



Sustainable
Technology Solutions

PRIMER

Supplement





Why Read This Primer

KBR (Kellogg Brown & Root) has a rich history of more than 100 years in the energy industry. In 2014, KBR began a strategic shift, and the “new” KBR as we stand today emerged in 2020. In this report, we examine the strategies which have driven this shift, with a specific focus on the Sustainable Technology Solutions (STS) segment.

We see STS as a significant growth vector for KBR driven by the Energy Trilemma. We will introduce each of STS’ differentiated product and solution lines and outline the market drivers for each.

KBR does many amazing things and is helping solve some of the world’s toughest challenges, including climate change, energy security and energy transition. Recent growth in STS has created more interest and attention around this segment specifically. This Primer Supplement is meant to complement the Primer Webinar.

Key Takeaways

- Sustainability is at the heart of KBR’s vision and strategy.
- Digital innovation, deep domain expertise and proprietary technologies are capability sets used across KBR.
- KBR is up-market, innovative and future-focused. KBR is no longer a construction company and no longer has the risk appetite for work on lump sum turnkey contracts.
- STS comprises two major product/solution lines (PSLs). The Sustainable Technologies PSL provides 80-plus licensable proprietary technologies. The Sustainable Solutions PSL provides world-class, award-winning digitalized engineering solutions.
- Both the Technologies and Solutions PSLs are high growth, high margin and low capital intensity and aligned to strong end markets with growing market share.
- STS provides solutions across the full asset lifecycle from end-to-end. Our support starts from ideation and continues all the way through plant startup and beyond.
- Customer centricity is part of the success story at KBR, and we do work that matters for our customers and their missions.

Table of Contents

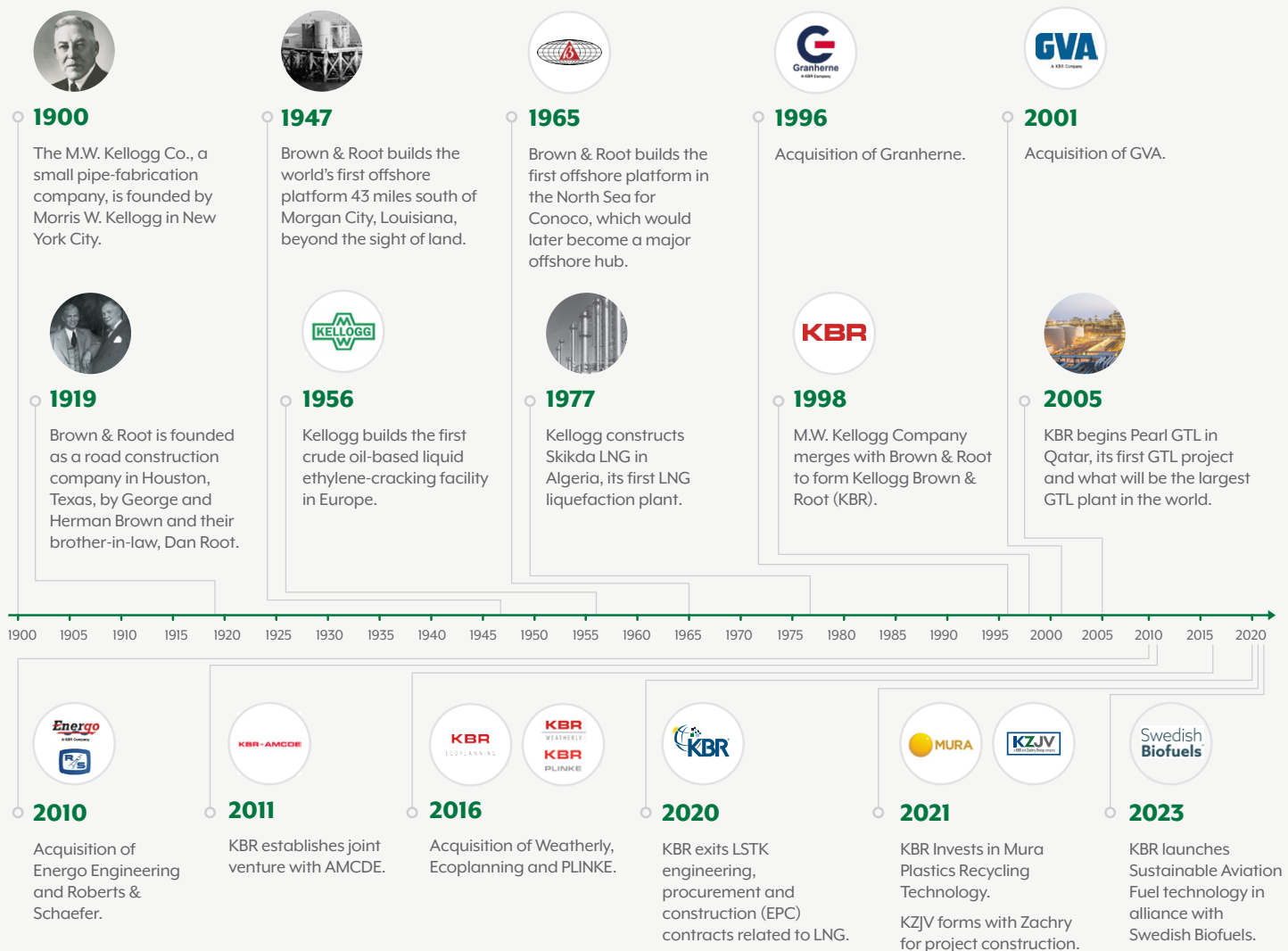
4	Introduction
6	Sustainability Vision
9	Organization and Offerings
11	Product and Solution Lines
11	Sustainable Technologies
12	Sustainable Solutions
13	Profit Streams
14	Energy Market Vectors
15	Clean Ammonia and Hydrogen
17	Sustainable Petrochemicals
19	Plastic Waste Recycling
21	Low-carbon Refining and Biofuels
23	Inorganic Chemistry
25	Next-gen LNG
26	Digital Capabilities Highlights
30	Global Diversification
31	STS Future
32	Glossary
33	Appendix

Introduction

KBR was at the forefront of the fossil era and is today at the forefront of the renewables era

KBR delivers science, technology and engineering solutions to governments and companies around the world. We employ a diverse workforce of approximately 34,000 people worldwide. The company's reporting segments include Government Solutions (GS) and Sustainable Technology Solutions (STS).

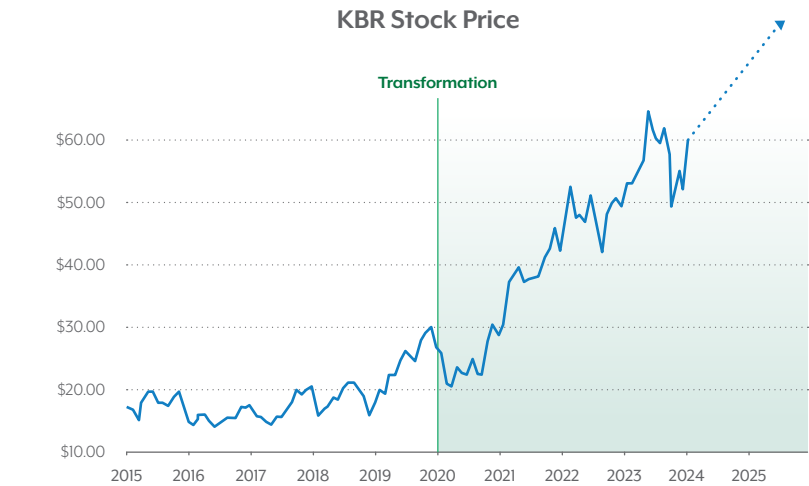
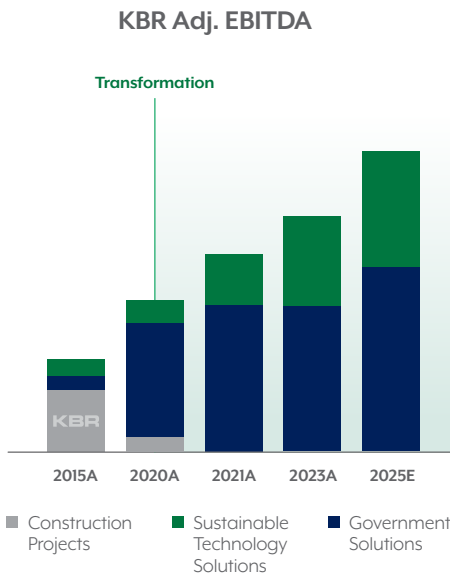
KBR has a long, proud history dating back to 1901. Over time, the world has changed, the energy industry has evolved, and the company has advanced with it. KBR has been a leader in energy industry engineering solutions for more than 100 years. Some notable achievements include designing the first catalytic cracking technology as well as the first crude oil liquid ethylene cracking technology. KBR also constructed the world's first offshore platform in 1947.





In 2014, when Stuart Bradie joined as CEO, Construction made up 75% of KBR activity, while Technology and Government Services combined only made up 25%

In 2020, KBR went through a strategic shift and reorganized into two business segments: GS and STS. KBR also formally exited commoditized services (including construction) and announced the strategic shift away from lump sum turnkey-type contracts and the related high-risk, capital-intensive requirements. The company continued investment in high-end, sustainability-focused proprietary technologies. Today STS continues to grow and is approximately 40% of the company's profits.



The STS segment of today provides sustainable solutions which enable clients to produce cleaner, safer and more energy-efficient products in a number of critical market vectors, all through a whole lifecycle approach.

What has not changed is our industry-leading expertise and the fact that we are leading the way toward a more sustainable future through our innovative solutions. With our culture of agility and delivery focus, we continue to add value to our clients and do work that matters.

Sustainability Vision

Sustainability is at the heart of KBR's mission and strategy.

KBR received the coveted AAA designation in MSCI's 2023 ESG Ratings. The AAA rating is MSCI's highest and is given to companies that are leading their industries in managing the most significant ESG risks and opportunities

*We strive to create a safer, more secure and **sustainable** world by bringing together the best and brightest to deliver technology and solutions that help our customers accomplish their most critical missions and objectives.*

More and more, sustainability is becoming a critical issue across society. In response, a growing number of countries and companies are targeting carbon neutrality and/or net-zero carbon emissions. KBR is uniquely positioned to bring differentiated, sustainability-focused technologies and solutions to bear across all sectors, helping those countries and companies achieve both their business and ESG goals.

KBR believes that each one of us has a responsibility to do the right thing and make decisions that count to safeguard our people, our customers, our planet, and the communities where we live and work. Our primary goal when it comes to our people, customers and partners is to ensure everyone returns home safely at the end of each day. That commitment is the foundation of our Zero Harm culture. We expanded that culture to include our sustainability platform which comprises ten key pillars.





At KBR, we believe that a commitment to sustainability includes using our capabilities and expertise to help our customers accomplish their sustainability goals, thus creating value for all our stakeholders. It is the people of KBR that are advancing this strategy, including more than 10,000 STS employees located across three major global hubs in India, the U.K. and the U.S. Our technical expertise is recognized internally through our ONE KBR Technical Fellows Program and externally through industry-leading technical journals.

Sustainability is a pillar of our corporate culture, and we believe in walking the talk. As such, we have been carbon neutral since 2019. In 2020, we committed to the UN Global Compact. Going forward we have set targets to become operationally net-zero carbon emissions by 2030.



