The Future of Energy

Diverse energy sources will each play a role in the world's future energy supply. At Halliburton, our work focuses in three areas:

- We develop and provide goods and services to help our customers reduce the emissions footprint of their oil and gas operations.
- We execute our core competencies to work to deliver solutions for low-carbon energy projects such as CCUS and geothermal energy.
- Through Halliburton Labs, we help early-stage companies in emergent energy sectors scale as we learn about where we can strategically engage new markets.

Our Innovation Sustainability Commitments

- Lead the industry in innovation and stewardship of global resources.
- Provide solutions that support decarbonizing our customers' production base.

Lowering the Carbon Intensity of Our Customers' Oil and Gas Operations

The oil and gas industry provides affordable, reliable energy that is necessary for global society and its growth. The path toward a lower-carbon future includes the more efficient, lower-carbon production of hydrocarbons. Halliburton's approach to sustainability is embedded in our new technology development process and customer collaboration. We offer leading and new technologies to customers to reduce emissions, maximize assets, and build a sustainable future.

Carbon Footprint Assessments

In 2024, we used our Carbon Footprint Assessment process to estimate emissions for several proposed large-scale, complex projects that involve multiple business lines in countries including Mexico, Norway, Iraq, and Namibia. The estimates we generated accounted for potential emissions from engines and other equipment, transport, facilities, and the carbon footprints of the Halliburton products that assist with project execution.

Halliburton performing a cementing operation on a rig in North Dakota

2024 Technology Sustainability Matrix

Our Technology Sustainability Matrix maps the offerings we develop to assist our customers to reduce their emissions in every stage of the well lifecycle and develop their low carbon projects. The table below highlights products and services we commercialized in 2024.

Products / Services	Operational Efficiency	Electrification	Customer Emissions Inventory Optimization	Materials and Logistics	Carbon Capture, Utilization, and Storage	Geothermal
Cementing						
CorrosaLock™ cement system					●	
Completion Tools						
OSTMZ™ sand control system	●					
XSTMZ™ xtreme single-trip multizone completion system	●					
NeoStar™ CS tubing retrievable safety valve					●	
Drill Bits and Services						
Hedron® fixed cutter PDC drill bits	●					●
Cerebro Force™ in-bit sensing	●				●	
XR Prime™ reamer hole enlargement tool	●				●	
Production Enhancement						
OCTIV® auto frac	●					
WAM Skid - Water Analysis Monitoring			●	●		
FR Selection Tool			●	●		
Production Solutions						
SandTrap® formation consolidation service	●					
Sperry Drilling						
iSTAR® intelligent drilling and logging platform generator	●			●		
Wireline and Perforating						
Automated Pump Down	●	●		●		
LOGIX™ Remote Logging	●			●		

Low Carbon Solutions

In 2024, Halliburton continued to see growth in global opportunities for carbon capture, utilization, and storage (CCUS), geothermal energy, and other existing and emerging low carbon energy markets. Our Low Carbon Solutions offerings apply our technology and understanding of subsurface conditions to support our customers design and develop wells to execute their projects.

Carbon Capture, Utilization, and Storage

Through active collaboration with our customers, we provide end-to-end fit-for-purpose technologies for the CCUS market. Our solutions include the NeoStar™ CS tubing-retrievable safety valve and CorrosaLock™ cement system for corrosive environments and ultra-low temperatures of CO_2 injection and containment. We also continue to build on our oil and gas technology alliances to develop and pursue integrated CCUS opportunities.

Geothermal Energy

Halliburton has long served the geothermal market. Today we use our core oil and gas competencies in conventional and direct heating geothermal projects. We help our customers through the geothermal well lifecycle, including subsurface understanding and testing, well construction, completions, and production.

Halliburton has designed technologies, such as GeoESP® submersible borehole and surface pumps and the Thermalock™ cement system for extreme conditions of our customers' geothermal work applications. We provide solutions such as hardier drill bits, drilling fluid additives that increase effectiveness in high-temperature environments, directional drilling for complex well paths, and specialized well designs and completions to address the challenges associated with drilling at great depths.

GeoESP Lifting Pump Installed in Germany

In the geothermal energy field, factors such as extreme temperatures and strenuous operating conditions pose unique stress to traditional geothermal technologies, including electric submersible pumps (ESP). To address these challenges, Halliburton's GeoESP system includes high-quality, heat-resistant materials that resist scale, corrosion, and abrasion. It also includes new, innovative technologies that help address the unique demands of geothermal applications. Our modular components can help enhance safety, reduce power input costs, and improve efficiency at geothermal well sites, empowering our customers to tap into more durable, profitable geothermal options.

In 2024, we collaborated with a German geothermal operator to replace their two existing ESPs with one GeoESP that possesses a broader operational range. The successful integration of this GeoESP lifting pump established the operator's access to a durable technology solution and helped them reduce risks and realize efficiencies. It also helped them avoid power quality issues, long equipment repair delays, and disruptions.

Halliburton Labs: The Future of Energy. Faster.™

Through Halliburton Labs, we help energy system innovators and entrepreneurs further their strategic goals by providing them with access to our capacity to scale and the vast resources in our global infrastructure and network. Participating startups include organizations engaged in industrial decarbonization, carbon capture and utilization, grid-scale and long-duration energy storage, energy generation and conversion, critical minerals recovery, hydrogen production and transportation, and circular economy.

As we support these organizations, we develop new insights and discover opportunities for exploration, investment, and growth. We also gain institutional knowledge that will enable us to collaborate and engineer solutions to maximize asset value in the energy systems of the future.

Halliburton Labs continued to grow in 2024. We closed out the year with 38 participant and alumni organizations that represent all facets of energy production, storage, distribution, and efficiency, as well as the industrial decarbonization and waste-to-value sectors. The increase in participants is a reflection of our growing profile, and today most participants approach us through referrals and recommendations.

38 Halliburton Labs Participant and Alumni Organizations

HALLIBURTON LABS®

Halliburton Labs Gives Clean-tech Startups Visibility

We hosted two Finalists' Pitch Day events in 2024 to showcase 18 startups who innovate solutions throughout the energy landscape. Our March event was held in collaboration with New Orleans Entrepreneur Week, which further expanded Halliburton Labs' and our finalists' reach, visibility, and networks.

Halliburton Labs was a founding partner for the inaugural Houston Energy and Climate Startup Week, which took place in September 2024 and showcased Houston's momentum in helping transform the energy industry while driving a sustainable, low-carbon energy future.

Halliburton Labs also hosted our second Company Showcase in June 2024. An audience of clean-tech venture investors attended live pitches from 14 of our participant startups and we curated more than 200 individual meetings between startups and relevant investors.

Participant Achievements

In 2024, many Halliburton Labs participants achieved important milestones in their work to scale their operations.

- SunGreenH2 and Cache Energy hosted demonstrations at Halliburton facilities
- Ayrton Energy raised $6.8 million and was included in Cleantech's 2024 50 to Watch list
- NanoTech Materials was recognized as one of Houston's top 5 fastest-growing companies by Innovation Map, and their Insulative Ceramic Particle was recognized by TIME as one of 2024's Best Inventions
- The EU's Horizon Europe funding program granted the Ondas de Peniche (ONDEP) project €19 million to deploy a 2 MW array of AW-Energy WaveRoller converters in Portugal
- Momentum Technologies, Disa Technologies, Ayrton Energy, and NanoTech Materials all moved into larger facilities as they made progress on their efforts to scale

Halliburton Labs team at Halliburton Labs Finalists Pitch Day in New Orleans, LA on Tulane University campus