

Appendices






A1 Abbreviations and acronyms

AI	Artificial intelligence	EAF	Electric arc furnace
AtJ	Alcohol-to-jet	EEXI	Energy Efficiency Design Index
ALK	Alkaline electrolysis	EJ	Exajoules
ARENA	Australian Renewable Energy Agency	EOR	Enhanced oil recovery
ARPA-E	Advanced Research Projects Agency-Energy	EU	European Union
ASTM	American Society for Testing and Materials	EU-ETS	European Union Emissions Trading Scheme
ATM	Air traffic management	EV	Electric vehicle
BAU	Business-as-usual	FID	Final investment decisions
BCC	Book and claim community	FMC	First Movers Coalition
BECCS	Bioenergy with carbon capture and storage	FT	Fischer-Tropsch
B2B	Business-to-business	GCCA	Global Cement and Concrete Association
B2C	Business-to-consumer	GCMD	Global Centre for Maritime Decarbonisation
BETs	Battery electric trucks	GHG	Greenhouse gas
BF-BOF	Blast furnace-basic oxygen furnace	GHGRP	Greenhouse Gas Reporting Program
BIS	Bureau of Indian Standards	GIIGNL	International Group of Liquefied Natural Gas Importers
CapEx	Capital expenditure	GJ	Gigajoule
CBAM	Carbon Border Adjustment Mechanism	GRI	Global Reporting Initiative
CCfD	Carbon Contracts for Difference	GSE	Ground support equipment
CCS	Carbon capture and storage	Gt	Gigatonnes
CCUS	Carbon capture, utilization and storage	GtCO₂e	Gigatonnes of carbon dioxide equivalent
CIF	Climate Investment Funds	GW	Gigawatt
CII	Carbon Intensity Indicator	HEFA	Hydroprocessed esters and fatty acids
CO₂	Carbon dioxide	HETs	Hydrogen electric trucks
CO₂e	Carbon dioxide equivalent	HFO	Heavy fuel oil
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation	HT-PEMFC	High Temperature Proton Exchange Membrane Fuel Cells
DRI	Direct reduced iron	IAI	International Aluminium Institute

IATA	International Air Transport Association	NZT	Net-zero technologies
ICAO	International Civil Aviation Organization	OBPS	Output-Based Pricing System
ICCA	International Council of Chemical Associations	OEMs	Original equipment manufacturers
ICCT	International Council on Clean Transportation	OGDC	Oil and Gas Decarbonization Charter
IDDI	Industrial Deep Decarbonisation Initiative	PPA	Power purchase agreements
IEA	International Energy Agency	PtL	Power-to-liquids
IED	Industrial Emissions Directive	R&D	Research and development
IMF	International Monetary Fund	ROIC	Return on invested capital
IMO	International Maritime Organization	RPK	Revenue passenger kilometres
IRA	Inflation Reduction Act	SAF	Sustainable aviation fuels
IRENA	International Renewable Energy Agency	SCM	Supplementary cementitious materials
ISED	Innovation, Science and Economic Development Canada	S&P	Standard & Poor's
ITA	Industrial Transition Accelerator	SOFC	Solid oxide fuel cells
kgCO₂eq/boe	Kilograms of carbon dioxide equivalent per barrel of oil equivalent	STEPS	Stated Policies Scenario
LFO	Light fuel oil	TCO	Total cost of ownership
LME	London Metal Exchange	T	Tonnes
LNG	Liquefied natural gas	tCO₂	Tonnes of carbon dioxide
LSFO	Low-sulphur fuel oil	tCO₂e	Equivalent tonnes of carbon dioxide
LTAG	Long-term aspirational goal	tCO₂e/t	Tonnes of carbon dioxide equivalent per tonne of output
MB/D	Million barrels per day	TRL	Technology readiness level
MCFC	Molten carbonate fuel cells	TSCA	Toxic Substances Control Act
MJ/RTK	Energy used per revenue tonne kilometre performed	TW	Terawatt
MJ/ton-km	Energy use (MJ per transported tonne and km)	UK	United Kingdom
MMMCZCS	Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping	US	United States
MPP	Mission Possible Partnership	WACC	Weighted average cost of capital
MRV	Measurement, reporting and verification	WEC	Waste emissions charge
MT	Million tonnes	ZEF	Zero-emission fuels
MTPA	Million tonnes per annum	ZEMBA	Zero Emission Maritime Buyers Alliance
MVR	Mechanical vapour recompression	ZET	Zero-emission trucks
NZE	Net-zero emissions	ZEV	Zero-emission vehicles
NZIA	Net Zero Industry Act		

A2 Readiness criteria

TABLE 20 Criteria for assessing the readiness dimensions

Dimension	Metric	Calculation methodology	Weight	Thresholds				
				Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
 Technology	Technology readiness level (TRL)	Weighted average of TRL calculated based on decarbonization levers	100%	TRL 1-3 Concept stage	TRL 4-6 Prototype stage	TRL 7-8 Demonstration stage	TRL 9 Early adoption stage	TRL 10-11 Mature stage
 Infrastructure	Infrastructure required for net zero by 2050	Clean power (GW)	Weights based on decarbonization levers for each sector	>300	100-300	30-100	0-30	<0
		Clean hydrogen (MTPA)		>75	50-75	30-50	10-30	<10
		CCUS (MTPA)		>750	500-750	250-500	100-250	<100
		Biofuels (MTPA)		>500	250-500	100-250	0-100	<0
 Demand	Price elasticity of demand	Absolute value of price elasticity of demand (long-run)	25%	>1	0.75-1	0.5-0.75	0-0.5	<0
	B2B green premium	Additional cost to produce green product (%)	25%	>20%	15-20%	10-15%	5-10%	<5%
	B2C green premium	Increase in final price for end consumer (%)	25%	>6%	4-6%	2-4%	0-2%	<0%
	Current green supply	MPP: percentage of projects announced from 2030 target	25%	<10%	10-25%	25-50%	50-100%	>100%
 Capital	Required increase in capital	Additional annual CapEx for decarbonization by 2050/ current annual CapEx	20%	>1	0.5-1	0.25-0.5	0.1-0.25	<0.1
	Capital efficiency	Total CapEx required by 2050/ total CO ₂ emission reduction by 2050 (\$/tCO ₂)	20%	>200	150-200	100-150	50-100	<50
	Ease of increasing capital	Sector-specific WACC (%)	20%	>10%	8-10%	6-8%	4-6%	<4%
	Current financed projects	MPP: percentage of projects financed from 2030 target	20%	<5%	5-10%	10-15%	15-20%	>20%
	Current return margins	Free cash flow after debt/revenue (%)	20%	<10%	10-15%	15-20%	20-25%	>25%
 Policy	Availability and maturity of policy	Availability and maturity of policy across regions and globally	100%	Qualitative				

A3 | Data sources

Methodology sources

Aluminium Stewardship Initiative (ASI)

BloombergNEF (BNEF)

Commodities Research Unit (CRU)

First Movers Coalition (FMC)

Global CCS Institute Global Cement and Concrete Association (GCCA)

Global Maritime Forum

International Air Transport Association (IATA)

International Aluminium Institute (IAI)

International Council on Clean Transportation (ICCT)

International Energy Agency (IEA)

International Maritime Organization (IMO)

International Renewable Energy Agency (IRENA)

Transition Pathway Initiative Centre, London School of Economics and Political Science (LSE-TPI Centre)

Maersk Mc-Kinney Moller Center for Zero Carbon Shipping (MMM)

Mission Possible Partnership (MPP)

NYU Stern

S&P Capital Pro

Standard & Poor's Global (S&P Global)

System IQ

World Steel Association

Contributors

Project team

Accenture

Muqsit Ashraf

Group Chief Executive, Accenture Strategy

Leia Bassam

Consultant, Strategy and Consulting, Energy

Shant Deyirmenjian

Manager, Strategy and Consulting, Energy

Sagar Kalra

Consultant, Strategy and Consulting, Energy

David Rabley

Managing Director and Global Energy Transition Lead, Energy

Vrinda Singh

Consultant, Strategy and Consulting, Energy

World Economic Forum

Roberto Bocca

Head, Centre for Energy and Materials; Member, Executive Committee

Espen Mehlum

Head, Energy Transition Intelligence and Regional Acceleration, Centre for Energy and Materials

Maksim Soshkin

Research and Analysis Specialist, Centre for Energy and Materials

Nicholas Wagner

Manager, Energy and Industry Transition Intelligence, Centre for Energy and Materials

Acknowledgements

Advisory board members

Rigoberto Ariel Yopez-Garcia

Economics Principal Advisor, Vice Presidency of Sectors and Knowledge, Inter-American Development Bank

Morgan Bazilian

Professor, Public Policy; Director, Payne Institute, Colorado School of Mines

Lin Boqiang

Dean, China Institute for Studies in Energy Policy, Xiamen University

Michaela Cappanelli

Head, Climate Strategy, Risk Mitigation, and Disclosure, Eni

Lucy Craig

Director, Innovation and Digitalization, DNV

Brian Efird

Executive Director, Strategic Partnerships, King Abdullah Petroleum Studies and Research Centre (KAPSARC)

Rabia Ferroukhi

Director, The International Network of Energy Transition Think Tanks (INETT), Agora Energiewende

Bertrand Magne

Senior Economist, European Investment Bank (EIB)

Sandra Melki

Vice-President, Marketing and Sustainability, Technip Energies

Davide Puglielli

Head, Scenario Planning and Group Strategic Positioning, Enel

John Scott

Head, Sustainability Risk, Zurich Insurance Group

Fridtjof Unander

Chief Economist, Aker Horizons

David Victor

Professor, University of California, San Diego (UCSD)

External experts

Maria Alegre

Global Stakeholder Relations Director,
Ball Corporation

Clare Broadbent

Head, Sustainability, Worldsteel

James Brown

Policy Leader, Climate Change, Energy and
Sustainability Issues, Dow

Noelle Froehlich

Team Lead Clean Operations Office, DHL Group

Annette Hansen

Global Environmental Lead, Topsoe

Teo Lombardo

Transport Analyst and Modeller, International
Energy Agency (IEA)

Laura LoSciuto

Manager, Battery Circular Economy Initiative, RMI

Christopher Lythcke-Elberling

Head, Transition Modelling and Analytics, Mærsk
Mc-Kinney Møller Center for Zero Carbon Shipping

Catherine McFarlane

Head, Sector Transitions, MPP

Frédéric Nyssen

Director, Net Zero Priorities and Opportunities, BASF

Vera O’Riordan

Energy Modeller, World Energy Outlook Team,
International Energy Agency (IEA)

Miles Prosser

Secretary General, IAI

Andrew Purvis

Director, Sustainable Manufacturing, Worldsteel

Justine Roure

Vice-President, Strategy and Policy, OGCI

Zhou Xuan

Secretary-General, Responsible Critical Mineral
Initiative (RCI)

