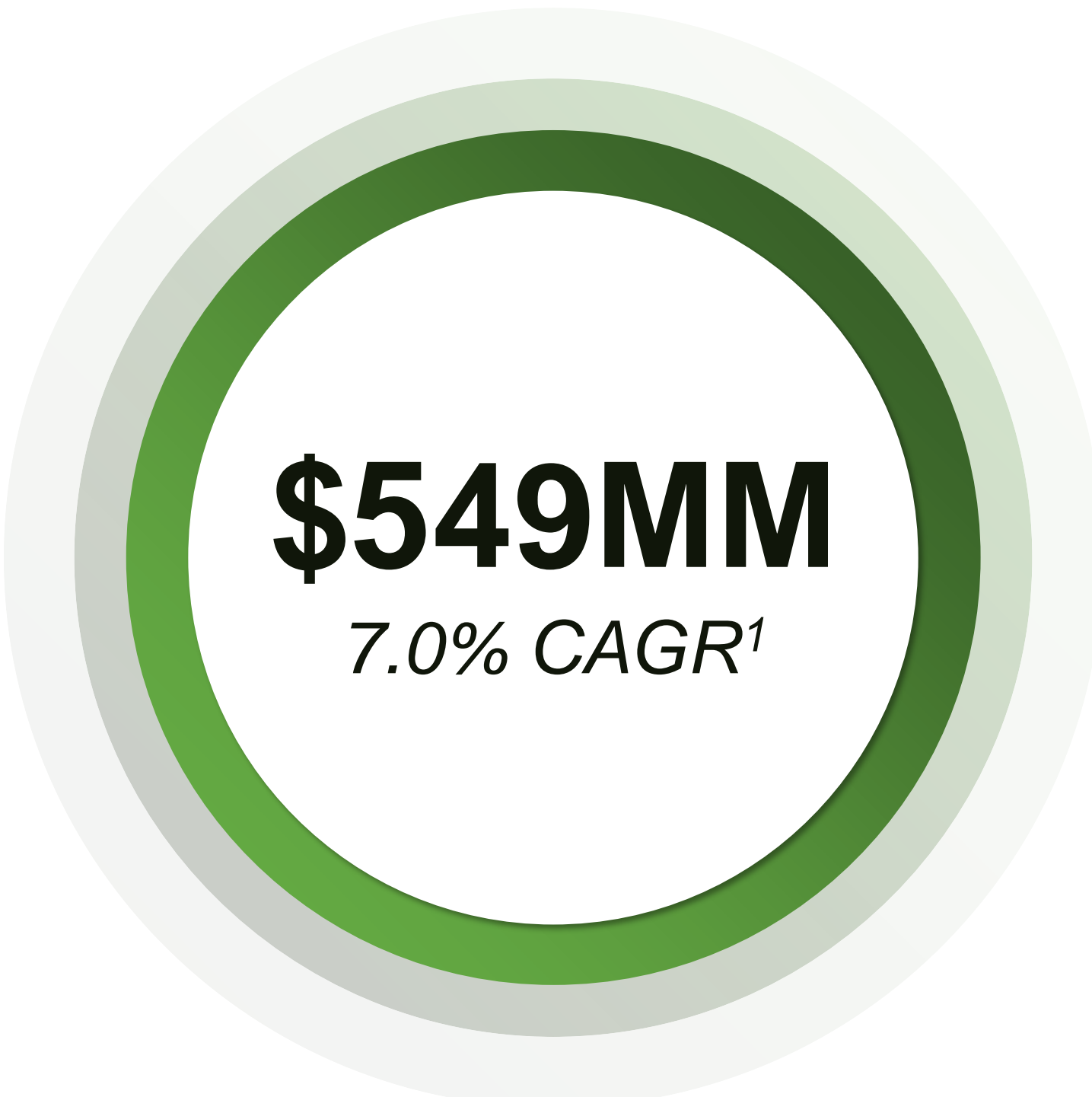
Economic & demographic factors

- Average KSA monthly household transport spending increased by ~30% between 2019 and 2024

