

SME Electrical

Presented by: Khaled AlGhadhban

Business Opportunities Workshop

January 14th, 2025

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.

We undertake no obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

All subsequent written and oral forward-looking statements attributable to us or to persons acting on our behalf are expressly qualified in their entirety by this cautionary statement.

Introduction

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% localization of all spending




iktva in Procurement

2000+ Service contracts	290+ Corporate purchase agreements
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Business Opportunities

12 Sectors	210 Business Opportunities	\$28 bn Annual Market Size
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Anchor Projects

IMI	SPARK	Tuwaiq
6 Anchor projects		

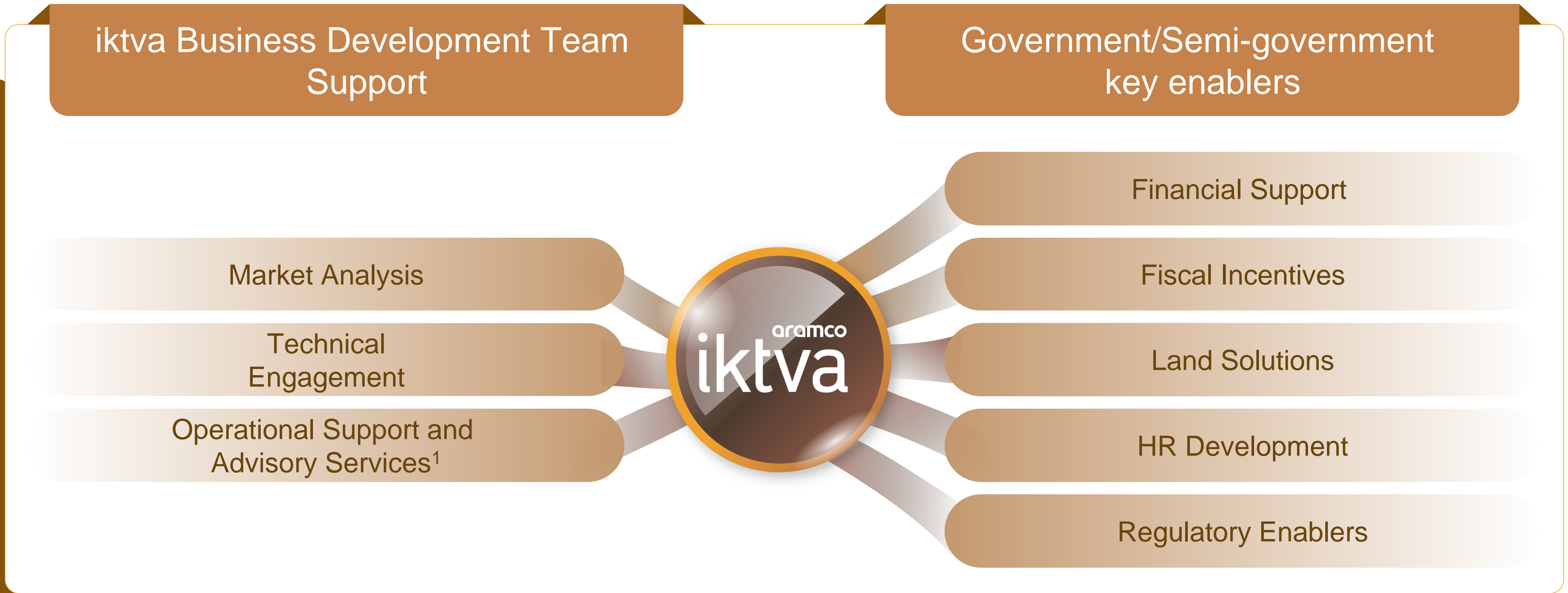


Local Workforce Development

16 National training centers	90+ Programs
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Catalyzing Supply Chains

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











Catalyzing Supply Chains

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

Catalyzing Supply Chains

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

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**

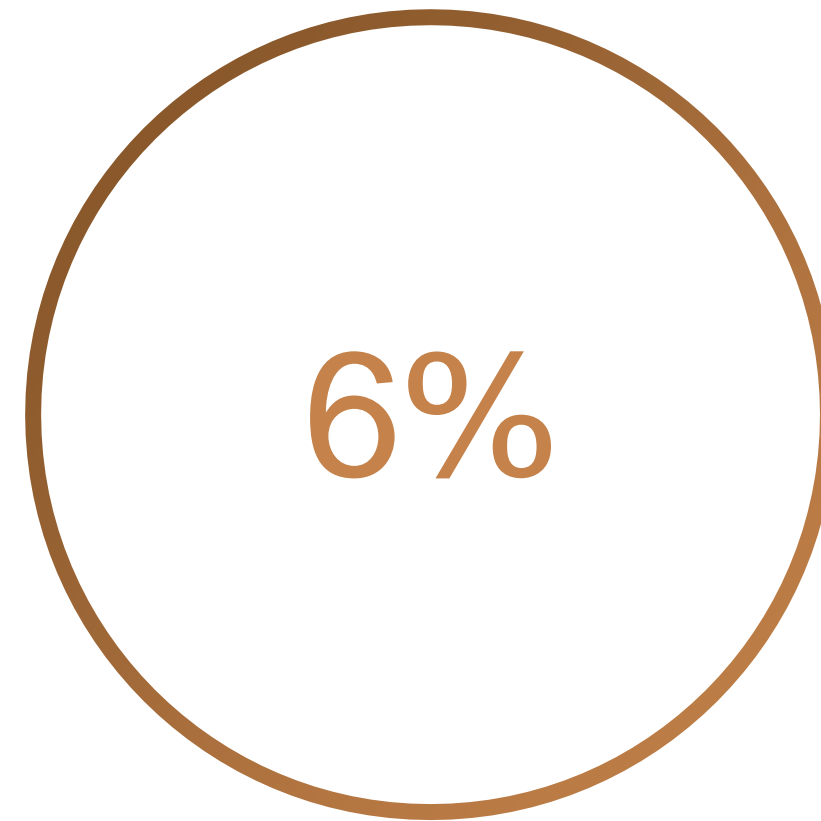
*Markets with accessible or
standardized technology and
available skilled labor*

KSA SME Electrical 2024 market snapshot (Billion USD)

Nine Business Opportunities to be discussed today



KSA market size
for opportunities in
today's SME Electrical
workshop



Forecasted
5-year CAGR

- 1 Vacuum circuit breakers
- 2 Overhead Power Lines
- 3 Diesel generator
- 4 Dry type transformer
- 5 Electric induction motor
- 6 Cable Bus
- 7 Industrial Battery Charger
- 8 UPS System
- 9 Protective relays

Agenda – SME Electrical Sector Business Opportunities

No.	Title of the Investment Opportunity	Presenter
	Introduction	Khaled AlGhadhban
1	Vacuum circuit breakers	Fatima Alessa
2	Overhead Power Lines	Fatima Alessa
3	Dry type transformer	Maha Al Zahrani
4	Electric induction motor	Maha Al Zahrani
5	Cable Bus	Hasan Al Khater
6	Diesel generator	Faten Abusaeed
7	Industrial Battery Charger	Faten Abusaeed
8	UPS System	Norhan Khoja
9	Protective relays	Norhan Khoja
	Closing Remarks	Khaled AlGhadhban

01

Vacuum circuit breakers

Presented by: Fatima Alessa

Vacuum Circuit Breaker (VCB) Opportunity Profile

1

Vacuum Circuit Breakers present an attractive investment opportunity

Types

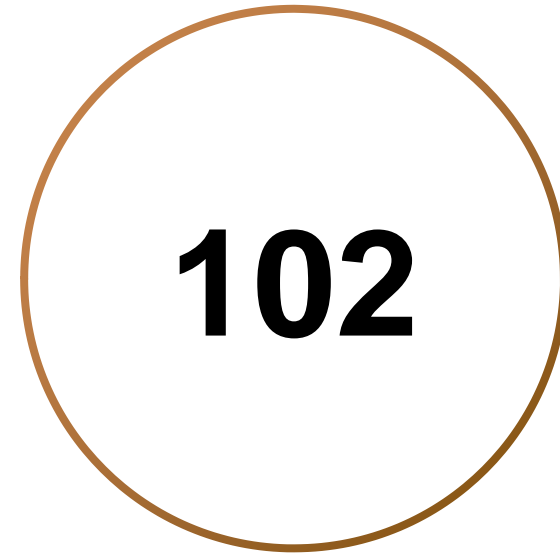


Vacuum circuit breaker

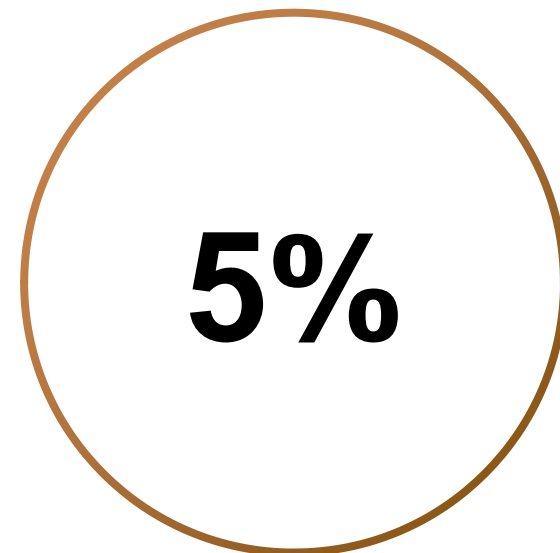
- Saudi Aramco 9COM **6000000843**

2

VCB market is expected to grow over next 5 years



Estimated 2024 KSA market size (Million USD)

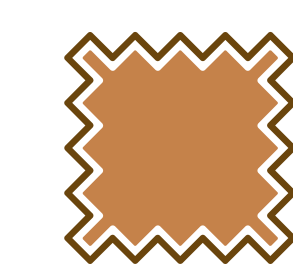


Forecasted 5-year CAGR

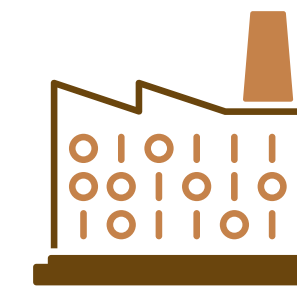
3

Attractive investment opportunities for VCB value chain

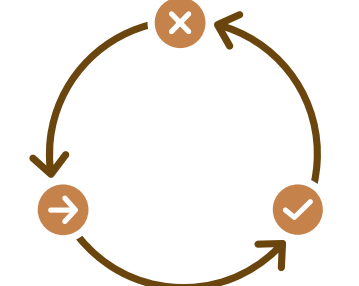
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

- Financial support
- Land and infrastructure
- Technical Enablers

Vacuum Circuit Breaker (VCB) Potential Localized Categories

Type(s)



Vacuum Circuit Breaker



Applications

- Medium voltage systems (1kV to 38kV)
- Indoor Metal-Clad Switchgear

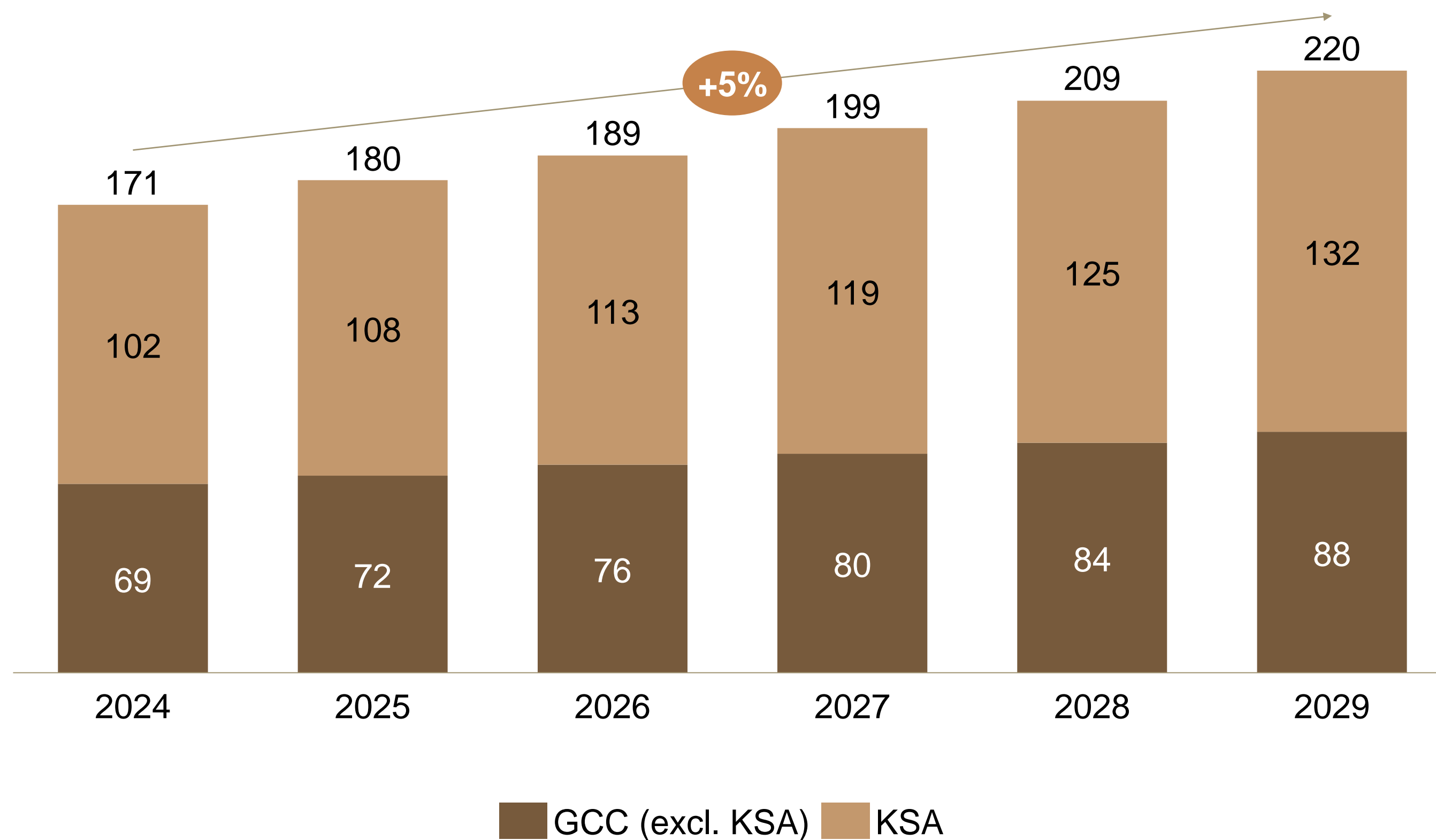
Key technical specifications

- Saudi Aramco 9COM **6000000843**
- 16-SAMSS-522
- 16-SAMSS-504

Catalyzing Supply Chains

Vacuum Circuit Breaker (VCB) Demand, Customers & Drivers

Forecasted KSA and rest of GCC vacuum circuit breaker market 2024-2029 (Million USD)



Vacuum circuit breakers customers in KSA



Utilities & energy power systems



Industrial players



Critical Infrastructure¹

Key KSA demand drivers

- **Industrial expansion:** With target of 36,000 factories by 2035, demand for high-capacity, electrical distribution systems is growing across industrial zones
- **Infrastructure development:** Development of smart grid technologies in ongoing megaprojects and need for efficient power management systems have led to increased demand for VCBs

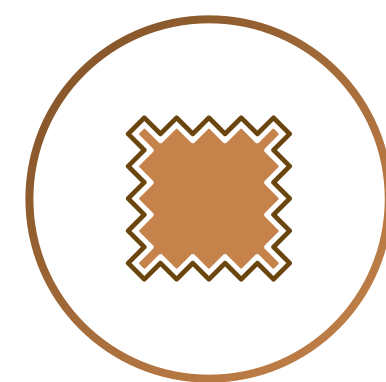
Catalyzing Supply Chains

1. Metros, airports, transportation hubs, and megaprojects

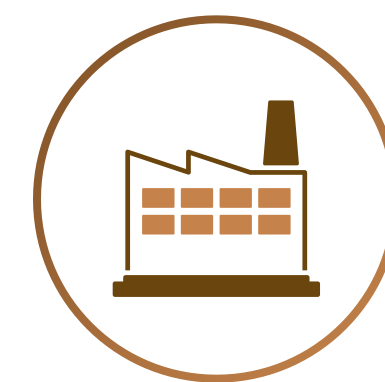
Notes: VCB = Vacuum circuit breaker

Source: MRF; Grandview; Credence; Fortune Business Insights; Expert inputs; Team analysis