World Economic Forum

Jelena Aleksić

Lead, Industry Decarbonization, Metals

Mette Asmussen

Lead, Maritime Sector Initiatives

Daniel Boero Vargas

Lead, Industry Decarbonization, Cement
and Concrete

Vladimir Borodin

Specialist, Airports of Tomorrow

Stefan Koch

Head, Chemical and Advanced Materials Industry

Sarah Moin

Lead, Energy and Materials Transition Financing

Charles Pacini

Manager, Transforming Industrial Ecosystems,
Industry Clusters

Giorgio Parolini

Lead, Aviation Decarbonization

Justine Roche

Lead, Energy Initiatives

Harsh Vijay Singh

Head, Equitable Transition

Thibault Villien De Gabiole

Lead, Industry Decarbonization, Trucking

Production

Phoebe Barker

Designer, Studio Miko

Laurence Denmark

Creative Director, Studio Miko

Jay Kelly

Designer, Studio Miko

Will Liley

Editor, Studio Miko

Oliver Turner

Designer, Studio Miko

Endnotes

1. World Bank Group. (n.d.). *World Development Indicators: Structure of value added*. <https://wdi.worldbank.org/table/4.2>.
2. UNEP. (2024). *Emissions Gap Report 2024: No more hot air ... please!*. <https://www.unep.org/resources/emissions-gap-report-2024>.
3. International Energy Agency (IEA). (2024). *CO₂ Emissions in 2023: Executive Summary*. <https://www.iea.org/reports/co2-emissions-in-2023/executive-summary>.
4. International Energy Agency (IEA). (n.d.). *Energy Efficiency*. <https://www.iea.org/energy-system/energy-efficiency-and-demand/energy-efficiency>.
5. Accenture based on International Energy Agency (IEA). (2023). *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*. <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach>.
6. World Bank Group. (2024). *Global Carbon Pricing Revenues Top a Record \$100 Billion*. <https://www.worldbank.org/en/news/press-release/2024/05/21/global-carbon-pricing-revenues-top-a-record-100-billion>.
7. International Energy Agency (IEA). (2024). *Energy Efficiency - Energy System*. IEA. <https://www.iea.org/energy-system/energy-efficiency-and-demand/energy-efficiency>.
8. Hydrogen Insight. (2024, September 17). McKinsey slashes long-term clean hydrogen demand predictions due to cost, regulation and uncertainty that some sectors will need it. <https://www.hydrogeninsight.com/production/mckinsey-slashes-long-term-clean-hydrogen-demand-predictions-due-to-cost-regulation-and-uncertainty-that-some-sectors-will-need-it/2-1-1710965>.
9. International Energy Agency (IEA). (n.d.). *Carbon Capture, Utilization & Storage*. <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage>.
10. Accenture. (n.d.). *Going for Growth*. <https://www.accenture.com/content/dam/accenture/final/accenture-com/document-3/Accenture-Going-for-Growth.pdf>.
11. International Energy Agency (IEA). (2023). *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*. <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach>.
12. IATA. (2024). *Aviation Net-Zero CO₂ Transition Pathways*. <https://www.iata.org/contentassets/8d19e716636a47c184e7221c77563c93/nz-roadmaps.pdf>.
13. International Civil Aviation Organization (ICAO). (n.d.). *Long term global aspirational goal (LTAG) for international aviation*. <https://www.icao.int/environmental-protection/Pages/LTAG.aspx>.
14. International Maritime Organization. (2023). *2023 IMO Strategy on Reduction of GHG Emissions from Ships*. <https://www.wcdn.imo.org/localresources/en/OurWork/Environment/Documents/annex/MEPC%2080/Annex%2015.pdf>.
15. International Aluminium Institute. (2021). *Aluminium Sector Greenhouse Gas Pathways to 2050*. <https://international-aluminium.org/resource/aluminium-sector-greenhouse-gas-pathways-to-2050-2021/>.
16. International Energy Agency (IEA). (n.d.). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.
17. International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
18. Mission Possible Partnership (MPP). (n.d.). *Sector Transition Strategies*. <https://www.missionpossiblepartnership.org/sector-transition-strategies/>.
19. International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
20. Ibid.
21. Ibid.
22. International Energy Agency (IEA). (n.d.). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.
23. Accenture analysis based on International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
24. Based on data received from IAI.
25. Accenture analysis based on International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
26. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
27. International Energy Agency (IEA). (2024). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.
28. International Energy Agency (IEA). (2024). *Energy Efficiency*. <https://www.iea.org/energy-system/energy-efficiency-and-demand/energy-efficiency>.

29. International Energy Agency (IEA). (2024). *Energy Data Explorer*. <https://www.iea.org/data-and-statistics/data-tools/greenhouse-gas-emissions-from-energy-data-explorer>.
30. IATA. (2024). *Aviation Net-Zero CO₂ Transition Pathways*. <https://www.iata.org/contentassets/8d19e716636a47c184e7221c77563c93/nz-roadmaps.pdf>.
31. International Maritime Organization. (2024). *Revised GHG reduction strategy for global shipping adopted*. <https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global-shipping-adopted-.aspx>.
32. International Aluminium Institute (IAI). (2024). *Greenhouse Gas Emissions Intensity- Primary Aluminium*. <https://international-aluminium.org/statistics/greenhouse-gas-emissions-intensity-primary-aluminium/>.
33. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/c036b390-ba9c-4132-870b-ffb455148b63/WorldEnergyOutlook2024.pdf>.
34. International Energy Agency (IEA). (2024). *Chemicals*. <https://www.iea.org/energy-system/industry/chemicals>.
35. International Energy Agency (IEA). (2024). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf>.
36. McKinsey & Company. (2024). *The hard stuff: Navigating the physical realities of the energy transition*. McKinsey Global Institute. <https://www.mckinsey.com/-/media/mckinsey/mckinsey%20global%20institute/our%20research/the%20hard%20stuff%20navigating%20the%20physical%20realities%20of%20the%20energy%20transition/the-hard-stuff-navigating-the-physical-realities-of-the-energy-transition-final.pdf>.
37. Debarre, R., P. Gahlot, C. Grillet and M. Plaisant. (2021). *Carbon Capture Utilization and Storage*. Kearney. <https://www.kearney.com/documents/17779499/17781864/CCUS-2021%2BFactBook.pdf/718e94af-1536-b23e-1ac9-a4de74ffef25?t=1623398953000>.
38. International Renewable Energy Agency (IRENA). (2024). *Decarbonising hard-to-abate sectors with renewables: Perspectives for the G7*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Apr/IRENA_G7_Decarbonising_hard_to_abate_sectors_2024.pdf.
39. PricewaterhouseCoopers (PwC). (n.d.). *The green hydrogen economy*. <https://www.pwc.com/gx/en/industries/energy-utilities-resources/future-energy/green-hydrogen-cost.html>.
40. International Energy Agency (IEA). (2020). *Deployment barriers and policy recommendations*. IEA Bioenergy. <https://www.ieabioenergy.com/wp-content/uploads/2020/11/Deployment-Barriers-and-Policy-Recommendations.pdf>.
41. International Renewable Energy Agency (IRENA). (2018). *Global Energy Transformation: A Roadmap to 2050*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf.
42. International Renewable Energy Agency (IRENA). (2024). *Decarbonising hard-to-abate sectors with renewables: Perspectives for the G7*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Apr/IRENA_G7_Decarbonising_hard_to_abate_sectors_2024.pdf.
43. BloombergNEF. (2023). *Lithium-Ion Battery Pack Prices Hit Record Low of \$139/kWh*. <https://about.bnef.com/blog/lithium-ion-battery-pack-prices-hit-record-low-of-139-kwh/>.
44. Debarre, R., P. Gahlot, C. Grillet and M. Plaisant. (2021). *Carbon Capture Utilization and Storage*. Kearney. <https://www.kearney.com/documents/17779499/17781864/CCUS-2021%2BFactBook.pdf/718e94af-1536-b23e-1ac9-a4de74ffef25?t=1623398953000>.
45. Datategy. (2023). *Future of Sustainability: The Role of AI in Decarbonization Strategies*. <https://www.datategy.net/2023/12/08/future-of-sustainability-the-role-of-ai-in-decarbonization-strategies/>.
46. Barclays Investment Banking. (2024). *AI is hungry for power*. <https://www.ib.barclays/our-insights/3-point-perspective/AI-power-energy-demand.html>.
47. International Energy Agency (IEA). (2024). *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*. <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach/a-renewed-pathway-to-net-zero-emissions>; International Energy Agency (IEA). (n.d.). *Global Hydrogen demand in the Net Zero Scenario, 2022-2050*. <https://www.iea.org/data-and-statistics/charts/global-hydrogen-demand-in-the-net-zero-scenario-2022-2050>; International Energy Agency (IEA). (2024). *Net Zero by 2050: A Roadmap for the Global Energy Sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.
48. International Energy Agency (IEA). (2024). *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*. <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach/a-renewed-pathway-to-net-zero-emissions>.
49. International Energy Agency (IEA). (2024). *Energy Data Explorer*. <https://www.iea.org/data-and-statistics/data-tools/greenhouse-gas-emissions-from-energy-data-explorer>.
50. International Energy Agency (IEA). (2024). *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*. <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach/a-renewed-pathway-to-net-zero-emissions>; International Energy Agency (IEA). (n.d.). *Global Hydrogen demand in the Net Zero Scenario, 2022-2050*. <https://www.iea.org/data-and-statistics/charts/global-hydrogen-demand-in-the-net-zero-scenario-2022-2050>; International Energy Agency (IEA). (2024). *Net Zero by 2050: A Roadmap for the Global Energy Sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.