Nonmetallic Automotive Market Overview

KSA Automotive market snapshot

Two opportunities to be discussed today



\$549MM
7.0% CAGR¹

2024 KSA market size for opportunities
in today's workshop

- 1 Composite battery enclosure
- 2 Tires

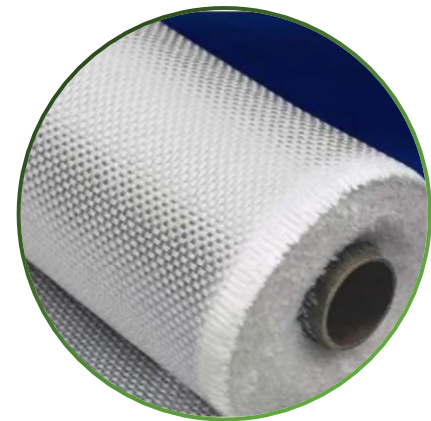
Composite Battery Enclosure

Opportunity profile – Composite Battery Enclosure

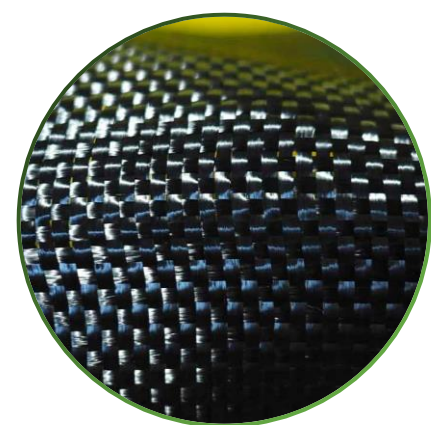
1

KSA in strong position to localize enclosure production

Types



Glass fiber reinforced polymer



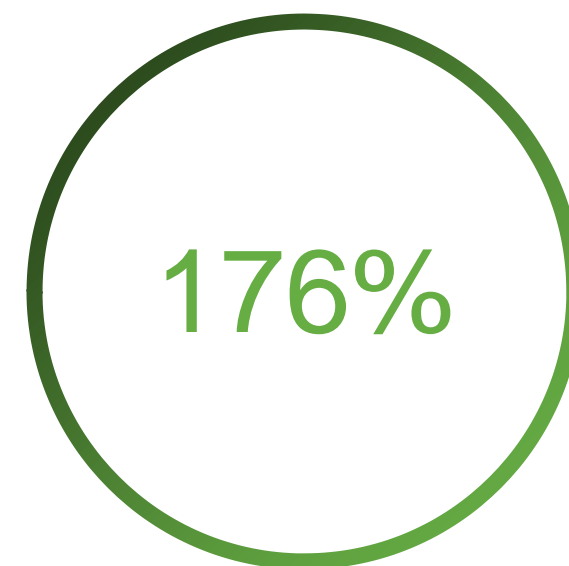
Carbon fiber reinforced polymer

2

Battery enclosure market is sizeable with significant forecasted growth



Estimated 2029 KSA market size



Forecasted 5-year KSA growth

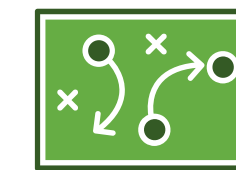
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Attractive investment opportunities in the battery enclosure value chain

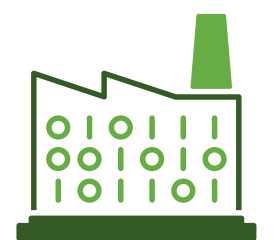
KSA value chain opportunities



Raw Material



Intermediate



Mfg.

KSA enablers examples

- Loans and financing through SIDF
- Skilled labor through HRDF programs
- Accelerated investor license support

Driving Prosperity

Note: SIDF = Saudi Industrial Development Fund; HRDF = Human Resource Development Fund
 Source: Lucid motors; Ceer; Hyundai; PIF; Composites world; Team analysis

Composite Battery Enclosure Opportunity Overview

Definition Lightweight protective housings for electric batteries for electric vehicles made of composite materials

