HOUSTON ENERGY TRANSITION INITIATIVE

MORE ENERGY, LESS EMISSIONS

GREATER HOUSTON PARTNERSHIP

Houston's Energy Leadership on Emissions Reduction:

PROGRESS, IMPACT AND MOMENTUM

EXECUTIVE SUMMARY

The Houston region is strategically important to global energy security, affordability, and reliability, with a long-standing reputation for innovation, safety and efficiency. Building on its legacy of energy leadership, Houston is actively shaping a future defined by more energy and less emissions with resilient supply chains, sustained economic growth, and job creation.

The Greater Houston Partnership (Partnership) is the principal business organization for the region, and through its Houston Energy Transition Initiative (HETI) convenes industry, academia, government agencies, and nonprofits to address shared challenges and opportunities in energy and emissions. Policy frameworks, regulatory clarity, and evolving market signals such as demand for low-carbon solutions and increasing willingness to pay for decarbonized energy and products, are accelerating momentum across the region. These drivers, combined with Houston's growing innovation ecosystem, are enabling the region's energy leaders to make substantial and measurable progress in reducing greenhouse gas (GHG) emissions while continuing to scale energy supply to meet growing global demand.

MAJOR RESULTS TO DATE

- More than $95 billion in low-carbon investments since 2017 by HETI affiliated companies, including infrastructure, acquisitions, and R&D. (See footnote 1 below)
- Industry-wide 20% reduction in total Scope 1 GHG emissions and 55% decrease in methane emissions from global operations since 2017.
- Dozens of operational case studies show clear progress in Scope 1 and 2 (see Appendix) emissions across a diverse range of companies. (See footnote 2 below)
- HETI's member companies representing the full energy value chain remain committed to further reducing their Scope 1 and 2 GHG emissions, as evidenced by several recent project development and investment announcements.

Moving forward, there are three key pathways to achieve additional emissions reductions:

1. **Enabling Operational Decarbonization**
2. **Accelerating Scale-Up of Low-Carbon Technologies**
3. **Creating Carbon Accounting Mechanism to Drive Global Greenhouse Gas Reduction**

[1] Investment data sourced from OGCI 2024 Progress Report

[2] Emissions reduction data sourced from OGCI 2024 Progress Report

SECTION 01

THE DUAL CHALLENGE—MORE ENERGY, LESS EMISSIONS

DECARBONIZATION OVER THE PAST 20 YEARS

The Houston region has been a leader in decarbonizing the energy and power sectors during a period of growing demand over the past 20 years, developing and delivering all forms of energy needed to meet the dual challenge (see Appendix). According to the US Energy Information Administration (EIA), total energy-related carbon dioxide (CO2) emissions in the US have decreased by roughly 24% across all sectors over the past 20 years, and by roughly 60% in the electricity sector (Figure 1). One of the biggest drivers of this emissions reduction over the last 20 years has been through the displacement of coal in the power sector with natural gas. In addition to reducing CO2 emissions, natural gas is also effective as a foundation for integrating intermittent renewable energy sources like wind and solar because of its flexibility, reliability and affordability.

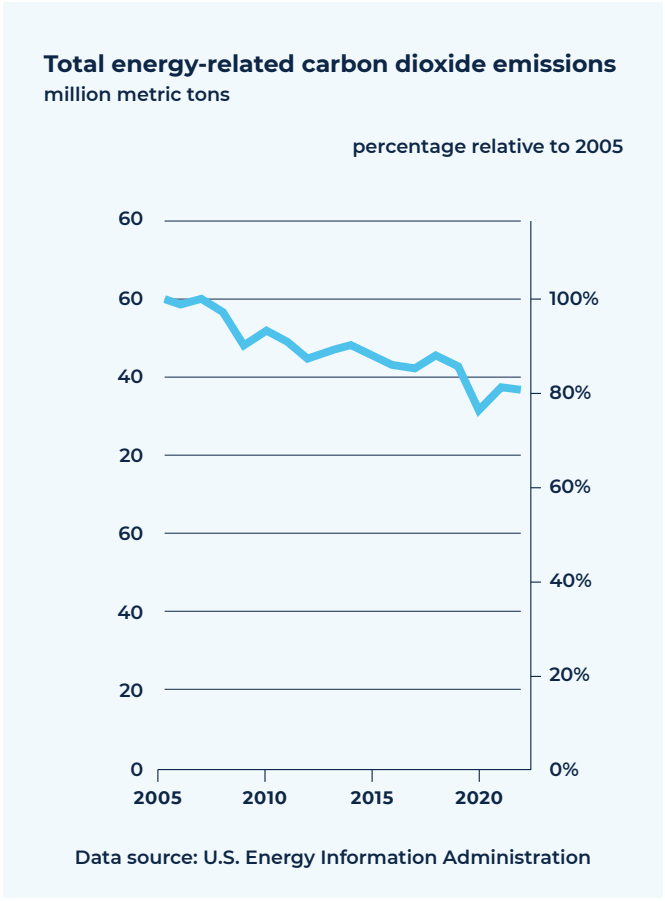


Figure 1. Total energy-related carbon dioxide emissions, historical from 2005, shown for all sectors, US Energy Information Administration, *Annual Energy Outlook 2023* (AEO2023).