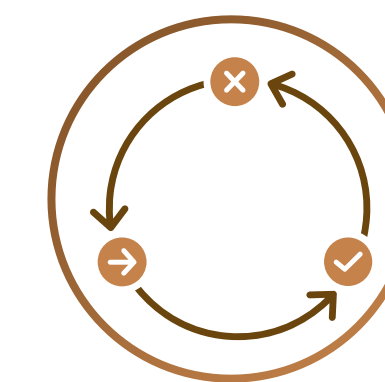
Vacuum Circuit Breaker (VCB) Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation



Some players



Few players



Few players

Current KSA value chain

- Raw materials required domestically available¹ with opportunity to localize copper refining and production

- Opportunity to **manufacture VCBs in the Kingdom**
- **SME opportunities:** manufacturing **metal enclosures, quality testing, sourcing of auxiliary components such as springs and seals**

- Several local players currently providing servicing for electrical and power transmission equipment

Opportunity

Opportunity

Opportunity

Key success factors

Technology

Advanced refining and extrusion technology

Precision engineering tools like CNC machining for contact assemblies, and leak testing for vacuum interrupters

Labor

Skilled in process and quality control

Electrical engineers with expertise in precision machining and ability to work with CAD, vacuum technology specialists

Catalyzing Supply Chains

1. Steel; aluminum

Source: MRF; Grandview; Credence; Fortune Business Insights; Expert inputs; Team analysis

Vacuum Circuit Breaker (VCB) Investment Opportunity and Enablers

Key enablers in KSA to drive success



Localization incentives: Government programs – e.g., SIDF loan subsidies, Zakat & tax benefits, or export tax exemption

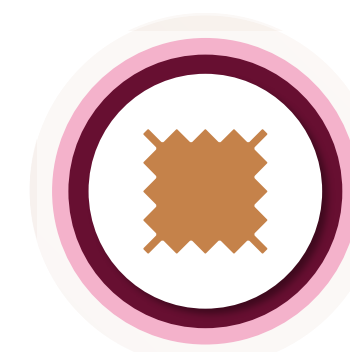


Land and infrastructure: Subsidized land and infrastructure in economic zones (e.g., Modon) reduce setup costs & accelerate



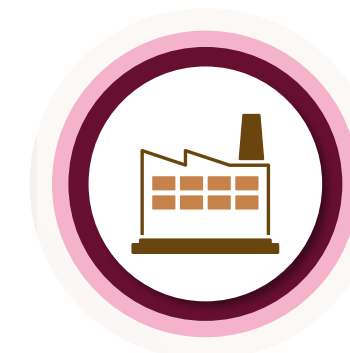
Widely available specialized labor: NCTC provides machinists, maintenance technicians, and equipment operators who can support manufacturing

Where is the opportunity



Raw materials

Opportunity to expand localization of copper production and refining in the Kingdom



Manufacturing & Assembly

Opportunity to increase localized manufacturing & assembly

For SMEs: metal enclosures, quality testing, sourcing of auxiliary components such as springs and seals, and assembly of VCB units

Catalyzing Supply Chains

02

Overhead Power Lines

Presented by: Fatima Alessa

Overhead Power Lines Opportunity Profile

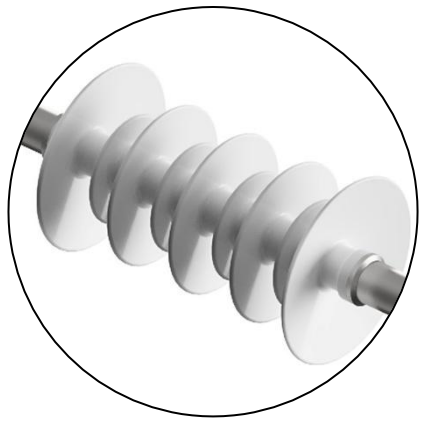
1

Overhead power lines present an attractive investment opportunity

Components



Galvanized Steel Line



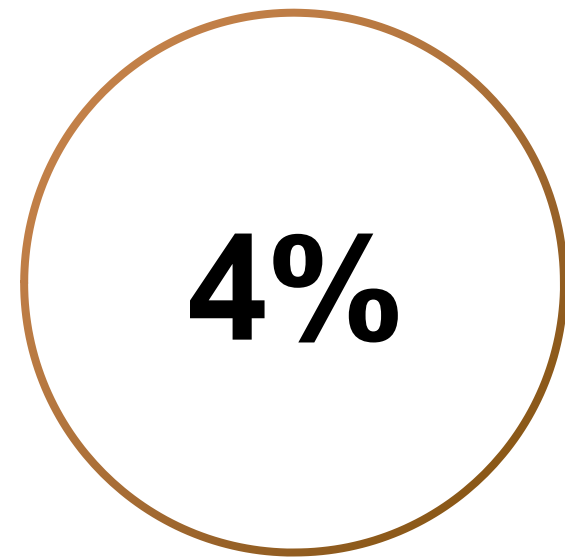
Insulators

2

KSA is major demand of Total GCC demand



Estimated 2024 KSA market size (Million USD)

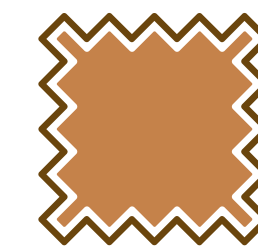


Forecasted 5-year CAGR

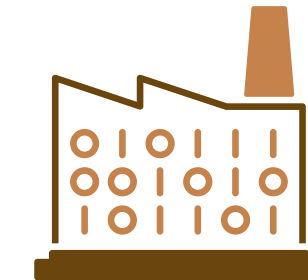
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Attractive investment opportunities for Overhead Power Lines value chain

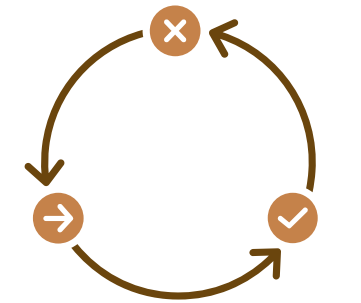
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

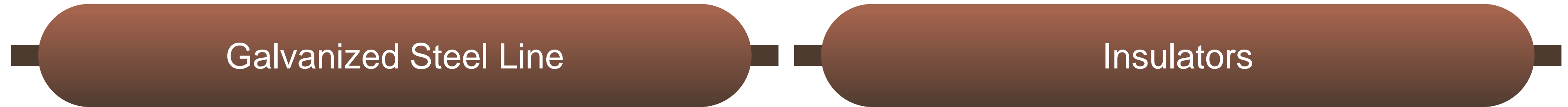
KSA enablers

- Government localization incentives
- Regulatory incentives
- Wide and qualified talent pool

Overhead Power Lines

Potential Components Localized Categories

Components



Galvanized Steel Line

Insulators



Applications

- Power transmission networks
- Power distribution networks
- Overhead transmission insulation
- Insulation and mechanical support for distribution

Key technical specifications

- Saudi Aramco Engineering Standards (SAES-P-107)
- Saudi Aramco Material Specifications (14-SAMSS-603)
- Material Specifications (20-TMSS-02)
- Material Specifications (15-SDMS-02;15-TMSS-5)

Saudi Aramco 9COM Numbers:

- 6000000771:POLE; LINE; POWER DISTRIBUTION; STEEL
- 6000014870: POLE LINE; POWER TRANSMISSION, 69 KV
- 6000012401: OHL COMPOSITE INSULATOR FOR T & D

Catalyzing Supply Chains

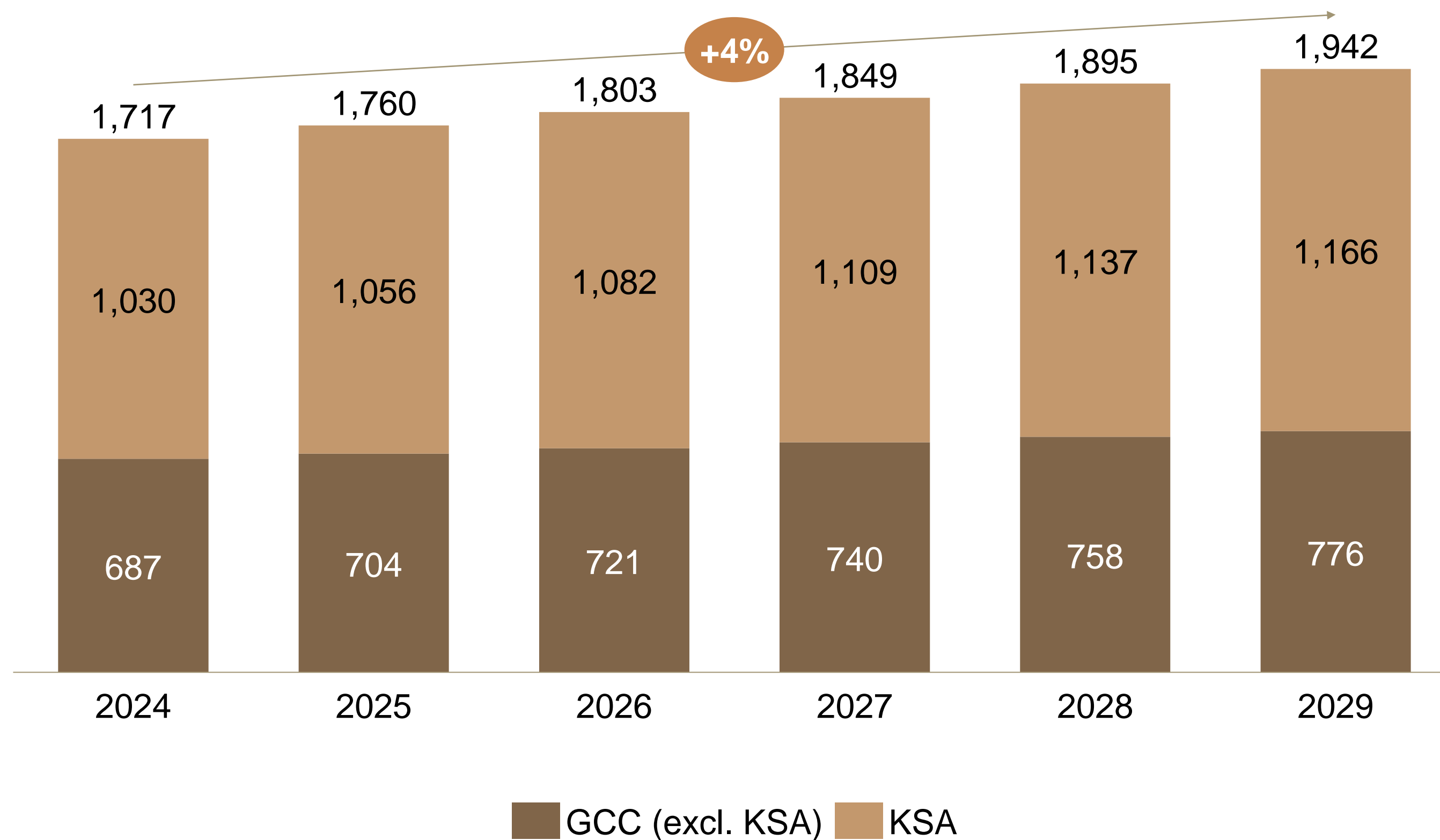
Overhead Power Lines

Overhead Power Line Components



Overhead Power Lines Demand, Customers & Drivers

Forecasted KSA and rest of GCC Overhead Power Line market 2024-2029 (Million USD)



Overhead Power Line customers in KSA



Oil & gas networks



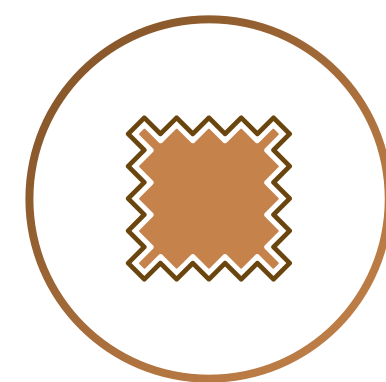
Utilities & energy power systems

Key KSA demand drivers

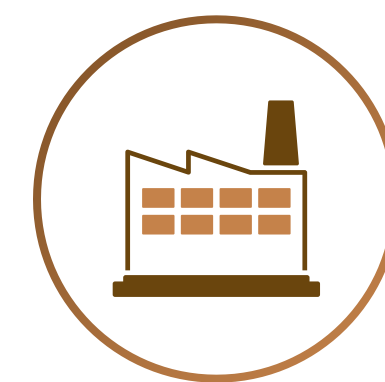
- **Industrial expansion:** Additional IBCs needed to support expansion of KSA industrial infrastructure – 36,000 plants expected by 2035
- **Infrastructure development:** Further overhead power lines required to support infrastructure development across megaprojects and existing city expansions

SME Electrical Workshop

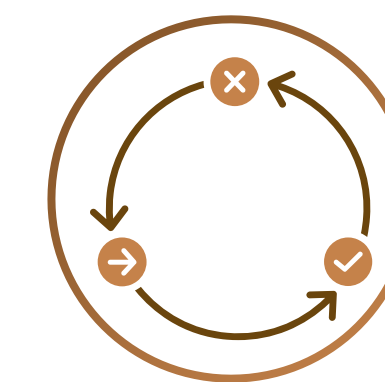
Overhead Power Lines Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation



Few players



Few players



Few players

Current KSA value chain

- Opportunity to expand localization of galvanized steel, aluminum, copper, and FRP fittings

- Opportunity to increase localized manufacturing & assembly
- **SME opportunities:** provide **hardware fittings, additional wire, and FRP core and silicone housing protection**

- Line installation and maintenance services

Opportunity

Opportunity

Opportunity

Key success factors

Technology

Processing equipment, CNC machines

Rolling, galvanization, and pultrusion equipment

Labor

Metallurgists, materials scientists, operators

Electrical engineers, machinists, technicians

SME Electrical Workshop

Catalyzing Supply Chains

Note: FRP = Fiber Reinforced Polymer; CNC = Computer Numerical Control
Source: Global Market Insights; IEA; GaSTAT, Team analysis

Overhead Power Lines Investment Opportunity and Enablers

Key enablers in KSA to drive success



Localization incentives: Government programs – e.g., SIDF loan subsidies, Zakat & tax benefits, or export tax exemption

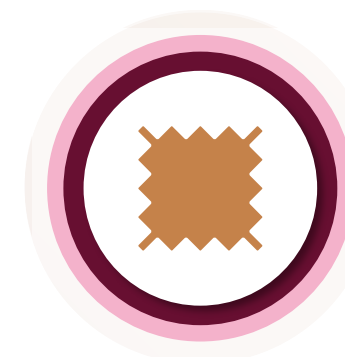


Land and infrastructure: Subsidized land and infrastructure in economic zones (e.g., Modon) reduce setup costs & accelerate



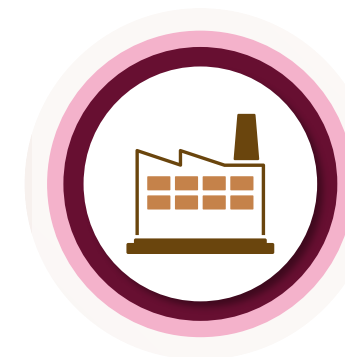
Widely available specialized labor: NITI provides machinists, maintenance technicians, and equipment operators who can support manufacturing

Where is the opportunity



Raw materials

Opportunity to expand localization of galvanized steel, aluminum, copper, and FRP fittings



Manufacturing & Assembly

Opportunity to increase localized manufacturing & assembly

For SMEs: provide hardware fittings, additional wire, and FRP core and silicone housing protection