Composite Battery Enclosure

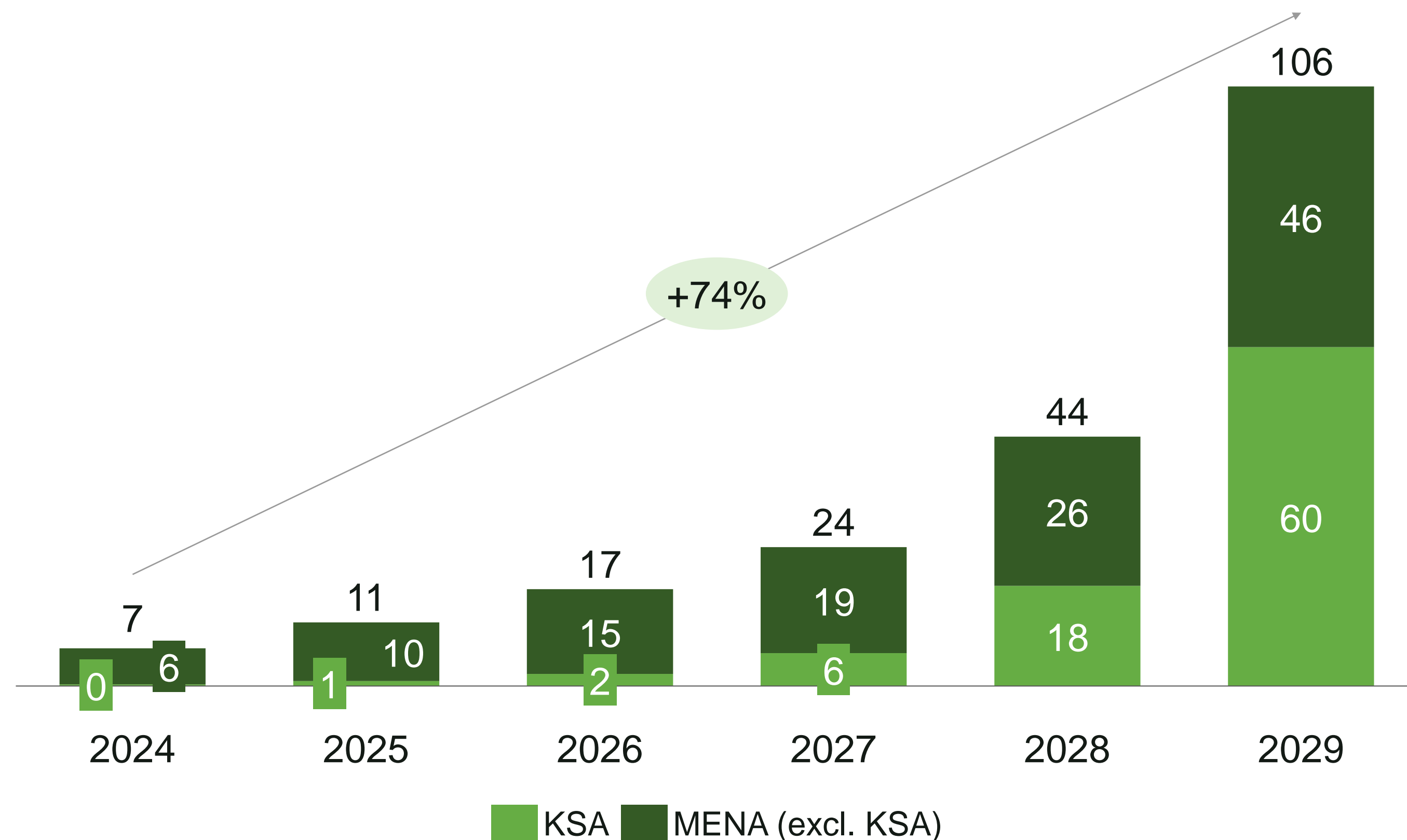


Product Details

- **Materials:** Made from fiber reinforced polymers, such as a carbon fiber or glass fiber and a resin system based on thermoplastics or thermosets
- **Advantages vs metallic:** Outstanding part integration, lighter, better corrosion resistance, and engineered for superior thermal insulation and safety (fire retardancy)
- **Application:** Passenger vehicles, trucks, buses
- **Logistics:** Production in proximity to factory advantageous due to bulky nature of product

Composite Battery Enclosure demand, customers, and drivers

Forecasted KSA and MENA battery enclosure market 2024-2029 (\$MM)