IMPACTFUL INVESTMENTS

HETI's members have made significant progress decarbonizing the full energy and power value chain, including their own operational footprint, investing significantly in decarbonization, growing renewables development and integration, and developing disruptive decarbonization technologies for the future. According to the most recent progress report from the Oil & Gas Climate Initiative (OGCI), its member companies, which include several HETI members, are investing in the energy system of the future to achieve a low-carbon economy with deep reductions in greenhouse gas emissions through individual and collective actions. Figures 2 and 3 highlight industry's progress with more than $95 billion in total low-carbon investments since 2017 resulting in a 55% industry average reduction in methane emissions and a 20% industry average reduction in total greenhouse gas emissions from operations.

OGCI member companies' total low-carbon investement[4]

$29.9bn	+15%	$95.8bn
total in 2023	2023 vs 2022	total since 2017

Figure 2. Energy industry has made significant progress in total low-carbon investments (investment, acquisitions, and research and development) since 2017, OGCI 2024 Progress Report.

OGCI members' total operated greenhouse gas emissions reductions in 2023 vs 2017 baseline

-21%	-19%	-55%	-47%
upstream carbon intensity	total GHG emissions (Scope 1)	total methane emissions upstream	GHG emissions from upstream flaring

Figure 3. Energy industry has made significant progress in reducing total operated greenhouse gas emissions since 2017, OGCI 2024 Progress Report.

DEPLOYING STRATEGIC LEVERS AND TECHNOLOGIES

Impactful strategies and organizational best practices currently being implemented by HETI member companies are reducing the Scope 1 and 2 emissions intensity of their existing operations, assets and products while continuing to ensure the secure supply of reliable and affordable energy. Across industry, companies are optimizing their portfolios to diversify their assets, high-grade for resilience, and invest in novel low-carbon and carbon-efficient technologies (Figure 4).

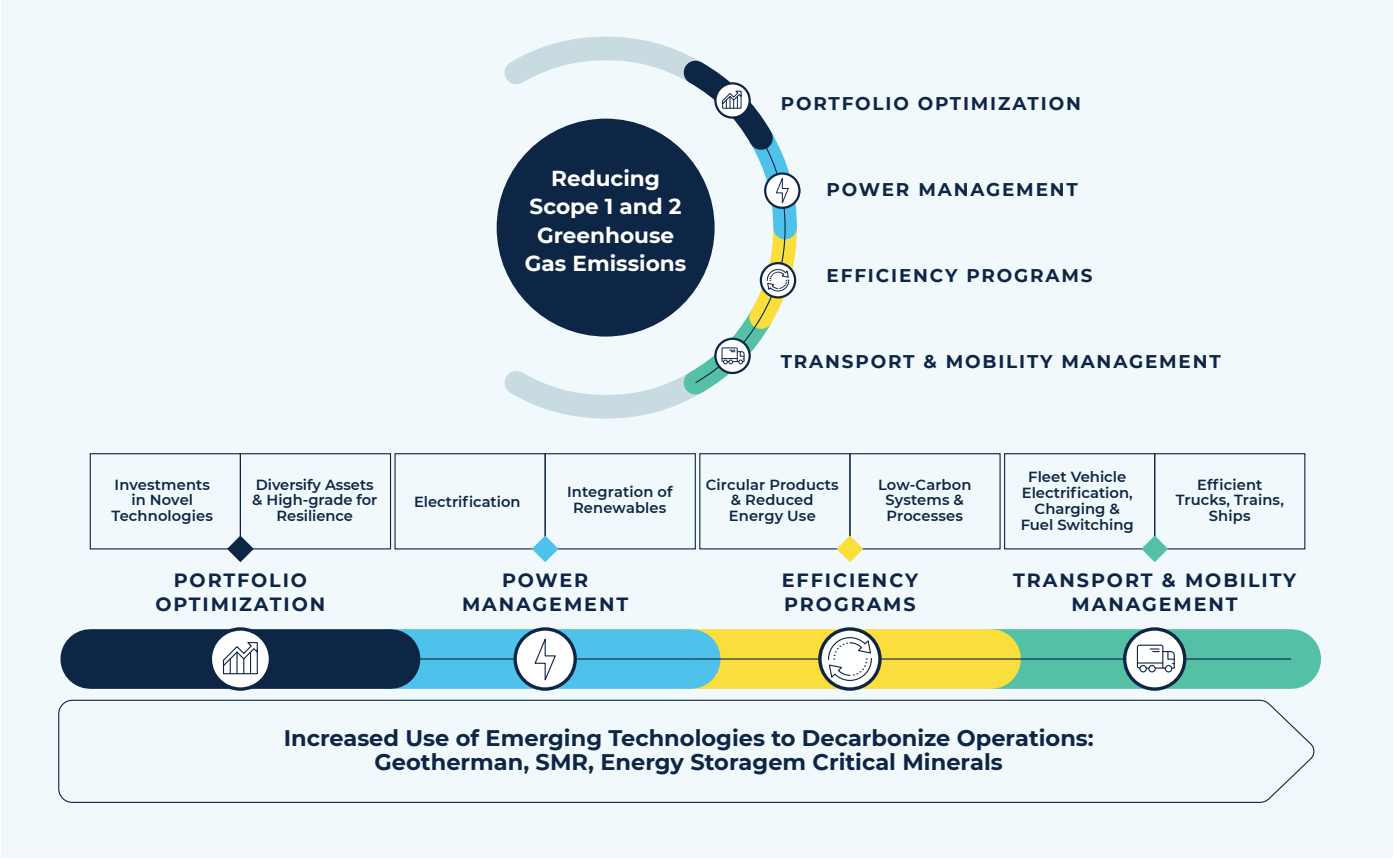


Figure 4. Strategic levers and emerging technologies are currently being deployed by HETI members to reduce Scope 1 and 2 emissions of their existing operations, assets and products.