Catalyzing Supply Chains

03

Dry type transformer

Presented by: Maha AlZahrani

Dry Type Transformer Opportunity Profile

1

Dry Type Transformers present an attractive investment opportunity

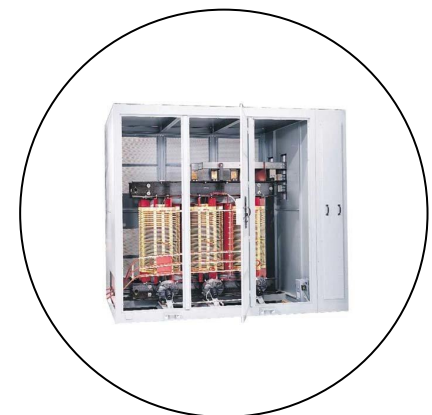
Key categories



Cast-Resin Dry-Type Transformers (CRT)



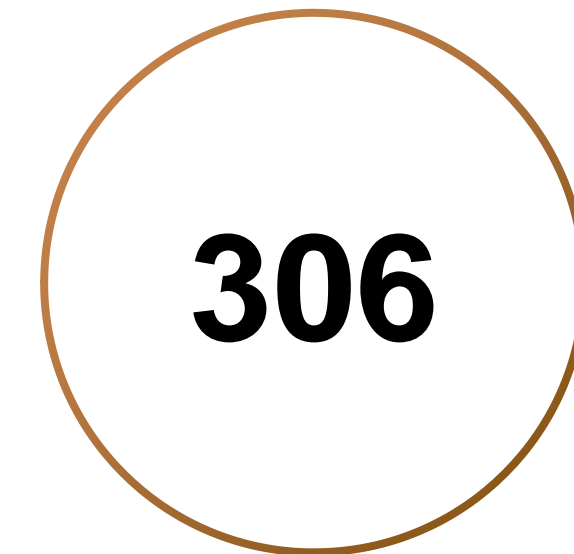
Vacuum Pressure Impregnated Transformers (VPT)



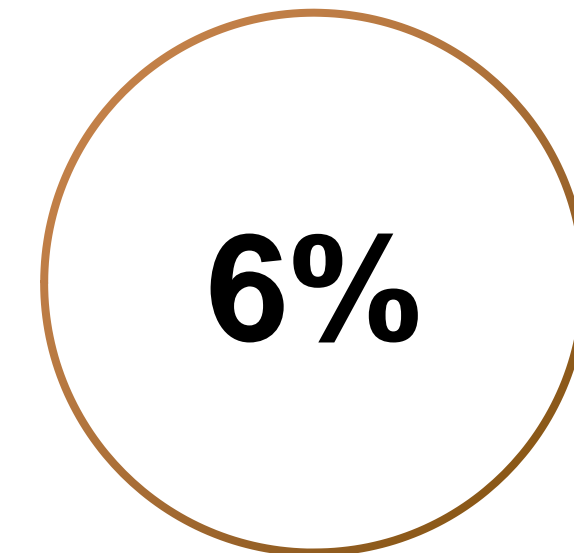
Ventilated Dry-Type Transformers

2

Dry Type Transformer is a growing market



Estimated 2024 KSA market size (Million USD)

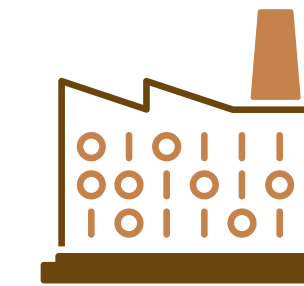


Forecasted 5-year CAGR

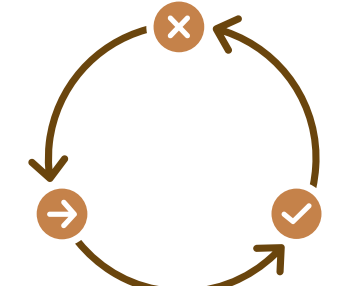
3

Attractive investment opportunities for Dry Type Transformer value chain

KSA value chain opportunities



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

- Government localization incentives
- Access to land and infrastructure
- Wide and qualified talent pool

Catalyzing Supply Chains

Dry Type Transformer

Potential Localized Categories

Type(s)

Cast-Resin Dry-Type Transformers

Vacuum Pressure Impregnated Transformers

Ventilated Dry-Type Transformers



Applications

- Offshore platforms
- Refineries

- Petrochemical plants
- Substations

- Onshore processing facilities
- Pumping stations

Key technical specifications

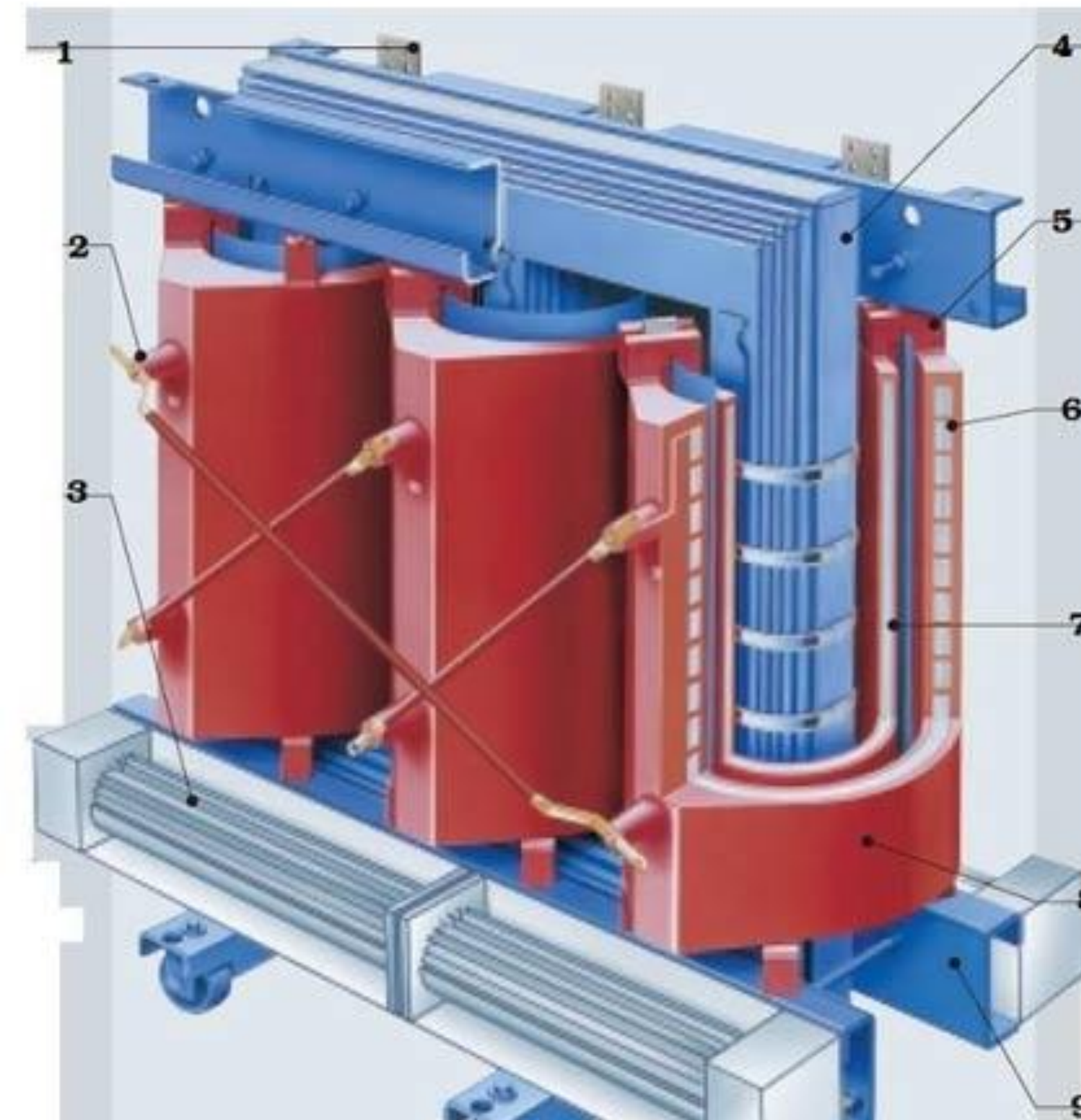
- Saudi Aramco Engineering Standards (SAES-P-121)
- Saudi Aramco Material Specifications (14-SAMSS-533)

Saudi Aramco 9COM Number:

- 6000000763: TRANSFORMER, POWER, DRY ABOVE 501 KVA

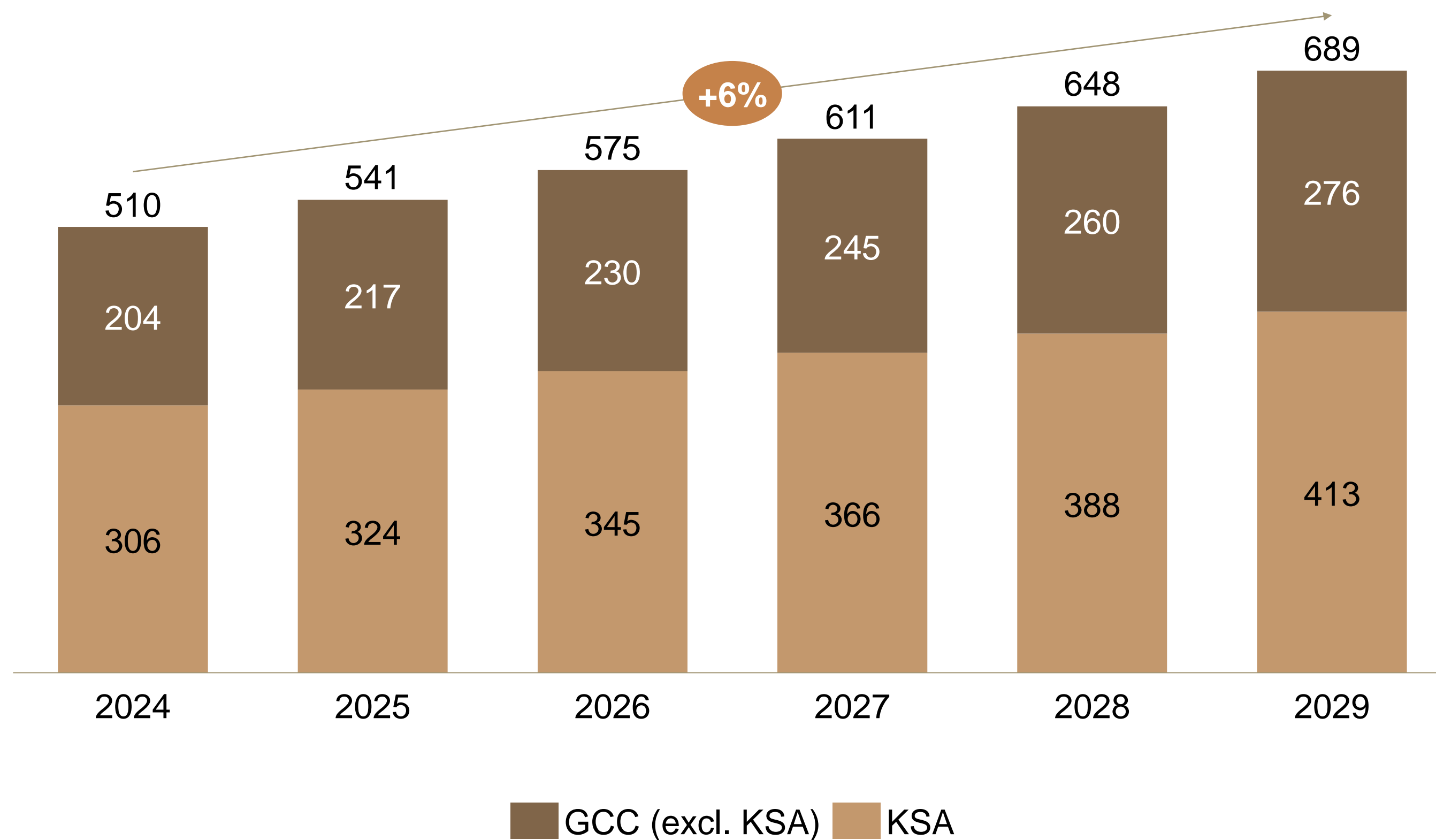
Catalyzing Supply Chains

Key Components of Dry Type Transformers



Dry Type Transformer Demand, Customers & Drivers

Forecasted KSA and rest of GCC Dry Type Transformer market 2024-2029, (Million USD)



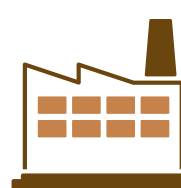
Dry Type Transformer customers in KSA



Oil & gas



Utilities & energy power systems



Industrial & manufacturing

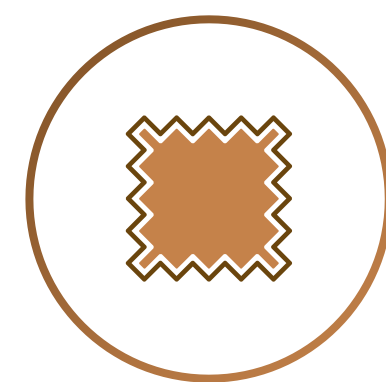
Key KSA demand drivers

- **Industrial expansion:** Additional Dry Type Transformers needed to support expansion of KSA industrial infrastructure – 36,000 plants expected by 2035
- **Offshore activity:** Further durable Dry Type Transformers required to match increase in offshore oil and gas activity

Catalyzing Supply Chains

Dry Type Transformer

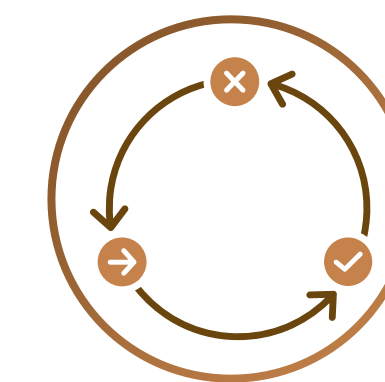
Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation

▶▶ Multiple players

Current KSA value chain

- Wide availability of steel, copper and aluminum cables and rods

▶▶ Few players

- Opportunity to manufacture **dry type transformer**
- **SME opportunities:** manufacture **grounding systems, insulation, terminals, bushings, enclosures and mechanisms.**

Opportunity

▶▶ Few players

- Opportunity to provide installation and maintenance services

Opportunity

Key success factors

Technology ▶▶▶

Cutting, stacking, VPI machines, curing and testing equipment

Labor ▶▶▶

Design engineers, technicians

Catalyzing Supply Chains

Dry Type Transformer Investment Opportunity and Enablers

Key enablers in KSA to drive success



Localization incentives: Government programs – e.g., SIDF loan subsidies, Zakat & tax benefits, or export tax exemption

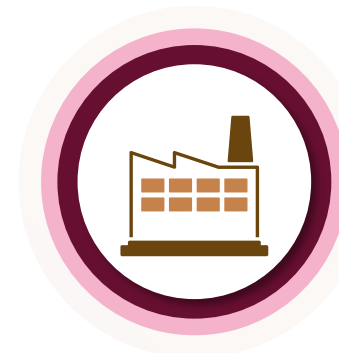


Land and infrastructure: Subsidized land and infrastructure in economic zones (e.g., Modon) reduce setup costs & accelerate



Widely available specialized labor: NITI provides machinists, maintenance technicians, and equipment operators who can support manufacturing

Where is the opportunity



Manufacturing & Assembly

Opportunity to increase localized dry type transformer manufacturing
 For SMEs: manufacture grounding systems, insulation, terminals, bushings, enclosures and mechanisms

Catalyzing Supply Chains

Note: NITI = National Industrial Training Institute; BMS = Building Management Systems
 Source: Fortune Business Insights; Allied Market Research; Grandview; Team analysis

04

Electric induction motor

Presented by: Maha AlZahrani

Electric Induction Motor Opportunity Profile

1

Electric Induction Motors present an attractive investment opportunity

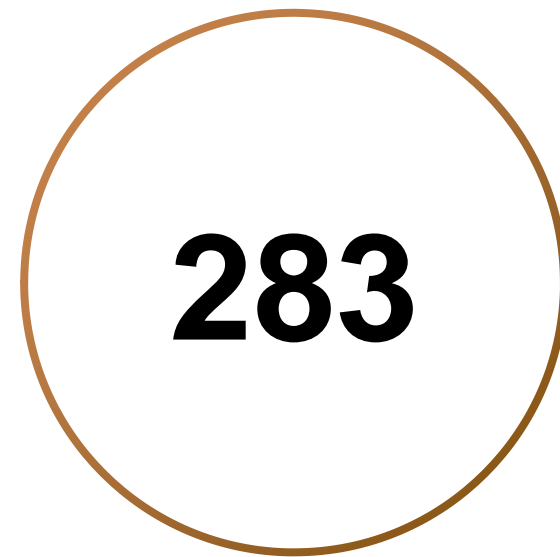
Type(s)