Typical battery enclosure customers

- Electric vehicles OEMs
- Electric truck manufacturers

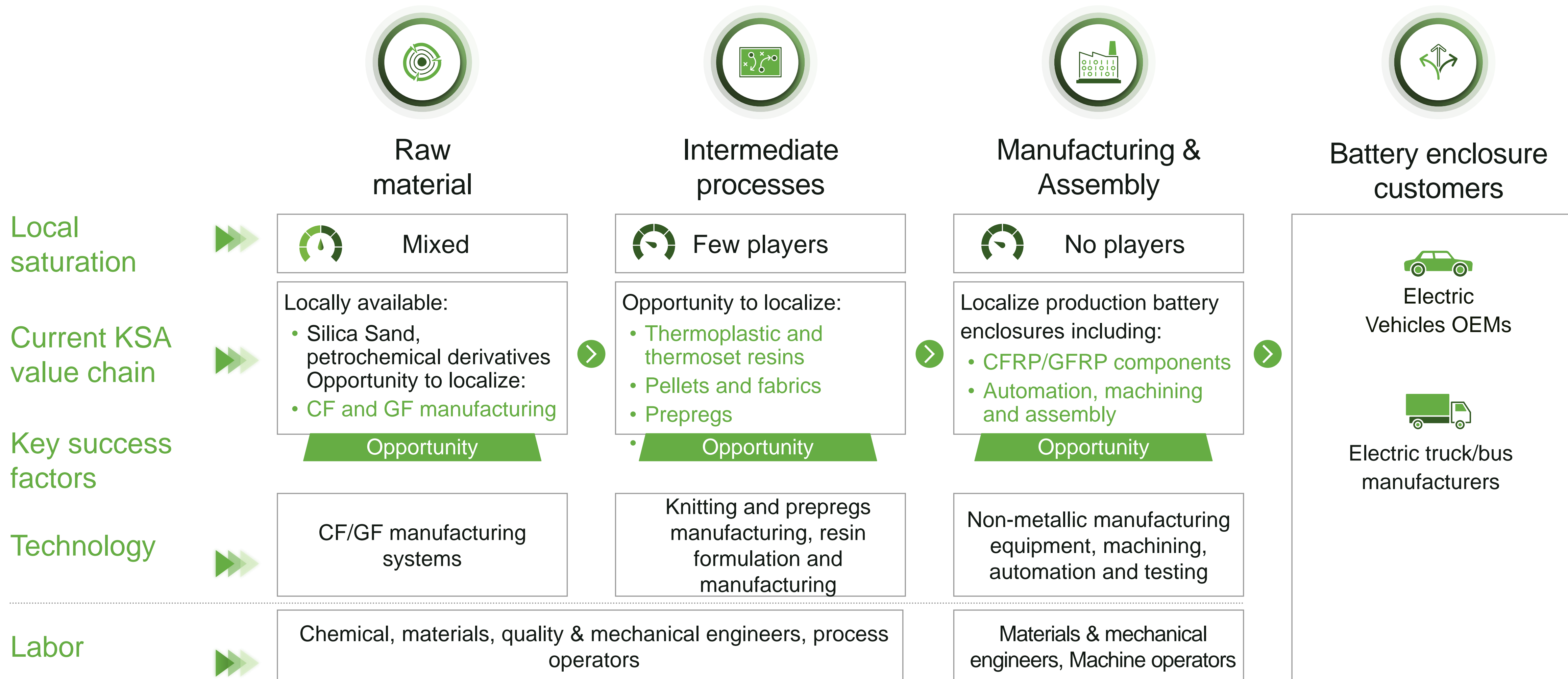
Key KSA demand drivers

- Light weighting trend:** Nonmetallic enclosures offer light-weight, higher part integration and a path to decrease the carbon footprint of the component
- Rising local production:** Expansion of domestic EV manufacturers such as Ceer, Lucid Motors and Hyundai with annual production of 455 000 EV by 2030

Nonmetallic automotive

Driving Prosperity

Value chain and key localization opportunities



Nonmetallic automotive

Driving Prosperity

Note: ECH = Epichlorohydrin; PAN = Polyacrylonitrile; GFRP = Glass Fiber Reinforced Polymer; CFRP = Carbon Fiber Reinforced Polymer

Source: Team analysis

Investment opportunity and enablers

Non-exhaustive

Key enablers in KSA to drive success



Financial Incentives: SIDF offers working capital loans in the initial phase and benefits for SMEs under Afaq program for plant setup



Land and infrastructure: Subsidized land and infrastructure in automotive economic zones such as KAEC reduces setup costs



Workforce Development: Fully covered or subsidized training programs by HRDF for productions operations

Where is the opportunity



Raw material

Localize production of carbon fiber and glass fiber



Intermediate

Localize production of Thermoplastic and thermoset resins pellets, fabrics and prepregs