Power management initiatives, such as electrification of facilities and integration of renewable and alternative energy sources to replace or supplement existing industrial processes, are being deployed by many HETI member companies. Programs that increase the efficiency of operations and assets are being implemented to optimize low-carbon systems and processes, reduce energy usage, and deliver circular products. Working across the supply chain, sustainable transportation and mobility management solutions are reducing the emissions intensity of industrial fleets, including the introduction of more efficient trucks, trains, and ships, fleet vehicle electrification and charging networks, and fuel switching. Additionally, the development of emerging technologies such as enhanced geothermal, next generation nuclear, energy storage, carbon capture, utilization and storage, low-carbon hydrogen production, and critical minerals have the potential to support further emissions reductions across industry. Table 1 highlights examples of the range of levers and technologies being deployed by HETI member companies to reduce their Scope 1 and 2 greenhouse gas (GHG) emissions.

Table 1. Examples of levers currently being deployed by HETI member companies to reduce their Scope 1 and 2 greenhouse gas (GHG) emissions (list is not exhaustive).

Scope 1 Levers	Scope 2 Levers
Equipment upgrades and optimization	Battery storage
Exhaust recovery	Energy metering
Heating and cooling loss recovery	Gas to electric equipment upgrade conversions
HVAC upgrades	LED retrofits, switches, timers and sensors
Leak detection and mitigation	Mechanical and electrical services
Vehicle electrification	Paperless operations
Flaring and Venting reduction	Renewable energy integration

IMPACT OF EXISTING ACTIONS: DEMONSTRATED PROGRESS IN REDUCING EMISSIONS

HETI member companies have made significant and measurable progress in reducing their Scope 1 and 2 greenhouse gas (GHG) emissions. Since 2017 total GHG emissions from global operations have decreased by 20% across industry, global methane emissions have been reduced by 55% across industry, and over $95 billion in low-carbon investments have been made across the full energy and power value chain. These outcomes reflect on-the-ground implementation of technologies, operational changes, and investment strategies that are already delivering value and decarbonization. Table 2[1] summarizes the emissions reductions reported to date by HETI member companies, followed by detailed examples of the wide array of strategies and technologies being deployed by HETI members to achieve results in demonstrating real-world emissions reductions within their existing operations.

Table 2. Summary of Emissions Reductions by HETI Member Companies from Public Reporting.

Company	Metric Type	Impact	Timeframe	Key Strategies and Notes
Baker Hughes	Scope 1 & 2 Emissions	28%	Since 2019	Electrification, energy efficiency, fleet optimization, global fuel switching
BP	Scope 1 & 2 (Net Zero Ops)	38%	Since 2019	Operational efficiency, CCUS, net zero sales, renewables, bioenergy
Chevron	Upstream Methane Intensity	64%	Since 2016	Methane reduction, CCUS, geothermal, hydrogen, project portfolio optimization
Daikin	Net Greenhouse Gas Emissions	14%	Since 2019	Heat pumps, inverter tech, logistics optimization, fluorocarbon recovery
ExxonMobil	Operated GHG Emissions Intensity	10%	Since 2016	Methane management, Permian Basin electrification, lithium, CCUS infrastructure
Hess	Methane Intensity	0.39%[2]	Current (2025 goal: 0.47%)	LDAR programs, flaring reduction, low-bleed pneumatics, intelligent pipeline monitoring
Honeywell	Scope 1 & 2 GHG Intensity	>90%	Since 2004	Energy efficiency, carbon capture, hydrofluoroolefin (HFO) products, hydrogen membrane tech, building management
Shell	Scope 1 & 2 Operational Emissions	31%	Since 2016	Low-carbon fuels, LNG, CCS, renewables, flaring and methane reduction
SLB	Scope 1 & 2 Absolute Emissions	30%	Since 2019	Renewable energy, lifecycle analysis, new energy systems, CCUS, lithium, geothermal
Wood	Scope 1 & 2 (market-based)	71%	Since 2019	Energy transition services, real estate efficiency, fuel use reduction
Woodside	Net Scope 1 & 2 Emissions	14%	Since 2016	Design-stage avoidance, operational efficiency, alternative power, CCUS

[1] Some metrics are absolute reductions and others are intensity-based or focused on specific greenhouse gas emissions like methane, reflecting different baselines and reporting practices across organizations.

[2] This is a current state methane intensity value rather than a reduction.

EXAMPLES OF INNOVATIVE STRATEGIES INCLUDE:

Baker Hughes has reduced their Scope 1 and 2 emissions by 28% and their emissions intensity by 33% since 2019 by implementing a range of technologies and strategic levers across their operations. Operational efficiency strategies have reduced emissions from manufacturing and field service operations and facility energy efficiency strategies have reduced emissions from energy use at facilities. Increased proportions of renewables in their electricity mix to 15% has reduced Scope 2 emissions, and increased electrification and low-carbon fueling across their vehicle and vessel fleet have reduced Scope 1 emissions. Examples of these emissions reductions across Baker Hughes' global operations include an employee shuttle service in Italy, diesel fuel to electric grid transformation in Saudi Arabia, reduction of heating fuel in Argentina, and fuel efficiency vessel upgrade in Brazil.

