Transforming Saudi Aramco technology
Our strength continues

261.1 billion barrels of oil reserves
294 trillion scf of gas reserves
1 in 8 barrels of the world’s total crude oil production
5.4 million bpd global refining capacity
We’ve defined a bold vision for the future

In 2020, Saudi Aramco is the world’s leading integrated energy and chemicals company, focused on maximizing value creation across the hydrocarbon chain, facilitating the sustainable expansion of the Kingdom’s economy, and enabling a vibrant Saudi energy sector.
Our strategic objectives
The world’s leading integrated energy and chemicals company by 2020

- Oil and Gas Preeminence
- HC Value Chain Integration
- Technology Leader
- Employer of Choice
- Adaptive Organization
- Kingdom Development
Saudi Aramco technology
Technology development & innovation goals

Alignment
Direction
Focus
Governance

Competitiveness
People & Partnerships
Processes
Kingdom Agenda

Value

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Saudi Aramco technology
Strategic technology direction

Vision
Global leadership in energy-related technology and supporting the creation of a flourishing knowledge economy in the Kingdom

Mission
To deliver commercially viable technology options for Saudi Aramco which provide a sustainable competitive advantage and attain recognition as a leader in the development of energy and chemicals technology
Saudi Aramco technology
A focused, business-aligned research portfolio

GEOLOGY
GEOPHYSICS
DRILLING
PRODUCTION
COMPUTATIONAL MODELING
RESERVOIR ENGINEERING
OIL & GAS TREATMENT
OIL UPGRADING
CHEMICALS
OIL & GAS NETWORK INTEGRITY
FUels/ENGINE TECHNOLOGY
CARBON MANAGEMENT

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Saudi Aramco technology
Ensuring technology alignment with business needs

Establish a technology oversight function

Develop a long term technology outlook

Establish a Technology Portfolio Management process
Saudi Aramco technology
Alignment across the technology lifecycle

Technology Lifecycle

- Technology strategy
- Portfolio Management
- Planning and budgeting
- R&D execution
- Deployment

Co-develop
Steer
Sponsor
Stage-gate
Own

Business Engagement

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Saudi Aramco technology
People | continued growth

Source: Saudi Aramco’s R&D Planning Group

*Estimated
Saudi Aramco technology
People | competencies and demographics

Number of PhD’s have doubled in the last 3 years (173 to 343)
Our people continue to be recognized both internally and internationally.
Saudi Aramco technology
People | developing technology leaders

- Chief Technologist position expanded across R&D
- Research Fellow position introduced
- Established a dedicated Talent Development Group for Technology
- Implemented a global R&D leadership development program to transform our Research Leaders to ‘Business Scientists’
Saudi Aramco technology
Global research network | accessing global talent & innovation hubs
Saudi Aramco technology
Global research network | academic partners
Saudi Aramco technology
Delivery value

Upstream

Downstream

Strategic

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Saudi Aramco technology
Upstream domains | discovery and recovery
Saudi Aramco technology
Upstream domains | discovery and recovery

- SpiceRack
- Borehole Electromagnetic Tool
- Full Waveform Inversion
- Extreme Reservoir Contact
- GigaPOWERS Multi-Billion Cells Simulation
- SmartWater Flooding
- Reservoir Nano-Agents
- Smart Fluids

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Reservoir engineering technology

CO$_2$ enhanced oil recovery project

- CO$_2$ injection facilities construction completed with first injection slated in 2015

- 40 MMSCFD of CO$_2$ will be captured from Hawiyah NGL plant, piped 85 kms

- Baseline production testing without CO$_2$ completed

- Innovative monitoring & surveillance system
Saudi Aramco technology
Downstream domains | maximizing value

- Supercritical Water Upgrading
- Membrane technology for NG Upgrading
- Heavy Reformates to Xylenes
- Saudi Aramco Inspection Robot (SAIR)
- SuperButol™
- Demetallized Oil Hydrocracking catalyst
- Crude to Chemicals
- Shallow Water Inspection & Monitoring Robot (SWIM-R)
Oil upgrading technology
CAN-15 Hydrocracking Catalyst

- Jointly developed hydrocracking catalyst capable of increased diesel and liquid products yields
- Successful 7% loading demonstration in Riyadh Refinery Hydrocracker Unit in 2014/2015
- Deployment at Riyadh Refinery planned for 2016
Chemicals technology
High severity fluidized catalytic cracking technology

• Jointly developed by Saudi Aramco, KFUPM and JX Nippon Oil & Energy- licensed through Axens

• Successful demonstrated at 3000 BPD in 2011 (Mizushima, Japan)

• 76 MBD S-Oil HS-FCC unit commercial operations expected in 2018-Q2
Saudi Aramco technology
Strategic domains | sustainability

Gasoline Combustion Ignition (GCI)

Oxycombustion

Mobile Carbon Capture

Carbon Capture MOF’s

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Saudi Arabia Advanced Research Alliance (SAARA)

- Promotion of intellectual property commercialization and technology deployment in the Kingdom

Saudi Company for Research Elements (SARE)

- Supply chain management services, procuring research materials and equipment for both public sector and industry
Saudi Aramco technology
Innovation | Our competitive edge in a rapidly changing world

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US Patent & Trademark Office Top Assignees - Oil & Gas

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Conclusion

**Alignment**
- Focused mission & vision
- Clear structure
- Business engagement

**Competitiveness**
- Growth of talent & partnerships
- Process streamlining
- Kingdom’s knowledge ecosystem

**Value**
- Timely R&D execution
- Effective deployment
Bringing technology to life