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# Drilling

*Downhole Completions & Supply Chain Ecosystem Workshop*

## Business Opportunities

13th January 2025

Downhole Completions & Supply Chain Ecosystem Workshop

Catalyzing Supply Chains

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.

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# 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

### Business Opportunities

12 Sectors

210 Business Opportunities

$28 bn Annual Market Size

### Anchor Projects

IMI

SPARK

Tuwaiq

6 Anchor projects

### Local Workforce Development

16 National Training Centers

90+ Programs

**Catalyzing Supply Chains**

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

# iktva Program Overview (2/2)

Non-exhaustive

## iktva Business Development Team Support

- Market Analysis
- Technical Engagement
- Operational Support and Advisory Services[1]

## Government/Semi-government key enablers

- Financial Support
- Fiscal Incentives
- Land Solutions
- HR Development
- Regulatory Enablers

**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.

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# 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

# Downhole Market Overview

## KSA downhole market snapshot

**$935MM**

*6% CAGR[1]*

2024 KSA market size for opportunities in today's workshop

## Eight opportunities to be discussed today

1. Intelligent Well Completions (IWCs)
2. Intelligent Well Completions Cable
3. Subsurface Safety Valves (SSSVs)
4. Multilateral Completions
5. Packers
6. Liner Hangers
7. PDC Cutters
8. Precision Machining





1. 5-year forecasted KSA CAGR (2024-2029)

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# How do we define what is an opportunity?

## 1 Growing market

*High growth high spend markets*

## 2 Limited local players & import driven

*Markets with few local contributors and high import resilience*

## 3 Technological & labor feasibility

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

# Intelligent Well Completions (IWCs)

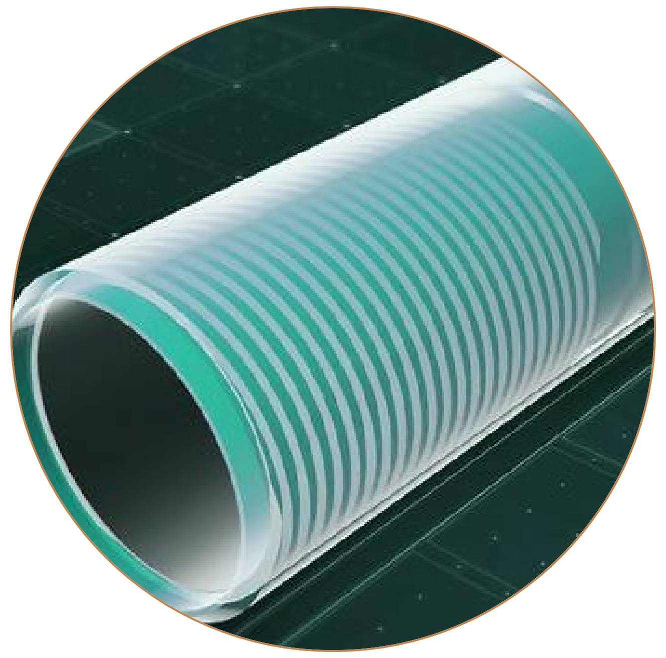
*Ahmed Al Haji*

# Opportunity profile – Intelligent Well Completions (IWCs)

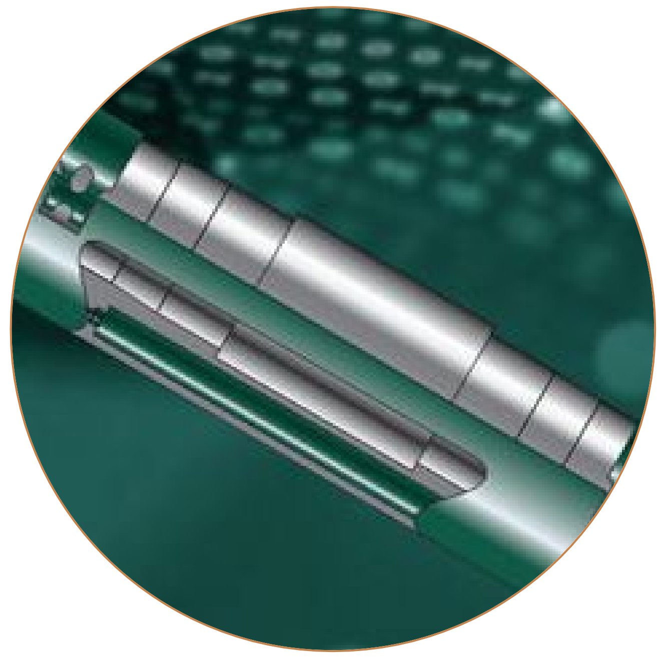
1

## KSA in high need of IWCs to realize ongoing O&G expansion

**Key components**[1]



Inflow Control Valve (ICV)



Permanent Downhole Monitoring System (PDHMS)

2

## IWC is a growing market and KSA has the largest regional share

**217** — Estimated 2024 KSA market size ($MM)

**7%** — Forecasted 5-year CAGR

3

## Attractive investment opportunities for the IWC value chain

**KSA value chain opportunities**

- R&D
- Precision Machining
- OEM Mfg.
- Lifecycle Mgmt.

**KSA enablers**

- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes

**Catalyzing Supply Chains**

1. Other complementary components covered under potential localized components on next slide

Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund

Source: Aramco; TechNavio; Team analysis

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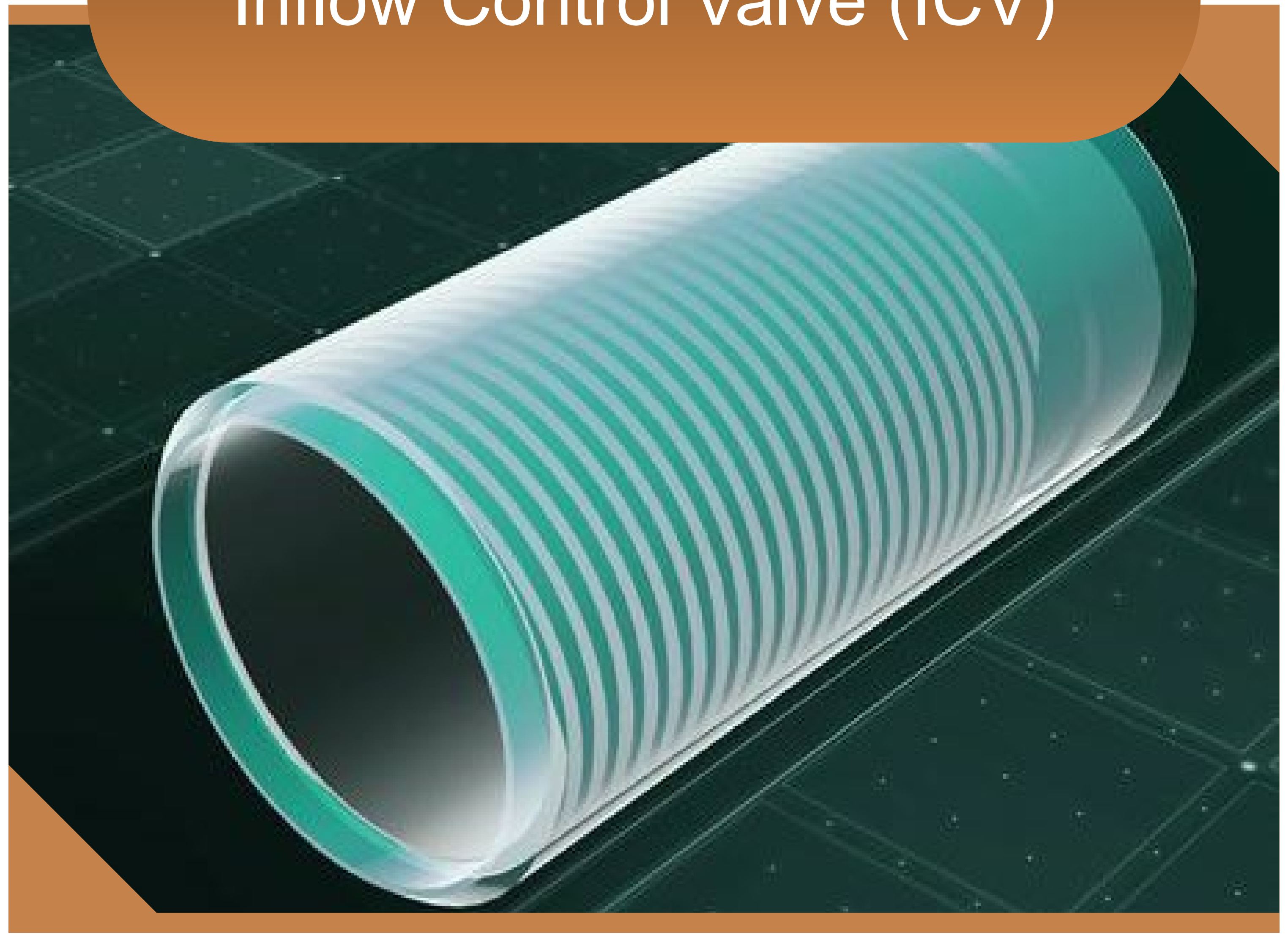
# Intelligent Well Completions technical overview

## Inflow Control Valve (ICV)



- Remotely operated downhole valves
- Used to control flow into or out of an isolated reservoir

## Permanent Downhole Monitoring System (PDHMS)

- Downhole sensor to measure downhole temperature and pressure

## Additional supporting components

1. Feed-through packers
2. Hydraulic control unit
3. Control lines
4. Surface acquisition unit

**Catalyzing Supply Chains**

Aramco material number: 1. 6000010708, 2. 6000013641, 3. 6000010702, 4. 6000010703, 5. 6000010704, 6. 6000010706, 7. 6000010707, 8. 6000010710, 9. 6000015596, 10. 6000010705, 11. 6000010709, 12. 6000010700, 13. 6000015787, 14. 6000010701