BP has reduced the combined Scope 1 and 2 emissions of their net zero operations by 38% since 2019 and reduced the average lifecycle carbon intensity of their energy products by 6% over the same period. These reductions have been achieved through implementing new growth strategies prioritizing their net zero operations and net zero sales along with focus areas supporting their people and planet strategies. BP's net zero operations strategy includes operational efficiency, carbon capture, utilization, and storage, hydrogen, methane management, and portfolio optimization. BP's net zero sales strategy includes bioenergy, electric vehicle charging, renewables and power, and hydrogen. BP also is unlocking growth in bioenergy with full ownership of bp Bunge Bioenergia in Brazil.

Chevron has decreased their portfolio carbon intensity by 3% since 2018, with upstream methane intensity decreased by 64% since 2016, volatile organic compounds emissions decreased by 44% since 2019, and nitrogen oxides emissions decreased by 21% since 2019. A range of technologies have been implemented to achieve these emissions reductions, including carbon capture, utilization, and storage, offsets, hydrogen, and emerging technologies such as geothermal, lithium extraction, long-duration energy storage (LDES), and small modular reactor (SMR) nuclear. Implementing integrated partnerships has also been an important factor in achieving emissions reductions. Examples of emissions reduction projects and activities include an upgraded diesel hydrotreater at the El Segundo refinery in California which can process either traditional feedstocks or 100% renewable energy and acquisition of a majority stake in ACES Delta LLC to develop a green hydrogen storage project in Utah.

Daikin has reduced their net greenhouse gas emissions by 14% since 2019 through implementing a series of growth strategies focused on achieving carbon neutrality through their products and promotion of their solutions business connected with their customers. Daikin has also deployed a suite of technologies, such as heat pumps, inverters, manufacturing efficiency improvements, and logistics optimizations, to achieve emissions reductions through their creating value through the power of air growth strategy. Daikin has demonstrated successful emissions reduction through city-wide optimal energy management initiatives in the UK, Portugal, Belgium, Italy, and Singapore and their fluorocarbon recovery network system in Japan.

ExxonMobil has reduced their operated greenhouse gas emissions intensity by 10% since 2016 and has cut their operated methane emissions in half over the same period. Several strategies have been deployed to achieve these emissions reductions across their operations, including several methane reduction, flaring elimination, and electrification initiatives focused on reducing emissions in their US operated unconventional production assets such as those in the Permian Basin. ExxonMobil Low Carbon Solutions has acquired Denbury Inc to expand business opportunities leveraging the largest CO2 pipeline network in the US and has signed CO2 offtake agreements with several industrial partners to capture, transport and store up to 5 million metric tons of CO2 per year. Additionally, ExxonMobil has begun drilling for lithium in southwest Arkansas to address the growing needs of the EV battery market and launched Strathcona biofuels to develop drop-in replacements for today's fossil fuels.

Hess has reduced their US operations methane intensity to 0.39%, below the 2025 ONE Future combined target of 0.47% for their operating sectors including production, gathering, boosting, and processing. This reduction has been attributed primarily to implementing flaring reduction across their operating facilities and phasing out of high-bleed pneumatic controllers. Hess is also driving progress through climate strategy and disclosures that are informed by their voluntary external engagements and initiatives that address emissions reductions and measurement and reporting. They are founding partners in the ONE Future Coalition and the Environmental Partnership which have contributed to the pursuit of technological innovation for enhanced leak detection and prevention through organizations like the Intelligent Pipeline Integrity Program (iPIPE) in North Dakota. A key example of Hess' progress in emissions reduction is their continued implementation of the leak detection and repair (LDAR) program across all their North Dakota production facilities.

Honeywell has reduced their Scope 1 and 2 greenhouse gas intensity by more than 90% since 2004 through implementing a range of growth strategies, enabling technologies, and product developments across their global operations, including through Honeywell UOP. These significant emissions reductions have been achieved through focusing on strategic ESG-oriented solutions such as energy efficiency, measurement and reporting, electrification, net zero enablers, health, safety, and security, and circularity initiatives. Technologies being implemented to reduce emissions include enabling technologies for facilities management and performance optimization, a next-generation catalyst-coated hydrogen membrane technology to optimize production and cost, and CO2 solutions process technologies including advanced solvent carbon capture technology. Product developments that have reduced emissions include hydrofluoroolefin (HFO) products to replace hydrofluorocarbons (HFC) with 99% lower global warming potential as well as electrification products such as thermal management systems, sensors for battery management systems, ionic modular battery energy storage systems, and energy control systems. Honeywell demonstrates their suite of sustainability solutions for buildings, carbon, and energy management at their Charlotte headquarters.

Shell has reduced their Scope 1 and 2 operational emissions by 31% since 2016 and reduced the net carbon intensity of their energy products by 6-8% over the same period. These significant emissions reductions have been achieved through deploying a series of growth strategies across Shell's upstream and downstream business operations. The Leading Integrated Gas strategy is focused on growing Shell's world-leading LNG

business with lower carbon intensity. The Advantaged Upstream strategy focuses on cutting emissions from Shell's oil and gas production while keeping oil production stable. The Differentiated Downstream, Renewables, and Energy Solutions strategy is focused on transforming Shell's businesses to offer more low-carbon solutions while reducing sales of oil products. Additionally, Shell prioritizes trading and optimization capabilities across all strategic initiatives and operations. Examples of projects demonstrating Shell's success in reducing emissions across existing operations include cutting emissions from oil and gas production assets in the US, Malaysia, Norway, and the Philippines.