51. Ibid.
52. International Aluminium Institute (IAI). (n.d.). *Statistics: Primary Aluminium Smelting Power Consumption*. <https://international-aluminium.org/statistics/primary-aluminium-smelting-power-consumption/>.
53. International Energy Agency (IEA). (2023). *Steel and aluminium*. <https://www.iea.org/reports/steel-and-aluminium>.
54. International Energy Agency (IEA). (n.d.). *Carbon Capture, Utilisation and Storage*. <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage>.
55. International Energy Agency (IEA). (2024). *World Energy Investment 2024*. <https://www.iea.org/reports/world-energy-investment-2024>.
56. International Energy Agency (IEA). (n.d.). *Carbon Capture, Utilisation and Storage*. <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage>.
57. Ibid.
58. Eni. (2024). *Eni Secures UK Government Funding for Liverpool Bay CO₂ Transport and Storage Project, a significant milestone in the development of the HyNet CCS project*. <https://www.eni.com/en-IT/media/press-release/2024/10/eni-secures-uk-government-funding-for-liverpool-bay-co2-transport.html>.
59. Equinor. (2024). *The Northern Lights project*. <https://www.equinor.com/energy/northern-lights>.
60. Mission Possible Partnership (MPP). *Steel: Pathways to Net Zero*. <https://dash-analytiq.plotly.host/mpp-steel-net-zero-explorer/>.
61. Mission Possible Partnership (MPP). (2023). *Making Net-Zero Aluminium Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-1.5-Aligned-Aluminium-possible.pdf>.
62. Accenture analysis based on IRENA. (n.d.). *Transport*. <https://www.irena.org/Energy-Transition/Technology/Transport#:~:text=A%20combination%20of%20energy%20efficiency,would%20need%20to%20be%20promoted;> International Energy Agency (IEA). (n.d.). *Road transport*. <https://www.iea.org/reports/road-transport#dashboard>.
63. International Energy Agency (IEA). (2023). *Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach*. https://iea.blob.core.windows.net/assets/2a240ed2-006b-486c-a994-9df5550dce86/NetZeroRoadmap_AGlobalPathwaytoKeepthe1.5CGoalinReach-2023Update.pdf.
64. International Energy Agency (IEA). (2021). *Net Zero by 2050: A Roadmap for the Global Energy Sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.
65. Industrial Transition Accelerator. (2024). *Mapping the Landscape of Low-Emissions Product Standards for the Industrial Transition*. [https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010937/PDFs/ITA-Mapping_the_Landscape_of_Low-Emissions_Product_Standards\(2024\).pdf?CID=33315821-4f75-4c7e-b7db-009cdd276441](https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010937/PDFs/ITA-Mapping_the_Landscape_of_Low-Emissions_Product_Standards(2024).pdf?CID=33315821-4f75-4c7e-b7db-009cdd276441).
66. Just Transition Fund. (n.d.). *About Us*. <https://justtransitionfund.org/about/>.
67. Accenture analysis based on IEA, IATA and MPP.
68. Ibid.
69. CSIMarket.com. (n.d.). *Oil and Gas Production Industry Profitability*. https://csimarket.com/Industry/industry_Profitability_Ratios.php?ind=602.
70. Yieh Corp. (2024). *Steel News*. <https://yieh.com/en/NewsItem/150488>.
71. Climate Bonds Initiative. (2018). *Green Securitisation: unlocking finance for small-scale low carbon projects*. https://www.climatebonds.net/files/files/March17_CBI_Briefing_Green_Securisation.pdf.
72. Climate Investment Funds. (2024). *Climate Investment Funds Invites Countries to Join \$1Bn Effort to Decarbonize Industry*. <https://www.cif.org/news/climate-investment-funds-invites-countries-join-1bn-effort-decarbonize-industry>.
73. U.S. Department of Energy. (2024). *U.S. Department of Energy Announces Initial Funding Tranches for California, Pacific Northwest, and Appalachian Regional Clean Hydrogen Hubs*. <https://www.energy.gov/eere/fuelcells/articles/us-department-energy-announces-initial-funding-tranches-california-pacific>.
74. Ara Partners. (n.d.). *Private Equity*. <https://www.arapartners.com/what-we-do/strategies/private-equity/#target-sectors>.
75. Kolk, M., M. Eikelenboom and R. P. Navarro. (2021). *Green Financing of Corporate Breakthroughs*. <https://www.adlittle.com/en/insights/viewpoints/green-financing-corporate-breakthroughs>.
76. McKinsey & Company. (n.d.). *Solving the climate finance equation for developing countries*. <https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability/our%20insights/solving%20the%20climate%20finance%20equation%20for%20developing%20countries/solving-the-climate-finance-equation%20for-developing-countries.pdf>.
77. World Economic Forum. (n.d.). *Blended Finance Debt Fund*. <https://initiatives.weforum.org/playbook-of-solutions/case-study-details/blended-finance-debt-fund/aJYTG0000000Jv4A2>.
78. McKinsey & Company. (2023). *Decarbonize and create value: How incumbents can tackle the steep challenge*. <https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability/our%20insights/decarbonize%20and%20create%20value%20how%20incumbents%20can%20tackle%20the%20steep%20challenge/decarbonize-and-create-value-how-incumbents-can-tackle-the-steep-challenge.pdf?shouldIndex=false>.

79. McKinsey & Company. (n.d.). *Capturing the value from sustainable materials*. <https://www.mckinsey.com/~media/mckinsey/industries/metals%20and%20mining/our%20insights/capturing%20the%20value%20from%20sustainable%20materials/capturing-the-green-premium-value-from-sustainable-materials-vf.pdf>.
80. McKinsey & Company. (2023). *Decarbonize and create value: How incumbents can tackle the steep challenge*. <https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability/our%20insights/decarbonize%20and%20create%20value%20how%20incumbents%20can%20tackle%20the%20steep%20challenge/decarbonize-and-create-value-how-incumbents-can-tackle-the-steep-challenge.pdf?shouldIndex=false>.
81. European Commission. (n.d.). *EU Emissions Trading System (EU ETS)*. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en.
82. European Commission. (n.d.). *Net-Zero Industry Act*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/green-deal-industrial-plan/net-zero-industry-act_en.
83. Climate Cooperation. (2024). *China Issues Action Plan for Energy Saving and Carbon Reduction (2024-2025)*. <https://climatecooperation.cn/climate/china-issues-action-plan-for-energy-saving-and-carbon-reduction-2024-2025/>.
84. Climate Action Tracker. (n.d.). *India - Policies & action*. <https://climateactiontracker.org/countries/india/policies-action/>.
85. U.S. Department of the Treasury. (n.d.). *Inflation Reduction Act*. <https://home.treasury.gov/policy-issues/inflation-reduction-act>.
86. InfluenceMap. (2024). *GX (Green Transformation) Basic Policy and Roadmap*. <https://japan.influencemap.org/policy/GX-Green-Transformation-5477>.
87. International Energy Agency (IEA). (2024). *Aviation*. IEA. <https://www.iea.org/energy-system/transport/aviation#tracking>.
88. Accenture analysis based on IATA and ICAO.
89. International Energy Agency (IEA). (2023). *Aviation and shipping*. IEA. <https://www.iea.org/reports/aviation-and-shipping#dashboard>.
90. Mission Possible Partnership (MPP). (2024). *Making Net-Zero Aviation possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Aviation-possible.pdf>.
91. Forecast International. (2024). *The Commercial Jet Market Continues to Recover: Key Insights and Projections*. Flight Plan. <https://flightplan.forecastinternational.com/2024/07/12/the-airline-market-continues-to-recover-key-insights-and-projections/>.
92. International Energy Agency (IEA). (n.d.). *Aviation*. <https://www.iea.org/energy-system/transport/aviation#tracking>.
93. Ibid.
94. Accenture analysis based on IEA data.
95. Airbus. (2024). *Sustainable aviation fuels*. <https://www.airbus.com/en/innovation/energy-transition/sustainable-aviation-fuels>.
96. IATA. (2024). *SAF Production to Triple in 2024 but More Opportunities for Diversification Needed*. <https://www.iata.org/en/pressroom/2024-releases/2024-06-02-03/>.
97. International Energy Agency (IEA). (2024). *Aviation*. IEA. <https://www.iea.org/energy-system/transport/aviation>.
98. IATA. (2024). *Net Zero Roadmaps*. <https://www.iata.org/contentassets/8d19e716636a47c184e7221c77563c93/nz-roadmaps.pdf>.
99. Ibid.
100. Ibid.
101. Ibid.
102. Transition Pathway Initiative. (2024). *Home - Transition Pathway Initiative*. <https://www.transitionpathwayinitiative.org/>.
103. International Energy Agency (IEA). (2024). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
104. Ibid.
105. IATA. (2024). *Energy and New Fuels Infrastructure Net Zero Roadmap*. <https://www.iata.org/contentassets/8d19e716636a47c184e7221c77563c93/energy-and-new-fuels-infrastructure-net-zero-roadmap.pdf>.
106. International Air Transport Association (IATA). (2023). *Energy and New Fuels Infrastructure: Net Zero Roadmap*. <https://www.iata.org/contentassets/8d19e716636a47c184e7221c77563c93/energy-and-new-fuels-infrastructure-net-zero-roadmap.pdf>.
107. Ibid.
108. Mission Possible Partnership (MPP). (n.d.). *Making Net-zero, 1.5°C-aligned Aviation Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/ATSIInfographics.pdf>.
109. Mission Possible Partnership (MPP). (2024). *Making Net-Zero Aviation possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Aviation-possible.pdf>.
110. Ibid.
111. Accenture analysis based on S&P Capital data.
112. 3 Steps Solutions. (n.d.). *Making Net Zero Aviation possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Aviation-possible.pdf>.

113. International Energy Agency (IEA). (2024). *Aviation*. <https://www.iea.org/energy-system/transport/aviation>.
114. International Energy Agency (IEA). (2023). *Aviation and shipping – Analysis*. <https://www.iea.org/reports/aviation-and-shipping>.
115. International Air Transport Association. (2023). *Air passenger market analysis*. [https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-market-analysis-december-2023/#:~:text=In%202023%2C%20industry%20RPKs%20reached%2094.1%25%20of%202019%20levels.&text=Available%20seat%20kilometers%20\(ASKs\),slightly%20under%20the%202019%20threshold](https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-market-analysis-december-2023/#:~:text=In%202023%2C%20industry%20RPKs%20reached%2094.1%25%20of%202019%20levels.&text=Available%20seat%20kilometers%20(ASKs),slightly%20under%20the%202019%20threshold).
116. Accenture analysis based on IATA and ICAO.
117. International Energy Agency (IEA). (2024). *Aviation*. <https://www.iea.org/energy-system/transport/aviation>.
118. International Air Transport Association. (2023). *Air passenger market analysis*. [https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-market-analysis-december-2023/#:~:text=In%202023%2C%20industry%20RPKs%20reached%2094.1%25%20of%202019%20levels.&text=Available%20seat%20kilometers%20\(ASKs\),slightly%20under%20the%202019%20threshold](https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-market-analysis-december-2023/#:~:text=In%202023%2C%20industry%20RPKs%20reached%2094.1%25%20of%202019%20levels.&text=Available%20seat%20kilometers%20(ASKs),slightly%20under%20the%202019%20threshold).
119. DHL. (2024). *Scaling Up Sustainable Aviation Fuel Solutions*. <https://www.dhl.com/global-en/delivered/responsibility/scaling-up-sustainable-aviation-fuel-solutions.html>.
120. TotalEnergies. (2024). *Air France-KLM ramps up its SAF offtake agreement with TotalEnergies, which will supply up to 1.5 million tons of more sustainable aviation fuel over a 10-year period*. <https://totalenergies.com/news/press-releases/air-france-klm-ramps-its-saf-offtake-agreement-totalenergies-which-will-supply>.
121. Airbus. (n.d.). *ZEROe*. <https://www.airbus.com/en/innovation/energy-transition/hydrogen/zeroe>.
122. Hydrogen Insight. (n.d.). *In the air by 2027: ZeroAvia tests show it could fly 60 passengers 900km on hydrogen-powered plane*. <https://www.hydrogeninsight.com/transport/in-the-air-by-2027-zeroavia-tests-show-it-could-fly-60-passengers-900km-on-hydrogen-powered-plane/2-1-1471050>.
123. International Energy Agency (IEA). (2023). *Aviation and shipping*. <https://www.iea.org/reports/aviation-and-shipping#dashboard>.
124. IATA. (2023). *Global outlook for air transport*. <https://www.iata.org/en/iata-repository/publications/economic-reports/global-outlook-for-air-transport---december-2023---report/>.
125. IATA. (2023). *SAF volumes growing but still missing opportunities*. <https://www.iata.org/en/pressroom/2023-releases/2023-12-06-02/>.
126. Council of the European Union. (2023). *RefuelEU aviation initiative: Council adopts new law to decarbonise the aviation sector*. <https://www.consilium.europa.eu/en/press/press-releases/2023/10/09/refueeu-aviation-initiative-council-adopts-new-law-to-decarbonise-the-aviation-sector/>.
127. European Union Aviation Safety Agency. (n.d.). *Fit for 55 and ReFuelEU Aviation*. <https://www.easa.europa.eu/en/light/topics/fit-55-and-refueeu-aviation>.
128. Airbus. (2020, September). *Airbus reveals new zero-emission concept aircraft*. <https://www.airbus.com/en/newsroom/press-releases/2020-09-airbus-reveals-new-zero-emission-concept-aircraft>.
129. Ampaire. (n.d.). *Meet the Electric EEL*. <https://www.ampaire.com/vehicles/electric-eel-aircraft>.
130. International Energy Agency (IEA). (2023). *Aviation and shipping*. <https://www.iea.org/reports/aviation-and-shipping#dashboard>.
131. Neste. (n.d.). *Neste provides sustainable aviation fuel to United Airlines for use at Chicago O'Hare International Airport in the U.S.* <https://www.neste.com/news/neste-provides-sustainable-aviation-fuel-to-united-airlines-for-use-at-chicago-o-hare-international-airport-in-the-u-s>.
132. ZeroAvia. (2022, May 10). *ZeroAvia Makes Major Strides in Hydrogen Refueling with Shell Collaboration and Airport Pipeline Launch*. PR Newswire. <https://www.prnewswire.com/news-releases/zeroavia-makes-major-strides-in-hydrogen-refueling-with-shell-collaboration-and-airport-pipeline-launch-301543260.html>.
133. International Energy Agency (IEA). (2023). *Aviation and shipping*. <https://www.iea.org/reports/aviation-and-shipping#dashboard>.
134. International Air Transport Association. (n.d.). *Developing Sustainable Aviation Fuel (SAF)*. <https://www.iata.org/en/programs/sustainability/sustainable-aviation-fuels/>.
135. Mission Possible Partnership (MPP). (n.d.). *Making Net-zero, 1.5°C-aligned Aviation Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/ATSInfographics.pdf>.
136. International Air Transport Association. (2023). *Air passenger market analysis*. <https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-market-analysis-december-2023/>.
137. OAG. (n.d.). *Busiest Airports in the World*. <https://www.oag.com/busiest-airports-world>.
138. 3 Step Solutions. (n.d.). *Making Net Zero Aviation possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Aviation-possible.pdf>.
139. Ibid.
140. Project SkyPower. (2024). *Accelerating the take-off for e-SAF in Europe*. <https://project-skypower.org/news-publications/accelerating-take-e-saf-europe>.
141. International Air Transport Association. (n.d.). *TrackZero*. <https://www.iata.org/en/programs/sustainability/ecohub/trackzero/>.