Source: Aramco; TechNavio; Team analysis

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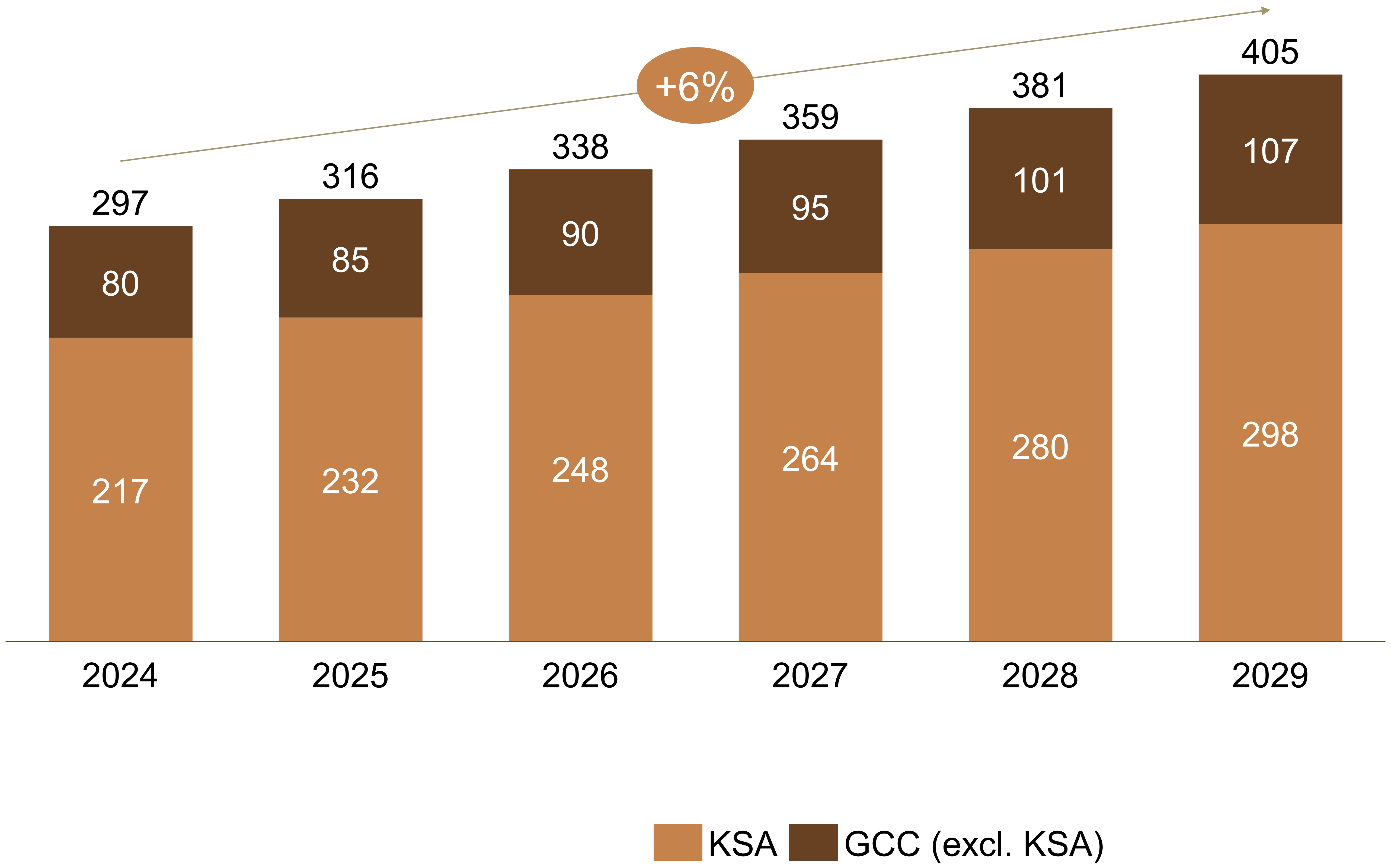
# IWC demand, customers, and drivers

Forecasted KSA and rest of GCC IWC market 2024-2029 ($MM)




## Typical IWC customers in KSA

Oil producers

Gas producers

## Key KSA demand drivers

- Rise in upstream activity and growth in gas production: Bolstered upstream and gas production activities require additional IWC components
- Completions complexity increase: Boost in complex well completions increases need for IWCs (specifically IVCs) for zonal isolation and selective production control

**Catalyzing Supply Chains**

Note: IWC = Intelligent Well Completion; Inflow Control Valve
Source: Aramco; TechNavio; Team analysis

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# Value chain and key localization opportunities

| | R&D | Precision Machining | OEM Manufacturing | Lifecycle Mgmt. |
|---|---|---|---|---|
| Local saturation | Few players | Few players | Few players | Few players |
| Current KSA value chain | • Conduct IWC R&D for local needs | • Manufacture components (e.g., control valves, housings) | • Manufacture downhole completion equipment<br>• Produce sensors and control systems | • Establish service hub for IWC maintenance |
| | Opportunity | Opportunity | Opportunity | Opportunity |
| **Key success factors** | | | | |
| Technology | Prototyping, testing equipment available | CNC machines available for import | CNC, torque machines & pressure testing eqt. available for import | Torque machines & pressure testing eqt. available for import |
| Labor | Material engineers, materials scientists available | CNC operators & machinists available | CNC operators & mechanical technicians available | Field engineers, technicians available |

**Catalyzing Supply Chains**

Note: HPHT = High Pressure High Temperature; CNC = Computer Numerical Control
Source: Aramco; Mordor Intelligence; Expert inputs; Team analysis

# Intelligent Well Completions Cable (IWC Cable)

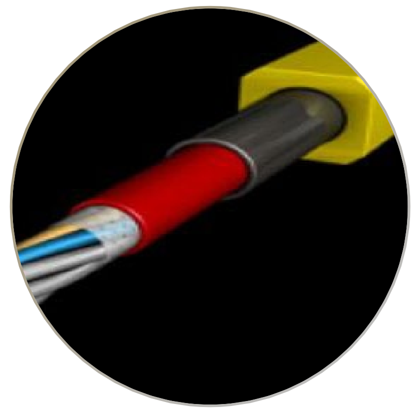
*Ahmed Al Haji*

Catalyzing Supply Chains

# Opportunity profile – IWC Cable

## 1 KSA in high need of IWC Cable to realize ongoing O&G expansion

**Key types**



Permanent Downhole Cable (PDC)

Flat Pack

## 2 IWC Cable is a growing market that supports overall IWC roll-out

**30** — Estimated 2024 KSA market size ($MM)

**7%** — Forecasted 5-year CAGR

## 3 Attractive investment opportunities for the IWC Cable value chain

**KSA value chain opportunities**

- R&D
- OEM Mfg.
- Lifecycle Mgmt.

**KSA enablers**

- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes

**Catalyzing Supply Chains**

Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; TechNavio; Press releases; Team analysis

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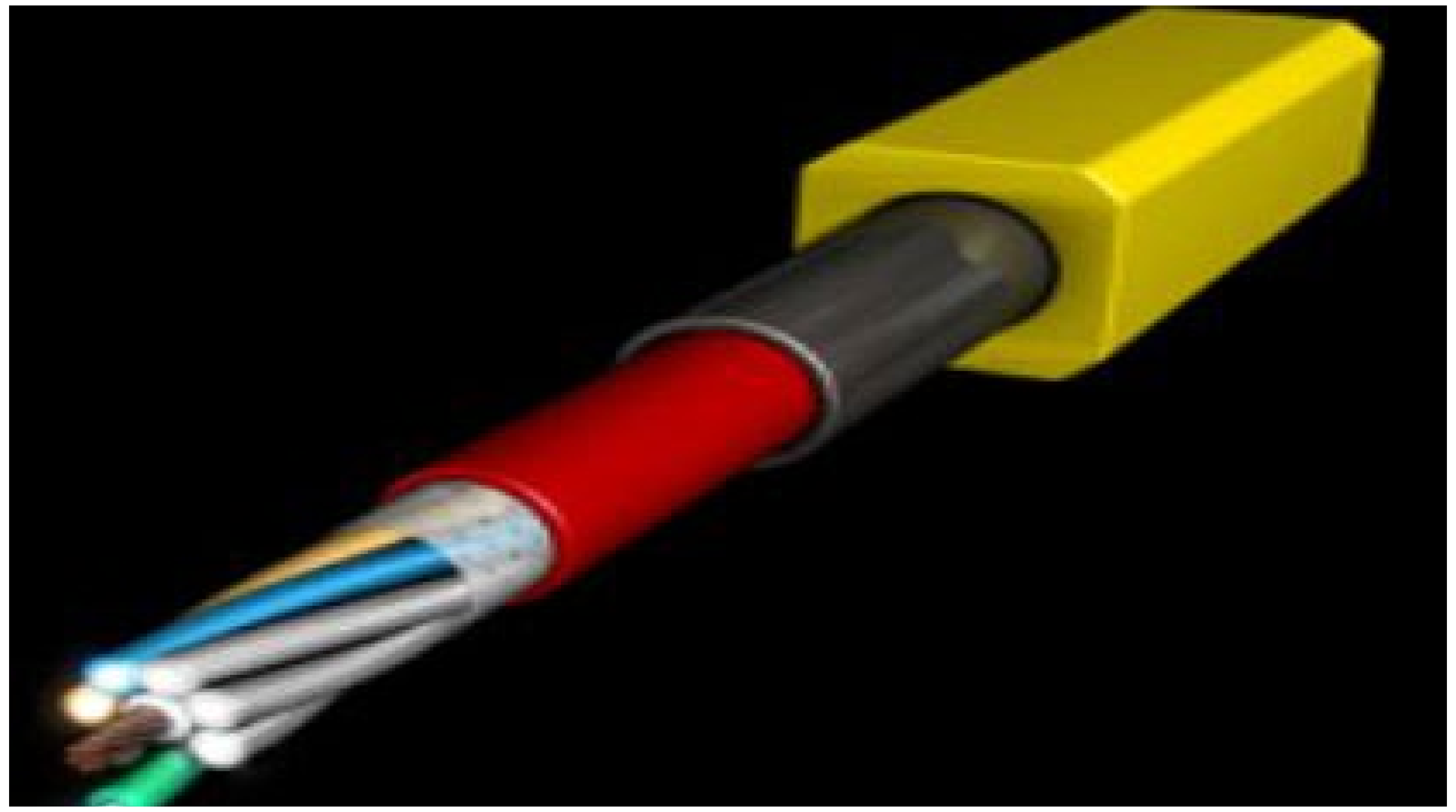
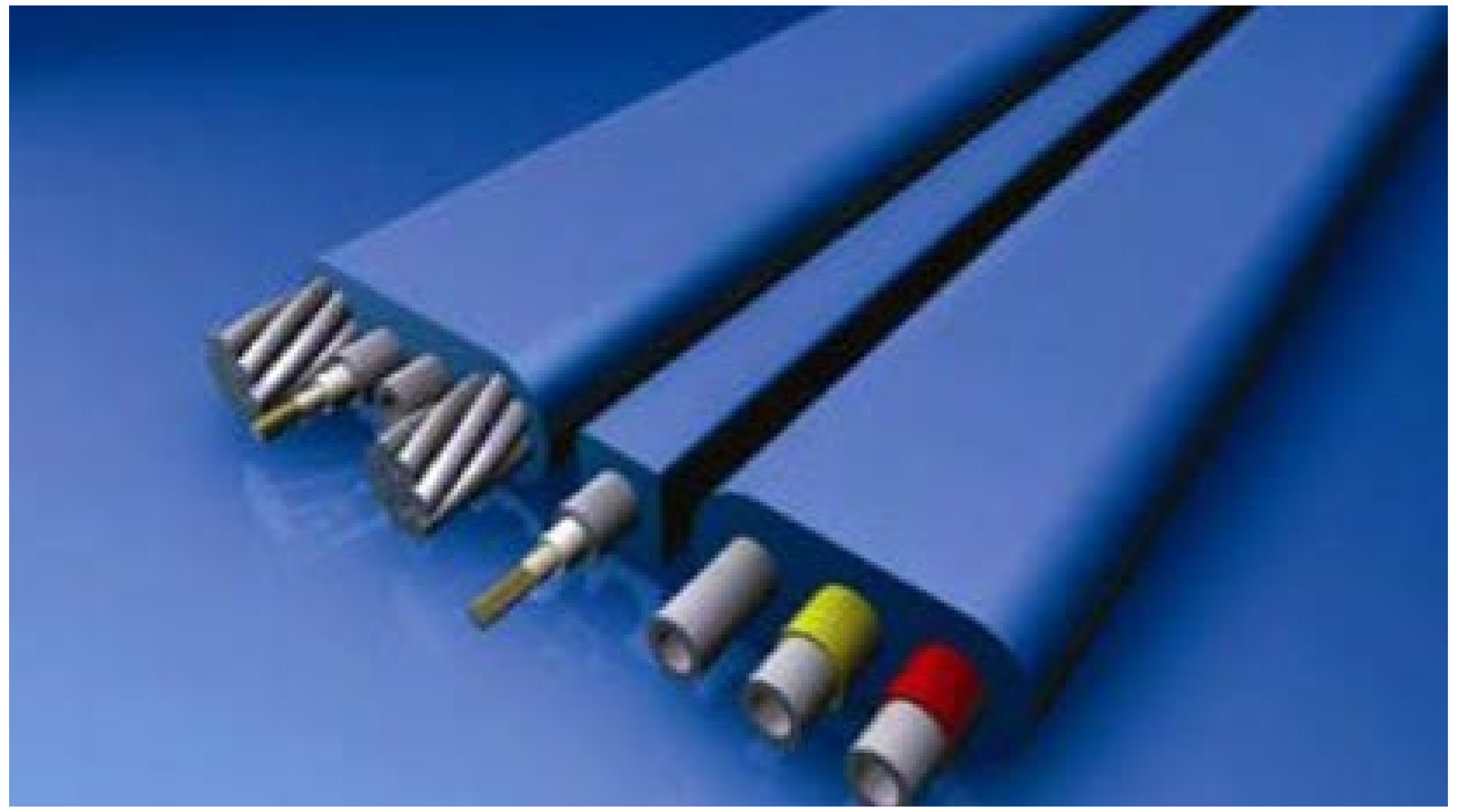
# IWC Cable technical overview