KBR's commitment to sustainability includes engaging with our communities and the next generation of talent. KBR created ONE OCEAN, a program with the mission to educate and encourage young people to investigate and develop creative and practical solutions to environmental issues. The program also addresses circularity and biomimicry among other innovative sustainability approaches.



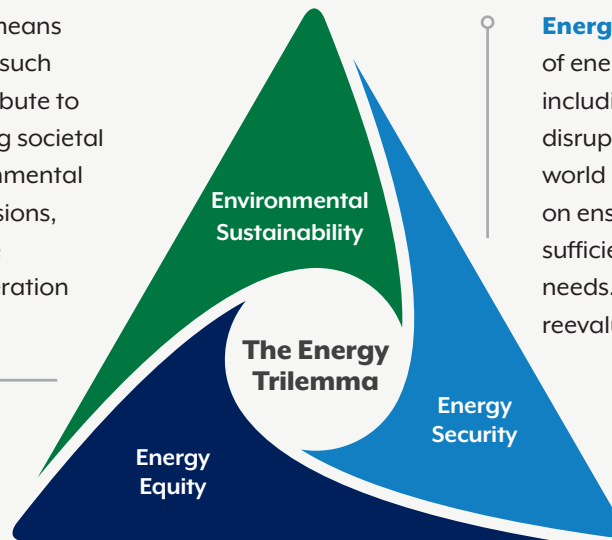
Energy Trilemma

STS has had double-digit growth in adjusted EBITDA the last four years in a row. STS adjusted EBITDA increased 50% year over year from 2022 to 2023. One of the most impactful macro drivers of this growth is the “Energy Trilemma.”

The **Energy Trilemma** is the three-pronged global challenge of energy security, environmental sustainability and energy equity.

Environmental sustainability means minimizing environmental harm, such as reducing emissions that contribute to climate change. Due to increasing societal (i.e., net-zero targets) and governmental pressures to reduce carbon emissions, companies and governments are transitioning from fossil fuel generation to more renewable sources.

Energy security means ensuring reliability of energy sources. Geopolitical turmoil, including the conflict in Ukraine, have disrupted the world energy supply. As the world is rebalancing, countries are focused on ensuring an adequate, affordable, sufficient supply of energy to meet global needs. International supply chains will be reevaluated and de-risked.



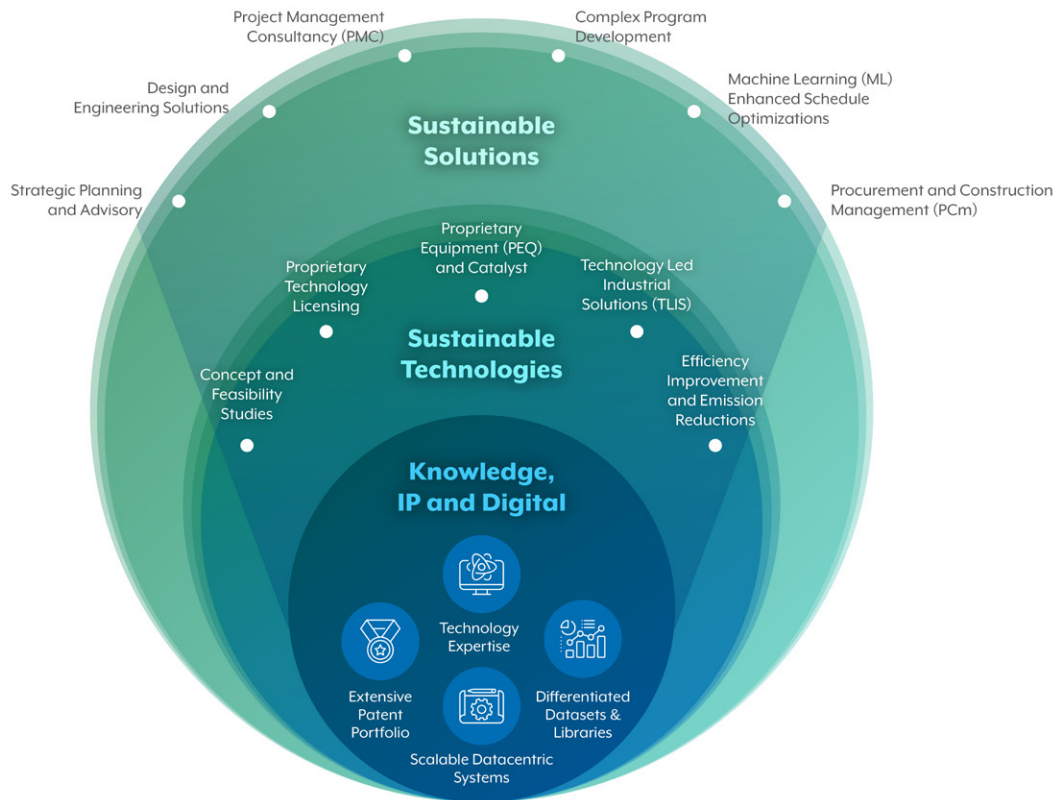
Energy equity means making energy affordable for consumers. Affordability is the most dominant and pressing issue because solving for energy security and energy sustainability requires investment, which is then passed onto the consumers. This underscores the importance of using advanced technology to lower total cost of production while doing so in a cleaner manner.

The trilemma represents our current global energy crisis and its three-pronged challenge: delivering more energy, clean energy, and affordable energy. KBR’s leadership in decarbonization and energy transition solutions has been in high demand in recent years as more companies and governments are earnestly looking to transition to more sustainable forms of energy and to create sustainable energy economies.

The Energy Trilemma is driving significant new investment in the recently under-invested energy sector as governments and companies are trying to progress on all three core elements. This investment includes a balance across grey (traditional fossil fuels), blue (fossil fuel with carbon capture) and green (renewable) energy sources.

Organization and Offerings

STS develops and offers proprietary technologies directly responsive to the energy trilemma challenge, and offers a full range of technology services to bring sustainable solutions into reality.



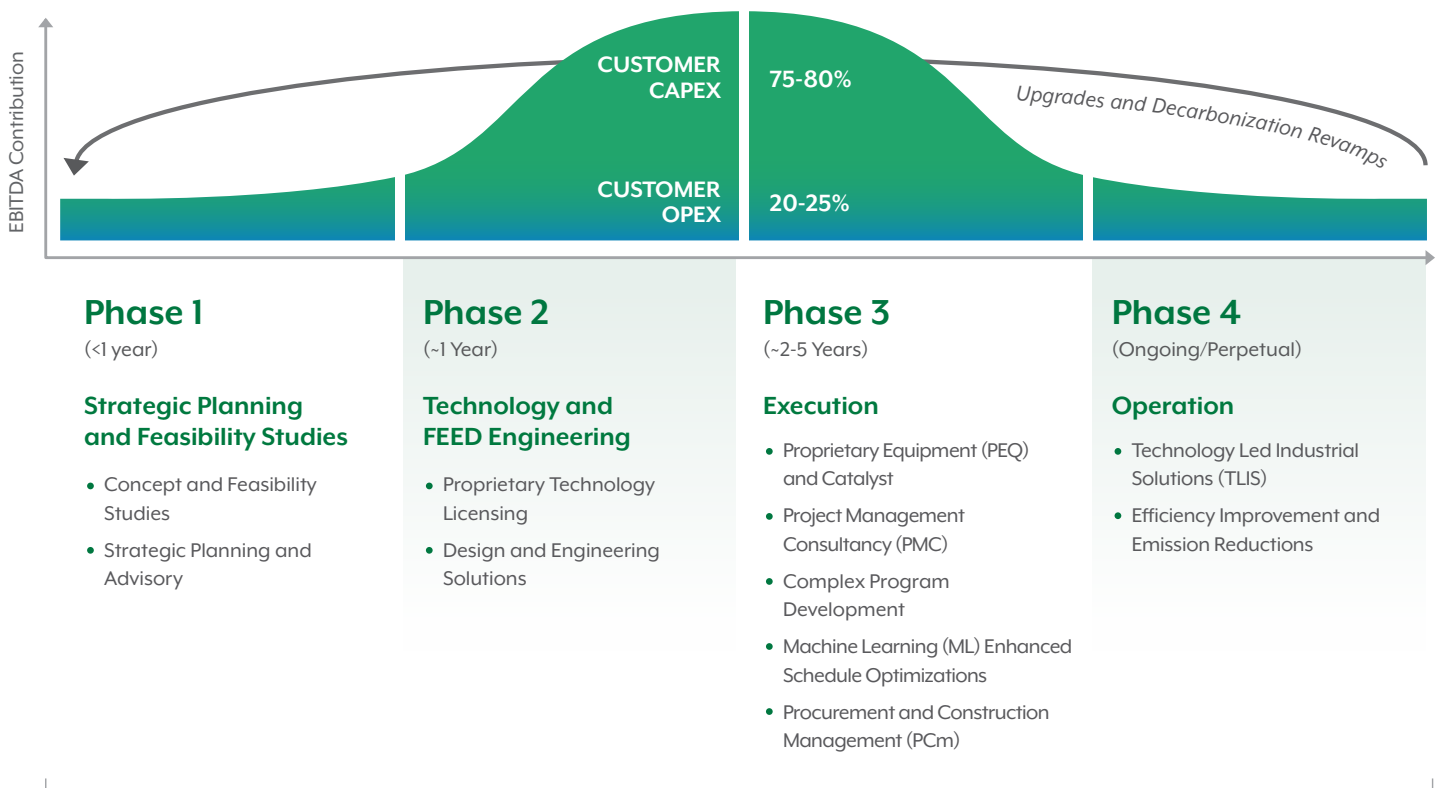
The **Sustainable Technologies** PSL is composed of KBR's leading global portfolio of proprietary process technologies. KBR's technologies are intellectual property (a mix of patents, trade secrets, and know-how) related to critical aspects of the design, fabrication, installation and operations necessary to chemically process or transform different feedstocks into desired end products. For example, in an ammonia plant, our technology is used to transform nitrogen and hydrogen (the feedstocks) into ammonia (the end product). KBR has more than 80 technologies in our portfolio, for which some of the IP is owned by KBR and some is owned by our alliance partners.

Through our **Sustainable Solutions** PSL, we provide best-in-class program management and serve as trusted advisor to corporations and governments. Through our differentiated services, we support our clients with sustainability strategies across energy transition topics (e.g., carbon capture utilization and storage, hydrogen infrastructure strategy and planning, renewable energy and fuels, decarbonization and asset optimization, etc.). We also offer integrated services, which provide solutions including engineering solutions, project management consultancy (PMC), and procurement and construction management (PCm).

All of our STS offerings are digitally enabled through advances such as model-based engineering, artificial intelligence, machine learning, predictive analytics, digital twins and real-time industrial process monitoring. KBR's partnerships with leading cloud hyper-scalers help us combine our deep industry expertise with advanced Internet of Things (IoT), cloud services and technology infrastructure to deliver the greatest value for our customers. Our digital solutions drive efficiency, improve reliability and safety, reduce opex and capex, and enhance security.



STS Project Lifecycle



STS provides solutions across the full asset lifecycle from end-to-end. Our support starts from ideation and continues all the way through plant startup and beyond.

Product and Solution Lines

Significant synergy is driven between the Sustainable Technologies and Sustainable Solutions PSLs as they mutually enhance and support each other. The key aspects of each STS PSL along the project life cycle are highlighted below.