142. European Commission. (n.d.). Reducing emissions from aviation. *Climate Action*. https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-aviation_en.
143. International Air Transport Association. (n.d.). *Sustainable aviation fuel technical certifications*. <https://www.iata.org/contentassets/d13875e9ed784f75bac90f000760e998/saf-technical-certifications.pdf>.
144. International Civil Aviation Organization. (n.d.). CORSIA. <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>.
145. Federal Aviation Administration. (n.d.). *ICAO Airplane CO₂ Certification Database*. <https://www.faa.gov/headquartersoffices/apl/ae/icao-airplane-co2-certification-database>.
146. European Union Aviation Safety Agency. (n.d.). *Fit for 55 and ReFuelEU Aviation*. <https://www.easa.europa.eu/en/light/topics/fit-55-and-refueeu-aviation>.
147. Internal Revenue Service. (n.d.). *Sustainable aviation fuel credit*. <https://www.irs.gov/credits-deductions/businesses/sustainable-aviation-fuel-credit>.
148. Department for Transport. (2023). *Revenue certainty mechanism for SAF: delivery plan*. <https://www.gov.uk/government/publications/revenue-certainty-mechanism-for-saf-delivery-plan>.
149. European Union Aviation Safety Agency. (n.d.). *Clean Sky*. <https://www.easa.europa.eu/eco/eaer/topics/technology-and-design/clean-sky>.
150. International Energy Agency (IEA). (n.d.). *International shipping*. <https://www.iea.org/energy-system/transport/international-shipping>.
151. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
152. IRENA. (2021). *A pathway to decarbonize the shipping sector*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Oct/IRENA_Decarbonising_Shipping_2021.pdf.
153. Lin, M. (2023). *PATH TO NET ZERO: Major shipping firms show ambition in hard-to-abate sector*. <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/shipping/111423-path-to-net-zero-major-shipping-firms-show-ambition-in-hard-to-abate-sector>; DNV. (2023). *Industry Insights: Challenging road ahead for retrofitting to dual-fuel engines*. <https://www.dnv.com/expert-story/maritime-impact/challenging-road-ahead-for-retrofitting-to-dual-fuel-engine/>.
154. International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
155. Ibid.
156. IMO. (2023). *Revised GHG Reduction Strategy for Global Shipping Adopted*. <https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global-shipping-adopted-.aspx>.
157. Ibid.
158. Ibid.
159. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Methanol-fuelled ship engine*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=tr&selectedTechID=7c4f84c2>.
160. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Hydrogen-fuelled engine*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=tr&selectedTechID=24431048>;
International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Ammonia-fuelled ship engine*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=list&selectedTechID=3be79868>.
161. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Battery electric ship*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=tr&selectedTechID=74d18fae>.
162. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Proton exchange membrane*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=tr&selectedTechID=2d4c79b4>.
163. Mission Possible Partnership (MPP). (2024). *MPP Global Project Tracker*. <https://tracker.missionpossiblepartnership.org/mpp-global-projects-map/>.
164. Ibid.
165. Lin, M. (2023). *PATH TO NET ZERO: Major shipping firms show ambition in hard-to-abate sector*. <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/shipping/111423-path-to-net-zero-major-shipping-firms-show-ambition-in-hard-to-abate-sector>; DNV. (2023). *Industry Insights: Challenging road ahead for retrofitting to dual-fuel engines*. <https://www.dnv.com/expert-story/maritime-impact/challenging-road-ahead-for-retrofitting-to-dual-fuel-engine/>.
166. World Shipping Council. (n.d.). *Delivering net zero by 2050 with the Green Balance Mechanism*. <https://www.worldshipping.org/green-balance-mechanism>.
167. International Energy Agency (IEA). (2023). *Aviation and Shipping*. <https://www.iea.org/reports/aviation-and-shipping#dashboard>.
168. Accenture analysis as per IRENA. (2021). *A Pathway To Decarbonise The Shipping Sector By 2050*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Oct/IRENA_Decarbonising_Shipping_2021.pdf.
169. International Energy Agency (IEA). (2023). *Aviation and Shipping*. <https://www.iea.org/reports/aviation-and-shipping#dashboard>.
170. Ibid.

171. International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
172. Accenture calculations based on International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
173. International Energy Agency (IEA). (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
174. UNCTAD. (2023). *Bold global action needed to decarbonize shipping and ensure a just transition: UNCTAD report*. <https://unctad.org/news/bold-global-action-needed-decarbonize-shipping-and-ensure-just-transition-unctad-report>.
175. Yara International. (2023). *The World's First Clean Ammonia-Powered Container Ship*. <https://www.yara.com/corporate-releases/the-worlds-first-clean-ammonia-powered-container-ship/>.
176. Bloomberg. (2024). *Maersk Unveils World's Biggest Methanol-Powered Container Ship*. <https://www.bloomberg.com/news/articles/2024-01-26/maersk-unveils-world-s-biggest-methanol-powered-container-ship>.
177. MAN Energy Solutions. (2024). *mitsui Performs World-First Hydrogen Test*. <https://www.man-es.com/company/press-releases/press-details/2024/03/07/mitsui-performs-world-first-hydrogen-test>.
178. IRENA. (2021). *A Pathway To Decarbonise The Shipping Sector By 2050*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Oct/IRENA_Decarbonising_Shipping_2021.pdf.
179. Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping. (2021). *Industry Transition Strategy*. https://cms.zerocarbonshipping.com/media/uploads/documents/MMMCZCS_Industry-Transition-Strategy_Oct_2021.pdf.
180. Ibid.
181. UNFCCC. (2023). *Shipping Leaders And Green Hydrogen Producers Agree On Ambitious Uptake Targets For 2030 To Enable A Net Zero Maritime Sector*. <https://climatechampions.unfccc.int/maritime-green-hydrogen-call-to-action/>.
182. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Methanol-fuelled ship engine*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=trl&selectedTechID=7c4f84c2>.
183. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Hydrogen-fuelled engine*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=trl&selectedTechID=24431048>;
International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Ammonia-fuelled ship engine*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=list&selectedTechID=3be79868>.
184. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Battery electric ship*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=trl&selectedTechID=74d18fae>.
185. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Proton exchange membrane*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=trl&selectedTechID=2d4c79b4>.
186. SEA-LNG. (2019). *Well-To-Wake GHG Emission Study On LNG As A Marine Fuel*. https://sea-lng.org/wp-content/uploads/2019/04/190410_SEALNG_GHG_Messaging_Document_DIGITAL-compressed.pdf.
187. Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping. (2021). *Industry Transition Strategy*. https://cms.zerocarbonshipping.com/media/uploads/documents/MMMCZCS_Industry-Transition-Strategy_Oct_2021.pdf.
188. Reuters. (2023). *Neste To Start Production At Singapore Renewables Fuels Expansion In 'Weeks'*. <https://www.reuters.com/business/energy/neste-start-production-singapore-renewables-fuels-expansion-weeks-official-2023-04-05/>.
189. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Rotor sail - Rigid sail*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=trl&selectedTechID=e418f2f8>.
190. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide: Rudder bulb*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=trl&selectedTechID=645ff4db>.
191. Accenture. (n.d.). *Global Hydrogen Demand*. <https://www.iea.org/data-and-statistics/charts/global-hydrogen-demand-in-the-net-zero-scenario-2022-2050>.
192. Global Maritime Forum (GMF). (2021). *A Strategy for the Transition to Zero Emission Shipping*. <https://globalmaritimeforum.org/report/a-strategy-for-the-transition-to-zero-emission-shipping/>.
193. Yara International. (2024). *The world's first ship-to-ship ammonia transfer at anchorage: "A major milestone to decarbonize shipping fuel"*. <https://www.yara.com/corporate-releases/the-worlds-first-ship-to-ship-ammonia-transfer-at-anchorage-a-major-milestone-to-decarbonize-shipping-fuel/>.
194. International Energy Agency (IEA). (2020). *Indicative shipping fuel cost ranges*. <https://www.iea.org/data-and-statistics/charts/indicative-shipping-fuel-cost-ranges>.
195. FMC. (2022). *Shipping Commitment*. https://www3.weforum.org/docs/WEF_First_Movers_Coalition_Shipping_Commitment_2022.pdf.
196. RMI. (2024). *Maritime Book and Claim System Advances Pilot Study to Support First Movers in Zero-Emissions Shipping*. <https://rmi.org/press-release/maritime-book-and-claim-system-advances-pilot-study-to-support-first-movers-in-zero-emissions-shipping/>.
197. Marine Insight. (2024). *MOL Becomes 1st Japanese Board Member Of Book And Claim Community To Decarbonize Logistics*. <https://www.marineinsight.com/shipping-news/mol-becomes-1st-japanese-board-member-of-book-and-claim-community-to-decarbonize-logistics/>.