SLB has reduced their Scope 1 and 2 absolute emissions by 30% since 2019 and has avoided over 950,000 tons of carbon dioxide-equivalent emissions over the same period through a suite of growth strategies and technology deployments. Renewable energy has been deployed into their facilities at a rate of 38% of the total share of electricity since 2022 to decarbonize operations. Additional growth strategies deployed include a Record-Reduce-Replace facilities emissions reduction program, decarbonizing their customer operations through applying Lifecycle Analysis (LCA), Transition Technologies Portfolio and SLB's End-to-End Emissions Solutions (SEES), and investing in scaling of new energy systems across their operations. SLB has implemented several technologies within their new energy systems program, including next generation carbon capture, storage, and innovation solutions, geothermal, sustainable lithium production, renewable storage solutions, and technology industrialization pilot projects to bridge innovation and adoption. Examples of SLB's emissions reduction projects include solar panel installations, lighting and efficiency improvements to reduce the carbon footprint and costs in West Singapore and renewable fuels to lower the emissions intensity of fleet operations with biodiesel mixtures in Indonesia and Oman.

Wood has reduced their absolute market-based Scope 1 and 2 greenhouse gas emissions by 71% from the 2019 baseline, without the use of offsets. These significant reductions have been achieved through implementing several strategic growth strategies. First, they are capitalizing on opportunities from trends driven by environmental considerations to grow their revenue from energy transition, decarbonization, and sustainable materials services. Second, they are securing the supply of affordable energy as a key consideration while the world transitions to a lower carbon energy system with energy security market drivers for their oil and gas services which have the potential to generate environmental impacts. Third, they are delivering innovative solutions to support the net-zero agenda, combined with world-class environmental management in their operations as they deliver across their many and diverse projects. Examples of how Wood is implementing these strategies across their operations include a continued focus on consolidating and increasing energy efficiency in their real estate portfolio and lowering their on-site fuel usage as certain major lump sum contracts are completed and not replaced in line with their preferred contracting structure. Wood has also completed more than 200 studies to advise and engineer the design and digitalization of carbon capture and storage projects in the US, Canada, and Saudi Arabia.

Woodside Energy has decreased their net Scope 1 and 2 emissions by 14% since 2016, has utilized 13% fewer carbon credits since 2022, and their gross emissions intensity and methane intensity are lower than industry benchmarks with an advantaged natural gas portfolio. Woodside has achieved these emissions reductions through strategic focus on reducing net equity Scope 1 & 2 greenhouse gas emissions through avoiding emissions in design, reducing emissions in operations, and offsetting the remainder with carbon credits. Investing in products and services for the energy transition has also been a strategic focus for Woodside, including assessing investments for their resilience to the energy transition, diversifying their products and services, and supporting their customers and suppliers to reduce their emissions. Promoting global measurement and reporting systems, including publication of transparent disclosures, is also a key strategic priority for Woodside. A range of alternative power, carbon capture, utilization, and storage, and systems integration and commercialization technologies have been developed and implemented to achieve these emissions reductions at their assets in Australia, the US, Trinidad, and Senegal.

From global corporations to regional businesses, HETI member companies are actively cutting their emissions and building a strong foundation for an energy-abundant, low-carbon future. The success of current emissions reduction strategies centers around asset optimization, technology deployment, and collaborative innovation. HETI members are creating infrastructure, tools, and knowledge bases that benefit the entire energy ecosystem. These results are the outcome of years of sustained industry investment, innovation and accountability, enabled by evolving policy frameworks, regulatory clarity, and market signals including demand for low-carbon solutions and willingness to pay for decarbonized energy and products. The Houston region is not just planning for a low-carbon future, but building it, delivering it, and proving what's possible for a future with more energy and less emissions.

MOMENTUM AND COMMITMENT TO DECARBONIZATION

With Houston's scale, growing energy innovation ecosystem, and integrated value chain, the region is well-positioned to lead global industrial decarbonization. HETI members are doubling down on commitments to decarbonization and continued progress in reducing greenhouse gas emissions with ambitious near- and long-term targets through individual and collective actions. Many HETI members have set targets to lower the carbon intensity of their operations by 2030 and 2050, with clear interim targets and investment roadmaps. Companies are continuing plans to develop and deploy key decarbonization projects at scale, including energy efficiency, carbon capture and storage, boosting production of low-carbon hydrogen and fuels, increasing electrification, and offsets.

Examples of individual company targets and project development and investment announcements to further reduce emissions within their operations include:

BP announced net zero by 2050 or sooner targets for Scope 1 and 2 emissions within their operational control and for average lifecycle carbon intensity of the energy products they sell, enabled by supportive government policies and the decarbonization of energy demand. Interim emissions reduction targets include a 20% reduction in operational emissions by the end of 2025, a 5% reduction in product emissions by the end of 2025, and methane intensity reduction of 0.20% by the end of 2025. By the end of 2030 BP is targeting a reduction in operational emissions of 45% against the 2019 baseline and a reduction in product emissions of 8-10% against the 2019 baseline. Notable recent low-carbon project development and investment announcements include reaching final investment decision (FID) with their partners in the $7 billion Tangguh UCC project in Indonesia for the first at-scale enhanced gas recovery project through CCUS, taking full ownership of bp Bunge Bioenergia in Brazil to unlock growth in the bioenergy business, and Lightsource BP's startup of its 187 MW utility-scale solar farm Peacock to partially power ExxonMobil and SABIC's $10B petrochemical complex along the Texas Gulf Coast (Figure 6).

Figure 6. Lightsource BP announced the startup of the Peacock solar project, 2025.