Sustainable Technologies

Concept and Feasibility Studies

- Techno-economic definition, scoping, and reviews to support the evaluation of capital and operating cost changes due to potentially installing new assets or revamping existing assets for a range of potential economic drivers, such as throughput, product diversification and/or energy reduction, and decarbonizing methodology.

Proprietary Technology Licensing

- Licensing: The contractual agreement which provides our clients with the non-exclusive right to utilize KBR's, or our technology alliance partners', intellectual property, which consists of a range of patent rights, know-how and trade secrets, to operate a facility for a specific process technology at a specific location for a specific rate of production.
- Proprietary Engineering Design (PED): The relevant documents which define the scope of the licensed technology process, inclusive of the intellectual property and specific engineering requirements of KBR, which will be further defined and detailed in subsequent engineering stages, such as FEED and detailed engineering.

Proprietary Equipment (PEQ) and Catalyst

- Proprietary Equipment (PEQ): The specific pieces of equipment (e.g., furnaces or reactors) or modularized subunits supplied by KBR are part of KBR's intellectual property, and the design and fabrication is critical to the performance of the technologies. KBR does not fabricate the equipment directly. Instead KBR uses back to back contracts to subcontract the manufacturing of both PEQ and Catalyst.
- Proprietary Catalyst(s): The physical components that are loaded within reactors, or similar pieces of equipment, which facilitate the desired chemical reactions at conditions specific to KBR and are necessary for the licensed technologies.

Technology Led Industrial Solutions (TLIS)

- Advance Process Control (APC): Delivers process stabilization and optimization through decision support systems that blend complex first-principles engineering design with real-world operating conditions.
- Strategic Maintenance and Reliability Advisory: Customized maintenance plans generated using AI/ML that leverage experiences and contextualizes hundreds of thousands of customer assets for long-term efficiency improvements in metrics like MTBF (mean time between failures) and OEE (original equipment efficiency). The ability to capture strong market conditions while planning scheduled maintenance during slow markets effectively delivers margin improvements for customers while lowering operating costs.
- Remote Monitoring: KBR's remote plant process monitoring allows customers to proactively identify potential unplanned failures and provides sufficient lead time to repair and avoid downtime, and can reduce man-powered operations which enhances safety.

Efficiency Improvement and Emission Reductions

- Modifying existing licensed technologies with modernized solutions that improve asset yield, reduce CO₂ footprint or utility consumption, or otherwise reduce consumption of raw materials.

Sustainable Solutions

Strategic Planning and Advisory

- We lead or support our clients' planning processes with scopes that may include baselining, target definition, planning and workflows. We support governmental and government-adjacent clients, with the technical fidelity to support the vision and definition of future legislative and rule-making activities related to energy and sustainability.

Design and Engineering Solutions

- Pre-FEED: The pre-FEED (pre-front-end engineering design) is a form of conceptual engineering completed with a rigor around technical feasibility, project planning scheduling, pros and cons, and overall economics that allows for strategic decisions to be taken on next steps in a project pipeline or on investment objectives.
- FEED: The engineering design which incorporates the KBR (or other technology providers') licensed engineering package as well as other engineering scopes to a level of accuracy sufficient to give comfort with the required costs (to the order of +/- 15 to 20% precision).
- Detailed Engineering: The final engineering design documents which are completed to a level of detail necessary to construct the relevant project based on the specific pieces of equipment that have been ordered from vendors.

Project Management Consultancy (PMC)

- The management of the overall project scope, which includes back-office and site coordination, covering all aspects of the project including cost, schedule, safety, risk and resourcing.

Complex Program Development

- Leveraging KBR's broad domain expertise and bespoke techno-economic programs, program management solutions are crafted for clients based on codifying client rules and objectives with KBR best practices to create a streamlined program that accelerates tasks and decision making.

Machine Learning (ML) Enhanced Schedule Optimizations

- Utilizing a variety of digital tools combined with data analytics solutions for project coordination and proprietary datasets, KBR effectively eliminates several steps in the project lifecycle, reducing project schedules significantly, while maintaining necessary fidelity in the data to ensure cost and safety standards are maintained.

Procurement and Construction Management (PCm)

- Procurement (P): The range of activities necessary to have equipment and materials quoted, contracted, invoiced and delivered to the desired destination (fabrication yard, site, etc.).
- Construction Management (Cm): The coordination and supervision of all aspects necessary for a safe and efficient construction project.

[Shell Strategic Ambition for Hydrogen Liquefaction](#)

The IPMT methodology combines KBR's subject matter experts (SMEs) in hydrogen and cryogenics with KBR's program management expertise to review, refine and define the relevant aspects of Shell's liquid hydrogen ecosystem, including transport and use in a variety of end markets

[BP Hydrogen Global Project Management](#)

KBR is leading the overall management of BP's portfolio of projects related to the hydrogen ecosystem through its IPMT approach

Profit Streams

STS generally starts the year with more than

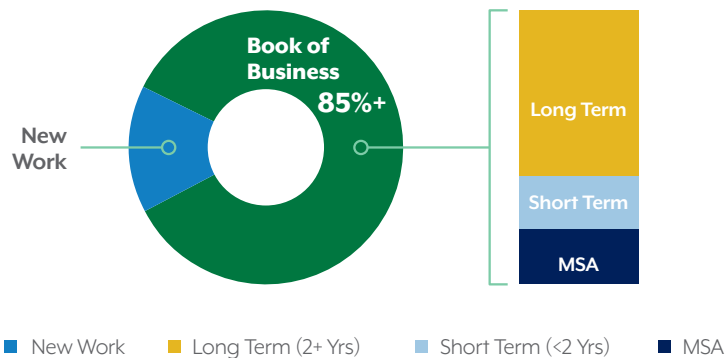
50%

of work already under contract to meet the annual budget

Projects in STS range from shorter-term studies to long-term major capital projects, which can span two to five years. Importantly, the profit streams from a project are spread out over the life of the project, bringing long-term visibility to the portfolio. In fact, STS generally starts the year with more than 50% of work already under contract to meet the annual budget.

The profit streams are a mix of of ~75-80% capex and ~20-25% opex from our customers, thus not dependent exclusively on capex investment cycles. The opex and capex investment cycles span both the Sustainable Technologies and Sustainable Solutions PSLs. Capex investment is predominately in Phase 2 and 3 of the project lifecycle.

2024 Profit Source Trajectory



Over

65%

of STS' profit comes from recurring customers

Uniquely, the STS segment operates with very low capital intensity and even negative working capital, due to the timing of different profit streams. Licensing revenue is typically paid in advance, as well as equipment and catalyst sales. Engineering design and other services are typically paid ratably over the life of the project.

Additionally, our strong customer relationships bring repeat business. In fact, over 65% of STS' profit comes from recurring customers. Moreover, we are not dependent on any one energy sector, so we are not exclusively tied to commodity prices (such as oil or gas).

Our profit streams span a number of key energy market vectors we have identified as follows: (1) Clean Ammonia and Hydrogen (2) Sustainable Petrochemicals (3) Plastic Waste Recycling (4) Low Carbon Refining and Biofuels (5) Inorganic Chemistry (6) and Liquefied Natural Gas (LNG).

Work Under Contract (WUC) includes projects booked into backlog. Book of Business includes backlog, options, renewals, and high confidence work in pipeline.

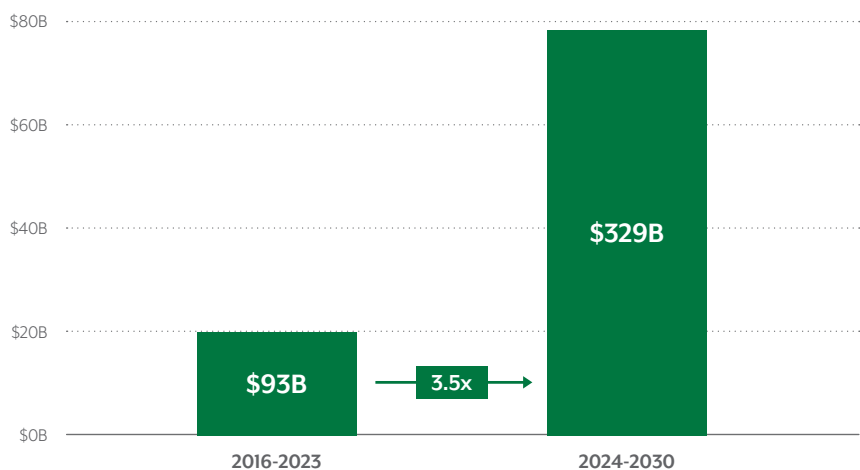


Energy Market Vectors

As the world is transitioning, KBR’s focus has evolved to meet the need, including a focus on how to further deliver reliable engineering more rapidly with the increased fidelity necessary in the digital age. The evolution does not stop in the delivery but also includes walking alongside our clients through the energy transition, as new and novel solutions avail themselves on the market. Understanding the implications and delivering these new first-of-a-kind projects requires the same leadership skills KBR brought through the last era.

All forecasts in clean technology and services show investment is accelerating significantly in the near term. As such, the market need for experienced partners is also accelerating

Green Capex Growth



Represents KBR's interpretation and synthesis of external sources. Refer to Appendix.

Ammonia is increasingly seen as the energy carrier of choice

Clean Ammonia and Hydrogen

As the world navigates the energy transition, ammonia has been identified as a key driver due to its hydrogen-concentrated chemistry. Ammonia brings a number of key benefits for greener solutions.

- **It's carbon free:** Converting ammonia to energy (directly or via cracking into hydrogen and subsequent use of hydrogen) does not generate any new CO₂.
- **It's environmentally friendly:** As compared to other hydrogen carriers, ammonia is generally benign, with the compound having been studied extensively over the preceding decades.
- **It's easy to store and trade:** Ammonia does not require significant or complex refrigeration to store and can be transported via existing infrastructure today at ambient temperature with moderate pressure as compared to hydrogen or other gaseous energy carriers, like LNG.

Historically, the agricultural/industrial space has been the predominate consumer of ammonia, with agriculture consuming the vast majority. As such, ammonia has enjoyed stable overall growth of approximately 2% year on year, which generally follows the global population.

This steady, conventional demand growth will be surpassed by the exponential growth expected from decarbonization-type services — namely ammonia as a hydrogen carrier, with hydrogen as a critical energy vector — through and past 2050 but also in conjunction with the decarbonization of critical heavy industries.



Agriculture / Industrial

Societal pressure alongside legislative and industry rule-making will drive clean ammonia demand in segment — ammonia will remain a key component of the agricultural and industrial segment.



Hydrogen carrier

Ammonia inherently advantaged through extensive existing infrastructure providing scale and ease of transport allowing for globalized supply chain and ease of handling.



Shipping fuel

Fundamentally simpler solution, with quickly expanding engine technology, in marine industry where GHG management of alternatives is challenged. Ammonia-powered ships would also enable compliance with IMO 2020 rules requiring the elimination of sulfur-heavy bunker fuels.



Power generation

Growing need for Ammonia as a partial substitute for coal (via coal co-firing) and other hydrocarbons in regions where renewable electricity generation is not favorable.