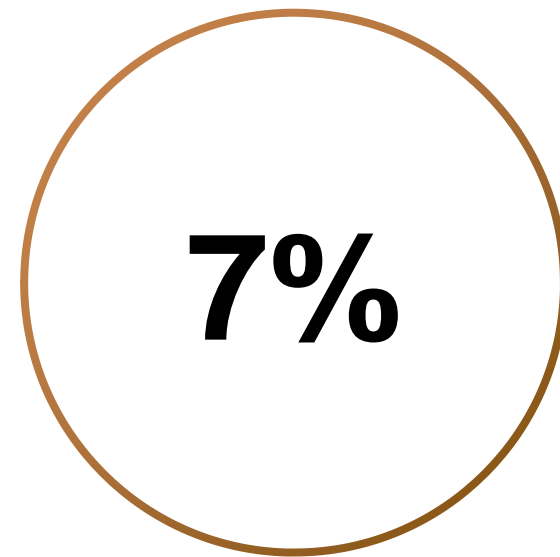
Electric induction motor – Three Phase

2

Electric Induction Motor market is growing moderately



Estimated 2024 KSA market size (Million USD)

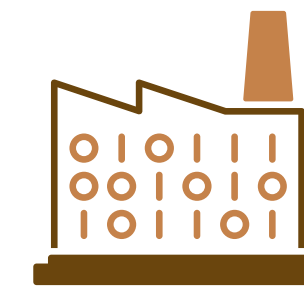


Forecasted 5-year CAGR

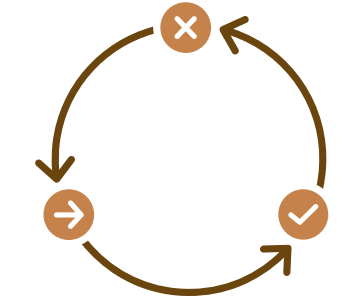
3

Attractive investment opportunities for Electric Induction Motor value chain

KSA value chain opportunities



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

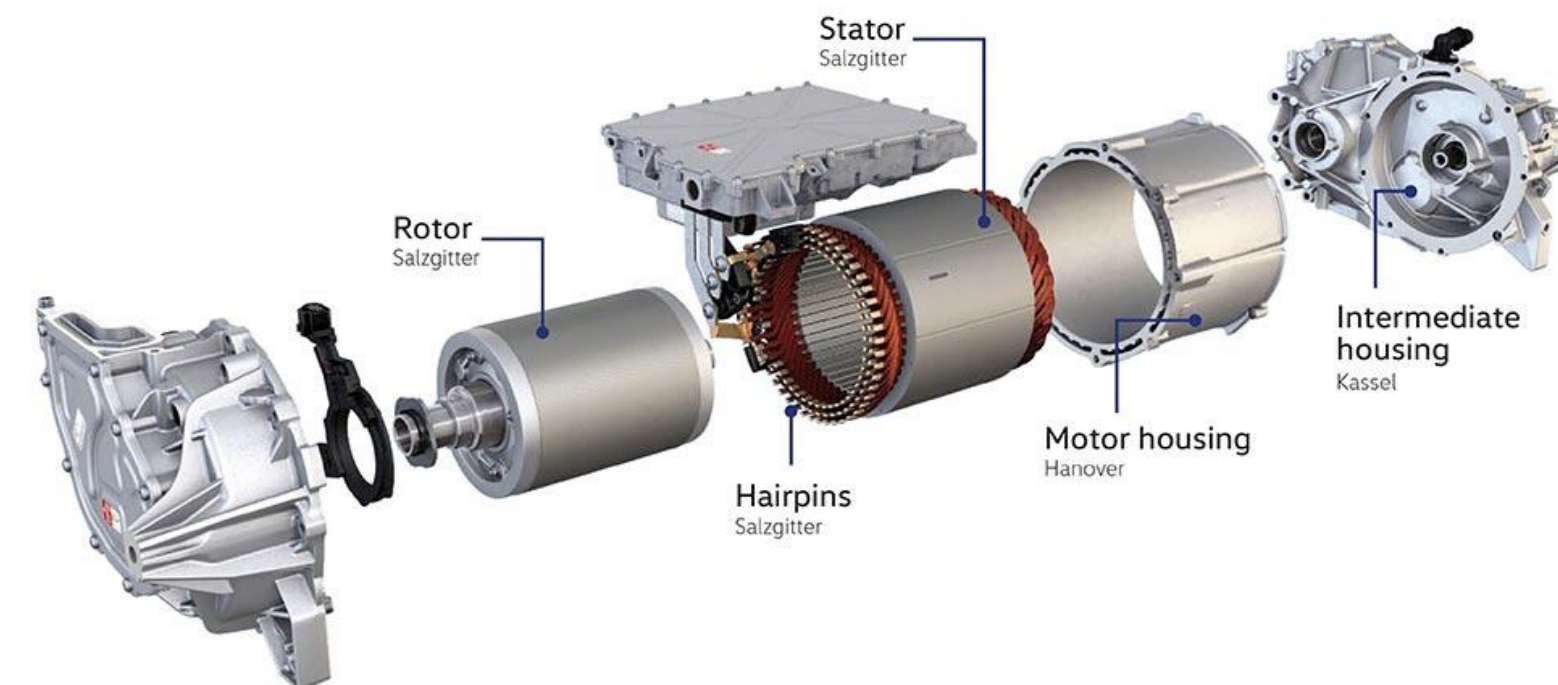
- Financial support
- Regulatory incentives
- Technical enablers

Electric Induction Motor

Technical Overview

Type(s)

Three-phase Electric Induction Motor



Applications

- Drilling rig equipment
- Pumps
- Centrifugal machinery

Key technical specifications

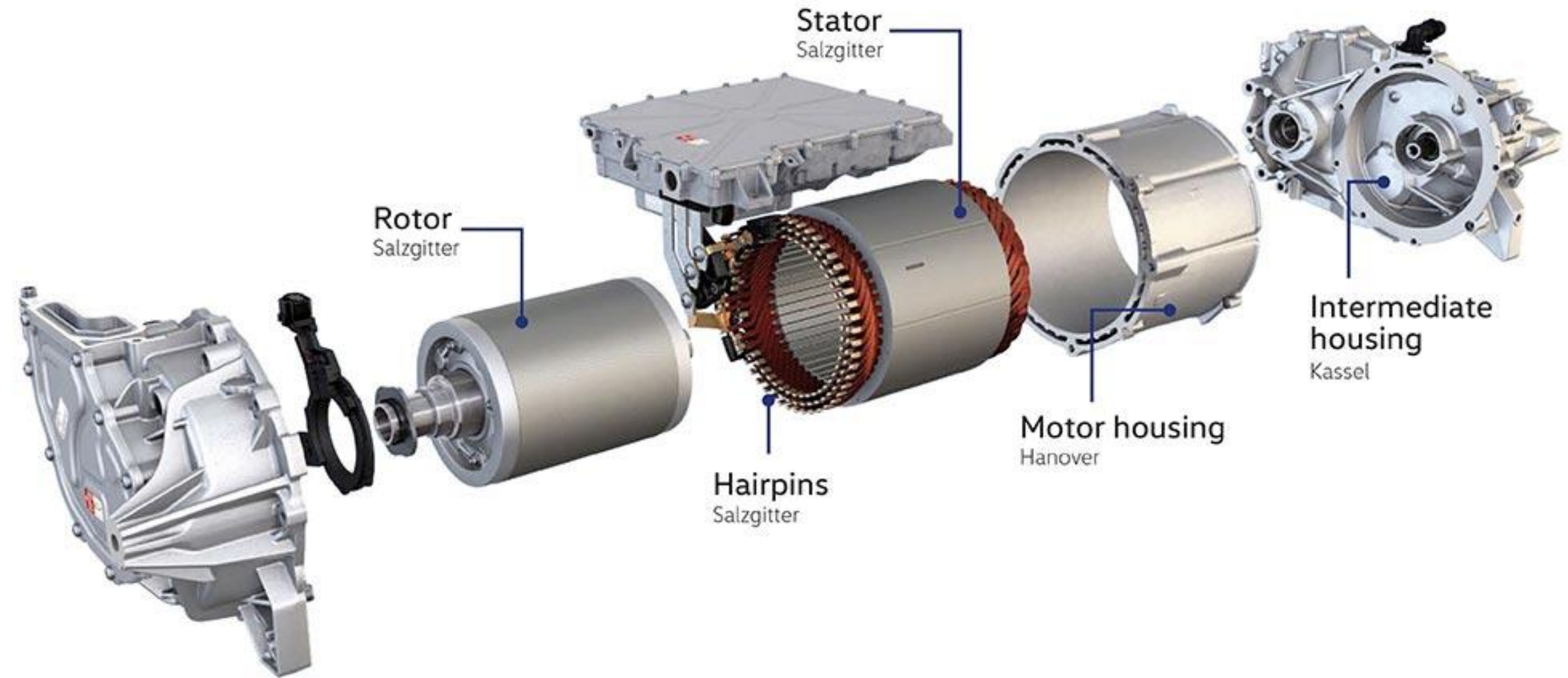
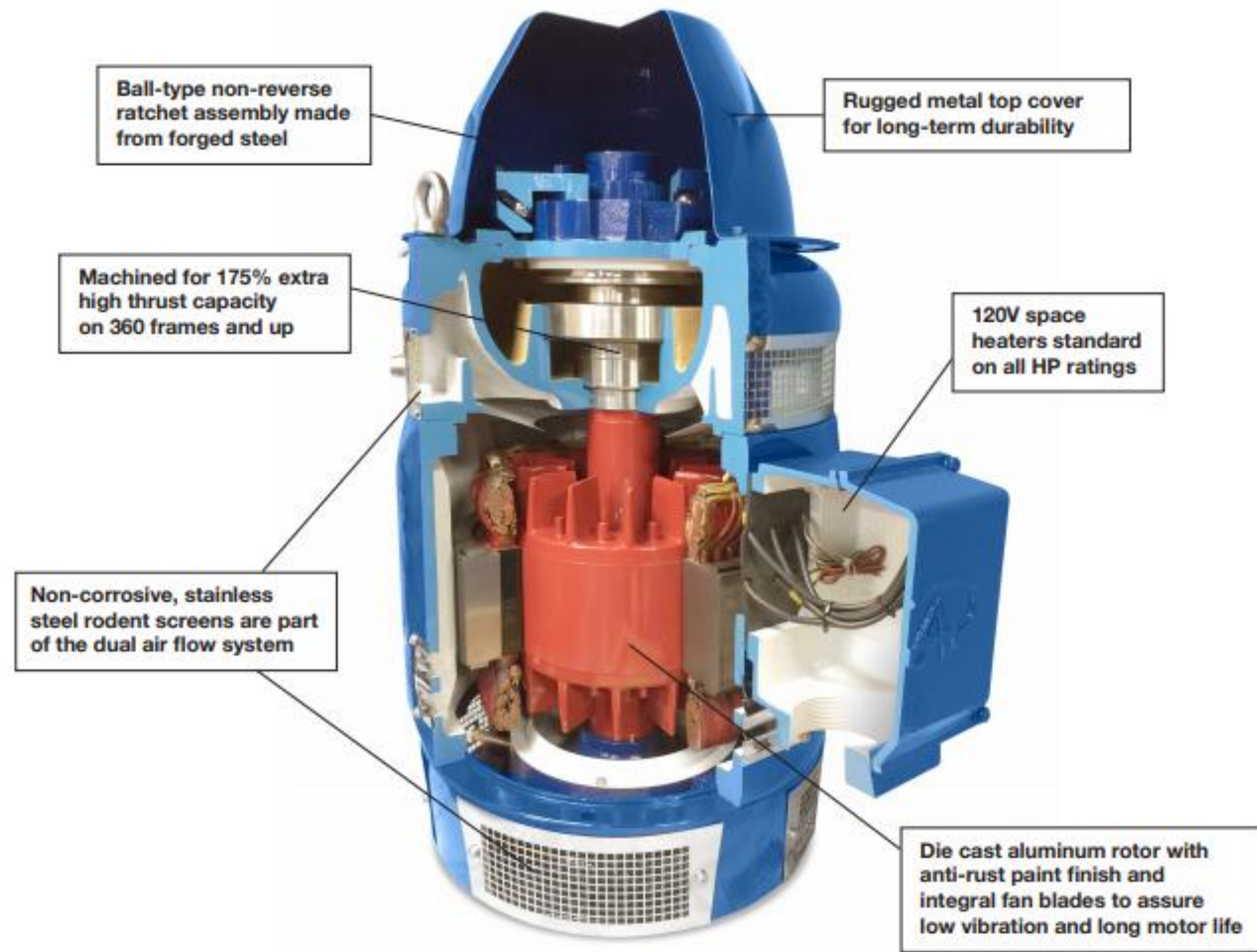
- Saudi Aramco Engineering Standards (SAES-P-113)
- Saudi Aramco Material Specifications (17-SAMMS-503 UP TO 500 HP)

Saudi Aramco 9COM Numbers:

- 6000000994: Electric motors up to 500HP Horizontal
- 6000000995: Electric motors up to 500 HP Vertical

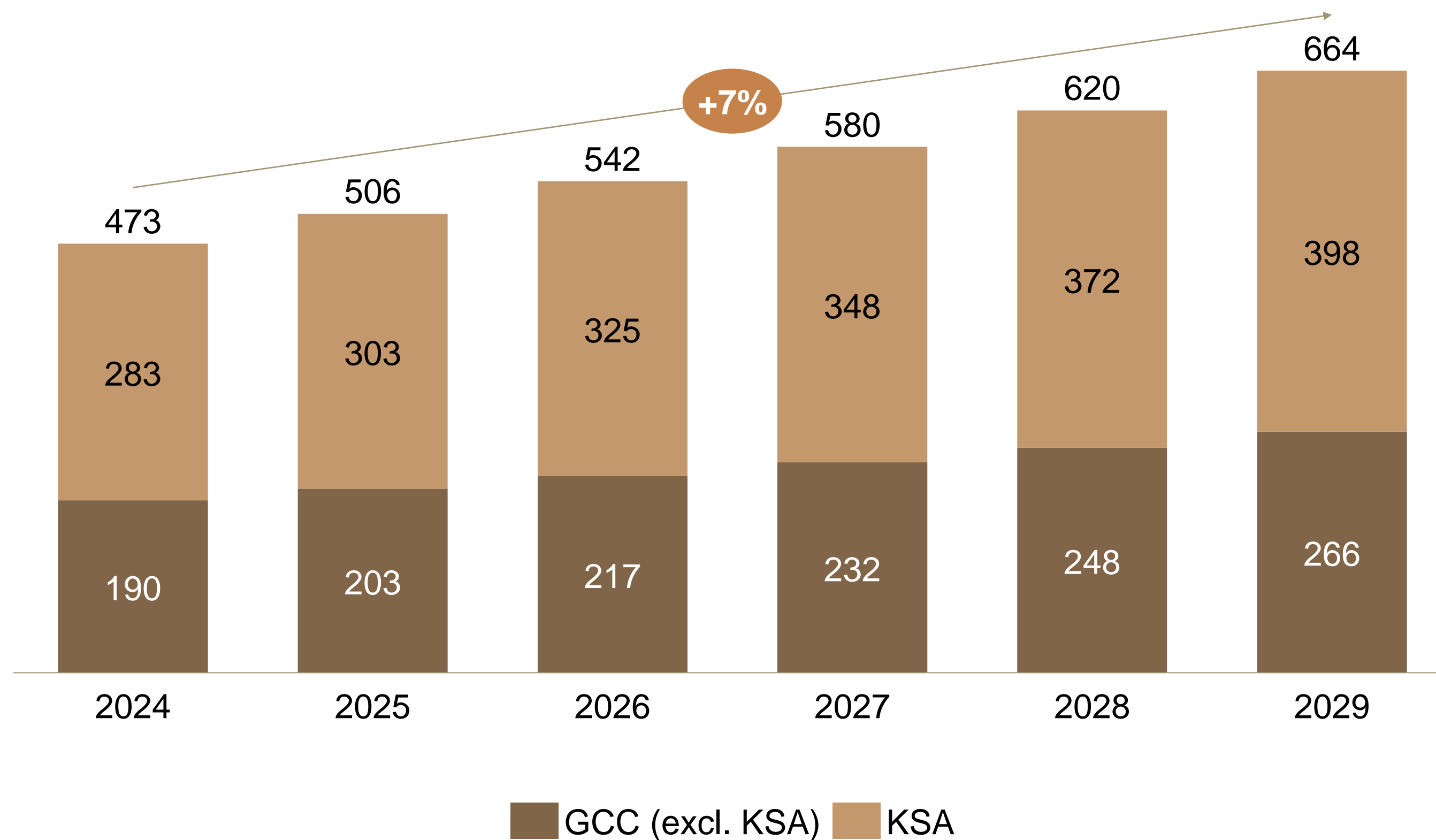
Catalyzing Supply Chains

Key Components of Electric Induction Motors



Electric Induction Motor Demand, Customers & Drivers

Forecasted KSA and rest of GCC Electric Induction Motor market
2024-2030 (Million USD)