Manufacturing

Localize manufacturing CFRP/GFRP components

Nonmetallic automotive

Driving Prosperity

Note: SIDF = Saudi Industrial Development Fund; KAEC = King Abdullah Economic City; HRDF= Human Resource Development Fund; ECH = Epichlorohydrin; PAN = Polyacrylonitrile; CFRP = Carbon-fiber Reinforced Polymer; GFRP = Glass Fiber Reinforced Polymer Source: Expert interviews; Govt websites; Team Analysis

Tires

Opportunity profile – Tires

1

Tires needed for growing passenger and commercial vehicles demand

Types



Passenger



On-highway



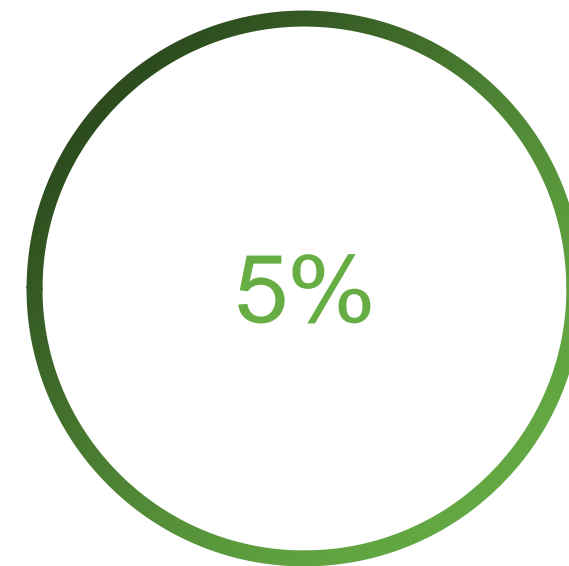
Off-highway

2

GCC Tires market is sizeable with steady forecasted growth



Estimated 2024 KSA market size

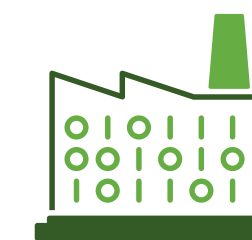


KSA forecasted growth

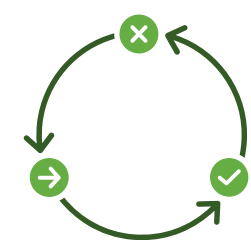
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Attractive investment opportunities in the Tires value chain

KSA value chain opportunities



Manufacturing



Lifecycle management




KSA enablers examples

- Land and infrastructure in KAEC
- Wide geographic export accessibility
- Duty exemptions for exported goods

Driving Prosperity

Note: KAEC = King Abdullah Economic City; HRDF= Human Resource Development Fund
 Source: TechSci Research; Expert interviews; Team analysis

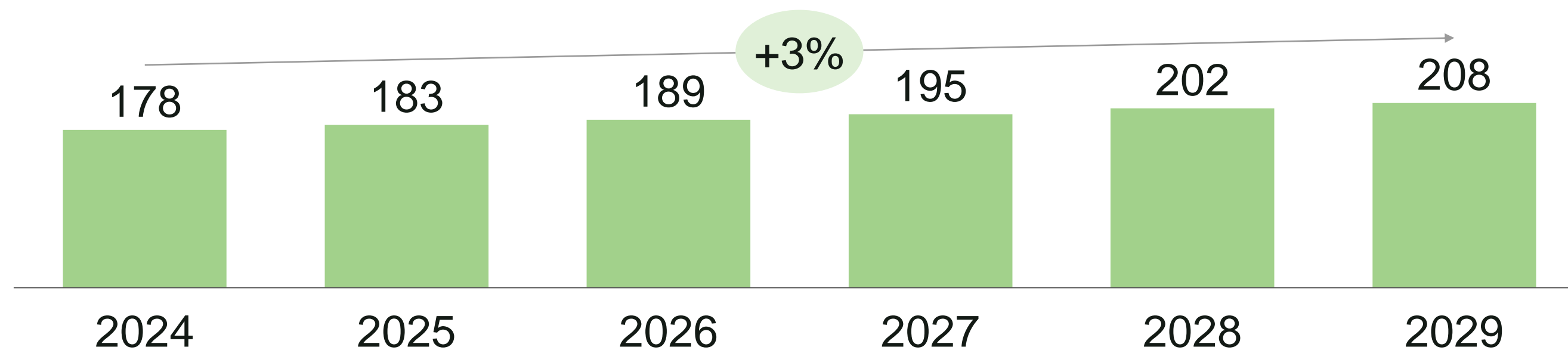
Potential Tires localized categories

			
Definition	Consumer tires for light vehicles	Industrial tires for on-road use	Industrial tires for off-road use
Applications	<ul style="list-style-type: none"> • Personal cars • Motorbikes • Camper vans 	<ul style="list-style-type: none"> • Light trucks • Buses • Long-haul trucks 	<ul style="list-style-type: none"> • Construction vehicles • Heavy duty mining loaders • Agricultural machinery

