



IGTIC

DECARBONIZATION OF THE OIL AND GAS INDUSTRY

MODULE 5

Material for group work





IGTIC

GOALS OF SECTORAL GROUP WORK

- Identify the main sources of greenhouse gas emissions in your sector.
- Familiarize yourself with the target indicators and quantitative measures of decarbonization in the industry.
- Learn which climate risks companies in this sector consider most significant.
- Assess the activities and technological solutions that are most common and acceptable in the short and long term for sector decarbonization



"PRIMARY SOURCES OF GREENHOUSE GAS EMISSIONS IN THE OIL AND GAS INDUSTRY"



- The burning of fossil fuels is the main source of greenhouse gas emissions in the oil and gas industry. This occurs during the extraction, processing, and transportation of oil and gas. When these fuels are burned to generate energy or power machinery and vehicles, carbon dioxide (CO₂) is emitted into the atmosphere. (Scope 1)
- Methane emissions: Methane (CH₄) is a potent greenhouse gas with a significantly higher global warming potential than carbon dioxide (CO₂) over a shorter period. Methane is released during various stages of the oil and gas industry, including drilling, extraction, refining, and transportation. Common sources of methane leaks include ventilation and combustion of natural gas.
- Flaring and venting: Flaring is the controlled burning of natural gas that cannot be captured or utilized for various reasons, such as safety concerns or lack of infrastructure. Venting involves releasing unburned gases directly into the atmosphere. Both flaring and venting contribute to emissions of CO₂, methane, and other greenhouse gases.



"PRIMARY SOURCES OF GREENHOUSE GAS EMISSIONS IN THE OIL AND GAS INDUSTRY"

- Exploration and production processes: Oil and gas exploration, drilling and production involve various energy-intensive operations and equipment, resulting in indirect emissions from electricity and fuel consumption (Scope 2).
- Refining: The process of refining crude oil into usable products also results in greenhouse gas emissions, including CO₂ and methane (Scope 1).
- Transportation and distribution: Transportation and distribution of oil and gas through pipelines, ships, trucks and other means also contribute to GHG emissions, mainly through fuel combustion in vehicles (Scope 3).



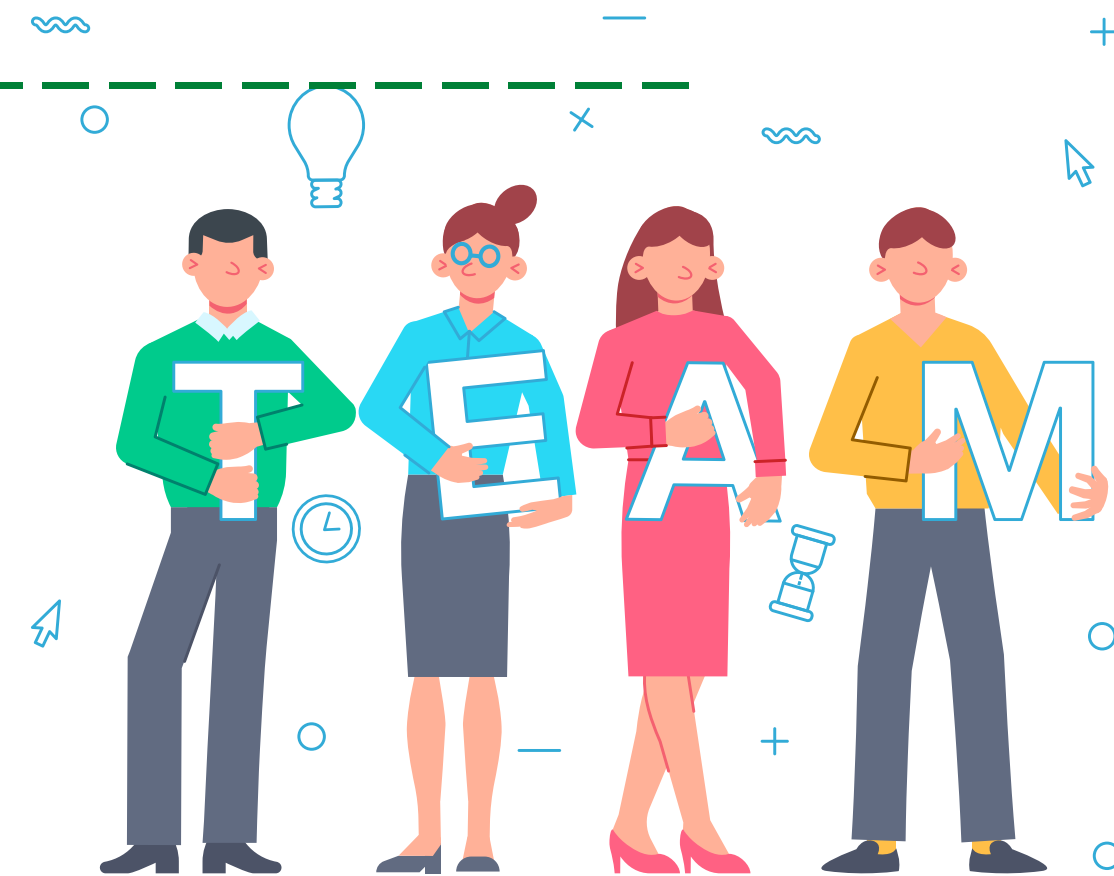
WHAT PROCESSES LEAD TO GREENHOUSE GAS EMISSIONS UNDER SCOPE 1 AND 2 AT YOUR ENTERPRISE