Electric induction motor customers in KSA

- Oil & gas facilities
- Utilities & energy firms
- Manufacturing firms

Key KSA demand drivers

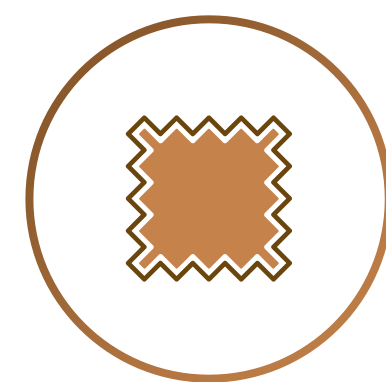
- **Industrial expansion:** Additional electric induction motors needed to support expansion of KSA industrial infrastructure – 36,000 plants expected by 2035
- **Infrastructure development:** Further electric induction motors required to support infrastructure development across industrial cities, expanding O&G and utilities operations

Catalyzing Supply Chains

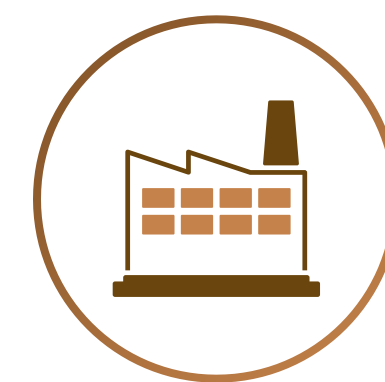
Note: O&G = Oil & Gas
Source: Verified Market Reports, Mordor Intelligence; IMARC Team analysis

Electric Induction Motor

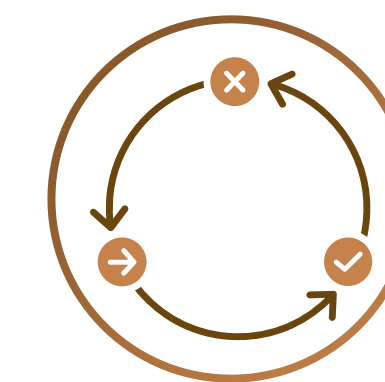
Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation



Multiple players

Current KSA value chain

- Steel, varnishes, and resins produced by multiple players



Few players

- Opportunity to manufacture **Electric Induction Motors**
- **SME opportunities:** provide **bearings, stator windings, rotor windings, shaft, enclosures, and fans.**



Few players

- Opportunity to provide installation and maintenance services

Opportunity

Opportunity

Key success factors

Technology



Cutting and stamping, winding, testing equipment

Labor



Electrical engineers, machinists, technicians

Catalyzing Supply Chains

Electric Induction Motor Investment Opportunity and Enablers

Key enablers in KSA to drive success



Localization incentives: Government programs – e.g., SIDF loan subsidies, Zakat & tax benefits, or export tax exemption

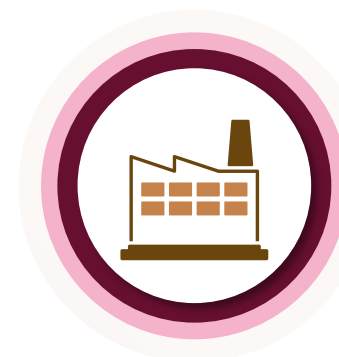


Land and infrastructure: Subsidized land and infrastructure in economic zones (e.g., Modon) reduce setup costs & accelerate



Widely available specialized labor: NITI provides machinists, maintenance technicians, and equipment operators who can support manufacturing

Where is the opportunity



Manufacturing & Assembly

Opportunity to increase localized manufacturing & assembly

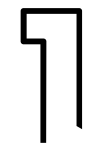
For SMEs: provide bearings, stator windings, rotor windings, shaft, enclosures, and fans.

Catalyzing Supply Chains

05 Cable Bus

Presented by: Hasan Al Khater

Cable Bus Opportunity Profile



Cable Bus present an attractive investment opportunity

Type of product



Indoor



Outdoor



Cable bus market is moderately growing

282

Estimated 2024 KSA market size (Million USD)

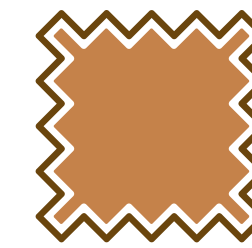
6%

Forecasted 5-year CAGR

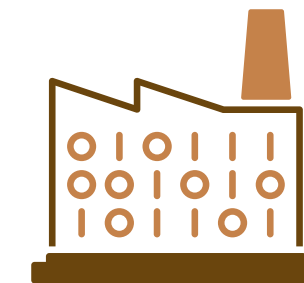


Attractive investment opportunities for cable bus value chain

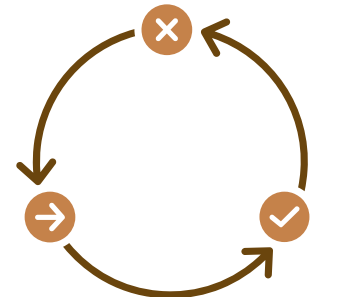
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

- Financial support including low interest loan programs
- Tax exemption from earnings and customs duty for exports
- Subsidized training programs

Cable Bus Potential Localized Categories

Type(s)



Applications

- Power distribution between buildings
- Renewable energy installations
- Drilling equipment
- Offshore platforms

- Manufacturing facilities and process control
- HVAC systems, elevators
- Critical medical equipment

Key technical specifications

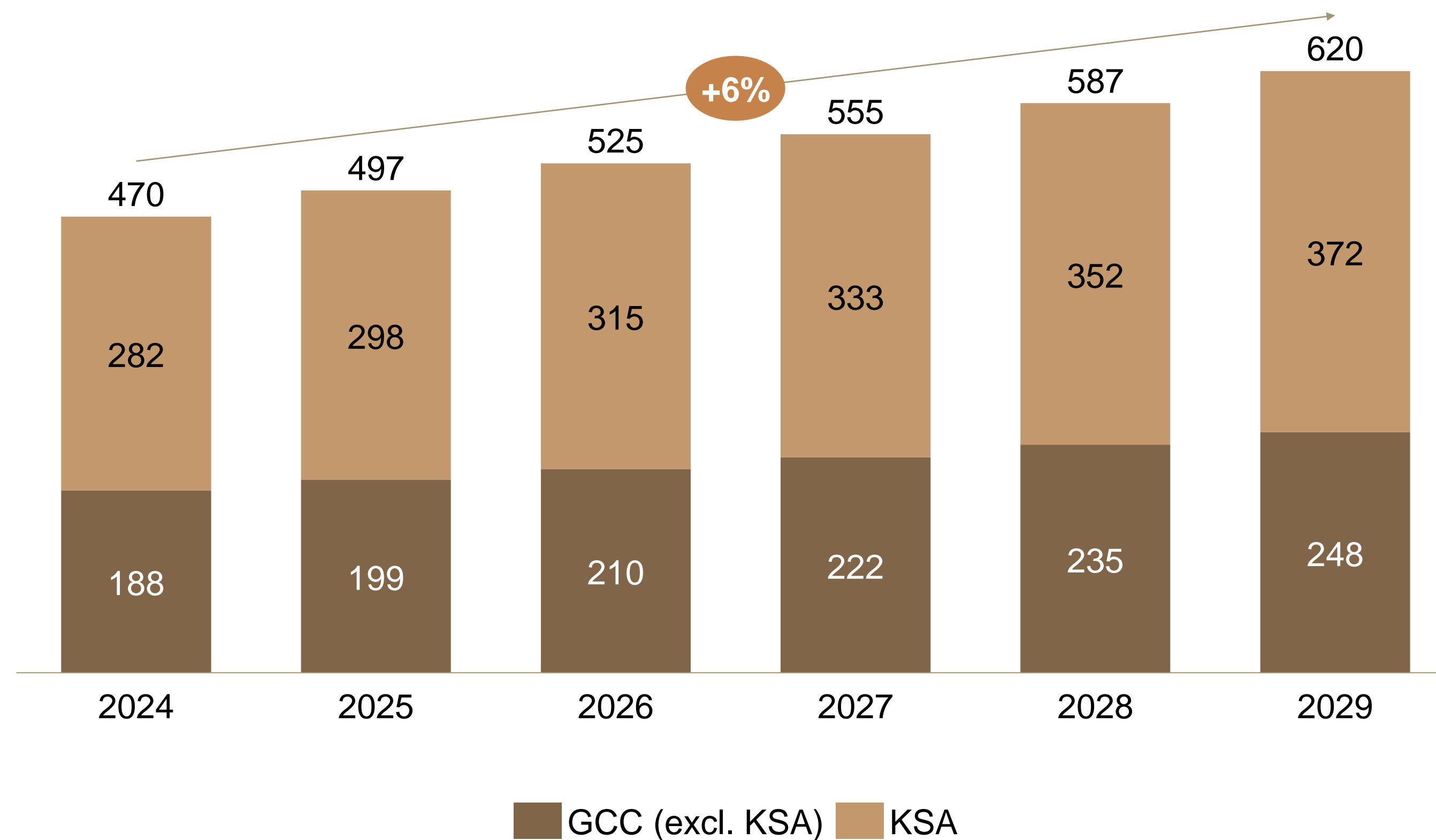
- Saudi Aramco 9COM number: 6000000929
- Saudi Aramco Engineering Standards (16-SAMSS-520)

Cablebus is a system of a group power cable to supply load with current rated from 1,200 to 4,000 amperes and up to and including 34.5 kV nominal system voltage, suitable for indoor and outdoor

Catalyzing Supply Chains

Cable Bus Demand, Customers & Drivers

Forecasted KSA and rest of GCC cable bus market
2024-2029 (Million USD)



Cable bus customers in KSA

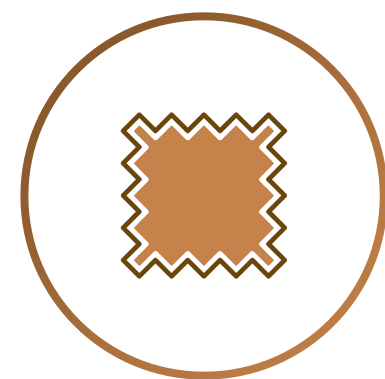
-  Oil & gas
-  Industrial & manufacturing
-  Utilities & energy

Key KSA demand drivers

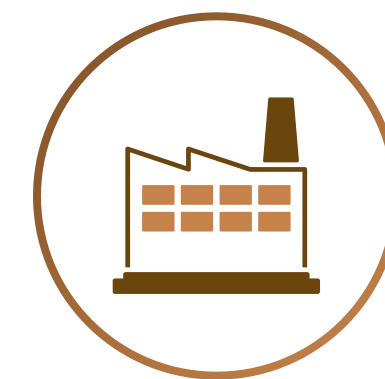
- **Industrial expansion:** With target of 36,000 factories by 2035, demand for high-capacity, power distribution systems is growing across industrial zones
- **Infrastructure development:** Development of futuristic cities emphasizes the need for advanced and reliable electrical systems, where cable buses play a critical role

Catalyzing Supply Chains

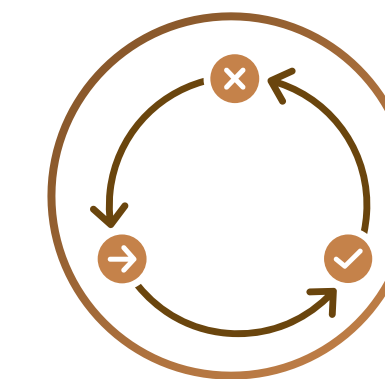
Cable Bus Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation



Few players



Few players



Few players

Current KSA value chain

- Opportunity to localize copper refining and production of insulation materials

- Opportunity to localize manufacturing of **cable bus**
- **SME opportunities:** manufacture **cable bus enclosures, assemble conductors, and production of ancillary components such as cable clamps and mounting brackets**

- Opportunity to provide installation and maintenance services

Opportunity

Opportunity

Opportunity

Key success factors

Technology

Advanced refining and extrusion technology

Simulation tools to create cable bus layouts

Labor

Skilled in process and quality control

Skills advanced machinery handling and assembly process

Catalyzing Supply Chains

Cable Bus Investment Opportunity and Enablers

Key enablers in KSA to drive success



Financial support: Access to subsidized capital and financial support from SIDF (e.g., WC loans, 'Afaq' program)

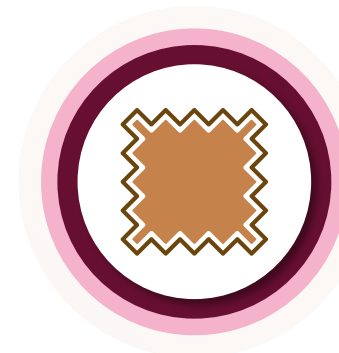


Export enabler: Financing, insurance, and trade facilitation support to ease procedural hurdles for commodity exports



Workforce development: Subsidized training programs for Saudi nationals by HRDF

Where is the opportunity



Raw materials

Establish facilities for copper refining and insulation material production



Manufacturing & Assembly

Establish facility to manufacture cable bus
 For SMEs - opportunity to manufacture cable bus enclosures, assemble conductors, and production of ancillary components such as cable clamps and mounting brackets.

Catalyzing Supply Chains

06

Diesel generator

Presented by: Faten Abusaeed

Diesel Generator Opportunity Profile

1

Diesel Generator present an attractive investment opportunity

Type



Diesel generator

- 9COM 6000000964: GENERATOR: DIESEL, 35-10000 KW

Diesel Generator is the combination of a diesel engine with an electric generator where it converts mechanical energy obtained from an engine into electrical energy as the output.