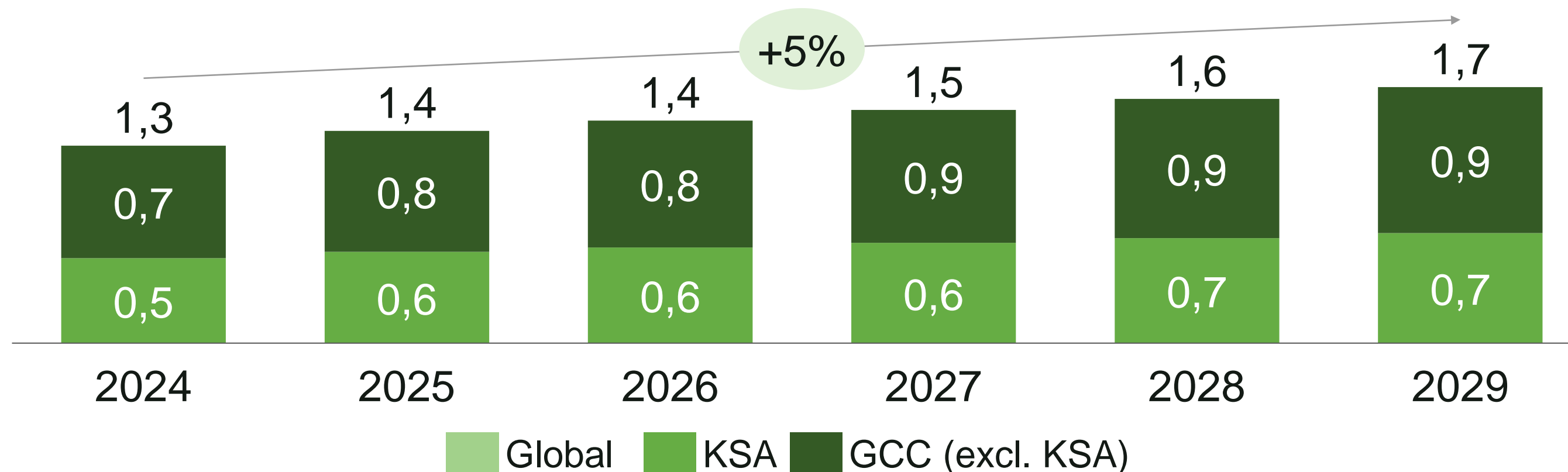
Nonmetallic automotive

Tires demand, customers, and drivers

Forecasted Global Tires market 2024-2029 (\$Bn)



Forecasted Global, KSA, and other GCC Tires market 2024-2029 (\$Bn)