198. Lin, M. (2023). *PATH TO NET ZERO: Major shipping firms show ambition in hard-to-abate sector*. <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/shipping/111423-path-to-net-zero-major-shipping-firms-show-ambition-in-hard-to-abate-sector>; DNV. (2023). *Industry Insights: Challenging road ahead for retrofitting to dual-fuel engines*. <https://www.dnv.com/expert-story/maritime-impact/challenging-road-ahead-for-retrofitting-to-dual-fuel-engine/>.
199. According to S&P Capital Pro IQ data.
200. Lin, M. (2023). *PATH TO NET ZERO: Major shipping firms show ambition in hard-to-abate sector*. <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/shipping/111423-path-to-net-zero-major-shipping-firms-show-ambition-in-hard-to-abate-sector>.
201. DNV. (2023). *Industry Insights: Challenging road ahead for retrofitting to dual-fuel engines*. <https://www.dnv.com/expert-story/maritime-impact/challenging-road-ahead-for-retrofitting-to-dual-fuel-engine/>.
202. Accenture analysis based on S&P Capital data.
203. Damodaran Online. (n.d.). *Data: Current*. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datacurrent.html#.
204. IMO. (2023). *Revised GHG reduction strategy for global shipping adopted*. <https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global-shipping-adopted-.aspx>.
205. European Commission. (n.d.). *EU emissions trading system (US ETS)*. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en.
206. DNV. (n.d.). *FuelEU maritime*. <https://www.dnv.com/maritime/insights/topics/fueleu-maritime/>.
207. World Shipping Council. (n.d.). *Delivering net zero by 2050 with the green balance mechanism*. <https://www.worldshipping.org/green-balance-mechanism>.
208. European Commission. (n.d.). *EU emissions trading system (US ETS)*. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en.
209. Sheldon Whitehouse. (2023). *On World Oceans Day, Whitehouse and Padilla Introduce Pair of Bills to Reduce Ocean Shipping Emissions*. <https://www.whitehouse.senate.gov/news/release/on-world-oceans-day-whitehouse-and-padilla-introduce-pair-of-bills-to-reduce-ocean-shipping-emissions/>.
210. IMO. (2023). *Revised GHG reduction strategy for global shipping adopted*. <https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global-shipping-adopted-.aspx>.
211. DNV. (n.d.). *Emissions data tracking key to EU ETS and CII cost management*. <https://www.dnv.com/expert-story/maritime-impact/Emissions-data-tracking-key-to-EU-ETS-and-CII-cost-management/>.
212. Safety4Sea. (2023). *U.S. senators introduce legislation to eliminate in-port ship emissions*. <https://safety4sea.com/u-s-senators-introduce-legislation-to-eliminate-in-port-ship-emissions/>.
213. DNV. (n.d.). *EEXI – the energy efficiency existing ship index*. <https://www.dnv.com/maritime/insights/topics/eexi/index.html>.
214. DNV. (n.d.). *CII - Carbon Intensity Indicator*. <https://www.dnv.com/maritime/insights/topics/CII-carbon-intensity-indicator/>.
215. DNV. (n.d.). *FuelEU Maritime*. <https://www.dnv.com/maritime/insights/topics/fueleu-maritime/>.
216. Bahtić, F. (2023). *U.S.: Clean Shipping Act 2023 introduced to help curb GHG emissions from ships*. Offshore Energy. <https://www.offshore-energy.biz/us-clean-shipping-act-2023-introduced-to-help-curb-ghg-emissions-from-ships/>.
217. IMO. (2023). *Revised GHG Reduction Strategy for Global Shipping Adopted*. <https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global-shipping-adopted-.aspx>.
218. CSIS. (2023). *How 45v Tax Credit Definition Could Make or Break Clean Hydrogen Economy*. <https://www.csis.org/analysis/how-45v-tax-credit-definition-could-make-or-break-clean-hydrogen-economy>.
219. Zhou, Y. (2023). *Can the Inflation Reduction Act unlock a green hydrogen economy?* The International Council on Clean Transportation. <https://theicct.org/ira-unlock-green-hydrogen-jan23/>.
220. UK Government. (2023). *COP28: US and UK joint statement on green shipping corridor collaboration*. <https://www.gov.uk/government/publications/cop28-green-shipping-corridor-collaboration/cop28-us-and-uk-joint-statement-on-green-shipping-corridor-collaboration>.
221. Global Maritime Forum. (2023). *Annual Progress Report on Green Shipping Corridors*. https://cms.globalmaritimeforum.org/wp-content/uploads/2023/11/Global-Maritime-Forum-Annual-Progress-Report-on-Green-Shipping-Corridors_2023.pdf.
222. European Commission. (2023). *Analysis of the recovery and resilience plan of Croatia*. https://commission.europa.eu/document/download/0d17dc3a-1df4-4217-95de-31135ea942f_en?filename=SWD_2023_380_1_EN_autre_document_travail_service_part1_v4.pdf.
223. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
224. International Energy Agency (IEA). (2024). *Trucks and buses*. <https://www.iea.org/energy-system/transport/trucks-and-buses>.
225. International Energy Agency (IEA). (2023). *Net Zero by 2050: A Roadmap for the Global Energy Sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.
226. Accenture analysis based on Mission Possible Partnerships (MPP). (2022). *Making Zero-Emissions Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Zero-Emissions-Trucking-Possible.pdf>.

227. Net-zero emissions in trucking from tailpipe emissions assessment, not lifecycle assessments (LCA).
228. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
229. International Energy Agency (IEA). (2024). *Trucks and buses*. <https://www.iea.org/energy-system/transport/trucks-and-buses>.
230. Ibid.
231. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
232. International Energy Agency (IEA). (2023). *Road transport*. <https://www.iea.org/reports/road-transport>.
233. Accenture analysis based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
234. Ibid.
235. Ibid.
236. Mission Possible Partnership (MPP). (n.d.). *MPP Global Project Tracker*. <https://tracker.missionpossiblepartnership.org/mpp-global-projects-map/>.
237. International Energy Agency (IEA). (2023). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
238. Ibid.
239. International Energy Agency (IEA). (2023). *Road transport*. <https://www.iea.org/reports/road-transport>.
240. Mission Possible Partnership (MPP). (n.d.). *Infographics Summary: Making Zero Emissions, 1.5°C-aligned Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/TTSInfographics.pdf>.
241. International Energy Agency (IEA). (2023). *Road transport*. <https://www.iea.org/reports/road-transport>.
242. Accenture analysis.
243. Accenture analysis based on Mission Possible Partnership (MPP). *Making Zero-Emissions Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Zero-Emissions-Trucking-Possible.pdf>.
244. Ibid.
245. Accenture analysis based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
246. International Energy Agency (IEA). (n.d.). *Road transport*. <https://www.iea.org/reports/road-transport#dashboard>.
247. Accenture analysis based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
248. Ibid.
249. Ibid.
250. Ibid.
251. Ibid.
252. Ibid.
253. Ibid.
254. Tesla. (n.d.). *Semi*. <https://www.tesla.com/semi>.
255. Accenture analysis based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
256. Ibid.
257. Ibid.
258. Mission Possible Partnership (MPP). (n.d.). *MPP Global Project Tracker*. <https://tracker.missionpossiblepartnership.org/mpp-global-projects-map/>.
259. International Energy Agency (IEA). (n.d.). *Road transport*. <https://www.iea.org/reports/road-transport#dashboard>.
260. Mission Possible Partnership (MPP). (n.d.). *Infographics Summary: Making Zero Emissions, 1.5°C-aligned Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/TTSInfographics.pdf>.
261. Accenture analysis.
262. Accenture analysis based on Mission Possible Partnership (MPP). *Making Zero-Emissions Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Zero-Emissions-Trucking-Possible.pdf>.
263. Mission Possible Partnership (MPP). (n.d.). *MPP Global Project Tracker*. <https://tracker.missionpossiblepartnership.org/mpp-global-projects-map/>.
264. Ibid.

265. Ibid.
266. Ibid.
267. Ibid.
268. Ibid.
269. International Energy Agency (IEA). (n.d.). *Road transport*. <https://www.iea.org/reports/road-transport#dashboard>.
270. Mission Possible Partnership (MPP). *Making Zero-Emissions Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Zero-Emissions-Trucking-Possible.pdf>.
271. International Energy Agency (IEA). (n.d.). *Road transport*. <https://www.iea.org/reports/road-transport#dashboard>.
272. Ibid.
273. Ibid.
274. International Energy Agency (IEA). (n.d.). *Trucks and Buses*. <https://www.iea.org/energy-system/transport/trucks-and-buses#tracking>.
275. Accenture analysis.
276. Ibid.
277. International Energy Agency (IEA). (2023). *Electric truck registrations and sales share by region, 2015-2022*. <https://www.iea.org/data-and-statistics/charts/electric-truck-registrations-and-sales-share-by-region-2015-2022>.
278. Bloomberg. (n.d.). *Commercial ZEV Factbook*. https://assets.bbhub.io/professional/sites/24/Commercial_ZEV_Factbook.pdf.
279. Accenture analysis based on Mission Possible Partnership (MPP). *Making Zero-Emissions Trucking Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Zero-Emissions-Trucking-Possible.pdf>.
280. International Energy Agency (IEA). (n.d.). *Trucks and Buses*. <https://www.iea.org/energy-system/transport/trucks-and-buses#tracking>.
281. UK Government. (2023). *New UK levy to level carbon pricing*. <https://www.gov.uk/government/news/new-uk-levy-to-level-carbon-pricing>.
282. IPLTech Electric. (n.d.). *How the World is Evolving with CBAM (Carbon Border Adjustment Mechanism) & Its Impact on the domestic Trucking Industry?* <https://ipltelectric.com/blog/how-the-world-is-evolving-with-cbam-carbon-border-adjustment-mechanism-its-impact-on-the-domestic-trucking-industry>.
283. California Air Resources Board. (n.d.). *Low Emission Vehicle Program*. <https://ww2.arb.ca.gov/our-work/programs/low-emission-vehicle-program#:~:text=By%20combining%20control%20of%20all,gases%20in%20an%20effective%20manner>.
284. European Commission. (2024). *Questions and Answers: Revised CO₂ emission standards for Heavy-Duty Vehicles*. https://ec.europa.eu/commission/presscorner/detail/en/qanda_24_2527.
285. European Council. (2023). *Alternative fuels infrastructure: Council adopts new law for more recharging and refuelling stations across Europe*. <https://www.consilium.europa.eu/en/press/press-releases/2023/07/25/alternative-fuels-infrastructure-council-adopts-new-law-for-more-recharging-and-refuelling-stations-across-europe/>.
286. European Commission. (n.d.). *ETS2: buildings, road transport and additional sectors*. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/ets2-buildings-road-transport-and-additional-sectors_en
287. ECG Association. (2024). *Eurovignette Directive*. <https://www.ecgassociation.eu/wp-content/uploads/2024/08/Eurovignette.pdf>.
288. U.S. Department of Energy. (n.d.). *Alternative Fuels Data Center: Laws and Incentives*. <https://afdc.energy.gov/laws/409>.
289. California HVIP. (2024). *Home*. <https://californiahvip.org/>.
290. National Renewable Energy Laboratory. (n.d.). *Vehicle Technologies Office: Freight Highlights*. <https://www.nrel.gov/transportation/assets/pdfs/vto-doe-vehicle-technologies-office-freight-highlights-by-austin-brown.pdf>.
291. International Energy Agency (IEA). (2024). *Emissions Measurement and Data Collection for a Net Zero Steel Industry*. <https://www.iea.org/reports/emissions-measurement-and-data-collection-for-a-net-zero-steel-industry/executive-summary>.
292. Accenture calculations based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
293. Mission Possible Partnership (MPP). (2022). *Making Net-Zero Steel Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Steel-possible-steel.pdf>.
294. Accenture calculations based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
295. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
296. International Energy Agency (IEA). (n.d.). *Steel*. <https://www.iea.org/energy-system/industry/steel>.
297. According to Wood Mackenzie.