## Permanent Downhole Cable (PDC)



- Constructed with a stranded, insulated conductor within a tubing encasement
- Mechanical support for the conductor is provided through a cold-drawn filter material

## Flat Pack



- Encapsulation outside of the tubing to protect the control line
- Multiple control lines can be consolidated in a flat pack design





Aramco material number: 1. 6000010708
Source: Aramco; TechNavio; Press releases; Team analysis

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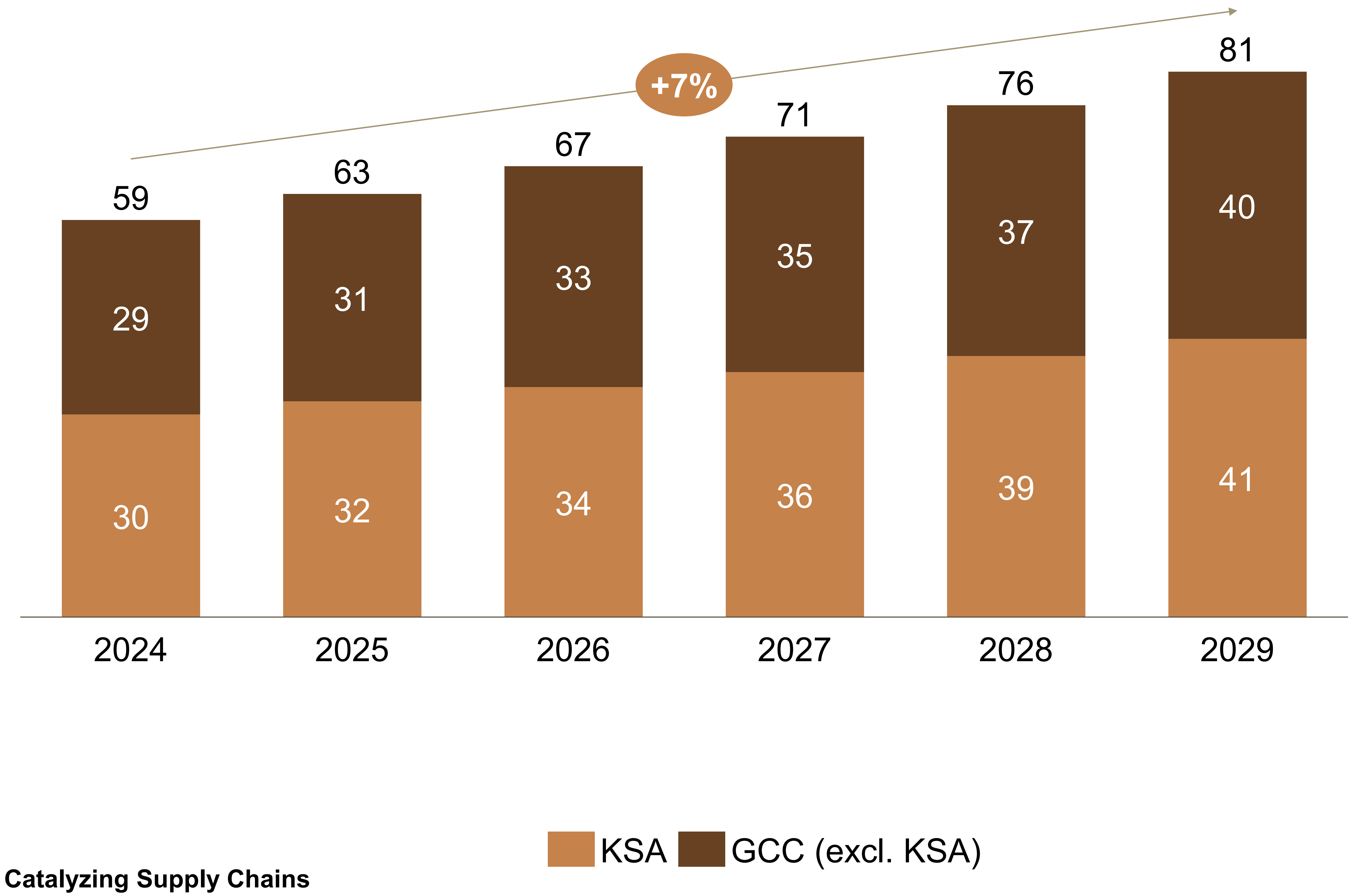
# IWC Cable demand, customers, and drivers

Forecasted KSA and rest of GCC IWC Cable market 2024-2029 ($MM)




## Typical IWC Cable customers in KSA

IWC Manufacturers

## Key KSA demand drivers

- Rise in upstream activity and growth in gas production: bolstered upstream and gas production activities require additional IWC components
- Completions complexity increase: boost in complex well completions increases need for IWCs (specifically IVCs) for zonal isolation and selective production control

**Catalyzing Supply Chains**

Note: $MM = USD Millions
Source: Aramco; Grandview; Press releases; Team analysis

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# Value chain and key localization opportunities

| | R&D | Supplier & Ecosystem Manufacturing | Lifecycle Mgmt. |
|---|---|---|---|
| Local saturation | Few players | Few players | Few players |
| Current KSA value chain | • Conduct IWC Cable R&D for local needs | • Manufacture IWC cable in-Kingdom | • Create service and maintenance hub for IWC Cable |
| | Opportunity | Opportunity | Opportunity |
| **Key success factors** | | | |
| Technology | Prototyping equipment, testing tools available | Extrusion, stranding, armoring, testing equipment available | Field testing equipment available |
| Labor | Mechanical engineers, material scientists available | Mechanical engineers and technicians available | Field engineers, technicians available |

**Catalyzing Supply Chains**

Source: Aramco; Grandview; Press releases; Team analysis

# Subsurface Safety Valves (SSSVs)

*Hani Al Yahya*

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# Opportunity profile – Subsurface Safety Valves (SSSV)

## 1

### KSA in high need of SSSVs to realize ongoing O&G expansion

**Key categories**

Tubing Retrieval SSSV

Wireline Retrieval SSSV

## 2

### SSSV is a growing market, KSA has the largest regional share

**25** — Estimated 2024 KSA market size ($MM)

**5%** — Forecasted 5-year CAGR

## 3

### Attractive investment opportunities for the SSSV value chain

**KSA value chain opportunities**

- R&D
- OEM Mfg.
- Lifecycle Mgmt.

**KSA enablers**

- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes





Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; Mordor Intelligence; Team analysis

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# SSSV technical overview

**Tubing Retrieval SSSV (TR-SSSV)**

**Wireline Retrieval SSSV (WR-SSSV)**

- Safety device installed in the upper wellbore to provide emergency production closure
- Designed to be failsafe such that wellbore is isolated in the event of any system failure or damage to surface production control facilities

**Catalyzing Supply Chains**

Aramco material numbers: 1 6000004087 Note: HPHT = High Pressure High Temperature
Source: Aramco; Mordor Intelligence; Team analysis