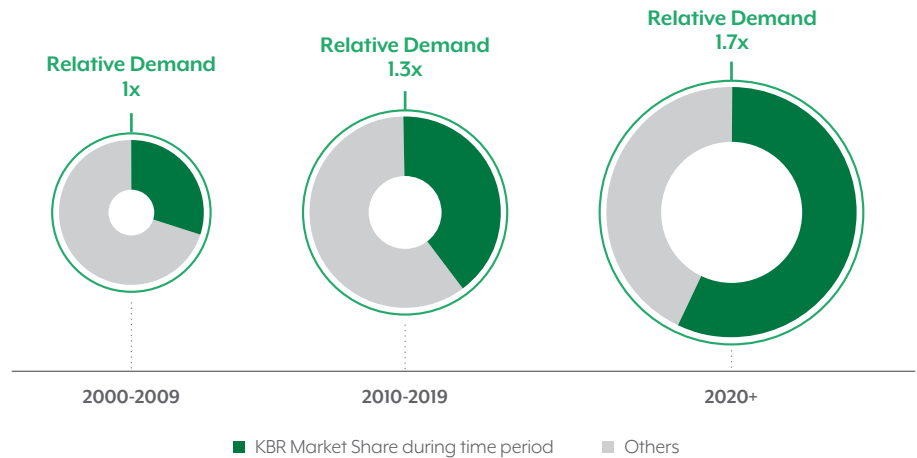
KBR has the record for largest single train ammonia plant, both in design and operation

50%+

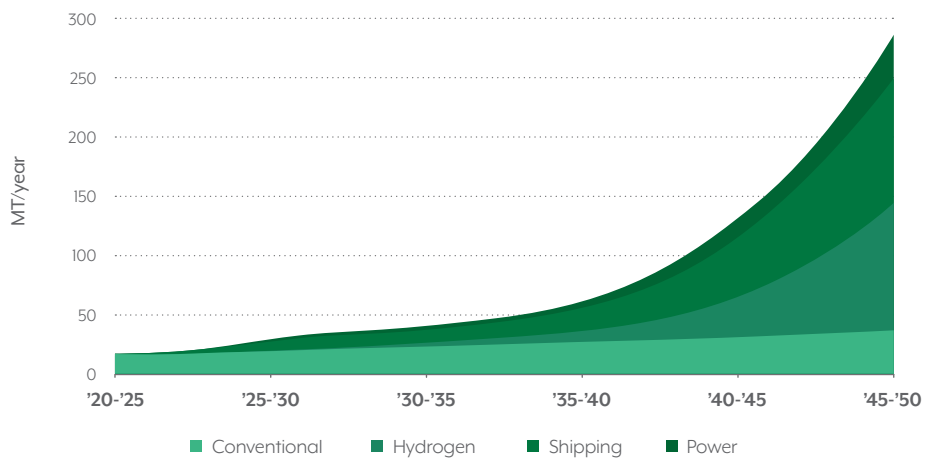
market share of license ammonia plants

Currently, ammonia demand is ~200 million tons (MT) per year — of which KBR has a 50%+ share of licensed plants — both by total capacity and by number of plants licensed. This indicates that KBR has remained at the forefront of the ammonia industry for decades. KBR’s leadership position has been driven through innovative improvements, both proprietary and conventional, that have continued to push the economic optimization of plants. As seen in the charts below, KBR has continued to grow its market share since the 2000s and is expanding its leadership position in an accelerating market.

Ammonia Capacity Deployed



Incremental Global Ammonia Demand



KBR has protected IP in grey, blue and green ammonia process technologies

As we look forward to the demand projections, we have strong tailwinds for a business with a track record of growth. As demand for higher capacity is needed, developers will be guided by the energy trilemma factors (more, cleaner and affordable energy). KBR’s ammonia technology offering provides all three. Projections for incremental demand for the 2025-2030 window (which would require projects starting today) is 9MT per year and continuing to rise. KBR’s key technical differentiators reinforce its leadership position. An example is PurifierPlus™ technology, with its (1) industry-lowest CO₂ footprint and (2) lowest energy demand per ton of ammonia, and (3) industry-leading continuous run lengths. Furthermore, KBR’s expertise and know-how have been leveraged in the critical growth markets of green ammonia and ammonia as a hydrogen carrier, where KBR is bringing the lowest energy requirement per hydrogen produced.

Represents KBR's interpretation and synthesis of external sources. Refer to Appendix.



Sustainable Petrochemicals

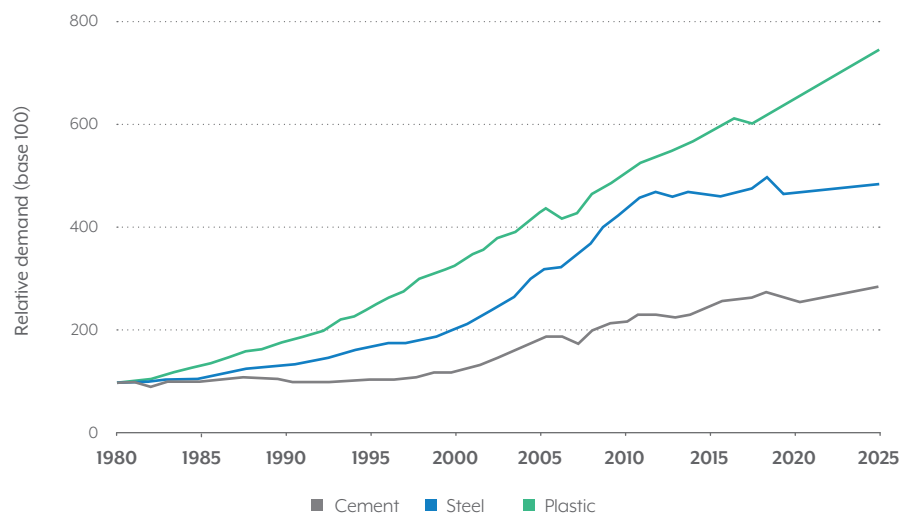
Petrochemicals products are everywhere and are integral to modern society. They include plastics, packaging, clothing, digital devices, medical equipment, detergents, tires and many others. They are also found in many parts of the modern, sustainable energy system, including solar panels, wind turbine blades, batteries, thermal insulation for buildings, and electric vehicle parts.

As a major component of the global energy system, petrochemicals will continue to grow with the demand for plastics, which represent the largest and most familiar portion of petrochemicals, consuming over two-thirds. Plastics demand has outpaced that of all other bulk materials (such as steel or cement) and has more than doubled since 2000.

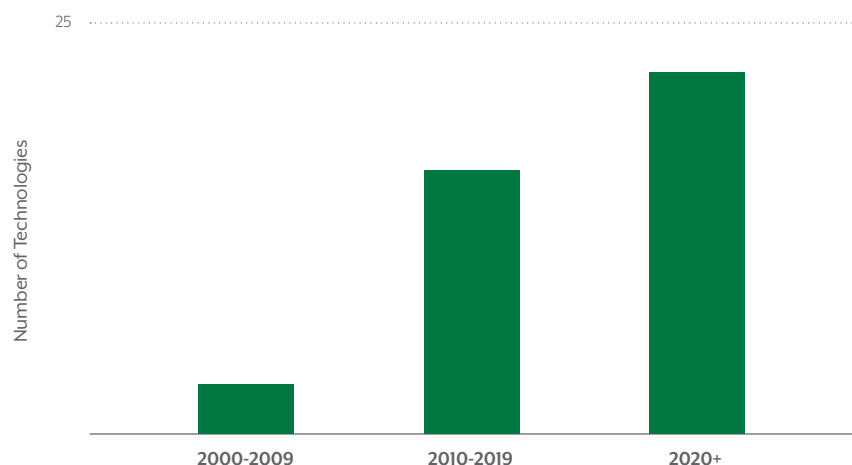
Leading Midstream Company Selects KBR's [Catalytic Olefins Technology](#) for US Petrochemicals Project

Plastic demand is outpacing demand of other infrastructure fundamentals

Key Infrastructure Fundamentals



KBR Portfolio of Petrochemical Technologies



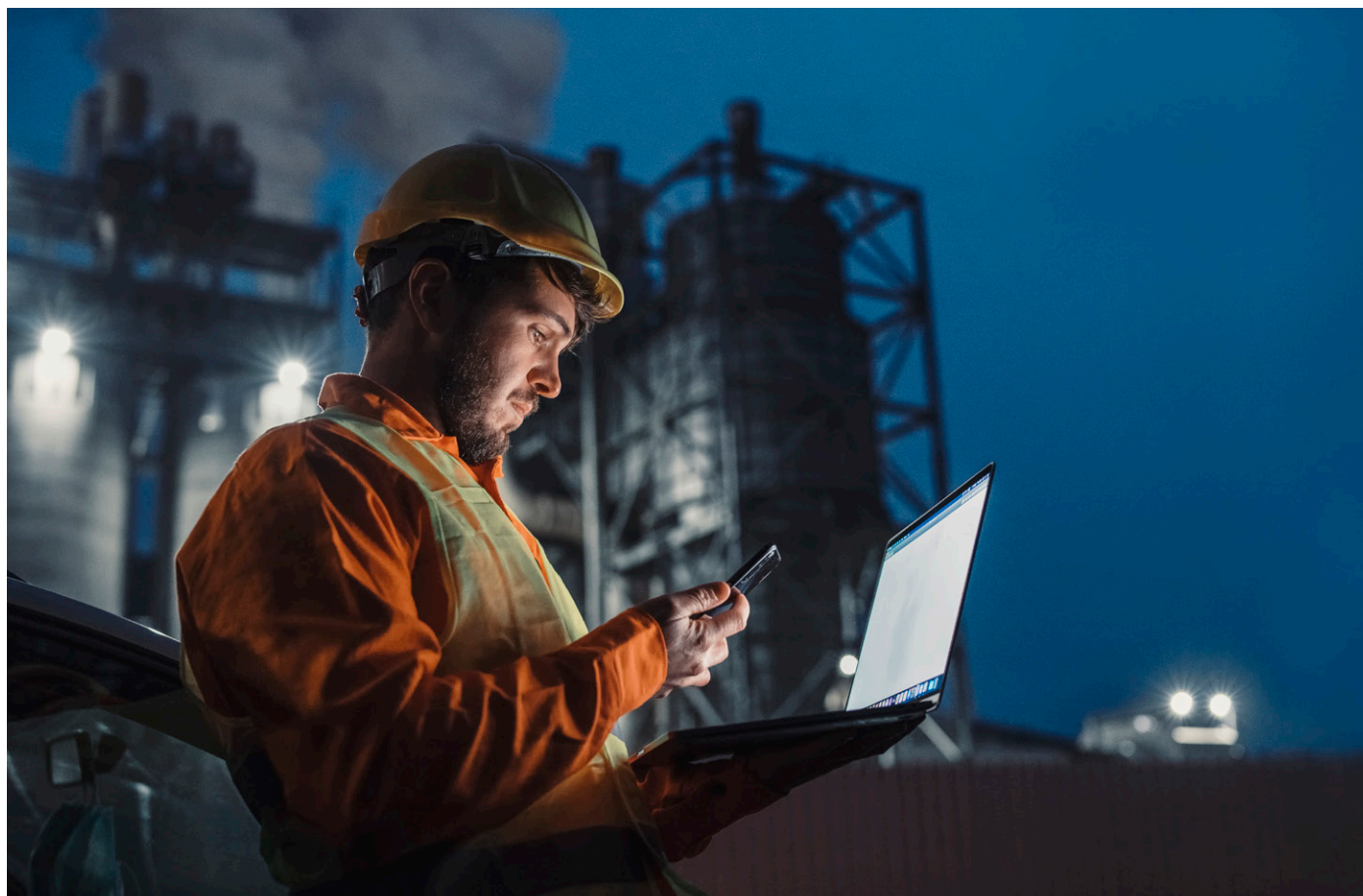
Represents KBR's interpretation and synthesis of external sources. Refer to Appendix.