298. Lempriere, M. (2023). Steel industry makes 'pivotal' shift towards lower-carbon production. *Carbon Brief*. <https://www.carbonbrief.org/steel-industry-makes-pivotal-shift-towards-lower-carbon-production/>.
299. Accenture analysis based on International Energy Agency (IEA). (n.d.). *Steel*. <https://www.iea.org/energy-system/industry/steel>; Mission Possible Partnership (MPP). (2022). *Making Net-Zero Steel Possible*. <https://dash-analytiq.plotly.host/mpp-steel-net-zero-explorer/>.
300. Transition Pathway Initiative. (2024). *Steel*. <https://www.transitionpathwayinitiative.org/sectors/aluminium>.
301. Accenture analysis based on International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>; Mission Possible Partnership (MPP). (2022). *Making Net-Zero Steel Possible: An industry-backed, 1.5°C-aligned transition strategy*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Steel-possible-steel.pdf>.
302. Accenture analysis based on Mission Possible Partnership (MPP). (2022). *Steel: Pathways to Net Zero*. <https://dash-analytiq.plotly.host/mpp-steel-net-zero-explorer/>.
303. Ibid.
304. Lempriere, M. (2023). *Steel industry makes 'pivotal' shift towards lower-carbon production*. CarbonBrief. <https://www.carbonbrief.org/steel-industry-makes-pivotal-shift-towards-lower-carbon-production/#:~:text=According%20to%20GEM's%20Global%20Steel,by%20up%20to%2027%25>.
305. Accenture analysis based on S&P Capital Pro data.
306. Accenture analysis based on Mission Possible Partnership (MPP). (2022). *Making Net-Zero Steel Possible: An industry-backed, 1.5°C-aligned transition strategy*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Steel-possible-steel.pdf>.
307. European Commission. (2024). *Carbon Border Adjustment Mechanism*. https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.
308. According to Wood Mackenzie.
309. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
310. Accenture calculations based on International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
311. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
312. World Steel. (2023). *Sustainability Indicators 2023 Report*. <https://worldsteel.org/steel-topics/sustainability/sustainability-indicators-2023-report/>.
313. Ibid.
314. Mission Possible Partnership (MPP). (2022). *Making Net-Zero Steel Possible*. <https://dash-analytiq.plotly.host/mpp-steel-net-zero-explorer/>.
315. Ibid.
316. BloombergNEF. (2023). *Green Steel Demand is Rising Faster Than Production Can Ramp Up*. <https://about.bnef.com/blog/green-steel-demand-is-rising-faster-than-production-can-ramp-up/>.
317. Accenture analysis based on S&P Capital data.
318. Damodaran Online. (n.d.). *Data: Current*. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datacurrent.html#.
319. European Commission. (n.d.). *EU Emissions Trading System (EU ETS)*. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en.
320. International Carbon Action Partnership. (n.d.). *USA - California Cap-and-Trade Program*. <https://icapcarbonaction.com/en/ets/usa-california-cap-and-trade-program>.
321. International Carbon Action Partnership. (n.d.). *Korea Emissions Trading Scheme*. <https://icapcarbonaction.com/en/ets/korea-emissions-trading-scheme>.
322. International Carbon Action Partnership. (n.d.). *China National ETS*. <https://icapcarbonaction.com/en/ets/china-national-ets>.
323. European Commission. (2024). *Carbon Border Adjustment Mechanism*. https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.
324. Climate Cooperation China. (2022). *China issues Action Plan for Industrial Carbon Peaking by 2030*. <https://climatecooperation.cn/climate/china-issues-action-plan-for-industrial-carbon-peaking-by-2030/>.
325. E3G. (n.d.). *Growing clean steel in the UK*. <https://www.e3g.org/publications/growing-clean-steel-in-the-uk/>.
326. U.S. Department of the Treasury. (n.d.). *Inflation Reduction Act*. <https://home.treasury.gov/policy-issues/inflation-reduction-act>.
327. European Commission. (n.d.). *Research Fund for Coal and Steel*. https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/research-fund-coal-and-steel-rfcs_en#:~:text=The%20RFCS%20and%20the%20European,steel%2Dmaking%20processes%20by%202030.

328. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
329. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
330. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
331. Mission Possible Partnership (MPP). (2023). *Making Net-Zero Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Report.pdf>.
332. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
333. Ibid.
334. Ibid.
335. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
336. Ibid.
337. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
338. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
339. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
340. International Energy Agency (IEA). (2023). *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*. https://iea.blob.core.windows.net/assets/9a698da4-4002-4e53-8ef3-631d8971bf84/NetZeroRoadmap_AGlobalPathwaytoKeepthe1.5CGoalinReach-2023Update.pdf.
341. Transition Pathway Initiative. (n.d.). *Home*. <https://www.transitionpathwayinitiative.org/>.
342. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
343. Ibid.
344. Mission Possible Partnership (MPP). (n.d.). *Making Net-Zero, 1.5°C-Aligned Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Infographics.pdf>.
345. Ibid.
346. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
347. Accenture analysis.
348. Mission Possible Partnership (MPP). (2023). *Making Net-Zero Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Report.pdf>.
349. Accenture analysis based on S&P Capital data.
350. Accenture analysis.
351. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
352. Ibid.
353. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
354. Ibid.
355. Ibid.
356. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
357. Ibid.
358. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
359. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
360. Holcim. (2023). *Holcim invests in Sublime Systems to scale up innovative low-carbon technology*. <https://www.holcim.com/media/company-news/investment-sublime-systems-low-carbon-technology#:~:text=Holcim%20invests%20in%20Sublime%20Systems%20to%20scale.raw%20materials%20and%20decarbonized%20energy%20to%20CCUS>.
361. RPS Group. (n.d.). *Norcem Carbon Capture and Storage Project*. <https://www.rpsgroup.com/projects/norcem-carbon-capture-and-storage-project-brevik-norway/#:~:text=The%20cement%20industry%20accounts%20for,terms%20of%20reaching%20climate%20goals>.

362. CEMEX. (2020). *CEMEX and Carbon Clean to develop low-cost carbon capture technology*. <https://www.cemex.com/w/cemex-and-carbon-clean-to-develop-low-cost-carbon-capture-technology>.
363. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
364. Ibid.
365. Ibid.
366. Mission Possible Partnership (MPP). (n.d.). *Making Net-Zero, 1.5°C-Aligned Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Infographics.pdf>.
367. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
368. Mission Possible Partnership (MPP). (n.d.). *Making Net-Zero, 1.5°C-Aligned Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Infographics.pdf>.
369. Ibid.
370. Mission Possible Partnership (MPP). (2023). *Making Net-Zero Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Report.pdf>.
371. Accenture analysis based on S&P Capital data.
372. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
373. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
374. Ibid.
375. Ibid.
376. Cembureau. (n.d.). *Recarbonation*. <https://lowcarboneyconomy.cembureau.eu/5-parallel-routes/downstream/recarbonation/#:~:text=Studies%20have%20been%20conducted%20to,the%20secondary%20or%20recycled%20lifetime>.
377. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
378. Ibid.
379. Ibid.
380. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
381. European Commission. (2024). *Shaping the future CO₂ transport network for Europe*. <https://publications.jrc.ec.europa.eu/repository/handle/JRC136709#:~:text=This%20study%20estimates%20the%20evolution,billion%20and%20EUR%2023.1%20billion>.
382. Heidelberg Materials. (n.d.). *Brevik CCS – World's first CO₂-capture facility in the cement industry*. <https://www.brevikccs.com/en>.
383. International Energy Agency (IEA). (2023). *Net Zero Emissions Guide: Cement*. <https://www.iea.org/reports/cement-3#dashboard>.
384. International Energy Agency (IEA). (n.d.). *Cement*. <https://www.iea.org/energy-system/industry/cement>.
385. Ibid.
386. Ibid.
387. Ibid.
388. Accenture analysis.
389. Mission Possible Partnership (MPP). (n.d.). *Making Net-Zero, 1.5°C-Aligned Concrete and Cement Possible*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-Net-Zero-Concrete-and-Cement-Possible-Infographics.pdf>.
390. Ibid.
391. Ibid.
392. Ibid.
393. Ibid.
394. Ibid.
395. U.S. Geological Survey. (2023). *Cement*. <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-cement.pdf>.
396. Global Cement and Concrete Association. (n.d.). *Home*. <https://gccassociation.org/>.
397. Industrial Decarbonization Accelerator. (n.d.). *Guidance for PCR Harmonization*. <https://www.industrialenergyaccelerator.org/general/guidance-for-pcr-harmonization/>.