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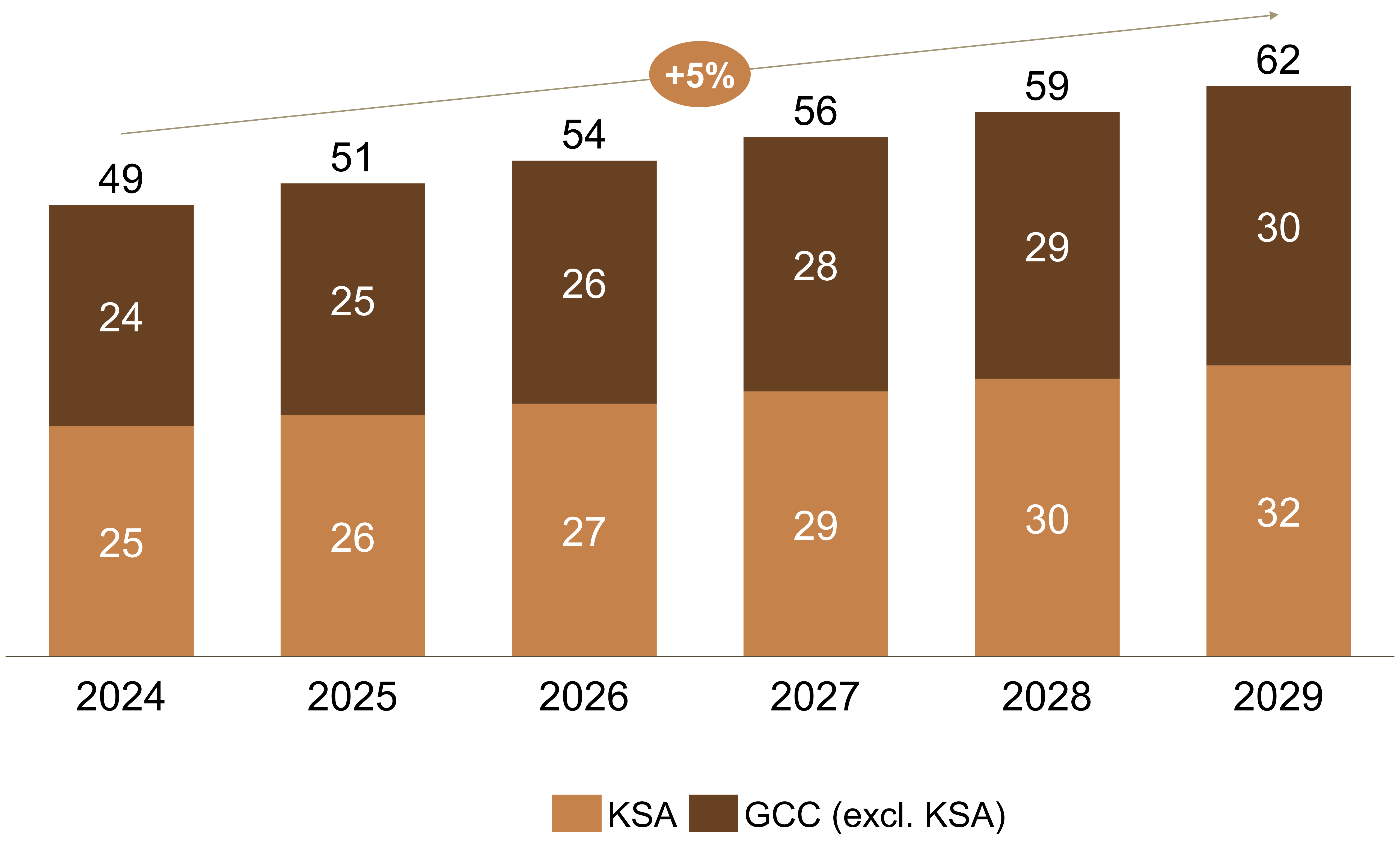
# SSSV demand, customers, and drivers

Forecasted KSA and rest of GCC SSSV market 2024-2029 ($MM)




## Typical SSSV customers in KSA

- Oil producers
- Gas producers

## Key KSA demand drivers

- Rise in upstream activity and growth in gas production: Bolstered upstream and gas production activities require additional SSSV
- Increase in critical areas drilling: Rise in required SSSV installations due to increase in offshore and near populated area well drilling to reduce the safety and environmental impact of any potential incidents

**Catalyzing Supply Chains**

Note: $MM = USD Millions
Source: Aramco; Mordor Intelligence; Press releases; Team analysis

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# Value chain and key localization opportunities

| | R&D | OEM Manufacturing | Lifecycle Mgmt. |
|---|---|---|---|
| Local saturation | Few players | Few players | Few players |
| Current KSA value chain | • Conduct SSSV R&D for local needs | • Manufacture components (e.g., valve bodies, flappers, piston and actuator assemblies)<br>• Assemble and test SSSV | • Establish service hub for SSSV maintenance - incl. HPHT testing, wireline and slackline inspection |
| | Opportunity | Opportunity | Opportunity |
| Key success factors | | | |
| Technology | Prototyping tools and testing equipment available | CNC machines, torque machines, pressure testing eqt. available for import | Torque machines & pressure testing eqt. available for import |
| Labor | Mechanical engineers, material scientists available | CNC operators, machinists, technicians available | Field engineers, technicians available |

**Catalyzing Supply Chains**

Note: CNC = Computer numerical control; SSSV = Subsurface Safety Valve; HPHT = High pressure high temperature; NDT = Non-Destructive Testing
Source: Aramco; Mordor Intelligence; Team analysis

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# Multilateral Completions

*Saud Al Shaheen*

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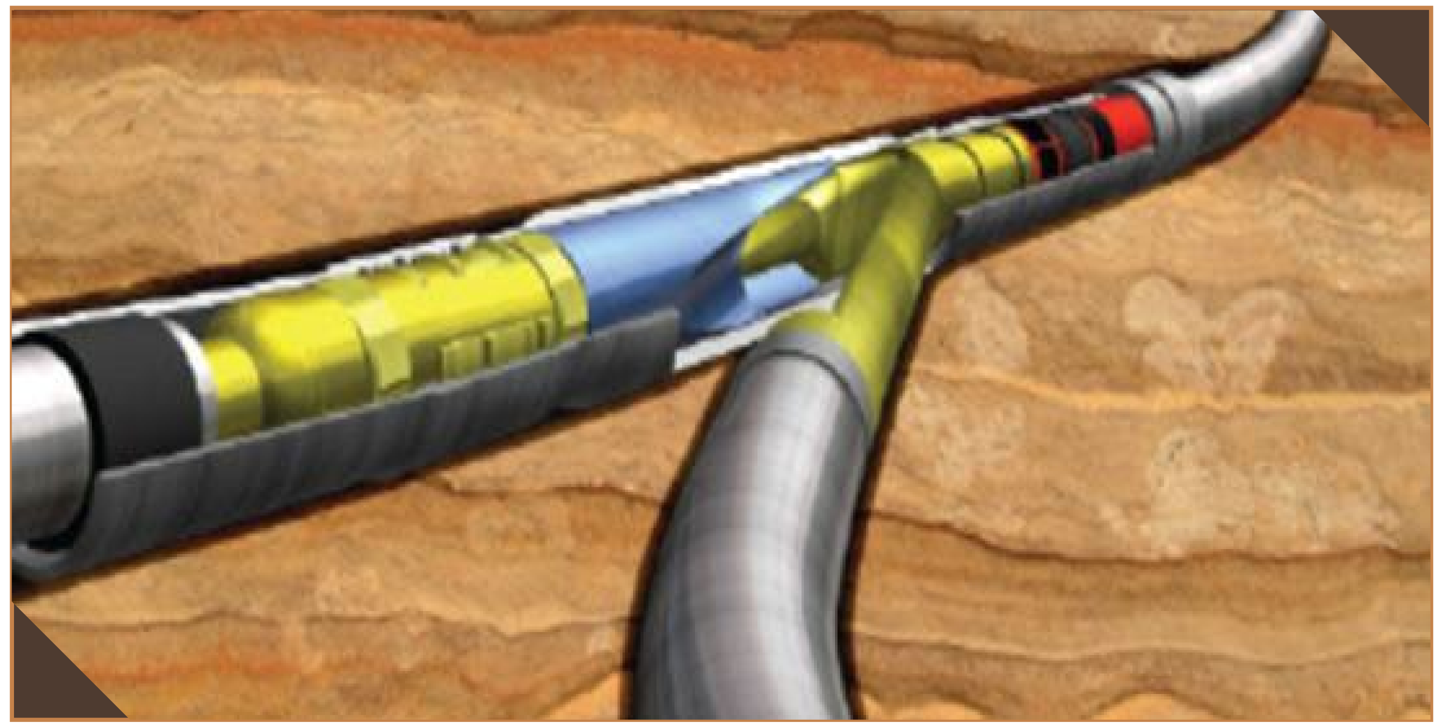
# Opportunity profile – Multilateral Completions (MLT)

## 1
### KSA in high need of MLTs to realize ongoing O&G expansion

**Key categories**



- Whipstock & Mill
- Selective Diverter
- ML Packer

## 2
### MLTs are a growing market, KSA has the largest regional share

**15** Estimated 2024 KSA market size ($MM)

**5%** Forecasted 5-year CAGR

## 3
### Attractive investment opportunities for the MLT value chain

**KSA value chain opportunities**

R&D | Precision Machining | OEM Mfg. | Lifecycle Mgmt.

**KSA enablers**

- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes



**Catalyzing Supply Chains**

Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; Press releases; Mordor Intelligence; Team analysis

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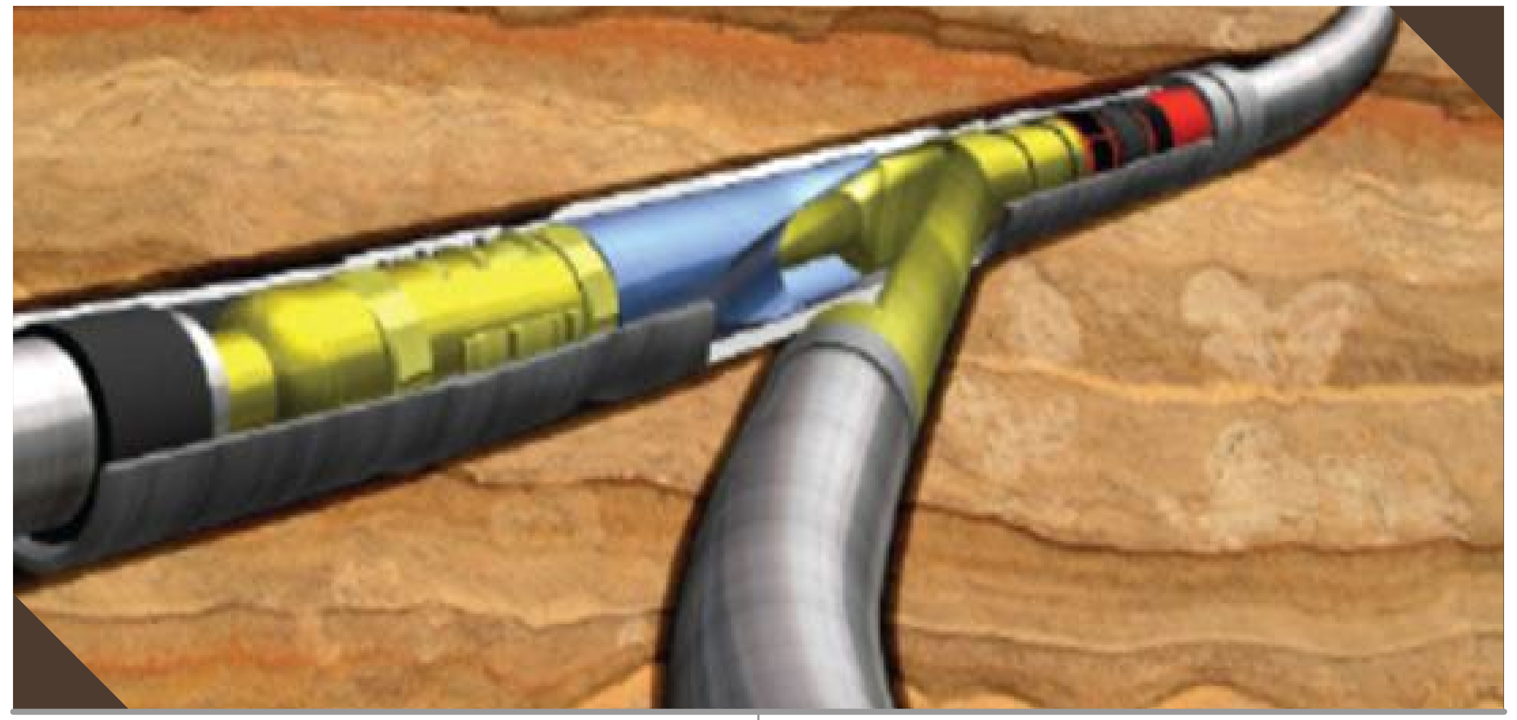
# Multilateral Completions technical overview