2

Diesel Generator market is moderately growing

1,080

Estimated 2024 KSA market size (Million USD)

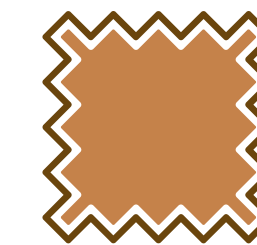
10%

Forecasted 5-year CAGR

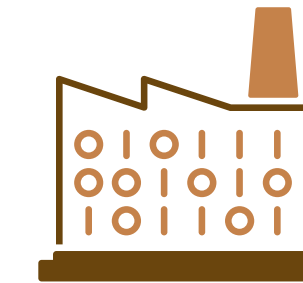
3

Attractive investment opportunities for diesel generator value chain

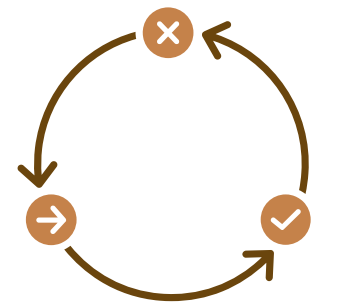
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

- Financial support including low interest loan programs
- Tax exemption from earnings and customs duty for exports
- Subsidized training programs

Diesel Generator

Technical overview

Type(s)

Diesel Generator



Applications

- Backup power supply for commercial and industrial buildings
- Primary power source for off grid locations and construction sites
- Grid stabilization
- Emergency disaster management

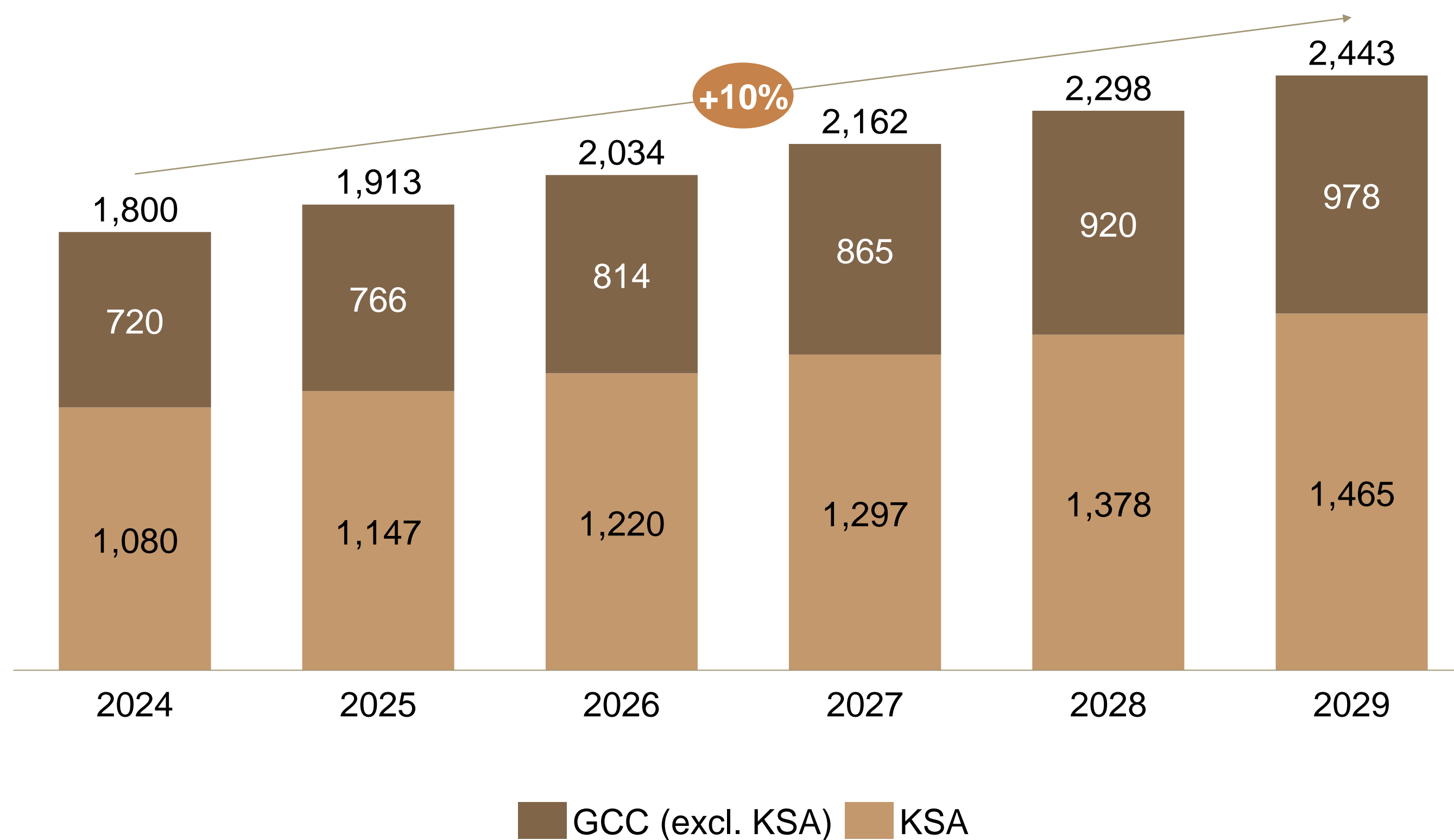
Key technical specifications

- Saudi Aramco engineering standards SAES-P-113
- Saudi Aramco material specifications 17-SAMSS-518
- 9COM: 6000000964





Catalyzing Supply Chains

Diesel Generator Demand, Customers & Drivers

Forecasted KSA and rest of GCC diesel generator market 2024-2029 (Million USD)



Diesel generator customers in KSA

-  Oil & gas
-  Industrial & manufacturing
-  Critical Infrastructure¹
-  Real estate

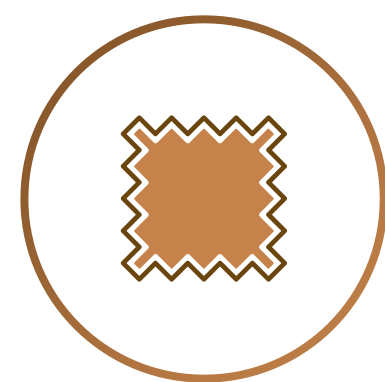
Key KSA demand drivers

- **Sector expansion:** Increasing offshore and upstream activities leads to rising demand for diesel generators used as backup power for uninterrupted operations
- **Industrial expansion:** Additional diesel generators needed to support rising demand for reliable power backup for industrial infrastructure – 36,000 plants expected by 2035

Catalyzing Supply Chains

1. Hospitals, airports, transportation hubs, and megaprojects
Source: Databridge; Grandview research; Mordor Intelligence; Saudi Aramco, Team analysis

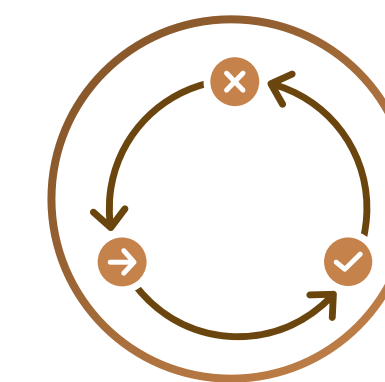
Diesel Generator Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation



Some players



Few players



Few players

Current KSA value chain

- High-grade materials domestically available¹ with opportunity to localize copper refining and production

- Opportunity to **manufacture diesel generators** in the Kingdom
- **SME opportunities:** Manufacturing **cylinder heads, engine blocks, and cooling systems, assembly of ignition system, fabrication of generator frames and cases**

- Generator installation and maintenance services and offering spare parts

Opportunity

Opportunity

Opportunity

Key success factors

Technology

Advanced refining and extrusion technology

Precision engineering tools like CNC machining for engine blocks, casting and forging technologies

Labor

Skilled in process and quality control

Engineers with expertise in precision machining, component manufacturing and electrical system assembly

Catalyzing Supply Chains

1. Stainless steel; aluminum;
Source: Expert inputs; Team analysis

Diesel Generator Investment Opportunity and Enablers

Key enablers in KSA to drive success



Financial support: Access to subsidized capital and financial support from SIDF (e.g., WC loans, 'Afaq' program)

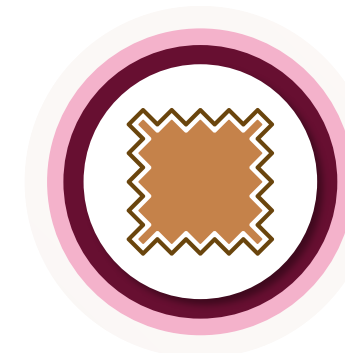


Export enabler: Financing, insurance, and trade facilitation support to ease procedural hurdles for UPS exports



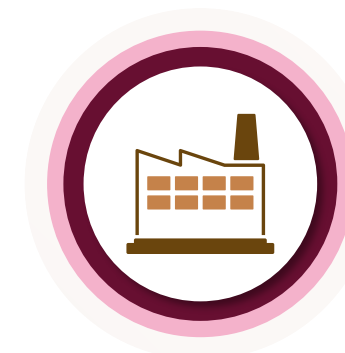
Workforce development: Subsidized training programs for Saudi nationals by HRDF

Where is the opportunity



Raw materials

Establish facilities for production and refining of copper in the Kingdom



Manufacturing & Assembly

Expand localization for diesel generators
 For SMEs: opportunity to manufacture cylinder heads, engine blocks, and cooling systems as well as assembly of ignition systems and fabrication of generator frames and cases

Catalyzing Supply Chains

Note: MRO = Maintenance, repair, overhaul
 Source: Expert interviews; Team analysis

07

Industrial Battery Charger

Presented by: Faten Abusaeed

Industrial Battery Charger (IBC) Opportunity Profile

1

Industrial Battery Chargers present an attractive investment opportunity

Types



Constant Voltage

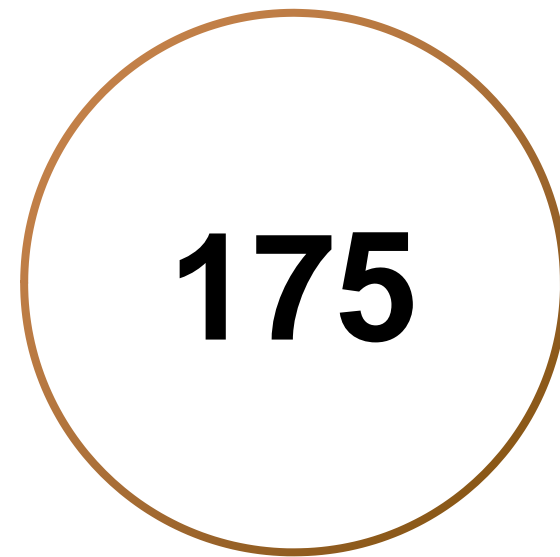


Constant Current

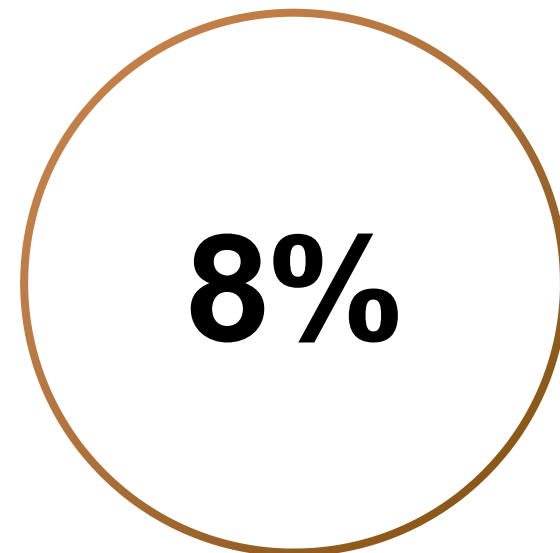
Battery charger is a charging device that stores energy in an electric battery by running current through it.

2

IBC market is rapidly growing; KSA has largest share in GCC



Estimated 2024 KSA market size (Million USD)

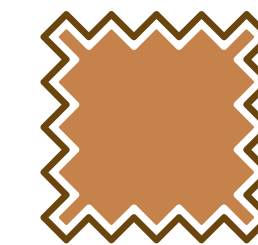


Forecasted 5-year CAGR

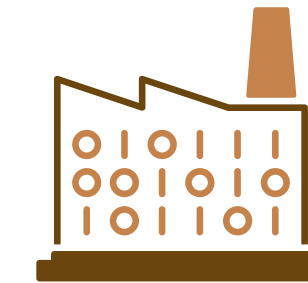
3

Attractive investment opportunities for IBC value chain

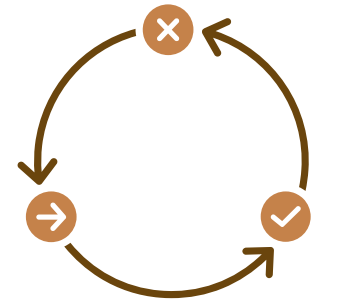
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

KSA value chain opportunities

- Financial support
- Regulatory incentives
- Technical enablers

Industrial Battery Charger (IBC) Potential Localized Categories

Type(s)

Constant Voltage

Constant Current



Applications

- UPS systems
- Telecommunication equipment
- Emergency lighting systems
- Electric vehicle batteries
- Renewable energy storage
- Stationary industrial ESS

Key technical specifications

- Saudi Aramco 9COM Numbers:
- 6000000947: BATTERY CHARGER/ RECTIFIER MORE 100 ADC
 - 6000010332: BATTERY CHARGER/ RECTIFIER LESS 100 ADC
 - Saudi Aramco Engineering Standards (SAES-P-107)
 - Saudi Aramco Material Specifications (17-SAMSS-514)

Catalyzing Supply Chains

Note: UPS = Uninterrupted power supply; ESS = Energy Storage System
 Source: Credence Research; Team analysis

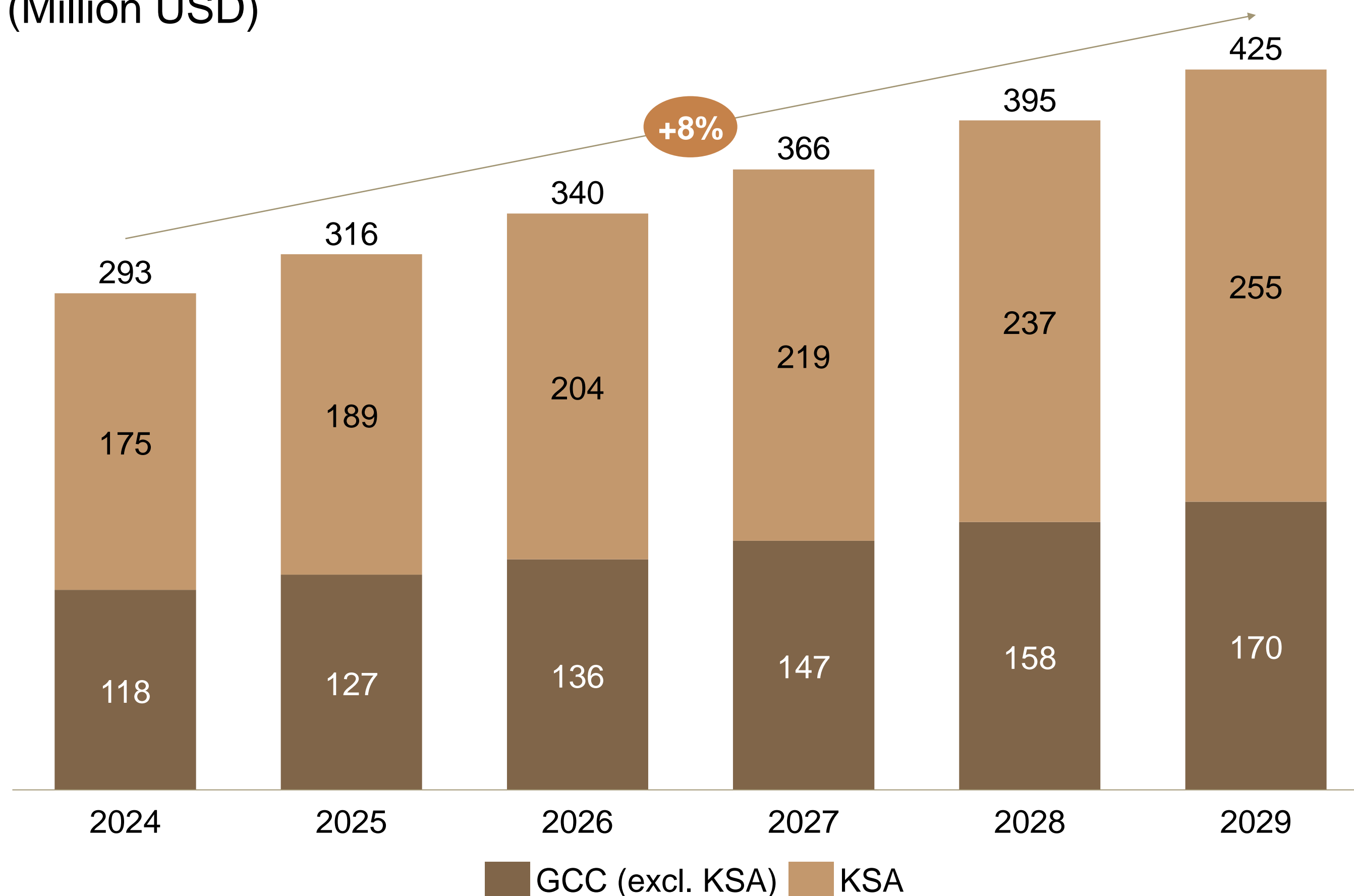
Industrial Battery Charger (IBC) Potential Localized Categories





