



The Future of Petroleum Engineering in a Changing Energy Landscape

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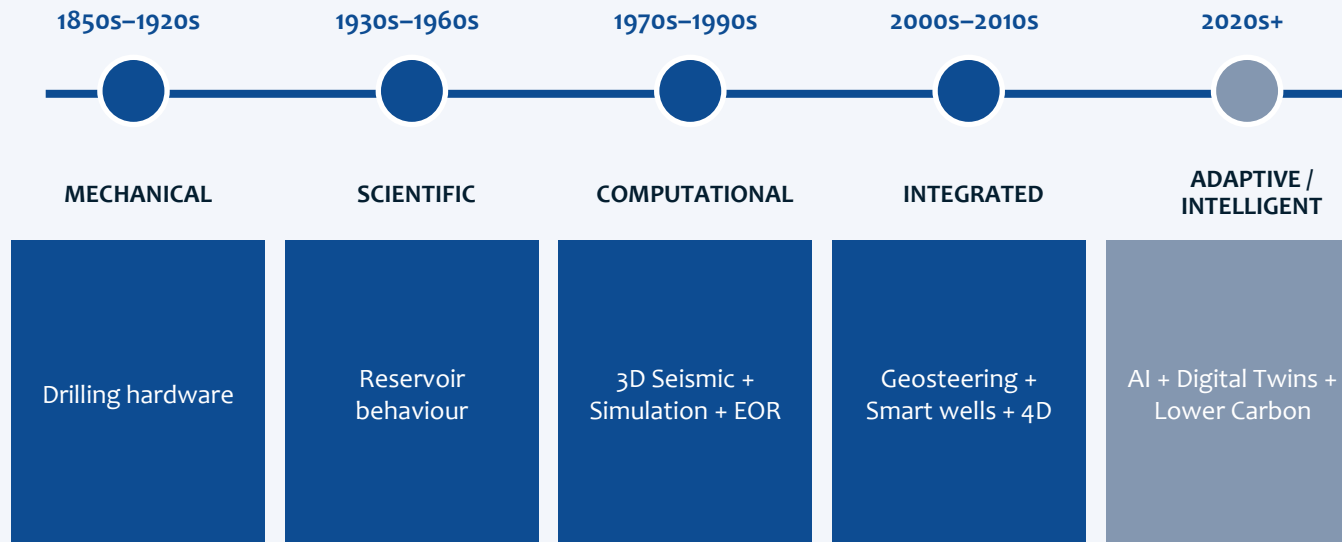
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The Future is
Adaptation

A History of Reinventions

The Petroleum Industry Has Never Been Static

Each era expanded what petroleum engineers could see, model, control and optimise



Petroleum engineering survives by expanding its problem-solving capability, not by preserving a fixed toolset



Enduring Relevance

Petroleum is more than fuel. Value to the society is currently unmatched



Petroleum supports human societies at enormous scale

Energy

- ▶ Mobility
- ▶ Heat
- ▶ Power

Materials

- ▶ Polymers
- ▶ Coatings
- ▶ Rubber

Health

- ▶ Tubing / Drugs
- ▶ PPE / Equipment Components
- ▶ Packaging / Consumables

Infrastructure

- ▶ Bitumen
- ▶ Lubricants
- ▶ Insulation

Thousands
of products
are derived
from
petroleum

Alternatives?

Scale **X**
Performance **X**
Reliability **X**
Affordability **X**

Petroleum displacement is not one problem.

It involves replacing multiple functions, markets, infrastructures, and supply chains

Disruption & Changing Landscape

The world is changing, but energy sources are being expanded, not reduced

Demand, technology, policy and geopolitics are moving simultaneously, *often in opposite directions*

Transition is increasingly energy expansion

Rising Demand

1

Population, development and AI

Decarbonisation

2

Climate, methane and carbon constraints

Selective Capital

3

Returns, policy (ESG) and project risk

Digital Disruption

4

AI, automation and new operating models

Energy Security

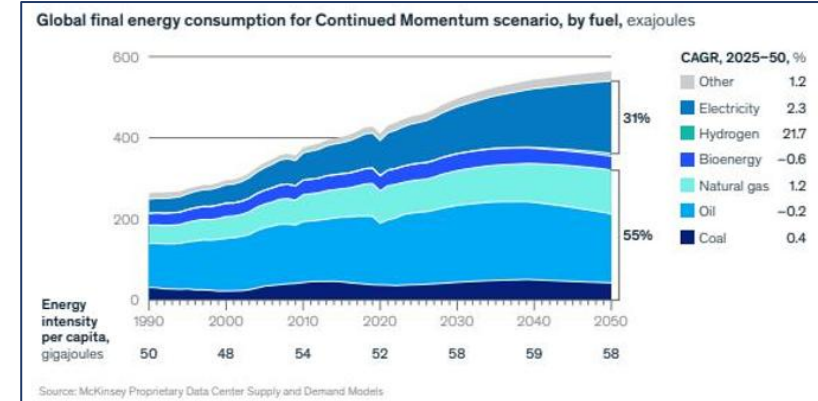
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Reliability, resilience, routes and domestic supply