398. Environment and Climate Change Canada. (2024). *Output-Based Pricing System*. <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system.html>.
399. European Commission. (n.d.). *Carbon Border Adjustment Mechanism*. https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.
400. Bureau of Indian Standards. (1991). *IS 1489-1 : 1991 Portland Pozzolana Cement Specification*. <https://law.resource.org/pub/in/bis/S03/is.1489.1.1991.pdf>.
401. European Environment Agency. (2010). *Directive 2010/75/EC on industrial emissions*. <https://www.eea.europa.eu/policy-documents/directive-2010-75-ec-on>.
402. Zhang, Q., D. Tong, Y. Zheng, J. Cheng, et al. (2021). Carbon and air pollutant emissions from China's cement industry 1990-2015: trends, evolution of technologies, and drivers. *Atmospheric Chemistry and Physics*, vol. 21, no. 3, pp. 1627-1647. <https://doi.org/10.5194/acp-21-1627-2021>.
403. Climate Action Tracker. (n.d.). *Net zero targets*. <https://climateactiontracker.org/countries/india/net-zero-targets/#:~:text=Target%20year%20%E2%80%93%20India%20aims%20to,Government%20of%20India%2C%202022a>.
404. Wright, R. (2024). *Germany announces €3.3 billion plan for decarbonising industry, including underground carbon storage*. Euronews. <https://www.euronews.com/green/2024/08/23/germany-announces-33-billion-plan-for-decarbonising-industry-including-underground-carbon-#:~:text=The%20German%20government%20is%20putting,aimed%20at%20medium%2Dsize%20companies>.
405. Office of Clean Energy Demonstrations. (n.d.). *Advanced Research Projects Agency-Energy (ARPA-E)*. <https://www.energy.gov/advanced-research-projects-agency-energy-arpa-e>.
406. Office of Clean Energy Demonstrations. (n.d.). *Industrial Demonstrations Program Selected and Awarded Projects: Cement and Concrete*. <https://www.energy.gov/oced/industrial-demonstrations-program-selected-and-awarded-projects-cement-and-concrete>.
407. International Energy Agency (IEA). (n.d.). *Aluminium*. <https://www.iea.org/energy-system/industry/aluminium#tracking>.
408. Accenture analysis based on International Aluminium Institute (IAI). (2023). *Greenhouse Gas Emissions – Aluminium Sector*. <https://international-aluminium.org/statistics/greenhouse-gas-emissions-aluminium-sector/>.
409. International Aluminium Institute (IAI). (n.d.). *Aluminium Sector Greenhouse Gas Pathways to 2050*. <https://international-aluminium.org/resource/aluminium-sector-greenhouse-gas-pathways-to-2050-2021/>.
410. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
411. Accenture analysis based on International Aluminium Institute (IAI). (2023). *Greenhouse Gas Emissions – Aluminium Sector*. <https://international-aluminium.org/statistics/greenhouse-gas-emissions-aluminium-sector/>.
412. International Aluminium Institute (IAI). (2023). *Greenhouse Gas Emissions – Aluminium Sector*. <https://international-aluminium.org/statistics/greenhouse-gas-emissions-aluminium-sector/>.
413. International Aluminium Institute (IAI). (2024). *Primary Aluminium Smelting Power Consumption*. <https://international-aluminium.org/statistics/primary-aluminium-smelting-power-consumption/>.
414. International Aluminium Institute (IAI). (2021). *Aluminium Sector Greenhouse Gas Pathways to 2050 (1.5 Degree Scenario)*. <https://international-aluminium.org/resource/aluminium-sector-greenhouse-gas-pathways-to-2050-2021/>.
415. Accenture analysis based on International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide?layout=list&selectedTechID=6d4fae80>.
416. Ibid.
417. Accenture analysis based on Mission Possible Partnership (MPP). (2023). *Making Net-Zero Aluminium Possible: An industry-backed, 1.5°C-aligned transition strategy*. <https://3stepsolutions.s3-accelerate.amazonaws.com/assets/custom/010856/downloads/Making-1.5-Aligned-Aluminium-possible.pdf>.
418. Ibid.
419. Aluminium Stewardship Initiative (ASI). (2022). *Issue Brief: Low Carbon Aluminium*. <https://aluminium-stewardship.org/low-carbon-aluminium>.
420. Accenture analysis.
421. European Commission. (2024). *Carbon Border Adjustment Mechanism*. https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.
422. Aluminium Stewardship Initiative (ASI). (n.d.). *ASI Chain of Custody Standard*. <https://aluminium-stewardship.org/asi-standards/chain-of-custody-standard>.
423. Mission Possible Partnership (MPP). (n.d.). *Aluminium*. <https://www.missionpossiblepartnership.org/action-sectors/aluminium/>.
424. Data received from International Aluminium Institute.
425. Ibid.
426. International Aluminium Institute (IAI). (2023). *Greenhouse Gas Emissions – Aluminium Sector*. <https://international-aluminium.org/statistics/greenhouse-gas-emissions-aluminium-sector/>.
427. International Aluminium Institute (IAI). (2024). *Primary Aluminium Smelting Power Consumption*. <https://international-aluminium.org/statistics/primary-aluminium-smelting-power-consumption/>.

428. International Aluminium Institute (IAI). (2023). *Metallurgical Alumina Refining Energy Intensity*. <https://international-aluminium.org/statistics/metallurgical-alumina-refining-fuel-consumption/>.
429. Mission Possible Partnership (MPP). (2023). *Aluminium*. <https://www.missionpossiblepartnership.org/action-sectors/aluminium/>.
430. Ibid.
431. Accenture analysis based on BloombergNEF.
432. International Aluminium Institute (IAI). (2024). *The Global Aluminium Cycle*. <https://alucycle.world-aluminium.org/public-access/>.
433. Accenture analysis based on Mission Possible Partnership (MPP). (2023). *Aluminium*. <https://www.missionpossiblepartnership.org/action-sectors/aluminium/>.
434. Aluminium Stewardship Initiative (ASI). (2023). *Issue Brief: Low Carbon Aluminium*. <https://aluminium-stewardship.org/low-carbon-aluminium>.
435. Accenture analysis.
436. Reuters. (2023). *China boosts green aluminium certification as demand grows*. <https://www.reuters.com/sustainability/china-boosts-green-aluminium-certification-demand-grows-2023-11-07/>.
437. Rio Tinto. (2021). *Rio Tinto launches START: the first sustainability label for aluminium using blockchain technology*. <https://www.riotinto.com/fr-ca/can/news/releases/rio-tinto-launches-start-the-first-sustainability-label-for-aluminium-using-blockchain-technology>.
438. Romco Metals. (n.d.). *LME Launches Sustainability Register for Aluminium and Other Metals*. <https://romcometals.com/lme-launches-sustainability-register-for-aluminium-and-other-metals/>.
439. Accenture analysis based on MPP.
440. Mission Possible Partnership (MPP). (2023). *Aluminium*. <https://www.missionpossiblepartnership.org/action-sectors/aluminium/>.
441. Accenture analysis based on S&P Capital data.
442. Damodaran Online. (n.d.). *Data: Current*. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datacurrent.html#.
443. European Commission. (n.d.). *What is the EU ETS?* https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en.
444. ERCST. (2021). *The aluminium value chain and implications for CBAM design*. <https://ercst.org/wp-content/uploads/2021/08/The-aluminium-value-chain-and-implications-for-CBAM-design.pdf>.
445. Aluminium Stewardship Initiative (ASI). (2023). *ASI Performance Standard Version 3 recognised in the Green Building Council Australia's Responsible Products Framework*. <https://aluminium-stewardship.org/asi-performance-standard-version-3-recognised-in-the-green-building-council-australias-responsible-products-framework>.
446. Home, A. (2023). *Europe adds aluminium to its critical raw materials list*. Reuters. <https://www.reuters.com/markets/commodities/europe-adds-aluminium-its-critical-raw-materials-list-andy-home-2023-07-06/>.
447. Chen, A. (2022). *China delays metals sector's climate target amid slow shift to renewables*. S&P Global. <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/china-delays-metals-sector-s-climate-target-amid-slow-shift-to-renewables-73247390>.
448. Shanghai Metals Market. (2022). *Guangxi Encourages Aluminium Smelters to Resume the Production through Financial Subsidy*. <https://news.metal.com/newscontent/102008369/guangxi-encourages-aluminium-smelters-to-resume-the-production-through-financial-subsidy>.
449. Government of Canada. (2021). *Investment to help Canada's aluminum industry eliminate its carbon footprint*. <https://www.canada.ca/en/innovation-science-economic-development/news/2021/06/investment-to-help-canadas-aluminum-industry-eliminate-its-carbon-footprint.html>.
450. International Energy Agency (IEA). (n.d.). *Chemicals*. <https://www.iea.org/energy-system/industry/chemicals>.
451. International Energy Agency (IEA). (2021). *Net Zero by 2050: A Roadmap for the Global Energy Sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.
452. International Energy Agency (IEA). (2024). *World Energy Outlook 2024*. <https://iea.blob.core.windows.net/assets/47a9a222-78e4-4c43-9bab-977b4ad5326b/WorldEnergyOutlook2024.pdf>.
453. International Energy Agency (IEA). (n.d.). *Primary chemicals*. <https://www.iea.org/reports/primary-chemicals>.
454. Accenture analysis based on Center for Global Commons. (2022). *Planet Positive Chemicals*. <https://cgc.ifu.u-tokyo.ac.jp/research/chemistry-industry/planet-positive-chemicals.pdf>.
455. International Energy Agency (IEA). (n.d.). *Chemicals*. <https://www.iea.org/energy-system/industry/chemicals>.
456. Total emissions do not include Scope 3 emissions.
457. Ibid.
458. Ibid.
459. International Energy Agency (IEA). (n.d.). *Primary chemicals*. <https://www.iea.org/reports/primary-chemicals>.
460. Ibid.
461. International Energy Agency (IEA). (n.d.). *Chemicals*. <https://www.iea.org/energy-system/industry/chemicals>.

462. International Energy Agency (IEA). (n.d.). *Net Zero Emissions Guide: Primary chemicals*. <https://www.iea.org/reports/primary-chemicals#dashboard>.
463. International Energy Agency (IEA). (n.d.). *Chemicals*. <https://www.iea.org/energy-system/industry/chemicals>.
464. Ibid.
465. Transition Pathway Initiative. (n.d.). *Home*. <https://www.transitionpathwayinitiative.org/>.
466. Science Based Targets. (n.d.). *Target dashboard (Beta)*. <https://sciencebasedtargets.org/target-dashboard>.
467. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
468. Ibid.
469. International Energy Agency (IEA). (n.d.). *Net Zero Emissions Guide: Primary chemicals*. <https://www.iea.org/reports/primary-chemicals#dashboard>.
470. Ibid.
471. Accenture analysis.
472. Center for Global Commons. (2022). *Planet Positive Chemicals*. <https://cgc.ifi.u-tokyo.ac.jp/research/chemistry-industry/planet-positive-chemicals.pdf>.
473. CAPEX Scope includes ammonia, methanol, ethylene, propylene, benzene, toluene, xylene, butadiene and waste management. The estimated additional investment includes both retrofit and greenfield production CapEx funds used by an organization to acquire or upgrade assets such as property, buildings, technology or equipment and investment in clean power and CCUS required.
474. Accenture analysis based on Center for Global Commons. (2022). *Planet Positive Chemicals*. <https://cgc.ifi.u-tokyo.ac.jp/research/chemistry-industry/planet-positive-chemicals.pdf>.
475. Ibid.
476. Accenture analysis.
477. International Energy Agency (IEA). (n.d.). *Net Zero Emissions Guide: Primary chemicals*. <https://www.iea.org/reports/primary-chemicals#dashboard>.
478. International Energy Agency (IEA). (n.d.). *Chemicals*. <https://www.iea.org/energy-system/industry/chemicals>.
479. Ibid.
480. Ibid.
481. Ibid.
482. Ibid.
483. International Energy Agency (IEA). (n.d.). *Net Zero Emissions Guide: Primary chemicals*. <https://www.iea.org/reports/primary-chemicals#dashboard>.
484. Ibid.
485. BASF. (2023). *BASF Venture Capital invests in startup DePoly SA*. <https://www.basf.com/global/en/media/news-releases/2023/06/p-23-254>.
486. SABIC. (n.d.). *Closing the loop on used plastic*. <https://www.sabic.com/en/newsandmedia/stories/our-world/closing-the-loop-on-used-plastic>.
487. ExxonMobil. (2024). *ExxonMobil and Shell selected to work with the Government of Singapore on a carbon capture and storage value chain*. https://corporate.exxonmobil.com/locations/singapore/singapore-updates/news-releases/03012024_exxonmobil-and-shell-selected-to-work-with-the-govt-of-singapore-on-a-ccs-value-chain.
488. Center for Global Commons. (2022). *Planet Positive Chemicals*. <https://cgc.ifi.u-tokyo.ac.jp/research/chemistry-industry/planet-positive-chemicals.pdf>.
489. Ibid.
490. Ibid.
491. Ibid.
492. International Energy Agency (IEA). (n.d.). *ETP Clean Energy Technology Guide*. <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.
493. Ibid.
494. Ibid.
495. Ibid.
496. Ibid.
497. International Energy Agency (IEA). (n.d.). *Net Zero Emissions Guide: Primary chemicals*. <https://www.iea.org/reports/primary-chemicals#dashboard>.
498. Air Products. (n.d.). *Clean Hydrogen Production and Supply*. <https://www.airproducts.com/energy-transition/clean-hydrogen-production>.