| Whipstocks & Mills | Selective Diverter | ML Packers |
|---|---|---|
| • Sidetracking tool used to deviate drill bit from vertical orientation inside the wellbore | • Machined tools to allow access to lateral or motherbore based on ODs | • Special packers to allow separate flow and isolate junction |



Aramco material numbers: 1. 6000015784 2. 6000004089 Note: OD = Outside diameter
Source: Aramco; Press releases; Mordor Intelligence; Team analysis

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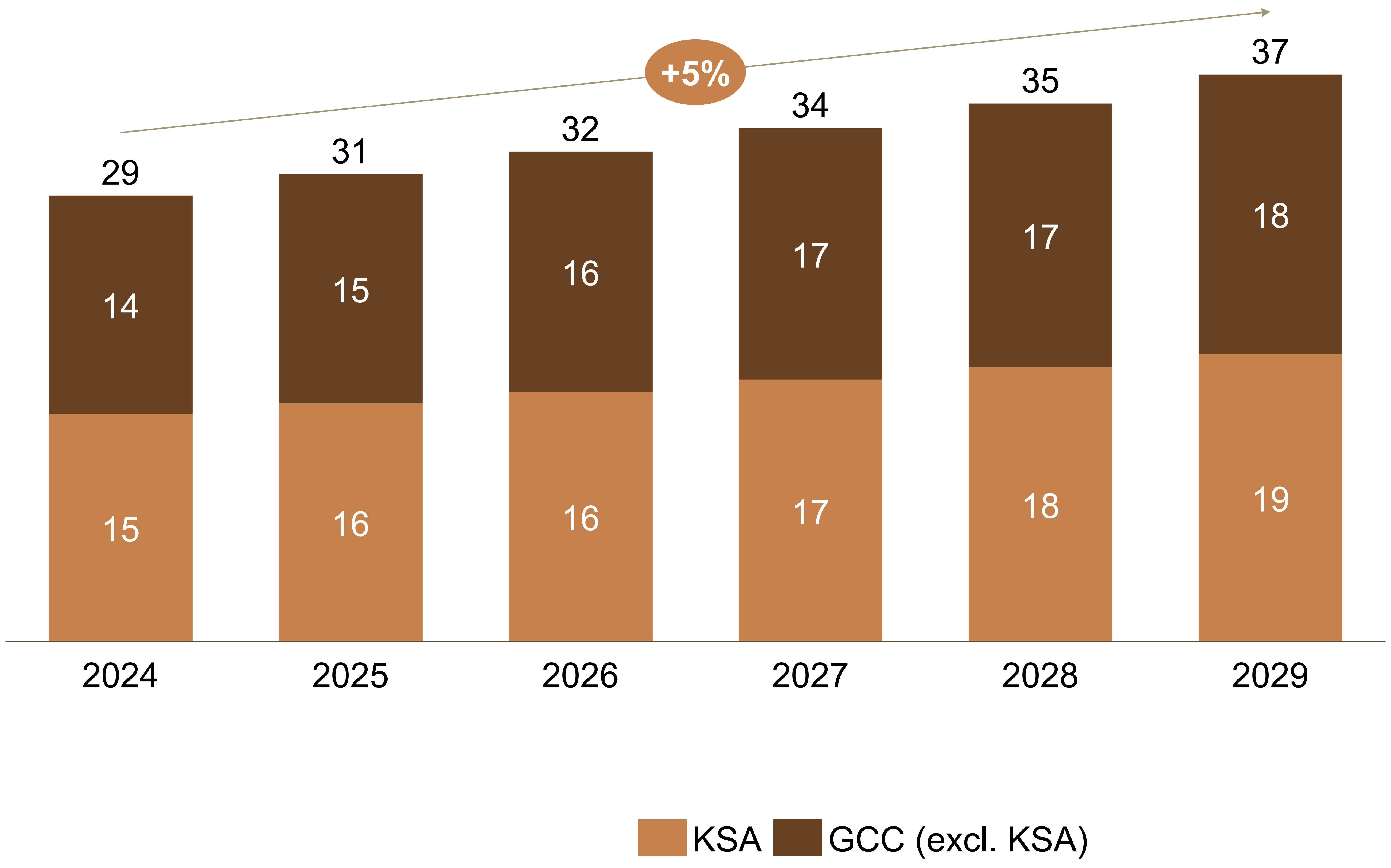
# Multilateral Completions demand, customers, and drivers

Forecasted KSA and rest of GCC MLT market 2024-2029 ($MM)




## Typical MLT customers in KSA

Oil producers

## Key KSA demand drivers

- Rise in upstream activity and growth in gas production: Bolstered upstream and gas production activities require additional MLT systems
- Increasing O&G recovery efforts from mature fields: Creation of additional channels for mature fields requires use of MLT systems

**Catalyzing Supply Chains**

Note: $MM = USD Millions
Source: Aramco; Press releases; Mordor Intelligence; Team analysis

# Value chain and key localization opportunities

| | R&D | Precision Machining | OEM Manufacturing | Lifecycle Mgmt. |
|---|---|---|---|---|
| Local saturation | Few players | Few players | Few players | Few players |
| Current KSA value chain | • Conduct MLT R&D for local needs | • Produce MLT components | • Manufacture MLT completion systems | • Establish service hub for MLT maintenance |
| | Opportunity | Opportunity | Opportunity | Opportunity |
| **Key success factors** | | | | |
| Technology | Prototyping tools, testing equipment available | CNC machines available for import | 5-axis CNC devices, EDM equipment available for import | Installation, surface data acquisition, and testing systems available |
| Labor | Mechanical engineers, material scientists available | CNC operators & machinists available | Machinists & hydraulic technicians available | Field service engineers, technicians available |



Note: VIM = Vacuum induction melting furnace; MLT = Multilateral Completion; CNC = Computer numerical control
Source: Aramco; Press releases; Mordor Intelligence; Team analysis

# Packers

*Deema Al Ghuwainim*

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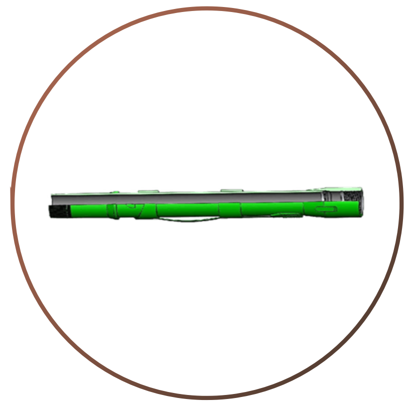
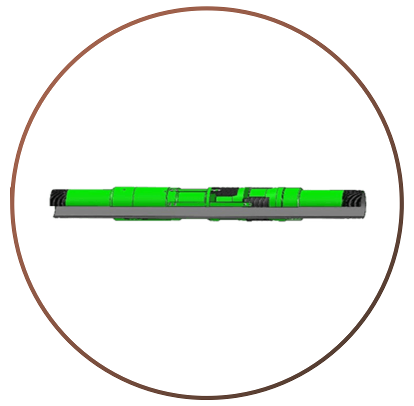
# Opportunity profile – Packers

## 1
### KSA in high need of Packers to realize ongoing O&G expansion

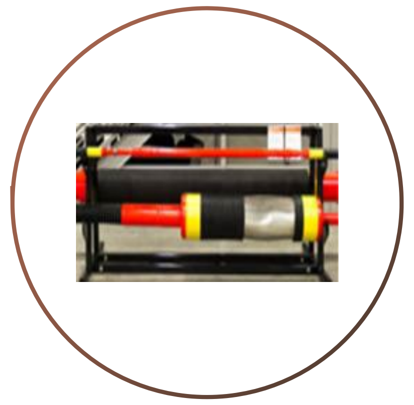
**Types**



Mechanical set



Hydraulic set



Inflatable

Swellable

## 2
### Packer market is growing, with KSA holding the largest regional share

**230** Estimated 2024 KSA market size ($MM)

**5%** Forecasted 5-year CAGR

## 3
### Attractive investment opportunities for the Packers value chain

**KSA value chain opportunities**

R&D | Precision Machining | OEM Mfg.