Chevron determined 2028 and 2030 as targets to lower the carbon intensity of their operations. Chevron's 2028 targets include portfolio carbon intensity of 71 g CO_2e/MJ (Scope 1, 2, and 3), gas carbon intensity of 24 kg CO_2e/boe (Scope 1 and 2), oil carbon intensity of 24 kg CO_2e/boe (Scope 1 and 2), and refining carbon intensity of 36 kg CO_2e/boe (Scope 1 and 2). Additionally, Chevron has set 2028 investment targets of $8 billion in lower carbon energy investments and $2 billion in carbon reduction projects. Chevron's 2030 targets include 100 mbd of renewable fuels production capacity, 25 mmtpa in their offsets business and CCUS, and 150 mtpa of hydrogen equity production capacity.

Daikin is approaching long-term and short-term targets for additional reductions in net greenhouse gas emissions through their growth strategies focused on value creation for the earth, value creation for cities, and value creation for people. Daikin remains committed to net zero by 2050 with interim net emissions reduction targets of over 30% reduction in net greenhouse gas emissions in 2025 and reduction of 50% or more in 2030.

ExxonMobil announced targets to drive further reductions in their operated greenhouse gas emissions intensity by 2030. Corporate-wide greenhouse gas intensity reduction target is

20-30% by 2030 versus 2016 levels and corporate-wide methane intensity reduction target is 70-80% by 2030 versus 2016 levels. Upstream greenhouse gas intensity reduction target is 40-50% by 2030 versus 2016 levels. Corporate-wide flaring intensity reduction target is 60-70% by 2030 versus 2016 levels. Additionally, ExxonMobil is eliminating routine flaring in their Permian Basin operated assets, in line with the World Bank's Zero Routine Flaring Initiative, as a key part of their 2030 goal of net-zero Scope 1 and 2 greenhouse gas emissions from unconventional operated assets in the Permian Basin.

Hess has shared several near-term and long-term targets to achieve additional emissions reduction across their operated facilities in North America, including achieving net zero Scope 1 and 2 greenhouse gas emissions on an equity basis by 2050. Hess is committed to reducing the greenhouse gas emissions intensity of their operated assets to 17 kg CO_2e/boe by the end of 2025 and reducing the methane intensity of their operated assets to 0.19% by the end of 2025. Additionally, Hess has a target to achieve zero routine flaring at their operated assets by the end of 2025 and has endorsed the World Bank Zero Routine Flaring by 2030 Initiative (ZRF) and the Global Methane Pledge to reduce their methane emissions by 30% below 2020 levels by 2030.

Mitsubishi Heavy Industries America (MHIA) announced their investment in Koloma, a Colorado-based geologic hydrogen exploration startup. Koloma aims to leverage its unique technology, proprietary data, and human capital advantages to identify and commercialize geologic hydrogen on a global scale by exploring for and harnessing clean hydrogen from natural underground reservoirs. MHIA is collaborating with and investing in partners to develop innovative technologies that will help to decarbonize existing infrastructure and help build a hydrogen ecosystem to contribute towards achieving a decarbonized society. MHIA joins a syndicate of investors, including Breakthrough Energy Ventures, Amazon's Climate Pledge Fund, United Airlines' Sustainable Flight Fund and Energy Impact Partners in the Koloma investment (Figure 7).

Figure 7. Mitsubishi Heavy Industries America announced their investment in geologic hydrogen startup Koloma, 2024.

Shell reinforced their ongoing commitment to net zero emissions by 2050 for Scopes 1, 2, and 3 as well as 2025 and 2030 interim targets for additional emissions reductions. Shell's targets and ambitions to further reduce Scope 1 and 2 emissions from their own operations include eliminating routine flaring from upstream operations by 2025, maintaining methane emissions intensity below 0.2% and achieving near-zero methane emissions by 2030, and halving Scope 1 and 2 emissions under their operational control by 2030 (relative to their 2016 reference year). Shell's targets and ambitions to reduce Scope 3 emissions from the products they sell include introducing a range of 15-20% target to reduce net carbon intensity (NCI) by 2030 (relative to their 2016 reference year) and reducing customer emissions from the use of their oil products by 15-20% by 2030 (Scope 3, Category 11 relative to their 2021 reference year). A notable recent announcement highlights Shell and Chevron's partnership at the Whale asset to lower the greenhouse gas intensity approximately 30% over the project lifecycle relative to similar deepwater oil and gas production assets (Figure 8).

Figure 8. Shell and Chevron announced the start of production at Whale with 30% lower GHG intensity than average deepwater production assets, 2025.

FORWARD VISION—ADVANCING THE MISSION OF MORE ENERGY WITH LESS EMISSIONS

Collectively, the Houston region can continue to tackle the dual challenge with a collaborative and integrated approach that leverages a diverse suite of emerging technologies, organizational strategies, and market-driven solutions. HETI is enabling Houston to capture its opportunity to be the global leader in delivering value-added low-carbon energy and products affordably and reliably to drive sustainable economic growth and create skilled jobs across the region. The initiative is developing collective resources that support Houston's global energy leadership for the dual challenge of providing more energy with less emissions and defining key areas of opportunity to enable value creation for decarbonized energy and products. Critical areas of opportunity have been identified as key for decarbonizing industry operations while creating an environment to attract and grow companies, projects and talent in a thriving energy innovation ecosystem.