Social Licence

6

Trust, talent and community expectations



The transition is neither a straight line away from hydrocarbons nor permission for business as usual

Energy Pentalemma

The energy trilemma is now a five-part test of competing requirements

Technology choices must balance engineering performance, economics, environmental impact and human needs

→ Total System Economics



Optimise the complete value chain, not a single technology in isolation



Energy Transition: The Nigeria Reality

Nigeria requires a development-compatible transition

The priority is to convert abundant resources into affordable energy, industrial value and improved living standards

A just pathway must connect resource wealth to energy access and industrialisation

Petroleum engineering is essential for actualising this pathway

Resource Wealth

37.01* Crude Oil Reserves
billion barrels  #11

215.19* Proven Gas Reserves
trillion cubic feet  #9

10 bscfd 2027 Gas Production Target

12 bscfd 2030 Gas Production Target

23 High Potential Gas Hubs (NGMP 2026)

Global Expectations

Lower emissions and credible governance

Chronic Energy Poverty

Unmet household and industrial demand

Use gas + lower-carbon energy to expand access, support industry and build optionality

* NUPRC (as of 1 Jan 2026)

Launching the Future

“Doing more with less” should become the industry mantra



The first **future** of petroleum engineering is better **petroleum engineering**

Methane >>> Detect, quantify and repair

Flaring >>> Recover, aggregate and commercialise

Energy Use >>> Electrify selectively, integrate renewables

Asset Integrity >>> Predict failures, extend useful life

Wells & Reservoirs >>> Reduce NPT*, maximise responsible recovery

Water & Waste >>> Reuse, reduce and close loops

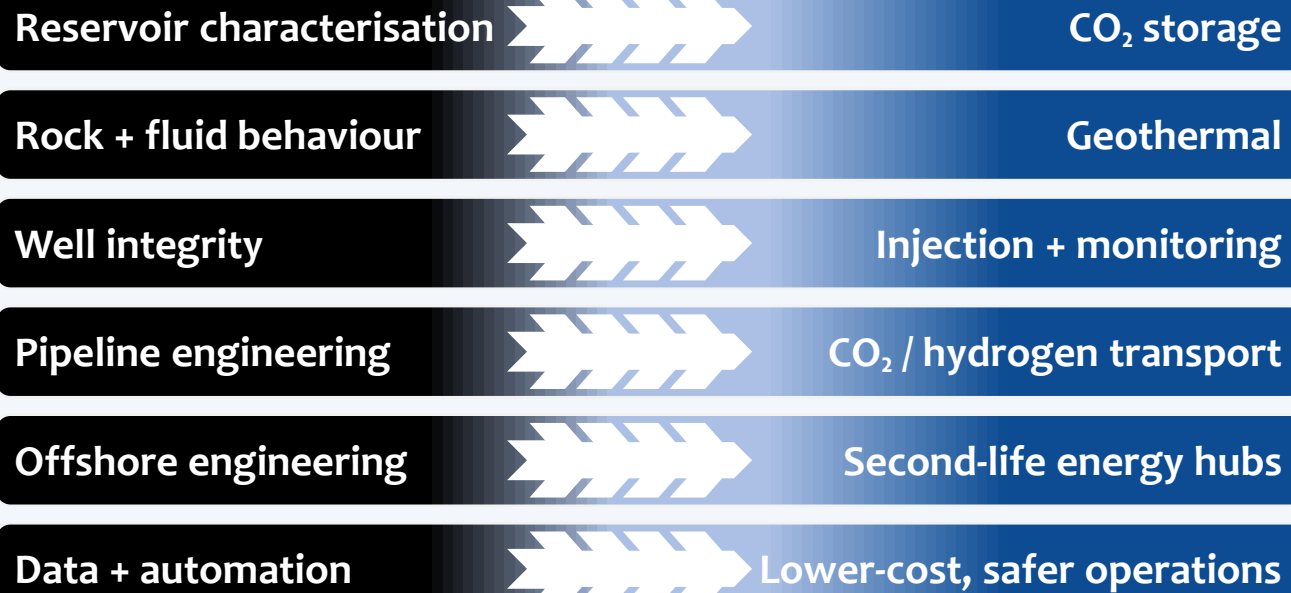
Every avoided leak, failed well, wasted molecule or unplanned shutdown saves cost and reduces environmental impact

Evolving the Future

The profession's boundaries are expanding to new frontiers

We should expand the frontiers of petroleum engineering without abandoning its core