Use of fossil fuels : _____

Methane emissions: _____

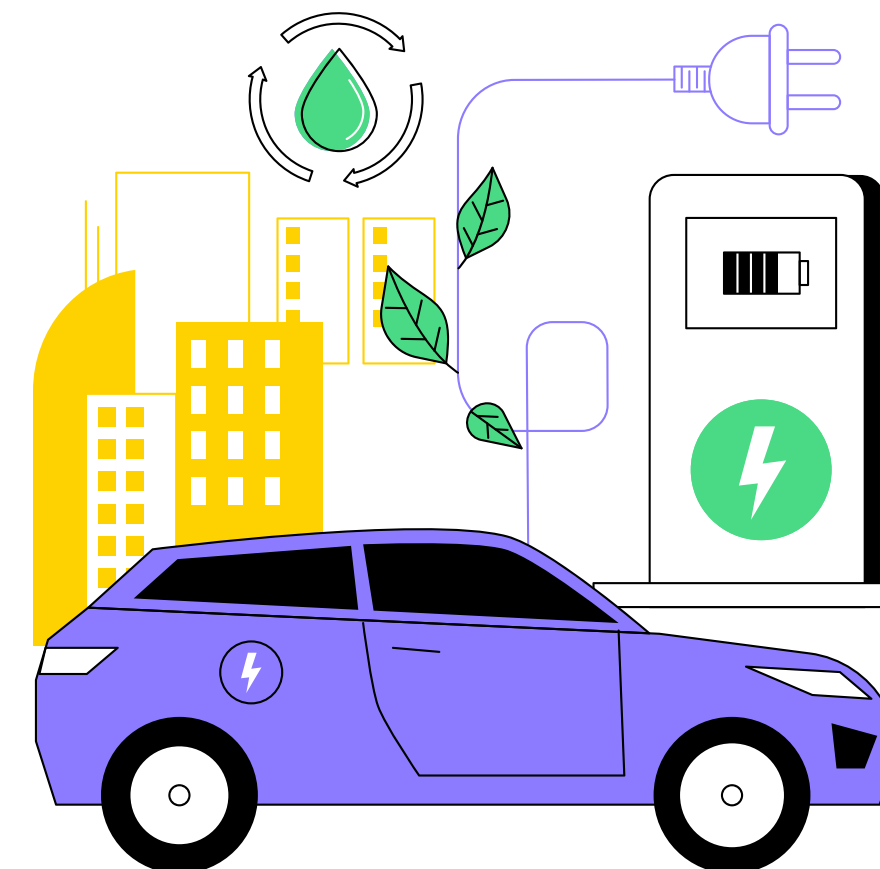
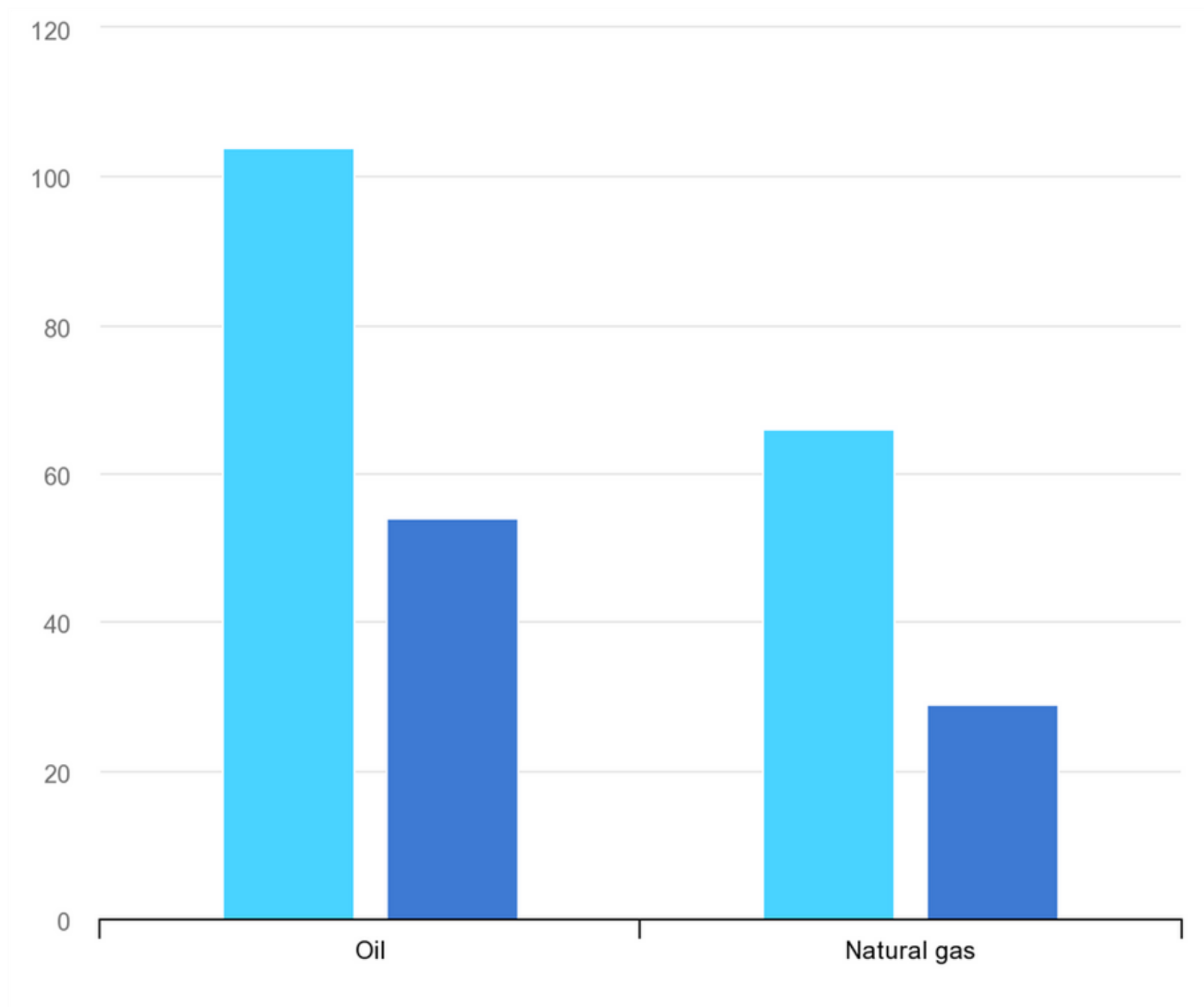
Gas flaring: _____