Typical tires customers in KSA

- Individual vehicle owners
- Logistics companies
- Construction firms

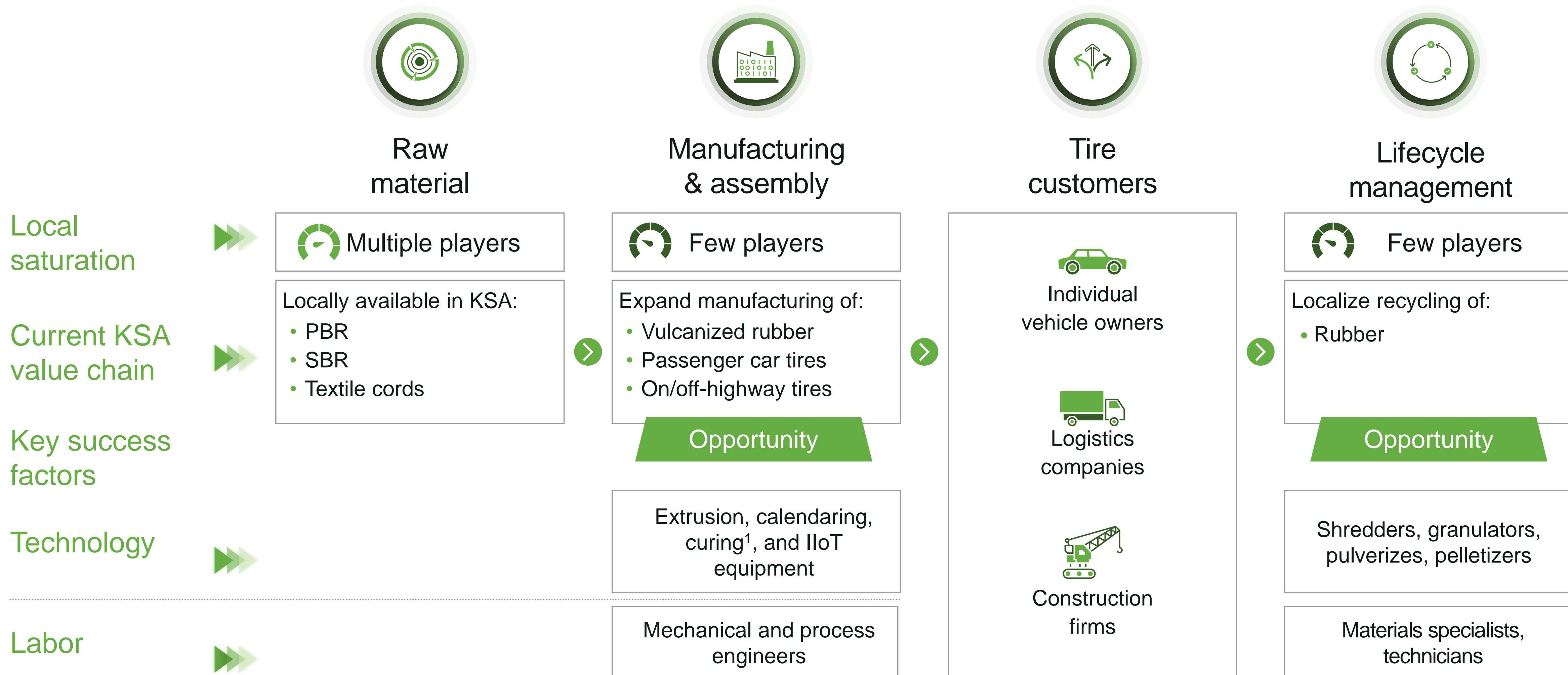
Key KSA demand drivers

- Rising local production:** Expansion of domestic EV manufacturers such as Ceer, Lucid Motors and Hyundai with annual production of 455,000 EV by 2030
- Infrastructure expansion:** Rising construction, mining, and transportation projects are boosting commercial vehicles tires demand

Nonmetallic automotive

Driving Prosperity

Value chain and key localization opportunities



Nonmetallic automotive

Driving Prosperity

1. Particularly for vulcanization for vulcanized rubber
 Note: PBR = Polybutadiene Rubber ; CBR = High cis-1,4-polybutadiene rubber; IIoT = Industrial Internet of Things
 Source: Manufacturing equipment vendor database; Expert interviews; Team analysis

Investment opportunity and enablers

Non-exhaustive

Key enablers in KSA to drive success



Land and infrastructure: Subsidized land and infrastructure in automotive economic zones such as KAEC reduces setup costs



Geographical accessibility: Strategic location enables exports to neighboring markets, with available tax exemptions



National R&D support: Access to applied research on plastic and rubber materials from leading entities e.g. HIPF



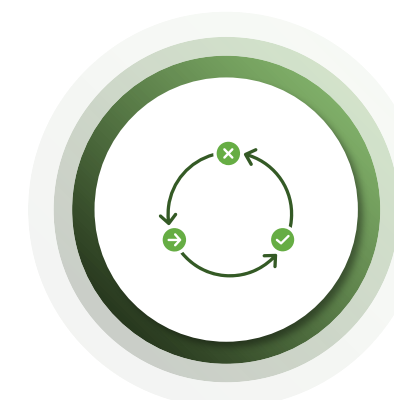
Workforce Development: Fully covered or subsidized training programs by HRDF for productions operations

Where is the opportunity



Manufacturing

Localize manufacturing of tires across application areas



Lifecycle management

Establish recycling facilities for rubber and metals

Driving Prosperity

Notes: KAEC = King Abdullah Economic City; HIPF = Higher institute for Plastics; HRDF= Human Resource Development Fund
 Source: Expert interviews; Govt websites; Team Analysis

**Thank
You**