KBR's expanding list of proprietary offerings in the growing petrochemicals market is made up of (1) technologies that offer best-in-class conversion and (2) a wide range of chemical value chains across a variety of end-use markets (including nearly all polymers).

Leading the way performance-wise is the integration of KBR's SCORE® technology, with its industry-leading yields of the most consumed chemical feedstocks, ethylene and propylene, of which nearly 2/3rds is converted into the common polymers polyethylene and polypropylene. When combined with the K-COT® technology – a fully commercialized industrial solution for the catalytic conversion of gasoline-like hydrocarbons into those same key chemicals, ethylene and propylene – operators are able to employ a flexible solution that provides the ability to tailor the product slate in a capital-efficient and lower-carbon design. The differentiated integration of KBR's SCORE and K-COT technologies was recently announced for a U.S. Gulf Coast operator with an estimated capex savings up to 25% lower than from producing ethylene and propylene from non-integrated solutions.

Phenolics underpin the Polycarbonate industry and the acetyls chain has a wide variety of end uses, including vinyl acetate polymers & PETE

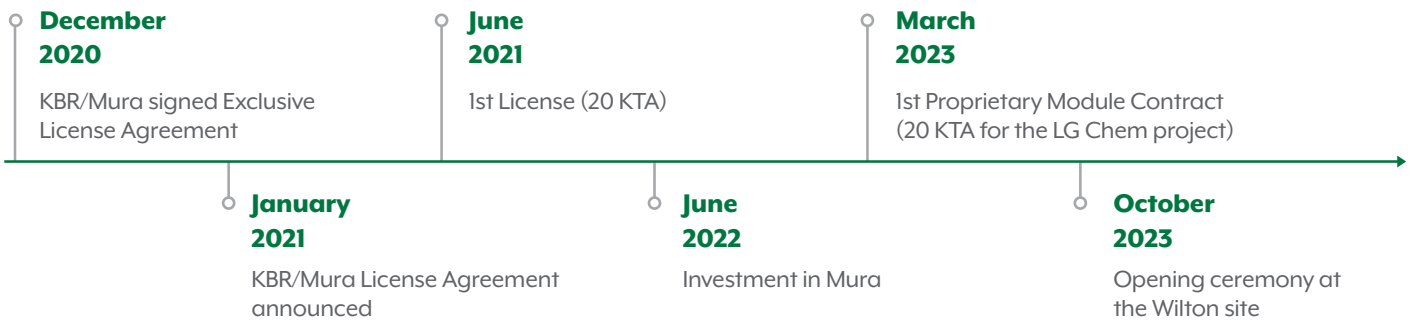
KBR's presence in the chemicals sector extends into specialty chemicals as well. This includes a leading position in the phenolics chain (for polycarbonates) and a growing portfolio of solutions in the acetyls chain with Acetica (production of acetic acid) and VAM (vinyl acetate monomer), enabling production of polyethylene-vinyl acetate (EVA), a fast-growing polymer segment.





Plastic Waste Recycling

While plastic waste is an all-society issue, plastics remain critical to the global economy. Moreover, plastics may be technically and economically necessary for the development of other sustainable energy sources. Fortunately, KBR has introduced Hydro-PRT®, a groundbreaking solution offered in alliance with Mura Technology, that effectively closes the loop and enables a true plastics circular economy.



External Licensing Market



■ KBR Market Share ■ Others

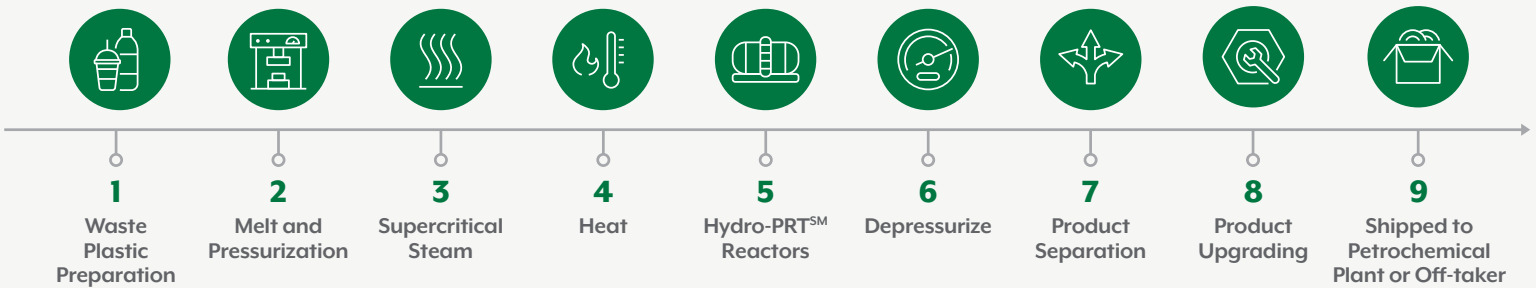
Next-gen Hydro-PRT has addressed a critical need in the marketplace and is the most carbon-efficient pathway for the recycling of waste plastics into petrochemical feedstocks. Since KBR first announced the technology alliance in January 2021, Hydro-PRT has been selected extensively, with multiple projects awarded in the first year.

KBR is winning ~60% of externally licensed awards (where the clients don't use their own technology), which demonstrates the strong growth momentum in the market.

Represents KBR's interpretation and synthesis of external sources. Refer to Appendix.

The proprietary and differentiated design of Hydro-PRT, using supercritical water and its unique properties, leads to the key performance benefits that drive this growth: (1) industry-leading product yield, (2) the ability to recycle many more types of plastics than competing technologies, (3) the ability to scale single-capacity trains, and (4) the lowest CO₂ equivalent (CO₂e) footprint for advanced recycling of waste plastics.

HydroPRT Technology Overview



EU27 target on [recycling](#) rate of plastic packaging waste by 2030 is

55%

As compared to pyrolysis (the earliest technology for waste plastics recycling in the marketplace), Hydro-PRT thermally decomposes plastics in water, producing nearly no char, or carbon lost to a waste byproduct. This allows for the greatest recovery of carbon in the feedstock (waste plastic). As the world continues to close the loop through circularity, carbon efficiency will only become more critical.

Hydro-PRT was validated by the European Commission's Joint Research Committee as having ~50% smaller CO₂ footprint (CO₂e) than competing routes for chemical recycling only.

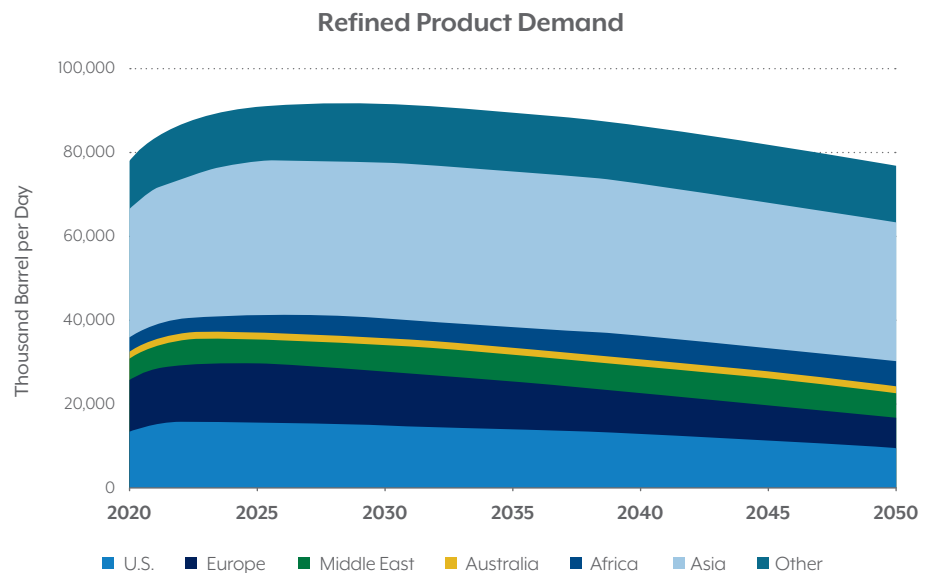
On acquiring this technology, our technical experts continued to innovate – identifying areas to enhance the circularity and efficiency of the offering by capturing and recycling steam and heat. We then utilized our digital engineering to modularize the solution, making it scalable and faster to market.





Low-carbon Refining and Biofuels

One of the three fundamentals of the Energy Trilemma is the affordable production of energy. For the foreseeable future, motor fuels and intermediates produced by refineries will continue to be a critical part of the energy ecosystem. While the world transitions to a more sustainable energy consumption mix, energy forecasts indicate that the consumption of hydrocarbon motor fuels have yet to peak, with demand in the Asia-Pacific region continuing to outpace reductions in the west for at least the next several years. As such 2050 total demand is expected to be consistent with 2010 levels.



To support the refining sector’s broader decarbonization goals and KBR’s expansion in biofuels, our decades of experience and know-how are being leveraged to introduce innovative improvements that allow for reduced energy consumption and CO₂ footprints in conjunction with improved process performance and safety.

Within the refining sector, the fluid catalytic cracker (FCC) (the first ever was built by KBR in 1942) remains the workhorse, critical for producing motor fuels but also petrochemicals. These petrochemicals can be selectively used for additional high-octane motor fuels, which is the historical approach, or increasingly used as petrochemical intermediates. As refiners look to diversify their product mixes, KBR’s is responding with innovative, flexible solutions, like KBR MAXOFINSM, FCC technology, which allows refiners to alternately produce either fuels or valuable hydrocarbons, like propylene, depending on market demand. An example is the PKN “Bottom of the Barrel” project, where the maximum amount of propylene and other high-value petrochemicals could be produced from refinery residue. The PKN “Bottom of the Barrel” project also includes KBR’s ROSE[®] super-critical solvent de-asphalting (SDA) technology, the gold standard that continues to deliver improvements.

PKN Orlen’s competitively [bid project](#) utilizes a dual riser MAXOFIN and ROSE SDA

HPCL licensed it’s [3rd ROSE unit](#) in 2023

Represents KBR’s interpretation and synthesis of external sources. Refer to Appendix.

KBR's position is not limited to improving existing solutions. We're constantly bringing new innovations to market, including those that can decarbonize or reduce the CO₂e footprint of existing refining assets.