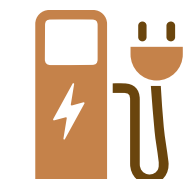
Catalyzing Supply Chains

Industrial Battery Charger Demand, Customers, & Drivers

KSA and rest of GCC Industrial Battery Charger market 2024-2029
(Million USD)



Industrial Battery Charger customers in KSA

-  Oil & gas
-  Utilities & energy
-  Transportation and logistics

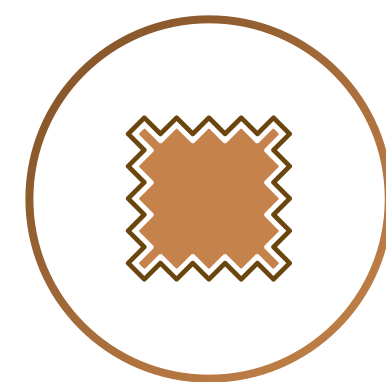
Key KSA demand drivers

- **Industrial expansion:** Additional IBCs needed to support expansion of KSA industrial infrastructure – 36,000 plants expected by 2035
- **EV adoption:** IBCs required to support EV charging needs to match 500,000 EV manufacturing target in 2030

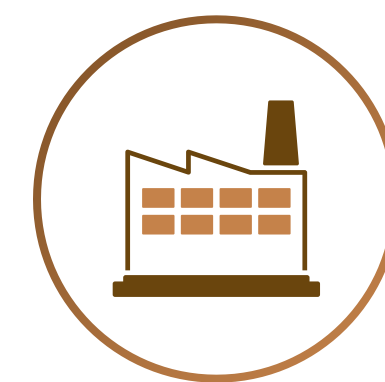
SME Electrical Workshop

Catalyzing Supply Chains

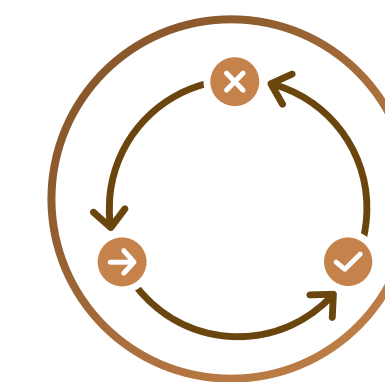
Industrial Battery Charger (IBC) Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation



Few players



Few players



Few players

Current KSA value chain

- Produce industrial battery charger components domestically¹

Opportunity

- Opportunity to increase localized manufacturing
- **SME opportunities:** manufacture PCBAs, capacitors, inductors

Opportunity

- Opportunity to provide installation and maintenance services

Opportunity

Key success factors

Technology

CNC machines, curing tools

Fabrication, testing equipment

Labor

Chemical engineers, technicians

PCB designers, process engineers, machine operators

SME Electrical Workshop

Catalyzing Supply Chains

1. E.g., heat sinks, diodes, and thermal interface materials
Source: Credence Research; Expert inputs; Team analysis

Industrial Battery Charger (IBC) Investment Opportunity and Enablers

Key enablers in KSA to drive success



Financial support: Access to subsidized capital and financial support from SIDF (e.g., WC loans, 'Afaq' program)

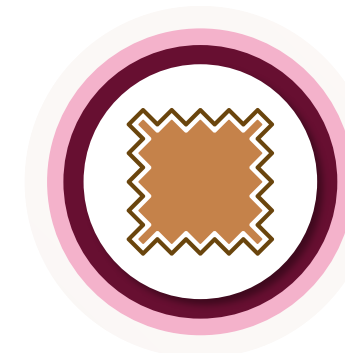


Export enabler: Financing, insurance, and trade facilitation support – includes exemption from taxes on export revenues



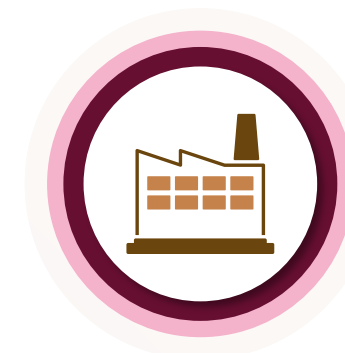
Workforce development: Subsidized training programs for Saudi nationals by HRDF

Where is the opportunity



Raw materials

Produce industrial battery charger components domestically¹



Manufacturing & Assembly

Opportunity to diversify localized Industrial Battery Charger manufacturing
 For SMEs: manufacture PCBs, capacitors, inductors

Catalyzing Supply Chains

1. Heat sinks, diodes, and thermal interface materials; Note: SIDF = Saudi Industrial Development Fund; HRDF = Human Resources Development Fund
 Source: Credence Research; Expert inputs; Team analysis

08 UPS System

Presented by: Norhan Khoja

UPS System Opportunity Profile

1 UPS System present an attractive investment opportunity

Types



Online UPS



Line interactive UPS



Modular UPS

2 UPS system market is sizeable showing moderate growth

369

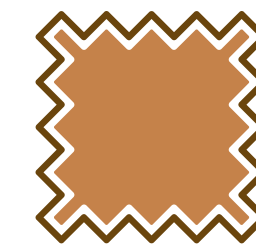
Estimated 2024 KSA market size (Million USD)

12%

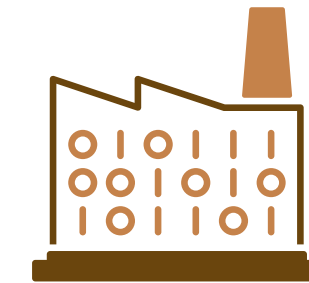
Forecasted 5-year CAGR

3 Attractive investment opportunities for UPS system value chain

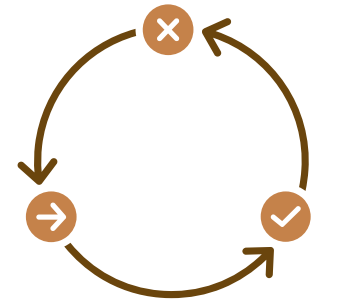
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

- Financial support including low interest loan programs
- Tax exemption from earnings and customs duty for exports
- Subsidized training programs

UPS System Potential Localized Categories

Type(s)

Online UPS – Double Conversion

Line interactive UPS

Modular UPS



Applications

- High precision manufacturing lines
- Hospitals and life - supporting systems
- Critical systems such as radar, and flight control systems

- HVAC systems
- POS systems, inventory tracking and security cameras in retail shops

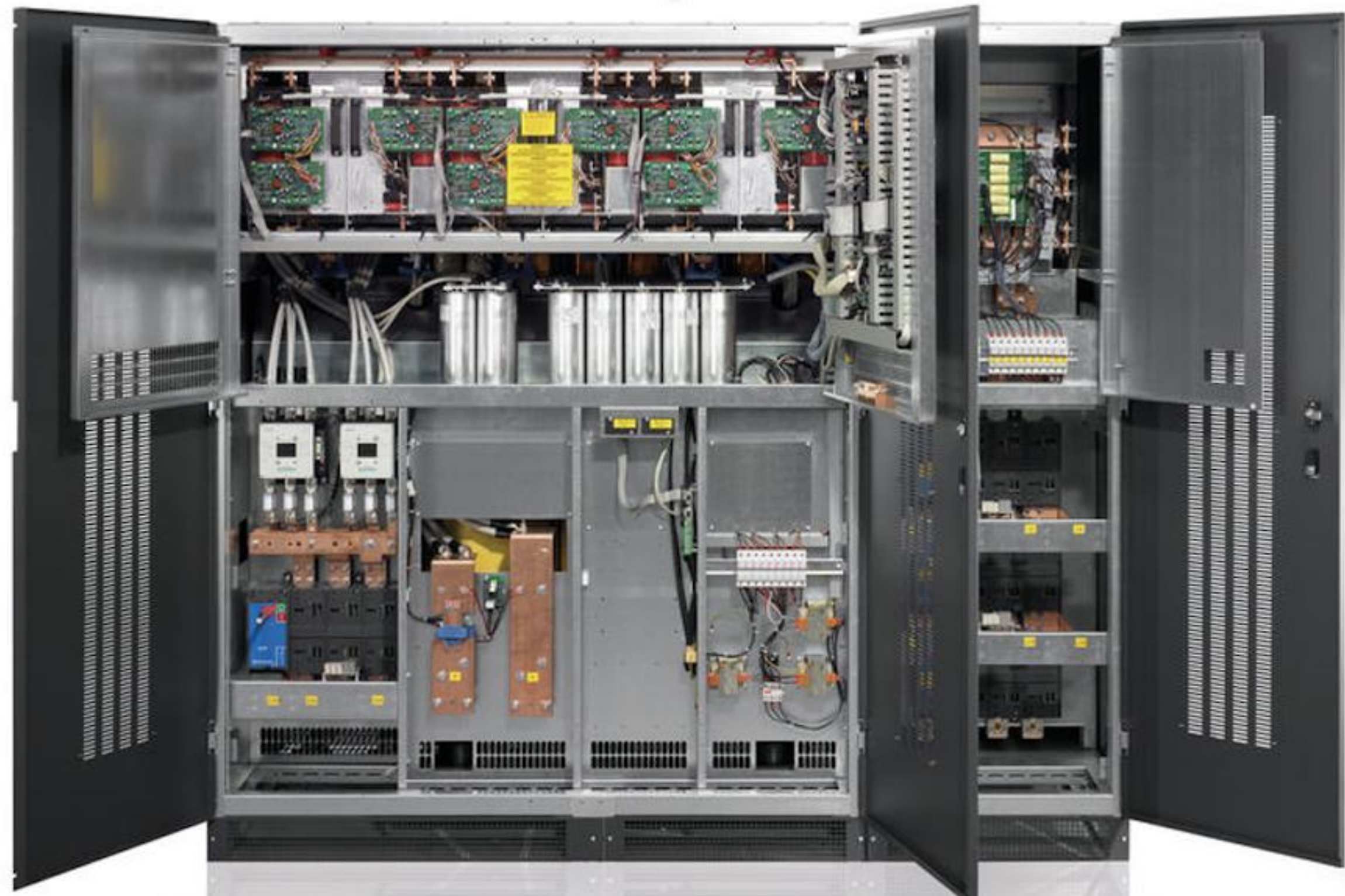
- Scalable industrial operations
- Facilities with rapidly growing or changing power needs
- Substation control and SCADA systems

Key technical specifications

- Saudi Aramco engineering standards SAES-P-107
- Saudi Aramco material specifications 17-SAMSS-516
- 9COM: 6000011555 (UPS system above 200KVA for plants) and 6000001012 (UPS systems above 10 TO 200KVA for plants)

Catalyzing Supply Chains

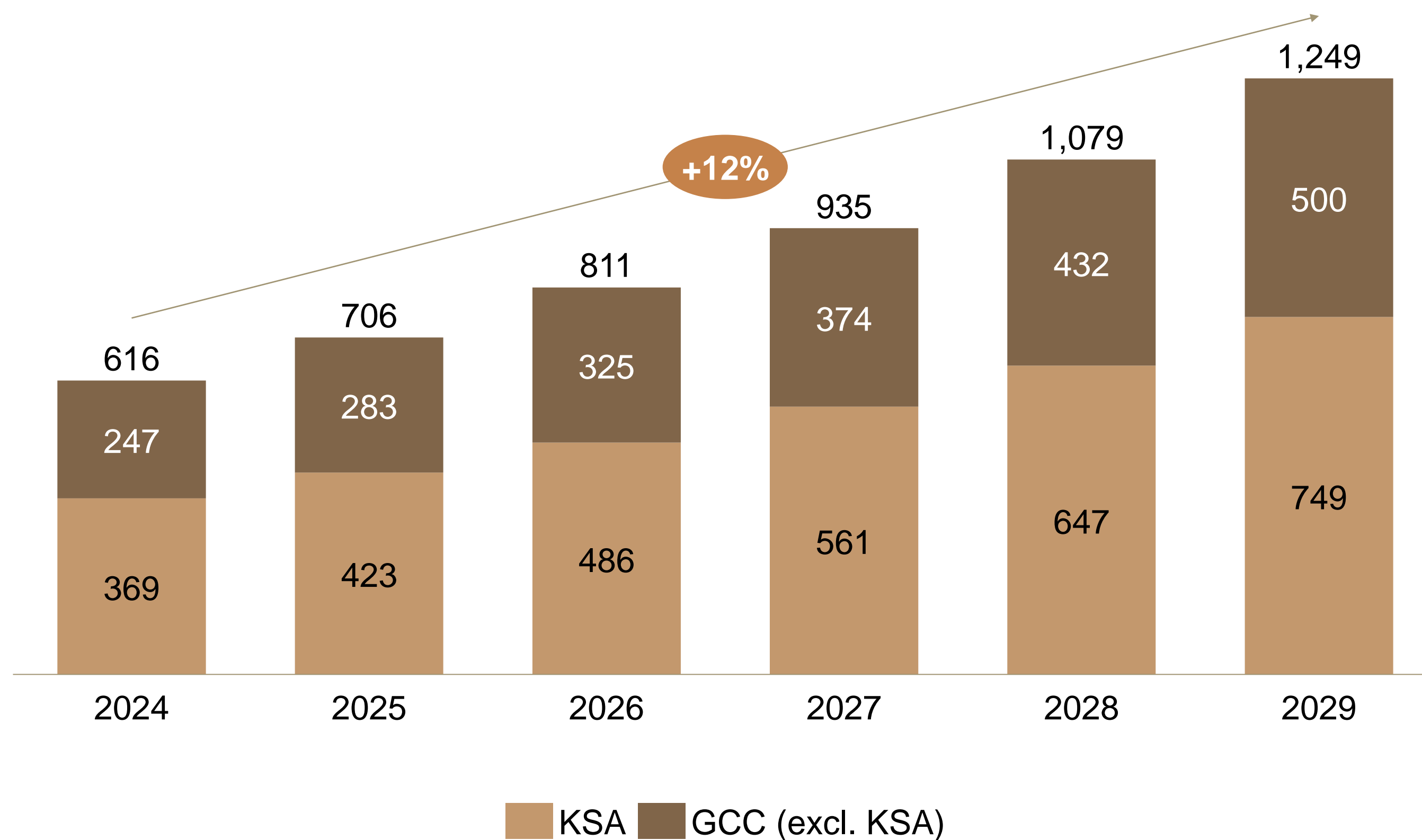
Key components for UPS



Catalyzing Supply Chains

UPS System Demand, Customers & Drivers

Forecasted KSA and rest of GCC UPS system market 2024-2029
(Million USD)



UPS system customers in KSA



Oil & gas



Utilities, Industrial & manufacturing



Critical Infrastructure¹

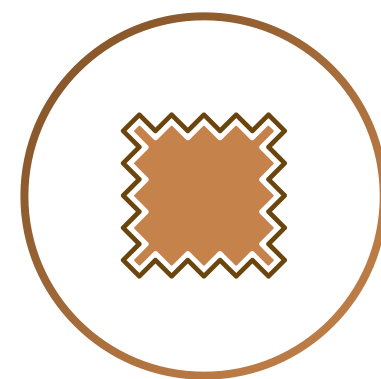
Key KSA demand drivers

- **Industrial expansion:** By 2035, Saudi Arabia plans for 36,000 factories, requiring uninterrupted power for essential operations
- **Infrastructure development:** Megaprojects like NEOM, Red Sea Project, and Qiddiya require uninterrupted power solutions for data centers, commercial establishments, and residential areas

Catalyzing Supply Chains

1. Hospitals, airports, transportation hubs, and megaprojects;
Source: Mordor Intelligence; TechSci; Team analysis

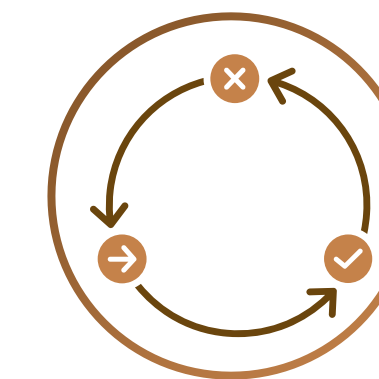
UPS System Value Chain and Key Localization Opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