499. Center for Global Commons. (2022). *Planet Positive Chemicals*. <https://cgc.ifi.u-tokyo.ac.jp/research/chemistry-industry/planet-positive-chemicals.pdf>.
500. Ibid.
501. International Energy Agency (IEA). (n.d.). Chemicals. <https://www.iea.org/energy-system/industry/chemicals>.
502. Ibid.
503. Accenture analysis.
504. Statista. (2023). *Revenue share of specialty chemicals by country 2023*. <https://www.statista.com/statistics/1330685/global-specialty-chemical-sales-share-by-country/>.
505. Statista. (2023). *Consumption of chemicals by country 2023*. <https://www.statista.com/statistics/272287/consumption-of-chemicals-by-country-2008/>.
506. CapEx scope includes ammonia, methanol, ethylene, propylene, benzene, toluene, xylene, butadiene and waste management. The estimated additional investment includes both retrofit and greenfield production CapEx funds used by an organization to acquire or upgrade assets such as property, buildings, technology or equipment and investment in clean power and CCUS infrastructure.
507. Accenture analysis based on Center for Global Commons. (2022). *Planet Positive Chemicals*. <https://cgc.ifi.u-tokyo.ac.jp/research/chemistry-industry/planet-positive-chemicals.pdf>.
508. Statista. (2023). *Revenue share of specialty chemicals by country 2023*. <https://www.statista.com/statistics/1330685/global-specialty-chemical-sales-share-by-country/>.
509. International Council of Chemical Associations. (2023). *Chemical industry announces global ambitions at landmark UN conference on the future of chemicals management*. <https://icca-chem.org/news/chemical-industry-announces-global-ambitions-at-landmark-un-conference-on-the-future-of-chemicals-management/>.
510. Government of Canada. (n.d.). *Carbon pollution pricing systems across Canada*. <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html>.
511. American Council for an Energy-Efficient Economy. (2024). *The U.S. needs a plan to reduce chemical sector emissions*. <https://www.aceee.org/blog-post/2024/04/us-needs-plan-reduce-chemical-sector-emissions>.
512. California Department of Toxic Substances Control. (n.d.). *Safer Consumer Products (SCP) Program Overview*. <https://dtsc.ca.gov/scp/safer-consumer-products-program-overview/>.
513. European Commission. (n.d.). *REACH Regulation*. https://environment.ec.europa.eu/topics/chemicals/reach-regulation_en.
514. U.S. Environmental Protection Agency. (n.d.). *Toxic Substances Control Act (TSCA) and Federal Facilities*. <https://www.epa.gov/enforcement/toxic-substances-control-act-tsca-and-federal-facilities>.
515. Climate Change Laws of the World. (n.d.). *Climate Action Plan 2050*. https://climate-laws.org/documents/climate-action-plan-2050_b6ce?id=climate-action-plan-2050_37a5.
516. International Energy Agency (IEA). (n.d.). *Carbon Contracts for Difference (CCfD) program for energy-intensive industries*. <https://www.iea.org/policies/17538-carbon-contracts-for-difference-ccfd-program-for-energy-intensive-industries>.
517. European Commission. (n.d.). *Chemicals and advanced materials*. https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/chemicals-and-advanced-materials_en.
518. International Energy Agency (IEA). (n.d.). *Fossil Fuels*. <https://www.iea.org/energy-system/fossil-fuels>.
519. International Energy Agency (IEA). (2022). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf>.
520. Accenture analysis based on IEA.
521. International Energy Agency (IEA). (2022). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf>.
522. International Energy Agency (IEA). (2022). *The Oil and Gas Industry in Net Zero Transitions: Insights from IEA analysis*. https://iea.blob.core.windows.net/assets/4315f4ed-5cb2-4264-b0ee-2054fd34c118/The_Oil_and_Gas_Industry_in_Energy_Transitions.pdf.
523. International Energy Agency (IEA). (2022). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf>.
524. Ibid.
525. Ibid.
526. Ibid.
527. Ibid.
528. Ibid.
529. Accenture analysis based on IEA.
530. Ibid.
531. Oil and Gas Climate Initiative. (n.d.). *Satellite Monitoring Campaign*. <https://www.ogci.com/methane-emissions/satellite-monitoring-campaign>.

532. International Energy Agency (IEA). (2022). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf>.
533. International Energy Agency. (2024). *World Energy Outlook*. <https://iea.blob.core.windows.net/assets/5e9122fc-9d5b-4f18-8438-dac8b39b702a/WorldEnergyOutlook2024.pdf>.
534. According to IEA.
535. Accenture analysis based on data from IEA and EIA.
536. International Energy Agency (IEA). (2022). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf>.
537. Ibid.
538. International Energy Agency (IEA). (2023). *Global Methane Tracker 2023*. <https://www.iea.org/reports/global-methane-tracker-2023/overview>.
539. International Energy Agency (IEA). (n.d.). *Gas Flaring*. <https://www.iea.org/energy-system/fossil-fuels/gas-flaring>.
540. OGDC. (n.d.). *About the charter*. <https://www.ogdc.org/about/#:~:text=or%20before%202050,-Aiming%20for%20Near%2DZero%20Upstream%20Methane%20Emissions%20by%202030,achieve%20near%2Dzero%20methane%20emissions>.
541. International Energy Agency (IEA). (2021). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.
542. Ibid.
543. IFS. (2022). *The Importance of CCUS In the Oil and Gas Industry*. <https://www.dxpe.com/ccus-in-the-oil-and-gas-industry/>.
544. International Energy Agency (IEA). (2021). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.
545. Wood Mackenzie. (2022). *Low-carbon hydrogen demand in refining could reach 50 Mtpa by 2050*. <https://www.woodmac.com/press-releases/low-carbon-hydrogen-demand-in-refining-could-reach-50-mtpa-by-2050/>.
546. Accenture analysis based on IEA.
547. Akella, S. (2022). *Leading oil and gas companies in the renewable energy theme*. Offshore Technology. <https://www.offshore-technology.com/data-insights/leading-oil-and-gas-companies-in-the-renewable-energy-theme-2/>.
548. Accenture analysis based on Statista. (n.d.). *Cumulative renewable energy capacity worldwide from 2010 to 2023*. <https://www.statista.com/statistics/1094331/global-renewable-capacity-cumulative/>.
549. International Energy Agency (IEA). (n.d.). *CCUS Projects Explorer*. <https://www.iea.org/data-and-statistics/data-tools/ccus-projects-explorer>.
550. Ibid.
551. The CCUS Hub. (n.d.). *Home*. <https://ccushub.ogci.com/>.
552. Accenture analysis based on IEA.
553. Ibid.
554. Ibid.
555. International Energy Agency (IEA). (2021). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.
556. Ibid.
557. Chevron. (2024). *Innovation fuels lower carbon, record production*. <https://www.chevron.com/newsroom/2024/q1/innovation-fuels-lower-carbon-record-production>.
558. Accenture analysis based on data from IEA and EIA.
559. National Bureau of Economic Research. (n.d.). *Commodity Trade Matters*. https://www.nber.org/system/files/working_papers/w24965/w24965.pdf.
560. Energy Institute. (n.d.). *Statistical Review of World Energy*. <https://www.energyinst.org/statistical-review>.
561. Ibid.
562. Statista. (n.d.). *Average CO₂ emissions from oil production by country*. [https://www.statista.com/statistics/1454500/average-co₂-emissions-from-oil-production-by-country/#:~:text=Norway's%20average%20carbon%20dioxide%20\(CO%E2%82%82,equivalent%20\(kgCO%E2%82%82eq%2Fboe\)](https://www.statista.com/statistics/1454500/average-co2-emissions-from-oil-production-by-country/#:~:text=Norway's%20average%20carbon%20dioxide%20(CO%E2%82%82,equivalent%20(kgCO%E2%82%82eq%2Fboe)).
563. Accenture analysis based on IEA.
564. Ibid.
565. International Energy Agency (IEA). (2021). *The Oil and Gas Industry in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/7a4b0c4e-d78c-4a8e-998c-6cde10a4e49b/TheOilandGasIndustryinNetZeroTransitions.pdf>.

566. CSImarket.com. (n.d.). Oil And Gas Production Industry Profitability by quarter, Gross, Operating and Net Margin from 2 Q 2024. https://csimarket.com/Industry/industry_Profitability_Ratios.php?ind=602.
567. European Commission. (n.d.). *EU Emissions Trading System (EU ETS)*. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en.
568. RBC. (n.d.). Oil and Gas Policies and Actions Towards Net Zero. <https://www.rbc.com/climate-action-institute/climate-action-24/oil-and-gas.html>.
569. International Energy Agency (IEA). (n.d.). *Guidelines for management of fugitive methane and greenhouse gases emissions in the upstream oil and gas operations in Nigeria*. <https://www.iea.org/policies/16952-guidelines-for-management-of-fugitive-methane-and-greenhouse-gases-emissions-in-the-upstream-oil-and-gas-operations-in-nigeria>.
570. International Energy Agency (IEA). (n.d.). *Inflation Reduction Act 2022: Sec. 60113 and Sec. 50263 on Methane Emissions Reductions*. <https://www.iea.org/policies/16317-inflation-reduction-act-2022-sec-60113-and-sec-50263-on-methane-emissions-reductions>.
571. Bipartisan Policy Center. (2022). *Inflation Reduction Act Summary: Energy and Climate Provisions*. <https://bipartisanpolicy.org/blog/inflation-reduction-act-summary-energy-climate-provisions/>.
572. Climate and Clean Air Coalition. (n.d.). *National Methane Action Plans*. <https://www.ccacoalition.org/resources/national-methane-action-plans>.
573. International Energy Agency (IEA). (2023). *Emissions from Oil and Gas Operations in Net Zero Transitions*. <https://iea.blob.core.windows.net/assets/2f65984e-73ee-40ba-a4d5-bb2e2c94cecb/EmissionsfromOilandGasOperationinNetZeroTransitions.pdf>.
574. The Global Environment Facility. (n.d.). *PIF for GEF-10 FULL-SIZED PROJECT: Scaling Up Implementation of the Kigali Amendment and Promoting HFC Alternatives in the Asia-Pacific Region*. https://www.thegef.org/sites/default/files/web-documents/10121_PIF.pdf.
575. International Group of Liquefied Natural Gas Importers. (2021). *GIIGNL releases MRV and GHG Neutral Framework*. <https://giignl.org/giignl-releases-framework-for-transparent-emissions-reporting-and-neutrality-declarations/>.
576. UAE Consensus. (n.d.). *Oil & Gas Decarbonization Charter launched to accelerate climate action*. <https://www.cop28.com/en/news/2023/12/Oil-Gas-Decarbonization-Charter-launched-to--accelerate-climate-action>.
577. International Energy Agency (IEA). (n.d.). *PACE: UAE-U.S. Clean Energy Strategic Partnership*. <https://www.iea.org/policies/17310-pace-uae-us-clean-energy-strategic-partnership>.
578. International Energy Agency (IEA). (2022). *Norway 2022*. <https://iea.blob.core.windows.net/assets/de28c6a6-8240-41d9-9082-a5dd65d9f3eb/NORWAY2022.pdf>.
579. U.S. Environmental Protection Agency. (2023). *Methane Emissions Reduction Program*. <https://www.epa.gov/inflation-reduction-act/methane-emissions-reduction-program>.



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org