Indicative FCC Decarbonization Improvement

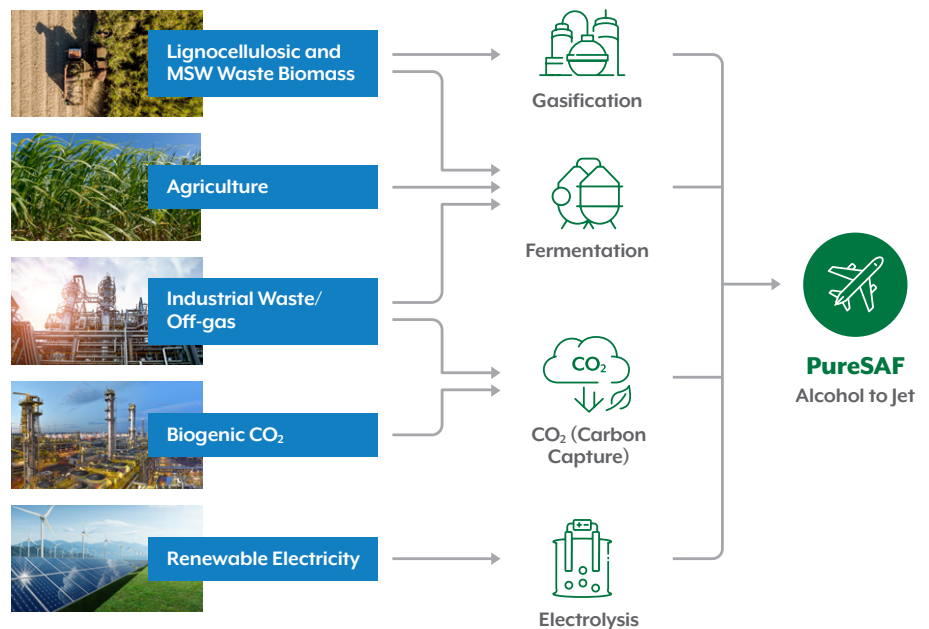


[CVR Energy](#) will revamp its liquid catalyzed HF alkylation unit with K-SAAT at its Wynnewood, OK refinery

Also related to these next-gen technologies is the production of the sustainable fuels required by modern transportation systems. One example is KBR's K-SAAT™ alkylation technology, which provides a stable, solid catalyst solution — in lieu of the liquid catalyzed alkylation units prevalent today — that is simpler to operate and enables a lower HSSE (health, safety, security and environment) risk.

Most recently, KBR commercialized a sustainable aviation fuel (SAF) offering, PureSAFSM, which utilizes the alcohol-to-jet pathway innovated by Swedish Biofuels, KBR's alliance partner. PureSAF can produce SAF from a range of alcohols and is the only technology capable of producing drop-in SAF, completely fungible with fossil jet fuel and meeting all specs without blending — a gamechanger for the aviation sector. With PureSAF, customers can sustainably convert syngas (a mix of hydrogen and carbon monoxide) directly to SAF or convert syngas produced through gasification of solid hydrocarbons (e.g., coal), adding technical and feedstock flexibility that the sustainable fuels marketplace is in critical need of.

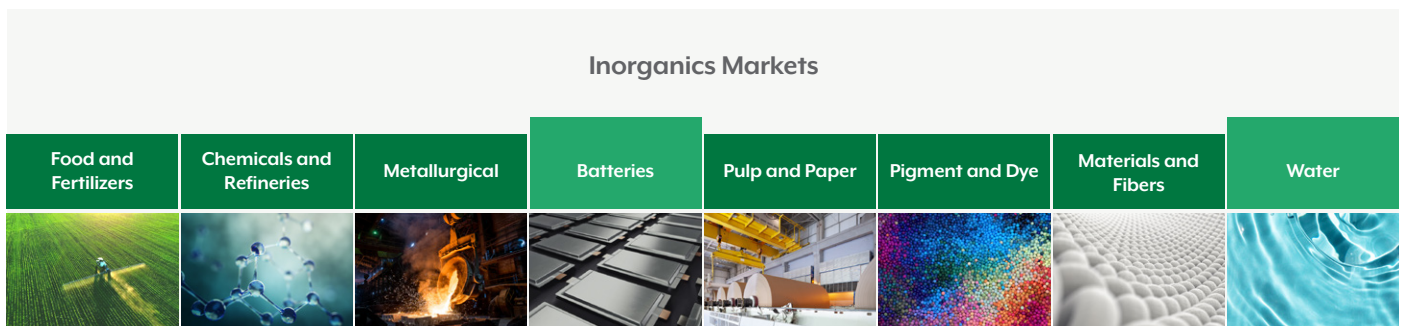
[The PureSAF technology](#) was demonstrated for, and validated by, DARPA (contract W911NF-08-C-0001)



Inorganic Chemistry

Inorganic chemistry (the study of compounds that do not contain carbon) is and will remain a critical piece of the energy ecosystem. For example, the inorganic compound, sulfuric acid, will continue to be the most-consumed chemical globally. KBR delivers state-of-the-art technologies for the purification, concentration and separation of streams of inorganic compounds over the full range of pH (measure of how acidic or basic a liquid is) as well as the proprietary equipment and catalysts that support the chemistry, including crystallization and evaporation solutions.

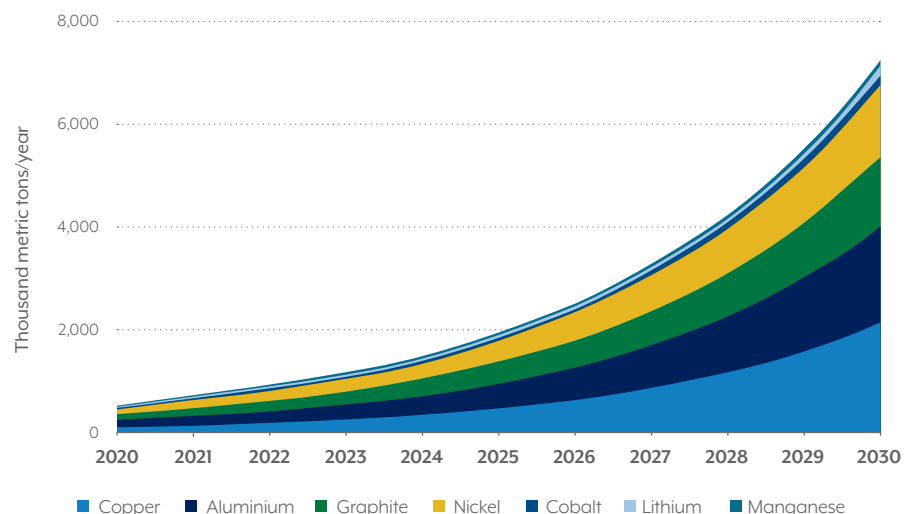
KBR’s experience in the inorganics space is extensive, with more than 700 installations across a range of compounds in diluted and concentrated streams. The compounds that KBR purifies and recycles are fundamental as feedstocks for specific needs across a wide range of industries, from food and fertilizers to pigments and dyes. Importantly, the recycling and recovery of the processed streams is central for minimizing the amount of natural resources we extract from the plant.



Batteries and water are two of the key markets, with which KBR’s Inorganics business are well aligned are also two key global energy transition drivers

Battery Materials Recovery and Recycling (15%+ CAGR): Global electric vehicle (EV) demand is underpinning the need for improved metals separation and recovery from traditional and non-traditional sources alike. KBR just introduced the [MetEx technology](#) to address this growing market.

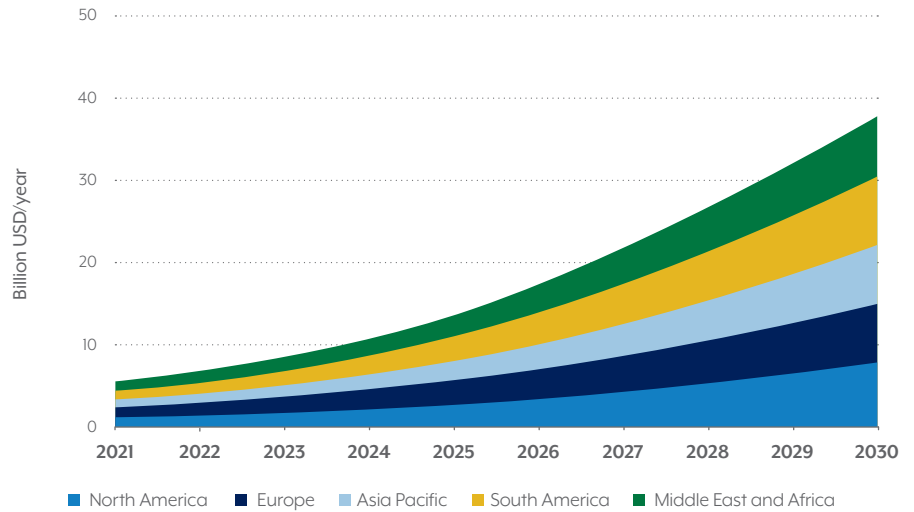
Metals and Materials Demand for EV Lithium-ion Battery Packs



Represents KBR’s interpretation and synthesis of external sources. Refer to Appendix.

Waste Handling and Management (7+% CAGR): Growing environmental concerns across a range of verticals require more efficient management of liquid waste materials and water management, up to and including zero-liquid discharge (ZLD) solutions, such as KBR's high purity lithium production technology, PureLiSM.

Zero Liquid Discharge (ZLD) Market Size



KBR has been active in these critical growth markets related to the electrification of transport including these recent projects.



Liex
Argentina

Lithium recovery from brine with downstream lithium salts processing.



ISU Chemical
South Korea

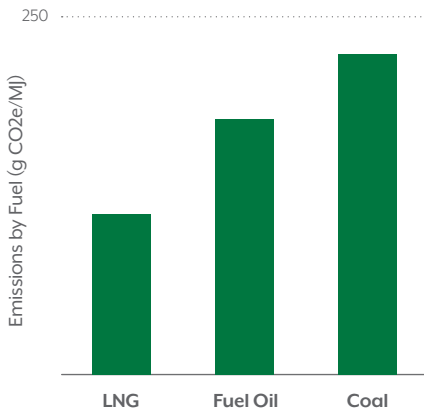
Joint development program to develop a novel manufacturing processes for lithium sulfide, a critical development for solid-state lithium battery manufacturing

Next-gen LNG

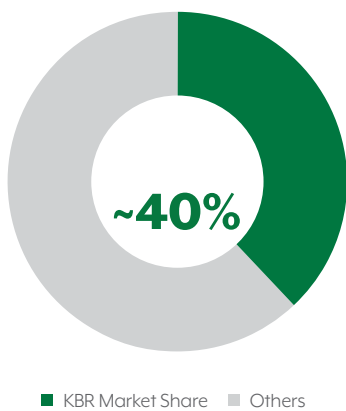
KBR understands a panoramic view is needed for the energy transition. As such, we have adopted and operated from a pragmatic and pluralistic approach to lead and deliver change. The approach is pragmatic in that the world’s energy needs cannot become “green” by simply flipping a switch. There will be transition away from grey and black energy to the green energy of tomorrow, and we want to accelerate the transition. But we cannot avoid that a transition, by definition, has a timeline. KBR thus remains pluralistic in our view of transition; there is not going to be a one-size-fits-all solution to cheap, abundant, green energy. We are committed to utilizing our global footprint to deliver the most impactful, but, more importantly, also the highest-value solutions, to each client based on their goals and practical constraints. As such, LNG will remain necessary for addressing the Energy Trilemma for the foreseeable future as it is critical for addressing aspects of both energy security and energy equity.

LNG remains an abundant energy vector with well-established infrastructure for production, shipping, and transmission. Additionally, its lower CO₂e footprint versus other conventional hydrocarbons used for electricity generation will drive demand growth globally. Even as LNG projects currently in construction or post-FID (final investment decision) are brought onstream, global demand is still expected to grow thereafter, with the need for additional LNG production capacity remaining strong for years.