**KSA enablers**

- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes



**Catalyzing Supply Chains**

Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; Mordor Intelligence; Expert inputs; Team analysis

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# Packers technical overview

## Packers Classification

### Permanent

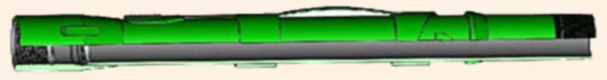
- Installed as long-term equipment
- Only removable in milling operations during workover

### Retrievable

- Packers which incorporate added feature of retrieval during workover operations

## Setting method

### Mechanical set



- Set via tubing movement
- E.g., Set via downward compression motion

### Hydraulic set

- Operates via fluid pressure against a piston
- Piston drives cone in place behind slips

### Inflatable

- Incorporates a bladder inflated with pressure and wellbore fluid

### Swellable

- Packer seals swell after exposure to specific fluids



Aramco material numbers: 1. 6000004047 2. 6000004065 3. 6000004063
Source: Aramco; Mordor Intelligence; Expert inputs; Team analysis

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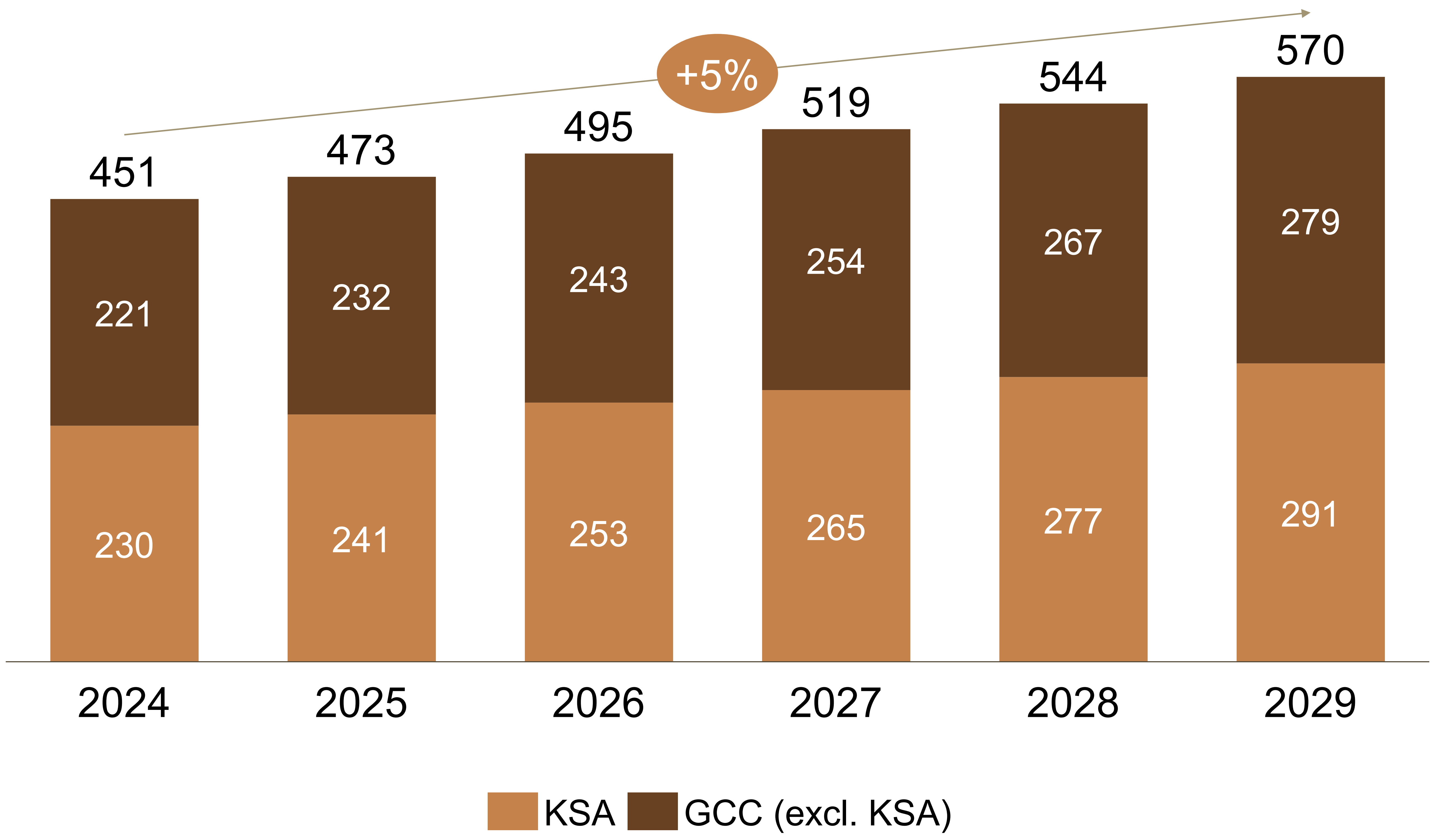
# Packers demand, customers, and drivers

Forecasted KSA and rest of GCC Packers market 2024-2029 ($MM)




## Typical Packers customers in KSA

- Oil producers
- Gas producers

## Key KSA demand drivers

- Rise in upstream activity and growth in gas production: Bolstered upstream and gas production activities require additional packers
- Completions complexity increase: Boost in complex well completions increases need for packers for zonal isolation and selective production control

**Catalyzing Supply Chains**

Note: $MM = USD Millions
Source: Aramco; Mordor Intelligence; Expert inputs; Team analysis

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# Value chain and key localization opportunities

| | R&D | Precision Machining | OEM Manufacturing | Lifecycle Mgmt. |
|---|---|---|---|---|
| Local saturation | Few players | Few players | Few players | Many players |
| Current KSA value chain | • Conduct packers R&D for the regional needs | • Manufacture components (slips, cones, mandrels, etc.) | • Manufacture packers incl. precision machining, assembly and testing | • Operations base to prepare equipment for deployment |
| | Opportunity | Opportunity | Opportunity | |
| **Key success factors** | | | | |
| Technology | Prototyping, testing equipment available | CNC machines available for import | CNC, torque machines & pressure testing eqt. available for import | Torque machines & pressure testing eqt. available for import |
| Labor | Material engineers, materials scientists available | CNC operators & machinists available | CNC operators & mechanical technicians available | Field engineers, technicians available |

**Catalyzing Supply Chains**

Note: HPHT = High Pressure High Temperature; CNC = Computer Numerical Control
Source: Aramco; Mordor Intelligence; Expert inputs; Team analysis

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# Liner Hangers

*Rayan Al Saber*

Catalyzing Supply Chains

Downhole Completions & Supply Chain Ecosystem Workshop

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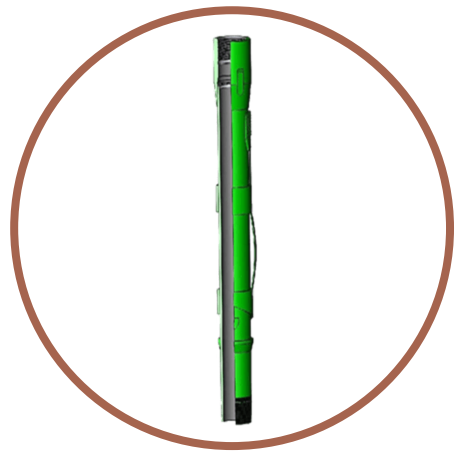
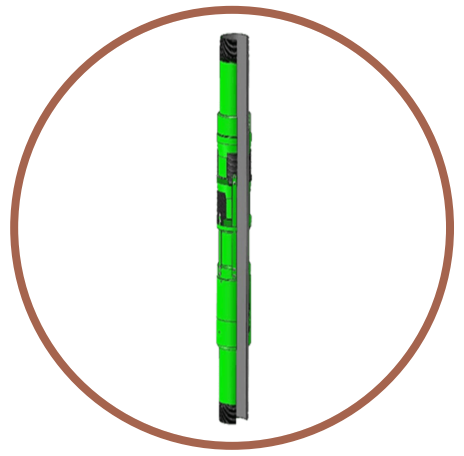
# Opportunity profile – Liner Hangers

## 1
### KSA in high need of Liner Hangers to realize ongoing O&G expansion

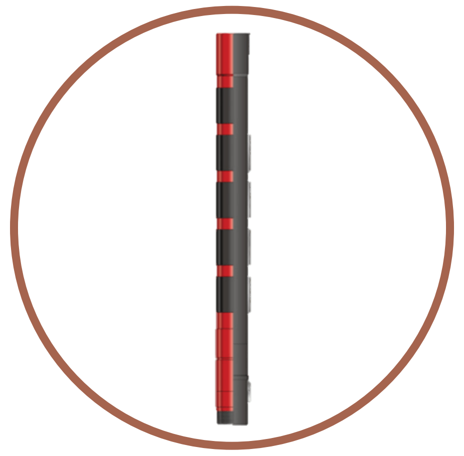
**Types**



Mechanical



Hydraulic



Expandable

## 2
### Liner hangers are a growing market, KSA has the largest regional share

**192** — Estimated 2024 KSA market size ($MM)

**6%** — Forecasted 5-year CAGR

## 3
### Attractive investment opportunities for the Liner Hanger value chain

**KSA value chain opportunities**

- R&D
- Precision Machining
- OEM Mfg.

**KSA enablers**

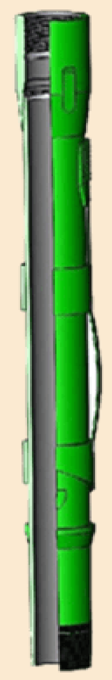
- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes

**Catalyzing Supply Chains**

Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; Mordor Intelligence; Team analysis

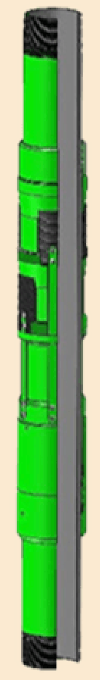
# Liner Hanger technical overview

## Mechanical



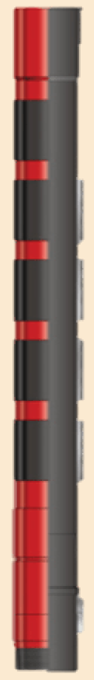
- Attaches to walls of the casing through mechanical mechanism
- Designed for use on vertical and low deviation wells

## Hydraulic



- Attaches to walls of casing through hydraulic pressure mechanism
- Used in offshore, deep onshore, and HPHT wells

## Expandable



- Attaches with bi-directional anchoring capabilities and bi-directional annular seal
- Offers higher tensile and compressive load capabilities for oil & gas wells
- Increased bypass area due to enlarged ID

Aramco material numbers: 1. 6000004041 2. 6000004039 Note: HPHT = High Pressure High Temperature; ID = Inside Diameter
Source: Aramco; Mordor Intelligence; Team analysis