Recommended Pathways for Houston to Lead in Monetizing Decarbonization:

1. **Enabling Operational Decarbonization:**

   Industry remains committed to long-term decarbonization goals, with strong interest in understanding and implementing decarbonization investment and planning tools such as techno-economic analysis and life-cycle analysis to optimize long-term investment decisions. HETI and a coalition of national laboratories, industry leaders, and regional academic institutions are planning and launching a series of workshops to address mutual scientific challenges and grow the connectivity between academic institutions, national laboratories, and industry. This coalition can facilitate relationship building and knowledge sharing with Houston's energy leaders and decision makers on a range of systems-level analysis and modeling capabilities that enable decarbonization investment and planning decisions.[3]

2. **Accelerating Scale-Up of Low-Carbon Technologies:**

   Innovation is critical to deploy emerging technologies for hard-to-abate operations decarbonization strategies. Strategic industry coalitions like HETI bring together operators and emitters with service providers and technology leaders to unlock novel near-term and long-term decarbonization solutions on a commercial scale.

3. **Creating Carbon Accounting Mechanism to Drive Global Greenhouse Gas Reduction:**

   A transparent carbon accounting standard and framework across the supply chain will enable industry to effectively monetize decarbonization investments and product developments. HETI can enable value creation in the carbon market and supply chain by identifying challenges and gaps and building a common knowledge base of solutions and frameworks that can effectively bridge these gaps.

[3] Preliminary results and recommendations from HETI's coalition with national laboratories, industry leaders, and regional academic institutions have been published in the report "Gaps and Opportunities for an Economic, Resilient, Lower-Carbon Energy System for Base Chemicals in the Gulf Coast".

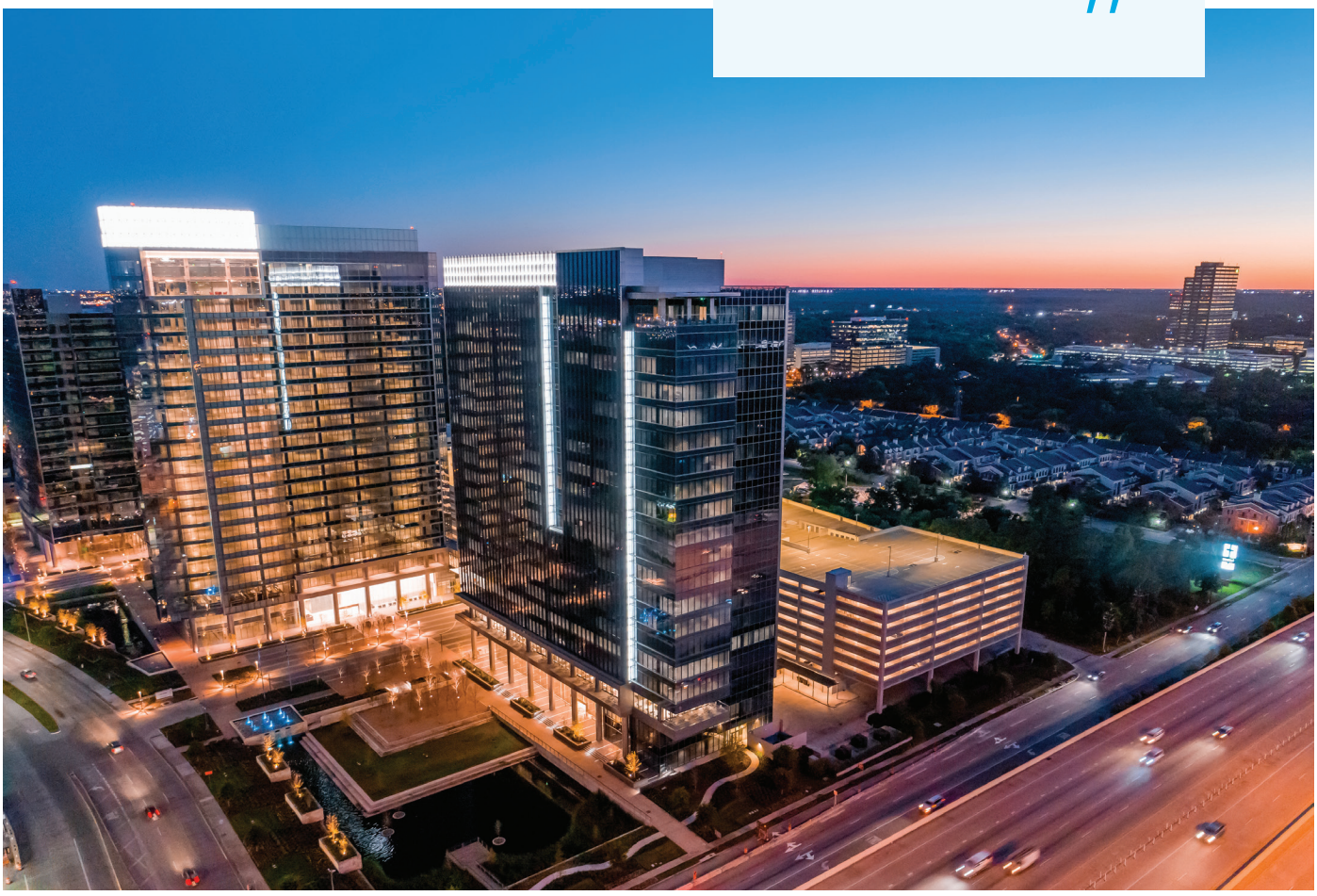
CONCLUSION

MEASURABLE PROGRESS WITH MOMENTUM FOR THE FUTURE

The Houston region is well-positioned to be the global industrial decarbonization leader with a growing innovation ecosystem of active collaboration from across incumbent energy, renewables, startups, finance and investment, academia, nonprofit organizations, and government. Partnerships and collaborations across the energy value chain hold the key to unlocking the energy abundant and low-emission future and HETI's members remain committed to decarbonization and continued progress in further reducing the Scope 1 and 2 emissions of their operations through individual and collective actions.