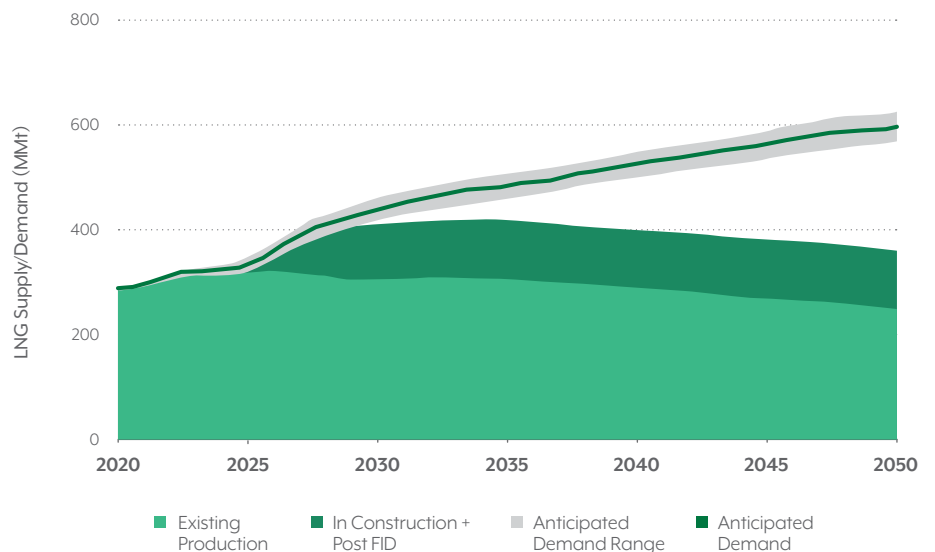
CO₂e Footprint of Electricity Generation Hydrocarbons



LNG Capacity Designed or Built by KBR



LNG Demand Forecast



Our LNG experience began with Skidda LNG in 1977 and has continued through some of the largest single-train projects globally. KBR’s best-in-class LNG delivery includes completion of more than 400 LNG studies and projects. These experiences continue to be critical as the LNG industry looks to accelerate solutions and cargo shipments.

Represents KBR’s interpretation and synthesis of external sources. Refer to Appendix.

Digital Capabilities Highlights

As the world moves forward with the second digital revolution and the exponential increase in accessible information, harnessing the abundance of data and extracting the value has been a key focus of STS. KBR is committed to using our decades of experience and harnessing the tools of the digital age to deliver value to customers so they can run their businesses more sustainably and effectively.

KBR’s management and technical expertise are being harnessed and deployed in a range of digitalized engineering execution approaches that bring meaningful fidelity to the variabilities of energy transition projects, as well as to the operation of the project plants after delivery. For the early stages of project definition and design, KBR has introduced a number of digitalized tools that help our clients define and accelerate their pre-FEED project portfolios.

AutoENGINEER

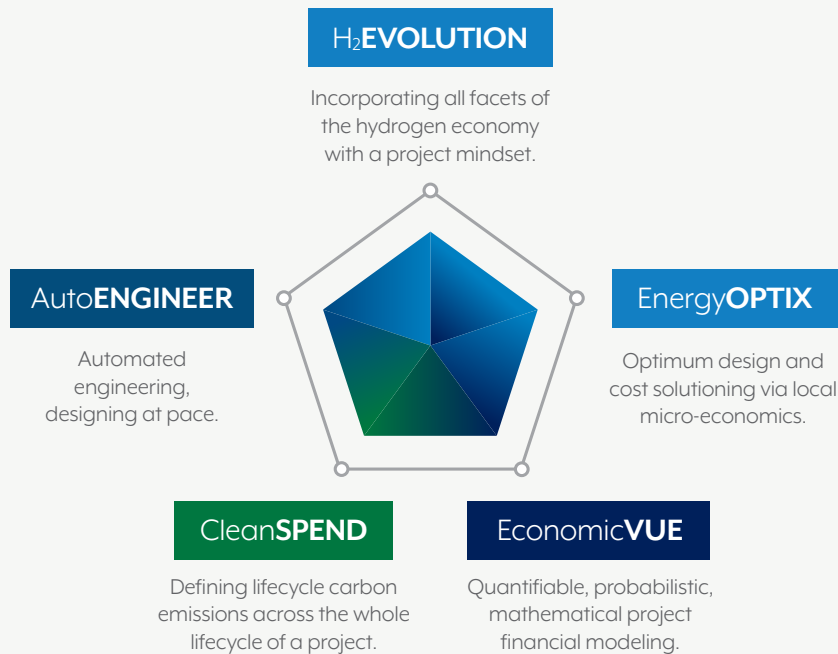
Using KBR design rules and engineering excellence to deliver standardized, high-quality engineering that can facilitate on-the-fly engineering at pace.

H₂EVOLUTION

In conjunction with EnerTECH, defining and designing a hydrogen generation complex from energy production, through hydrogen production technologies and their relevant cost/performance balances, and economics.

EnergyOPTIX

Incorporating energy supply/demand, integration and efficiency across a range of energy production vectors (e.g., solar PV) to determine the optimum balance of capex and opex for a given geography.



CleanSPENDSM

Optimizing projects for carbon-emission impacts, from large project design and delivery decisions (e.g., energy sourcing), to small (e.g., shipping specific equipment via rail or sea), and up to and including decommissioning of an asset. Optimizing projects in a carbon-cognizant way.

EconomicVUE

The initial culture-changing, solutioning approach to relentlessly pursuing savings by challenging all aspects of the project design philosophy to ensure client objectives and value propositions are met on a priority basis.

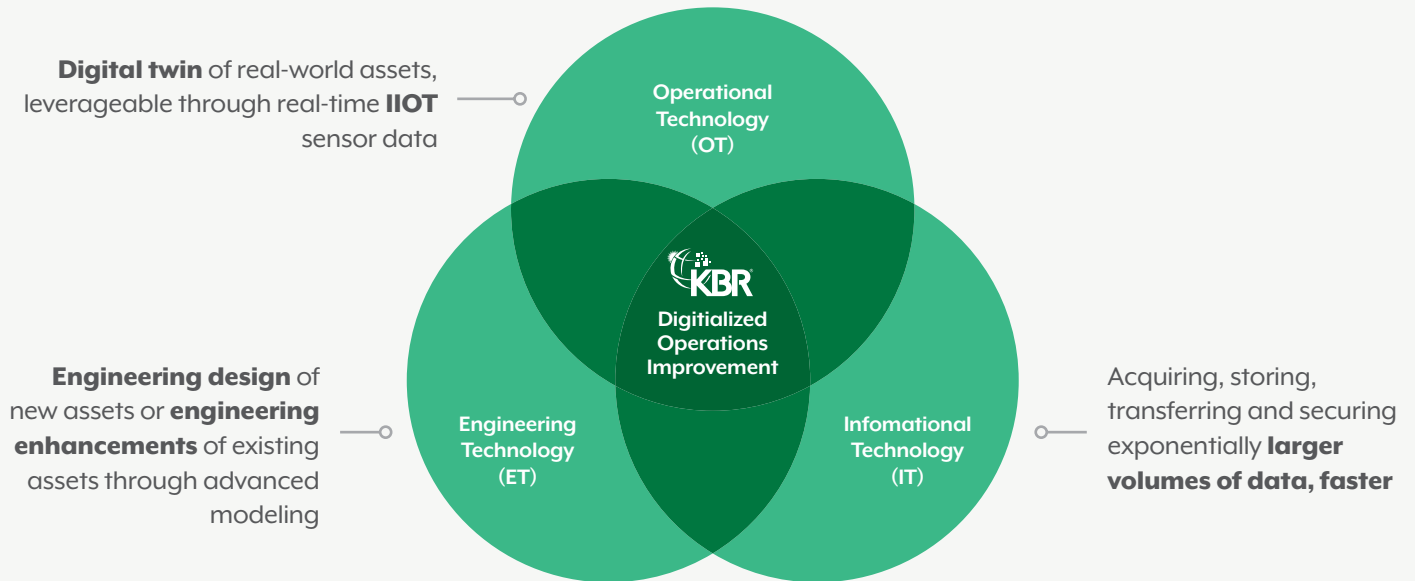


[The ACE platform](#) is the first of its kind to be designed through all phases, from concept to FEED and detailed design, to fully utilize KBR's Digital Twin technology.

These pre-FEED digital solutions are complemented by post-FEED digital solutions, such as the use of fully integrated digital twin technology, which KBR effectively implemented on the BP Azuri Central East (ACE) platform design.

The ACE project was designed and delivered with a full digital twin, a completely digitalized copy of the whole project that the client, other stakeholders, and contractors could immediately use to collaborate, globally and instantly, to design and define maintenance activities without ever having to send personnel to the facility. This is an inherently safer way to operate. This digital twin delivery approach was complemented by KBR's integrated procurement process, which leveraged the twin model to know — down to the individual bolt — what had been shipped, what had been consumed, and exactly which sections of the asset could be constructed in the fab site based on available materials, providing all stakeholders with continuous schedule and progress visibility.

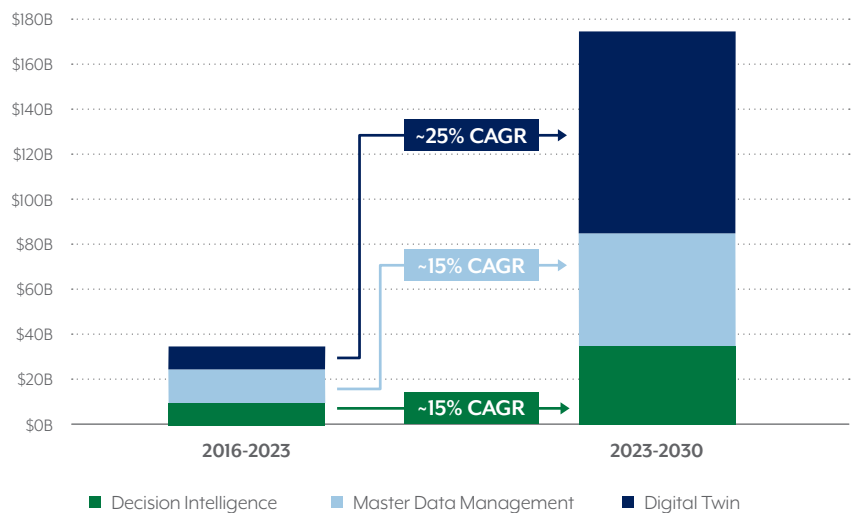
The digitalized solutions mentioned above are further complemented by the TLIS solutions that are utilized after the asset is operational.



The future convergence, integration and harmonization of IT, OT and ET – three traditionally separate domains within organizations – involves the alignment across people, process and technology to improve operational efficiency, drive innovation, and enable digital transformation initiatives. KBR possesses the capabilities and solutions that bridge the gap across these three key pillars, resulting in the hybrid intelligence of the future that connects the physical world to the digital world.

The applications of these converging domains occur across a broad range of use markets. A selection of relevant markets where KBR delivers know-how led solutions are noted below.

Selection of Digital Markets



Represents KBR's interpretation and synthesis of external sources. Refer to Appendix.



Highlights of our delivered solutions across three key high-growth market spaces include remote operations, intelligent asset management and advanced simulation.