Aramco material numbers: 1. 6000004041 2. 6000004039 Note: HPHT = High Pressure High Temperature; ID = Inside Diameter
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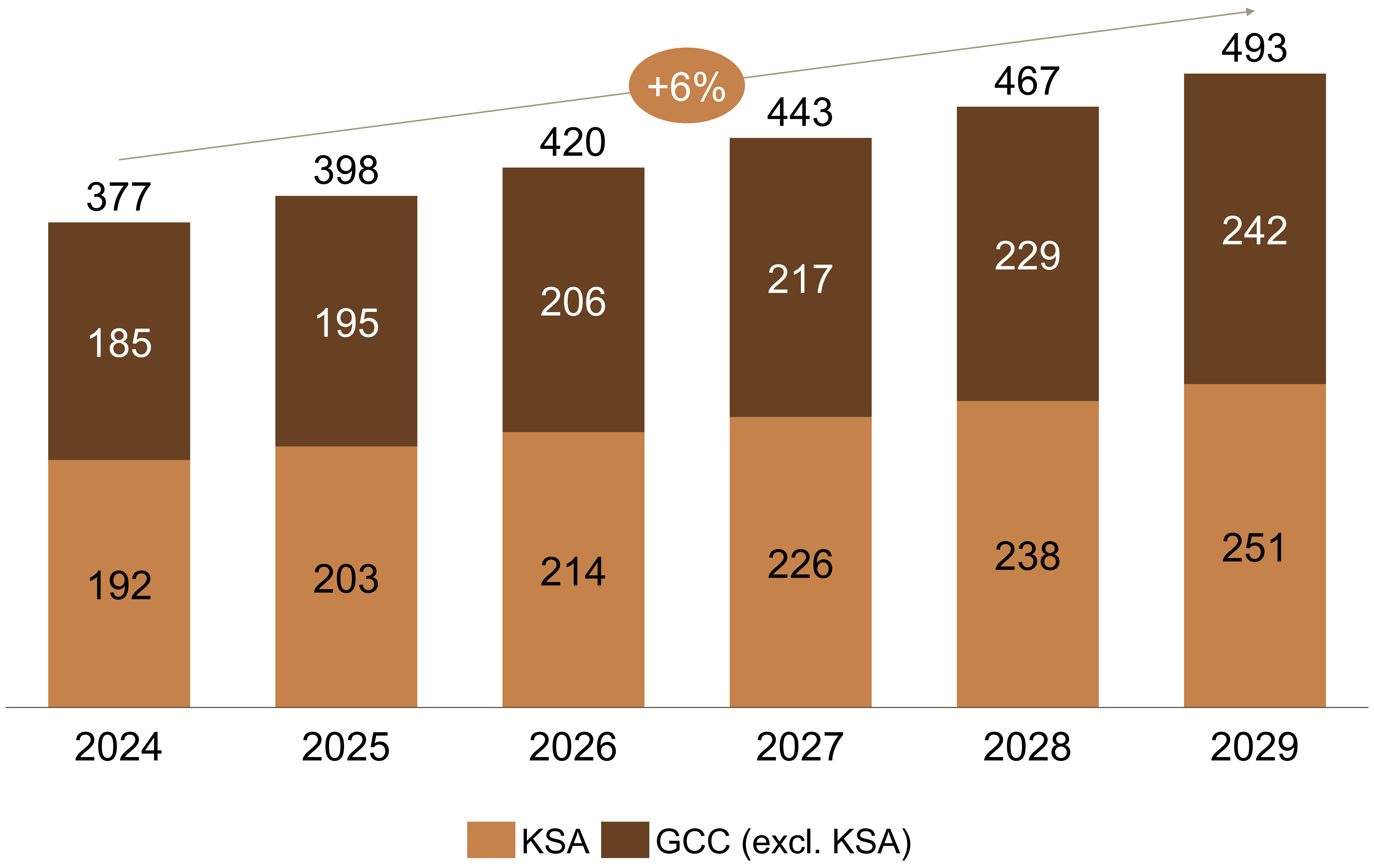
# Liner Hanger demand, customers, and drivers

Forecasted KSA and rest of GCC Liner Hanger market 2024-2029 ($MM)




## Typical Packers customers in KSA

- Oil producers
- Gas producers

## Key KSA demand drivers

- Rise in upstream activity and growth in gas production: Bolstered upstream and gas production activities require additional liner hangers
- Increased gas production for domestic consumption: Sour gas field developments require durable completions

**Catalyzing Supply Chains**

Note: $MM = USD Millions
Source: Aramco; Mordor Intelligence; Team analysis

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# Value chain and key localization opportunities

| | R&D | Precision Machining | OEM Manufacturing | Lifecycle Mgmt. |
|---|---|---|---|---|
| Local saturation | Few players | Few players | Few players | Many players |
| Current KSA value chain | • Conduct liner hanger R&D for local needs | • Manufacture components (e.g., barrels, slip assemblies, cones) | • Manufacture and assemble liner hangers | • Rethread, repair, and surface treat liner hangers |
| | Opportunity | Opportunity | Opportunity | |
| **Key success factors** | | | | |
| Technology | Prototyping, testing equipment available | CNC machines available for import | CNC, torque machines & pressure testing eqt. available for import | Torque machines & pressure testing eqt. available for import |
| Labor | Material engineers, materials scientists available | CNC operators & machinists available | CNC operators & mechanical technicians available | Field engineers, technicians available |

**Catalyzing Supply Chains**

Note: HPHT = High Pressure High Temperature; CNC = Computer Numerical Control
Source: Aramco; Mordor Intelligence; Expert inputs; Team analysis

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# PDC Cutters

*Mohammed Al Othman*

Catalyzing Supply Chains

Downhole Completions & Supply Chain Ecosystem Workshop

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# Opportunity profile – PDC Cutters

## 1
### KSA in high need of PDC Cutters to realize ongoing O&G expansion

**Key types**

Standard

Premium

Super Premium

## 2
### PDC Cutter is a growing market, KSA has the largest regional share

**45** Estimated 2024 KSA market size ($MM)

**4%** Forecasted 5-year CAGR

## 3
### Attractive investment opportunities for the PDC Cutter value chain

**KSA value chain opportunities**

- R&D
- Ecosystem Mfg.
- OEM Mfg.

**KSA enablers**

- Preference for local manufacturing supporting local content goals
- Available financing (SIDF)
- Benefits in industrial parks
- Competitive taxes

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Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; Grandview; Press releases; Team analysis

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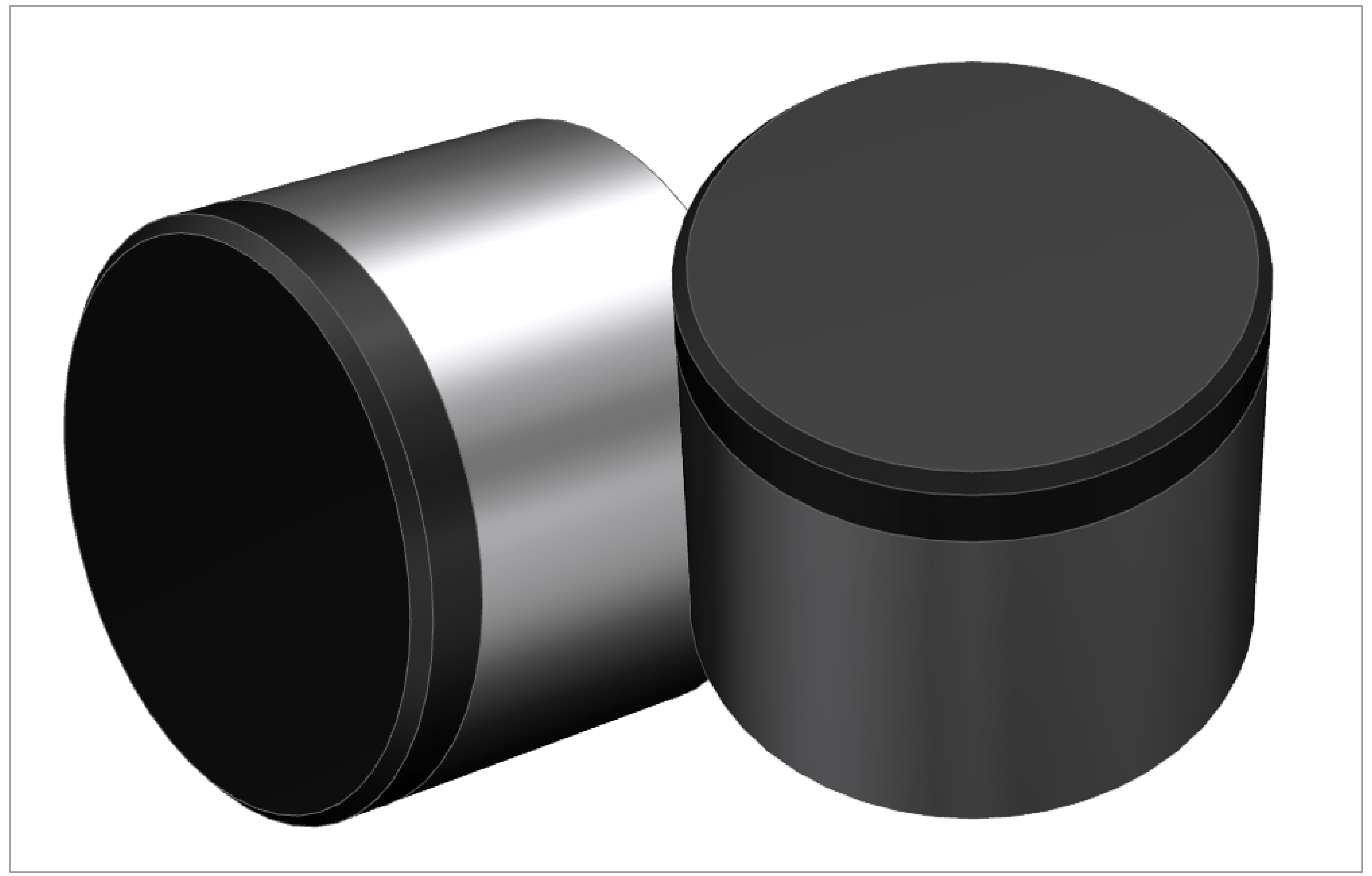
# Polycrystalline Diamond Compact (PDC) Cutters technical overview

| Standard PDC | Premium PDC | Super Premium PDC |
|---|---|---|
|  |  |  |
| • Widely used for conventional drilling applications<br>• Used for soft to moderately hard formations | • Designed for hard formation and abrasive formations.<br>• Commonly used in HPHT conditions | • Engineered for additional durability and anti-chipping features<br>• Used for interbedded and hard formations |

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Source: Aramco; Grandview; Press releases; Team analysis