Houston's energy leaders are demonstrating that decarbonization is happening now in the region, not just in future plans but in operational activities, capital deployment, and innovation pipelines. The combination of real results, cross-sector collaboration, and global scale uniquely positions the Houston region and HETI's member companies to demonstrate what successful, market-driven decarbonization looks like on a global stage.

> "Houston's energy leaders are demonstrating that decarbonization is happening now in the region, not just in future plans but in operational activities, capital deployment, and innovation pipelines."



APPENDIX

SCOPE 1 & 2 GREENHOUSE GAS EMISSIONS AND THE DUAL CHALLENGE

Global demand for energy will continue to grow significantly as populations increase and quality of life continues to improve around the world. The global population is estimated to rise by 2 billion people, or 25%, by 2050, and energy will be key to unlocking their growth as developing regions around the world seek to improve quality of life and economic opportunity. At the same time, greenhouse gas emissions need to be significantly reduced to ensure long-term success in a competitive global business environment.

According to the United States Environmental Protection Agency (EPA) and GHG Protocol Initiative, Scope 1 emissions are direct greenhouse gas (GHG) emissions that occur from sources that are controlled or owned by an organization. Common examples include emissions associated with fuel combustion in boilers, furnaces, and vehicles. Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although Scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they are a result of the organization's energy use. Figure 9 provides an overview of scopes and emissions across the value chain.

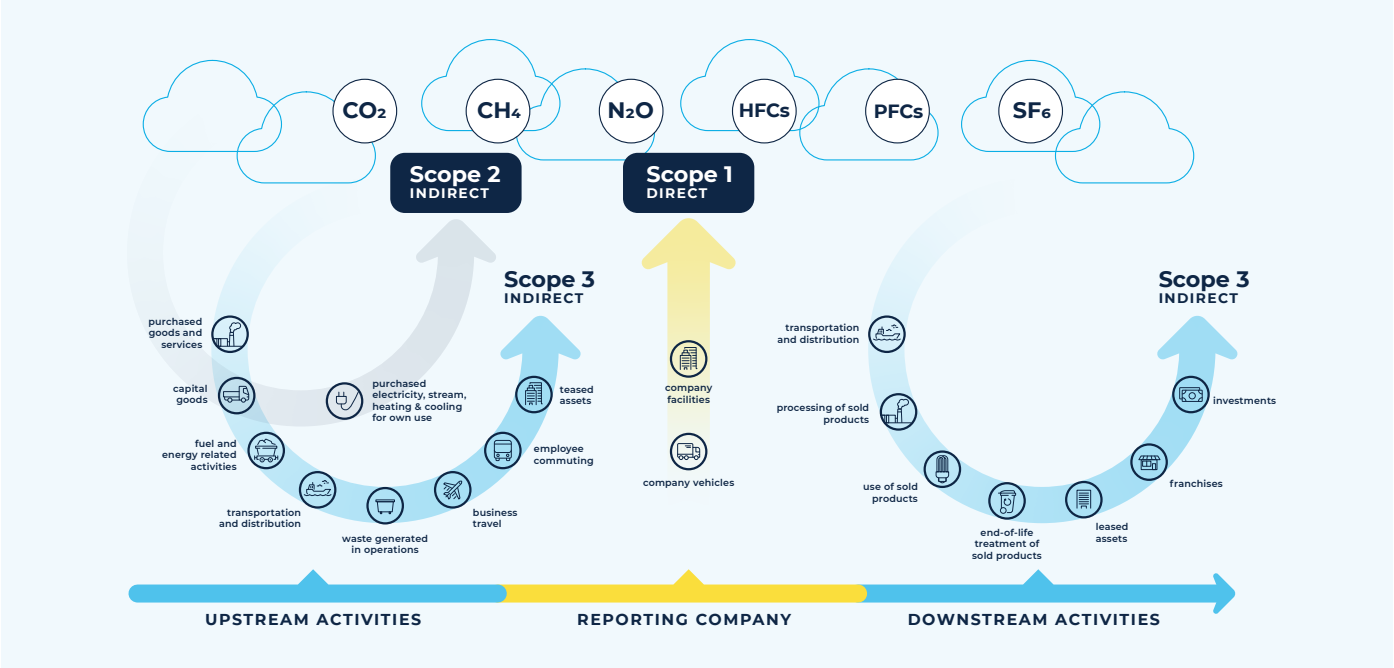


Figure 9. Overview of GHG Protocol scopes and emissions across the value chain. Source: *EPA Scope 1 and Scope 2 Inventory Guidance, from GHG Protocol Corporate Accounting and Reporting Standard*.

Many governments are taking steps to reduce greenhouse gas emissions through policies and programs that include the introduction of emissions trading programs, voluntary programs, carbon or energy taxes, and regulations and standards on energy efficiency and emissions. As a result, the energy sector must continue to evolve to meet the needs of a rapidly changing world, with multiple technologies and solutions required to reduce emissions while delivering lower carbon energy and products affordably and reliably. Organizations must be able to understand and manage their greenhouse gas emissions risks across the value chain to ensure long-term success in a competitive business environment. Additionally, companies can create value for their businesses through identifying opportunities for decarbonization, participation in voluntary GHG emissions reduction programs and markets, and recognition in the market for early voluntary action.

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