Subsurface and flow-system expertise can migrate into new energy domains



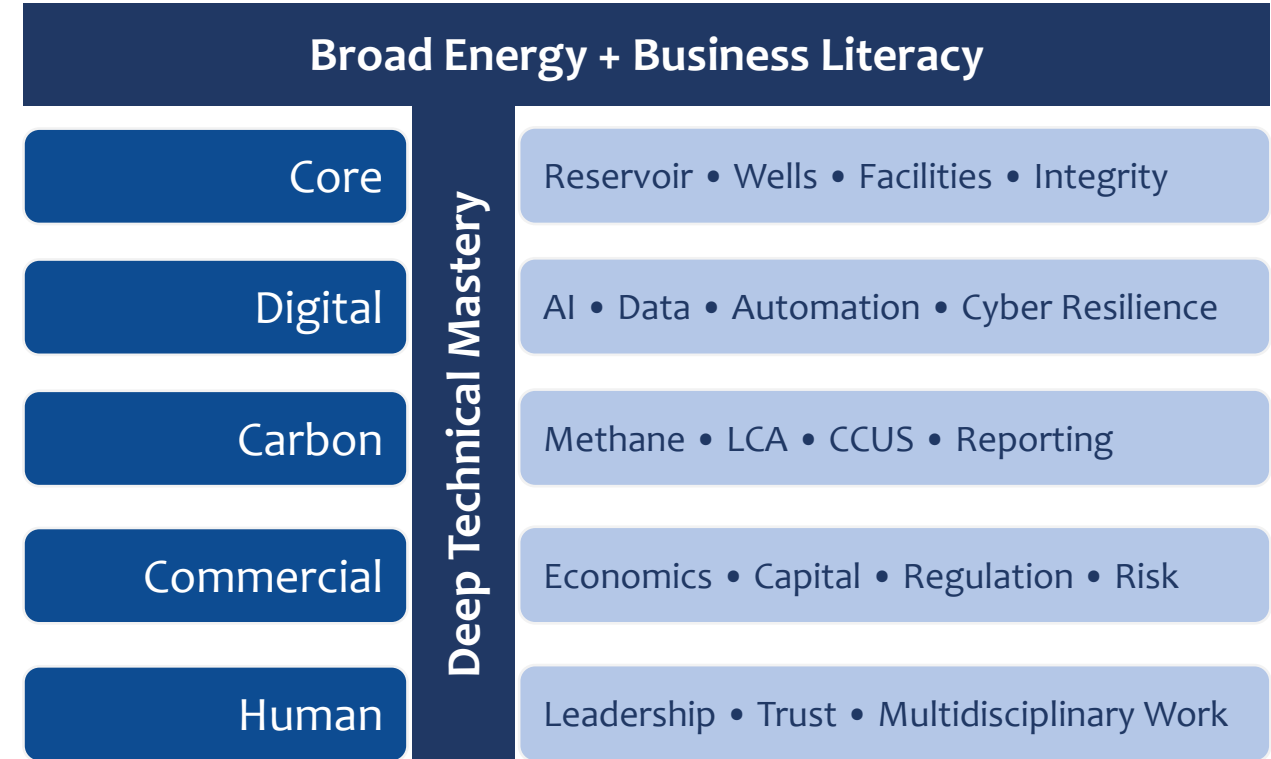
Economics and compatibility of adjacent frontiers needs to be engineered, not assumed



Future-Ready Professionals

The T-shaped energy professional is ready for whatever the future holds

Deep expertise remains essential, but resilience comes from digital, commercial and systems capability with strong human judgement



The differentiator is the ability to connect technical decisions to economic, environmental and behavioural consequences

*LCA – Life Cycle Assessment; CCUS – Carbon Capture, Utilisation and Storage

McKinsey & Company, Global Energy Perspective 2026

The Future is Adaptation

The future of petroleum engineering is not secured by defending yesterday

“Doing More With Less”

- More useful energy
- Fewer wasted resources
- Lower impact
- Stronger resilience

Secure the future by delivering useful energy today while building the capabilities, options and trust required for tomorrow

Professionals	Universities	Companies	SPE
Deepen, Digitise, Diversify	Modernise the curriculum	Decarbonise and future-proof	Connect knowledge across disciplines
▶ Preserve technical depth ▶ Build digital fluency ▶ Understand carbon and sustainability ▶ Learn economics and human behaviour ▶ Work across disciplines	▶ Retain subsurface rigour ▶ Incorporate energy systems, computing, and sustainability ▶ Build interdisciplinary laboratories and projects	▶ Reduce emissions from current operations ▶ Invest selectively in adjacent capabilities ▶ Future-proof infrastructure ▶ Reward learning and experimentation	▶ Protect the profession’s technical foundations ▶ Expand its energy mandate ▶ Create pathways for reskilling and cross-disciplinary collaboration

We would help the world change
without sacrificing energy security, affordability or human development

Thank You

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