Local saturation

Few players

Few players

Few players

Current KSA value chain

- Localizing battery production facilities

- Opportunity to increase localized manufacturing & E2E assembly
- **SME opportunities:** assembling sub-components, testing and compliance of manufactured models

- Opportunity to provide installation and maintenance services

Opportunity

Opportunity

Opportunity

Key success factors

Technology

Thermal management systems

Automated testing rigs, flexible conveyor systems

Labor

Engineers with battery production expertise

Precision assembly technicians

Catalyzing Supply Chains

UPS System Investment Opportunity and Enablers

Key enablers in KSA to drive success



Financial support: Access to subsidized capital and financial support from SIDF (e.g., WC loans, 'Afaq' program)

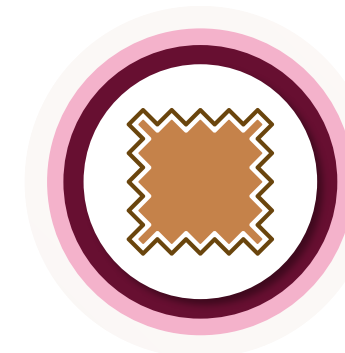


Export enabler: Financing, insurance, and trade facilitation support to ease procedural hurdles for UPS exports



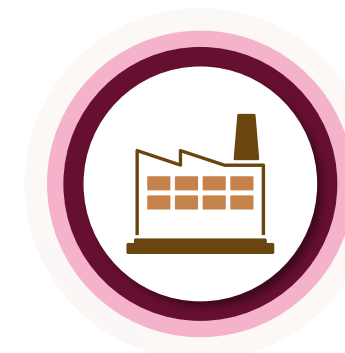
Workforce development: Subsidized training programs for Saudi nationals by HRDF

Where is the opportunity



Raw materials

Establish facilities for battery production and semi conductor fabrication



Manufacturing & Assembly

Opportunity to localize manufacturing of different UPS systems in KSA

For SMEs - opportunity to provide sub-components, and compliance testing

Catalyzing Supply Chains

09

Protective relays

Presented by: Norhan Khoja

Protective Relays Opportunity Profile

1

Protective Relays present an attractive investment opportunity

Function

Protective Relays is a relay device designed to trip a circuit breaker when a fault is detected to either eliminate or significantly reduce damage to personnel and/or equipment.



Catalyzing Supply Chains

2

Protective relays market is moderately growing

267

Estimated 2024 KSA market size (Million USD)

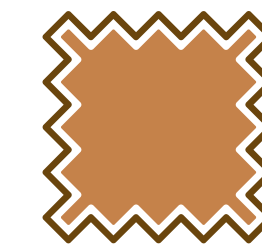
6%

Forecasted 5-year CAGR

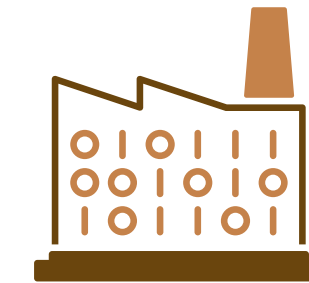
3

Attractive investment opportunities for protective relays value chain

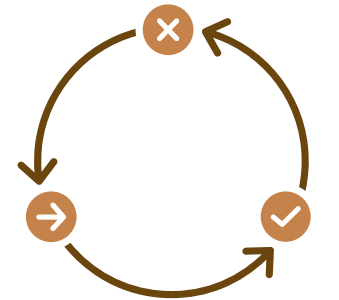
KSA value chain opportunities



Raw materials



Manufacturing & Assembly



Installation & Maintenance

KSA enablers

- Financial support including low interest loan programs
- Tax exemption from earnings and customs duty for exports
- Subsidized training programs

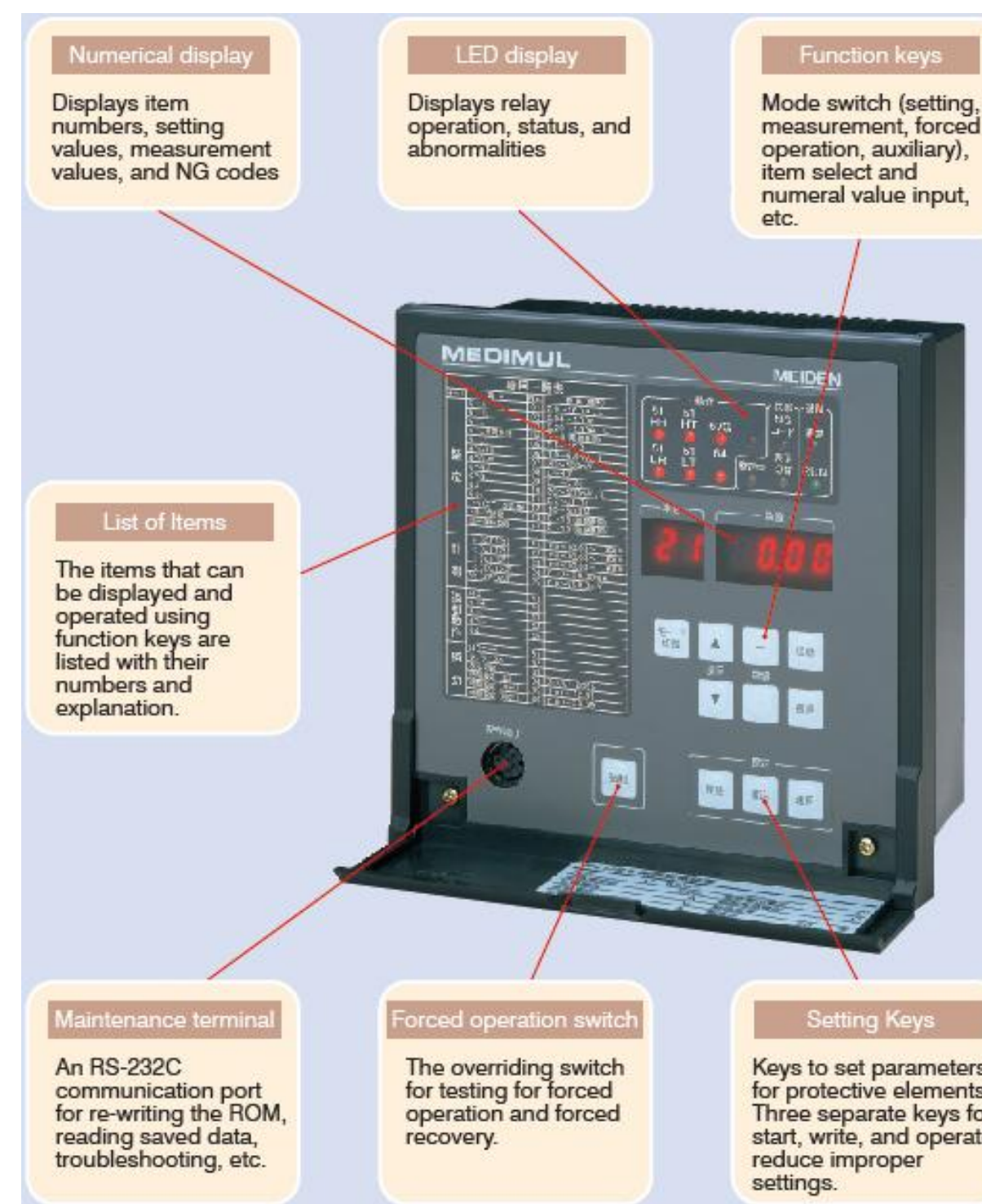
Protective Relays Components & Applications

Components

- LED display
- Numerical Display
- Function Keys
- Setting Keys
- Forced Operation Switch
- List of Items
- Maintenance Terminal

Applications

- Transmission lines
- Transformers
- Generator
- Switchgear
- Busbar



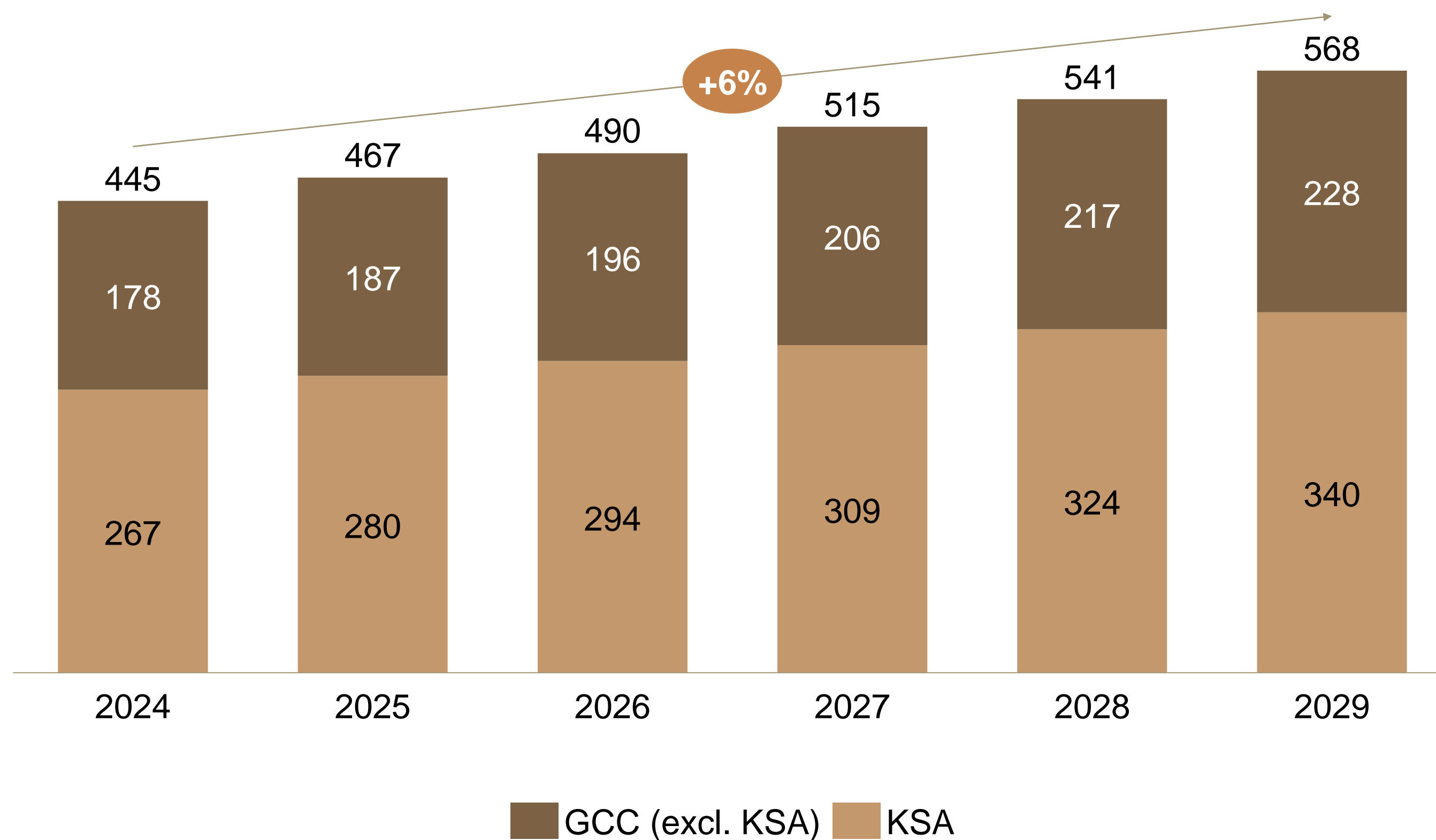
Key technical specifications

- Saudi Aramco engineering standards: SAES-P-114, SAES-P-126
- Saudi Aramco material specification: 16-SAMSS-514
- Saudi Aramco 9COM number: 6000000845




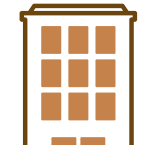
Catalyzing Supply Chains

Protective Relays Demand, Customers & Drivers

Forecasted KSA and rest of GCC protective relays market 2024-2029
(Million USD)



Protective relays customers in KSA

-  Oil & gas
-  Industrial & manufacturing
-  Critical Infrastructure¹
-  Commercial developers

Key KSA demand drivers

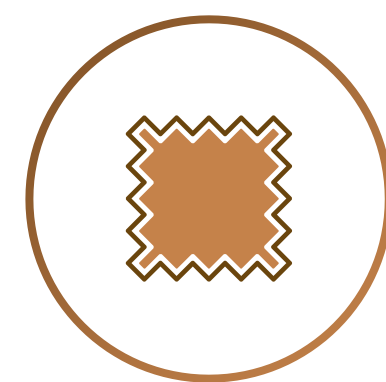
- **Industrial expansion:** KSAs goal of 36,000 factories by 2035 highlights need of stable power supply to support essential operations
- **Infrastructure development:** Ongoing megaprojects such as NEOM require robust power solutions for data centers, commercial establishments, and residential areas

Catalyzing Supply Chains

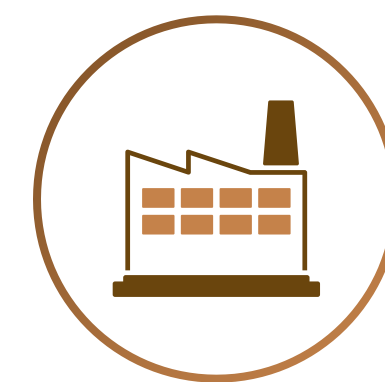
1. Hospitals, airports, transportation hubs, and megaprojects
Source: Grandview research; Research news today; Saudi Aramco, Team analysis

Protective Relays

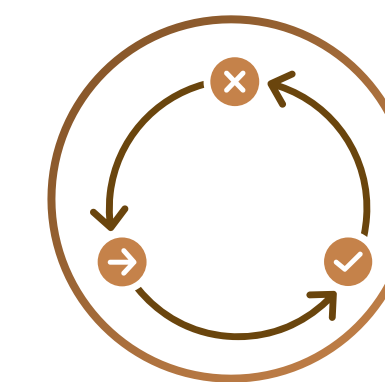
Value Chain and Key Localization Opportunities



Raw materials



Design & Manufacturing



Installation & Maintenance

Local saturation



Few players



Few players



Few players

Current KSA value chain

- Opportunity to source protective relay components in the Kingdom such as silicon steel, insulations material, and amorphous alloys

- Opportunity to localize design and increase manufacturing & assembly of protective relay
- **SME opportunities:** manufacture PCBAs, assemble small to medium voltage protective relays

- Opportunity to provide installation and maintenance services

Opportunity

Opportunity

Opportunity

Key success factors

Technology

Precision molding, coating lines

High precision manufacturing, integration of IoT for smart relays

Labor

Electronics technicians

Relay design engineers, PCB designers

Protective Relays

Investment Opportunity and Enablers

Key enablers in KSA to drive success



Financial support: Access to subsidized capital and financial support from SIDF (e.g., WC loans, 'Afaq' program)

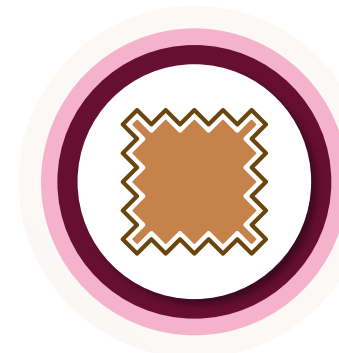


Export enabler: Financing, insurance, and trade facilitation support to ease procedural hurdles for UPS exports



Workforce development: Subsidized training programs for Saudi nationals by HRDF

Where is the opportunity



Raw materials
 Establish facilities for sourcing of raw material components for protective relays in the Kingdom¹



Manufacturing & Assembly
 Expand localization for protective relays
 For SMEs: opportunity to provide cable bus enclosures and assemble small to medium voltage protective relays

Catalyzing Supply Chains

1. Such as silicon steel and amorphous or nanocrystalline alloys

Note: MRO = Maintenance, repair, overhaul

Source: Expert interviews; Team analysis

**Thank
You**