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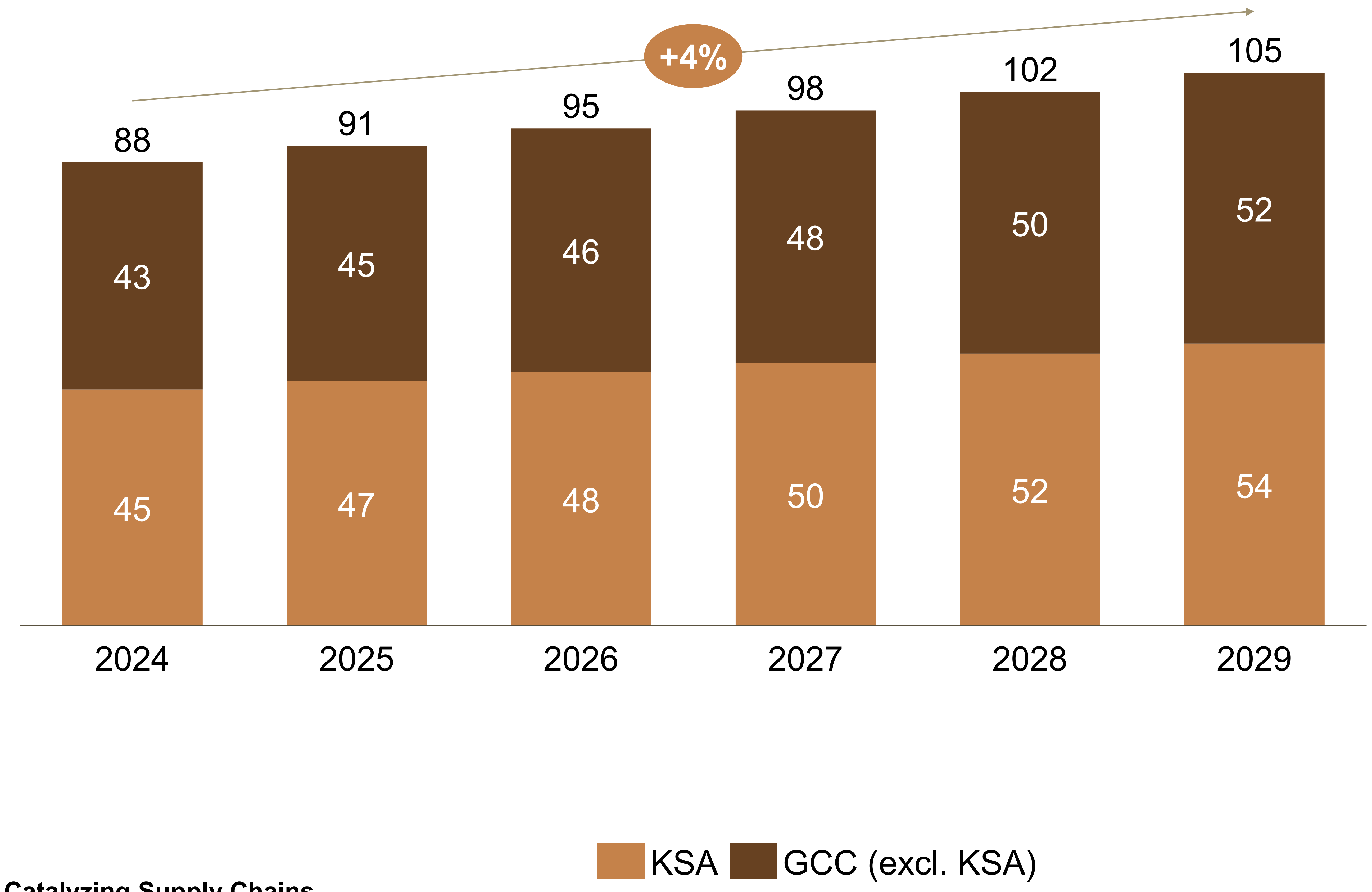
# PDC Cutters demand, customers, and drivers

Forecasted KSA and rest of GCC PDC Cutter market 2024-2029 ($MM)




## Typical PDC Cutter customers

Drill Bit Manufacturers

## Key KSA demand drivers

- Rise in oil, gas & upstream activities: Increase drilling and workover activities requires further use of drilling bits and downhole tools.



Note: $MM = USD Millions
Source: Aramco; Grandview; Press releases; Team analysis

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# Value chain and key localization opportunities

| | R&D | Supplier & Ecosystem Manufacturing | OEM Manufacturing |
|---|---|---|---|
| Local saturation | Few players | Few players | Few players |
| Current KSA value chain | • Conduct PDC Cutters R&D for local needs | • Produce base components, coatings, and brazing materials | • Manufacture PDC cutters<br>• Conduct bit integration |
| Key success factors | Opportunity | Opportunity | Opportunity |
| Technology | HPHT presses available for import, prototyping tools available | Diamond synthesis equipment available for import | Specialized CNC machines, heat treatment furnaces available for import |
| Labor | Mechanical engineers, materials scientists available | Mechanical engineers, technicians available | Production engineers, technicians available |

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Note: HFI = High-frequency induction; NDT = Non-Destructive Testing
Source: Aramco; Grandview; Press releases; Team analysis

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# Precision Machining

*Brian Stolz*



Catalyzing Supply Chains

# Opportunity profile – Precision Machining

## 1
### KSA requires Precision Machining to realize ongoing O&G expansion

**Selected applications[1]**

Packers

Liner Hangers

## 2
### Precision Machining is a growing market, KSA has leading regional share

**180** — Estimated 2024 KSA market size ($MM)

**6%** — Forecasted 5-year CAGR

## 3
### Attractive investment opportunities for Precision Machining value chain

**KSA value chain opportunities**

- R&D
- Manufacturing

**KSA enablers**

- Preference for local manufacturing aligned with local content goals
- Available financing (SIDF)
- Established industrial parks with access to labor & utilities
- Competitive taxes



1. Additional applications listed on technical overview slide; Note: $MM = USD Millions; SIDF = Saudi Industrial Development Fund
Source: Aramco; Mordor Intelligence; Press releases; Team analysis

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# Precision machining technical overview

## Packers

- Requires 4140 material, up to 9" outside diameter / 6" internal diameter, length up to 20 feet
- Utilizes boring, honing, up to 35" CNC lathe turning, CNC mill, and threading

## Liner Hangers

- Requires AISI 4140, Q125, L80, P110 material, up to 19" outside diameter / 17" internal diameter, length up to 20 feet
- Utilizes boring, honing, up to 35" CNC lathe turning, CNC mill, and threading

## Additional potential applications

1. Intelligent Well Completions
2. Subsurface Safety Valves
3. Multilateral Completions
4. Whipstock



Source: Aramco; Mordor Intelligence; Press releases; Team analysis

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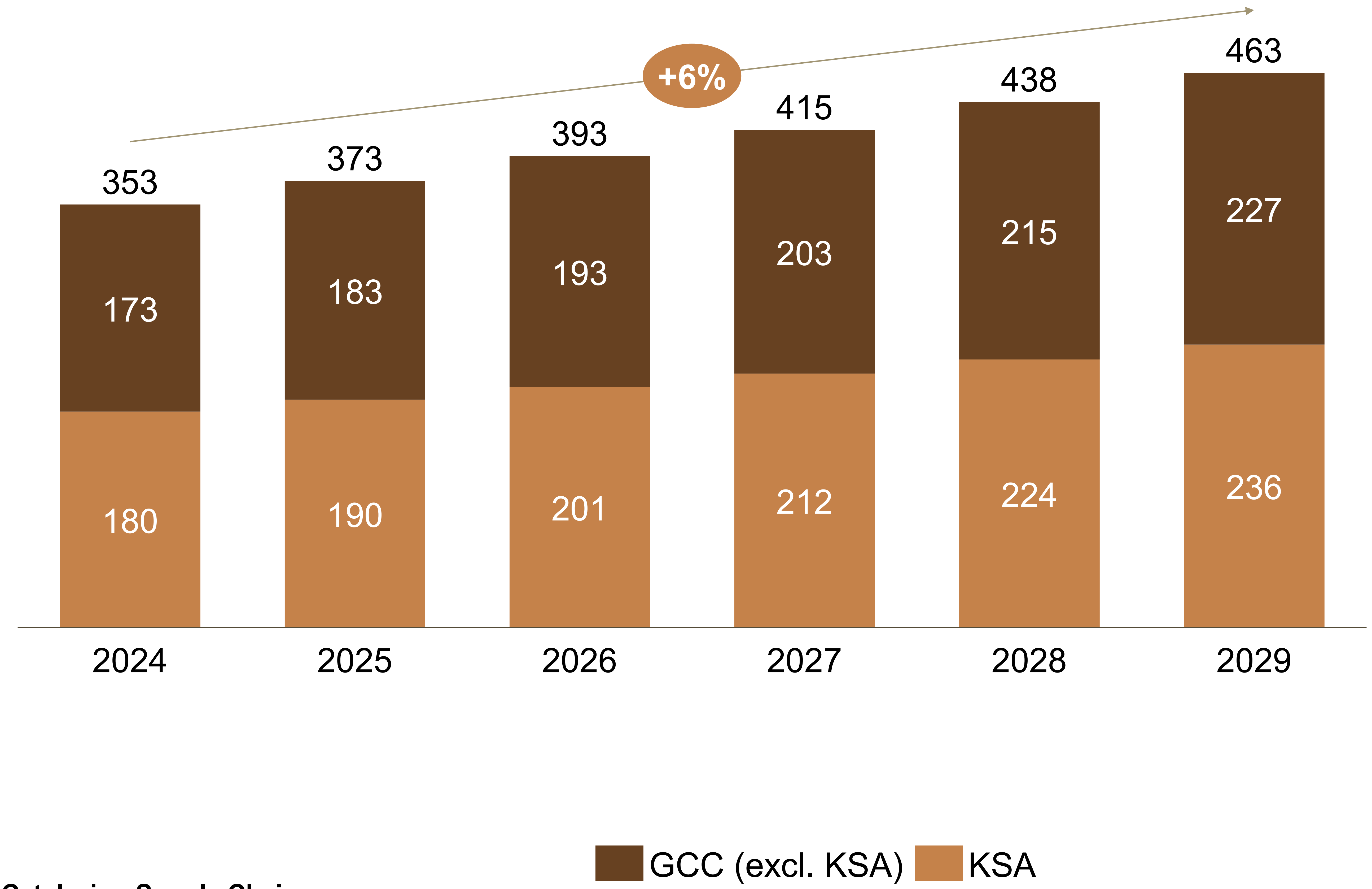
# Precision machining demand, customers, and drivers

Forecasted KSA and rest of GCC Precision Machining market 2024-2029 ($MM)




## Precision Machining customers in KSA

Completions Manufacturers

## Key KSA demand drivers

- Rise in gas & upstream activities: Rising need for precision machining to provide components for increase in gas & upstream activities
- Increase in well complexity: Additional precision machining for increased volume of technically complex components for increasingly complex drilled wells



Note: $MM = USD Millions
Source: Aramco; Grandview; Press releases; Team analysis

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# Value chain and key localization opportunities

| | R&D | Manufacturing |
|---|---|---|
| Local saturation | Few players | Few players |
| Current KSA value chain | • Conduct precision machining R&D for local needs | • Manufacture precision machined products to serve components manufacturing market |
| Key success factors | Opportunity | Opportunity |
| Technology | Material testing equipment available for import | Precision CNC machines, coating equipment available for import |
| Labor | Mechanical engineers, materials scientists available | Mechanical engineers, machinists available |

**Catalyzing Supply Chains**

Note: CNC = Computer numerical control
Source: Aramco; Mordor Intelligence; Press releases; Team analysis

# Please direct Business Opportunities inquiries below:

We invite you to engage with us and send us your Expression of Interest by scanning the QR code or visiting:

**Website: https://iktva.sa/english/opportunities/opportunity-submission-form**

**Email: local-content@Aramco.com**