Decision Intelligence through Hybrid Data Platforms

KBR's real-time, hybrid data platforms approach utilizes physics-based models alongside artificial intelligence (AI) and machine learning (ML) modules, tuned through KBR experiences, to deliver advanced forecasts of plant behavior and maintain optimal operations at inherently fluctuating economic pricing. At the core of this service is the ability to leverage in-house or remotely located subject matter experts, who apply their deep domain knowledge that blends engineering design with real-world digital twins for asset operators.

Master Data Management through Intelligent Asset Management

KBR INSITE®, our intelligent asset management suite of solutions, applies predictive analytics and cognitive computing integrated with streamlined and digitized operational rules to complex operating assets, resulting in reduced sustaining capital expenditures and increased asset reliability. All of this is built around infrastructure-agnostic solutions that work with our customers' existing IT ecosystems. KBR's clients benefit from measurable and quantifiable performance results, such as significant long-term improvements in meantime between failures as well as whole quartile improvements in third-party benchmarking studies.

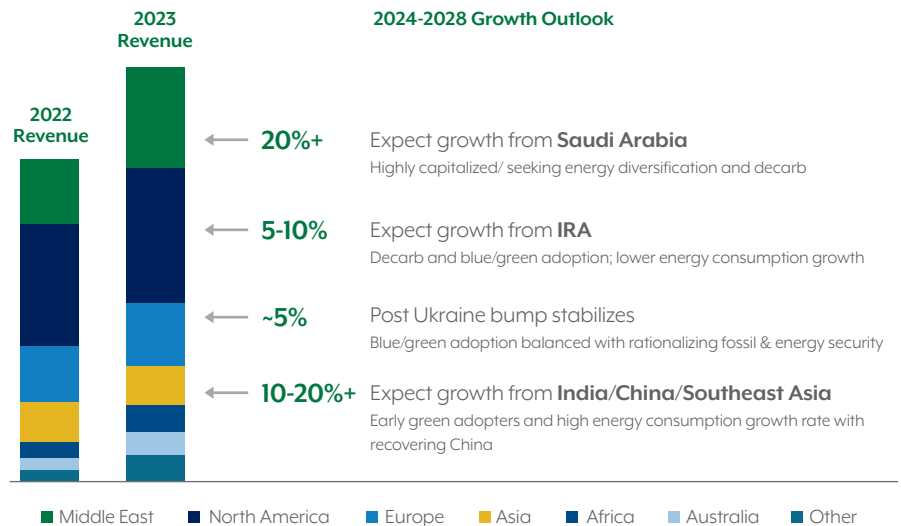
Remote Operations enabled by Digital Twin Technology

As detailed by KBR's activity on the BP ACE project in the previous section, remote operations command centers built on our common development environment unlock intelligent remote operations for our clients. The engineering platform integrates sensor data acquisition systems, communications networks, and operators training to access expertise regardless of physical location across the globe through a range of tools, including 3D and augmented reality trainings and complete emulation studios.



Global Diversification

Energy is global and so is STS. We serve clients in many different international regions. Our customer base is extensive (with large and small energy players), and our geographic footprint is also diversified. While global demand is growing across all our energy sectors, there are specific activity drivers affecting certain regions. The chart below shows STS revenues by region over time and also shows the recent drivers of growth in certain regions.



For the Middle East, growth is driven by energy structure (they are dominant in oil but want to diversify). In addition, the customer base in the Middle East is well funded, as they recently benefited from elevated oil and gas prices.

For the U.S. and Europe, growth is driven by energy intensity or the energy consumption per GDP, as well as being influenced by clean energy mandates and incentive programs to lower emissions.

For Asia, rapid population growth and economic growth (as measured by GDP) leads to higher energy demands. In addition, developing countries in Asia now require more energy for industrialization and economic development.

STS Future

In this report, we have discussed the market drivers and competitive advantages across all of STS market sectors.

STS is leading the toward a more sustainable future and helping our clients achieve their ESG goals.

We expect STS to continue to deliver ~20% margins and EBITDA growth. Key enablers to this expectation are:

- Strong decarbonization-focused IP portfolio responsive to the energy trilemma challenge
- Global client and supply base enables price/cost optimization opportunities
- Low overhead structure enabling economies of scale as we grow
- Enabling ESG commitments of our customers



In summary, STS is a diverse and differentiated portfolio of high-end technologies and solutions. This portfolio combines aggressive growth and great margins, on top of a market-leading foundation of business. In addition, STS operates in a low-risk, low-capital-intensity business model with strong free cash flow, backed by a strong balance sheet.

Glossary

ACE	Azuri Central East
AI/ML	Artificial Intelligence and Machine Learning
AMCDE	Azmi Abdulhadi & Abdulla Al Moaibed Consulting Engineering Company
APC	Advance Process Control
BED	Basic Engineering Design
CAGR	Compound Annual Growth Rate
CO₂e	CO ₂ Equivalent
DIP	Decarbonization Incentive Program
EPC	Engineering, Procurement and Construction
EPCm	Engineering, Procurement, and Construction Management
ESG	Environmental, Social, and Governance
ET	Engineering Technology
EVA	Ethylene-vinyl Acetate
FCC	Fluid Catalytic Cracker
FEED	Front-end Engineering Design
FID	Final Investment Decision
GDP	Gross Domestic Product
GS	Government Solutions
GTL	Gas to Liquids

IMO	International Maritime Organization
IPMT	Integrated Project Management Team
IoT	Internet of Things
IIoT	Industrial Internet of Things
IRA	Inflation Reduction Act
IT	Informational Technology
KBR	Kellogg Brown & Root
KZJV	KBR Zachry Joint Venture
LNG	Liquefied Natural Gas
LSTK	Lump Sum Turn Key
MT	Million Ton
MTBF	Mean Time Between Failures
OEE	Original Equipment Efficiency
OT	Operational Technology
PEQ	Proprietary Equipment
PETE	Polyethylene Terephthalate
PMC	Project Management Consultancy
SAF	Sustainable Aviation Fuel
STS	Sustainable Technology Solutions
VAM	Vinyl Acetate Monomer
ZLD	Zero Liquid Discharge

Appendix

Key Technologies by Energy Vector

Technologies	Process	Differentiation
Clean Ammonia and Hydrogen		
K-Green®	Ammonia production using Green H2	Hyper efficient design from leaders in ammonia / Most referenced Green Ammonia Technology
PurifierPlus® & PurifierA Blue Ammonia	Ammonia production from fossil fuels w/ CCUS	Market leading technology available with either SMR or ATR & CCUS
Ammonia 10000® (6000®)	Ammonia production from fossil fuels	Largest single train design available in market
H2ACT SM	Cracking of ammonia into hydrogen	Lowest energy consumption per ton of hydrogen produced
KCap SM	Carbon Capture	Reduced CAPEX approach through rotating packed bed design
Sustainable Petrochemicals		
SCOREKlean SM	Ethylene production from ethane through gasoil with zero emissions	Highest ethylene yield technology / no emissions
SCORE®	Ethylene production from ethane through gasoil	Highest ethylene yield technology (CCUS available)
K-COT®	Ethylene & Propylene production from catalytic cracking of naphtha	Balanced production of ethylene to propylene (1:1) / can take naphtha streams of any quality / can directly process oxygenates (e.g. methanol)
K-PRO®	Propylene from propane	Fluidized bed design with lower CAPEX than competition
ETE	Ethylene from ethanol	Most proven technology available in the market
Phenol	Phenol production	Most proven technology available in the market
Acetica	Acetic Acid production	Unique bubbling bed design
VAM	Vinyl Acetate monomer production	Largest single train design available
Plastic Waste Recycling		
Hydro-PRT®	Recycling of waste plastics into petrochemical feedstocks	Supercritical water design that produces superior yields with lowest CO ₂ footprint

Technologies	Process	Differentiation
Low-carbon Refining and Biofuels		
MAXOFIN®	Olefins and Fuels from the Fluid Catalytic Cracking of Gasoils and Residue	Dual-riser technology provides superior yields from builders of first FCC in the world
ROSE®	Supercritical Solvent Deasphalting of Vacuum Residue	Inventor of the process with >90% market share
K-SAAT®	High octane Alkylate	Inherently safer alkylation technology with solid catalyst
PureSAFSM	Sustainable Aviation Fuel (SAF) from alcohols, syngas, and CO ₂	Only technology which produces fully fungible jet fuel / can also directly convert CO _x to SAF
Inorganic Chemistry		
PureLiSM	High purity Lithium salt production	Production of battery grade qualities of Lithium Hydroxide or Lithium Carbonate
MetExSM	Battery Metal Extraction and Purification	Extraction and Production of metal salts which are key ingredients for the preparation battery cathode active materials (CAM)
Nitric Acid Concentration (NAPC® & NAC®)	Concentration, purification and recovery of Nitric Acid	Can include proprietary preconcentration steps
NOx Abatement	NOx Conversion to Nitric Acid	
Next-gen LNG		
LNG Lifecycle Services	Consulting, PreFEED, FEED, EPCm, Debottlenecking and Decarbonization of LNG	Leaders in LNG with ~40% of LNG production designed or built by KBR

Sources

Traditional and New Energy Vectors & Industry Investment

OPEC World Oil Outlook ('23)	Enterprise Products Analyst Day Presentation ('23)
IEA World Energy Outlook ('23)	IEA Energy Transition Outlook ('23)
BP Energy Outlook - New Momentum ('23)	McKinsey Global Energy Perspective ('23)
Shell Energy Security Scenarios - Archipelagos ('23)	IRENA Innovation Outlook Renewable Ammonia ('22)
S&P LNG Supply/Demand Gap ('23)	Yara Capital Markets Day ('22)
McKinsey Global Gas Outlook ('21)	S&P Fertecon ('23)

ABOUT KBR, INC.

DELIVERING SOLUTIONS, CHANGING THE WORLD.SM

We deliver science, technology and engineering solutions to governments and companies around the world. KBR employs approximately 34,000 people worldwide with customers in more than 80 countries and operations in over 30 countries.

KBR is proud to work with its customers across the globe to provide technology, value-added services, and long-term operations and maintenance services that ensure consistent delivery with predictable results. At KBR, We Deliver.

This presentation contains forward-looking statements regarding our plans, objectives, goals, strategies, future events, future financial performance, backlog information, future demand expectations and other information that is not historical. When used in this presentation, the words “estimates,” “expects,” “anticipates,” “projects,” “plans,” “intends,” “believes,” “forecasts” or future or conditional verbs such as “will,” “should,” “could” or “may,” and variations of such words or similar expressions are intended to identify forward-looking statements. Because forward-looking statements relate to the future, they are subject to inherent risks, uncertainties and other factors that are difficult to predict, and which could cause actual results to differ materially from the forward-looking statements contained in this presentation. Our most recently filed Annual Report on Form 10-K, any subsequent Form 10-Qs and 8-Ks and other U.S. Securities and Exchange Commission filings discuss some of the important risk factors that the company has identified that may affect its business, results of operations and financial condition.

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The company does not provide reconciliations of Adj. EBITDA, Free Cash Flow and Free Cash Conversion to the most comparable GAAP financial measures on a forward-looking basis because the company is unable to predict with reasonable certainty the ultimate outcome of legal proceedings, unusual gains and losses, and acquisition-related expenses without unreasonable effort, which could be material to the company's results computed in accordance with GAAP.

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