Other sources: _____



"INDUSTRY TARGETS: INTERNATIONAL ENERGY AGENCY

- The intensity of emissions from oil and gas activities should be halved by 2030 according to the IEA scenario.



CORPORATE OBJECTIVES FOR EMISSION REDUCTION IN THE INDUSTRY

Company	Target year: 2030
Shell	<p>Objective: Achieving carbon neutrality by 2050.</p> <p>Indicator: Reduction of greenhouse gas emissions per unit of energy produced by 50% by 2030.</p>
BP (British Petroleum)	<p>Objective: Reduce greenhouse gas emissions by 20% by 2025 and 50% by 2030.</p> <p>Indicator: Level of methane emissions and the amount of carbon dioxide released into the atmosphere.</p>
ExxonMobil	<p>Objective: Reduce the intensity of greenhouse gas emissions by 15%-20% by 2025 compared to 2016.</p> <p>Indicator: The total intensity of CO2 emissions per unit of production.</p>
Chevron	<p>Objective: Reduce GHG emission intensity by 35% by 2028.</p> <p>Indicator: The number of emissions per unit of oil or gas produced.</p>

HAS YOUR COMPANY SET DECARBONIZATION RELATED GOALS?

Scope 1 and 2: _____

Scope 3: _____

Other goals: _____

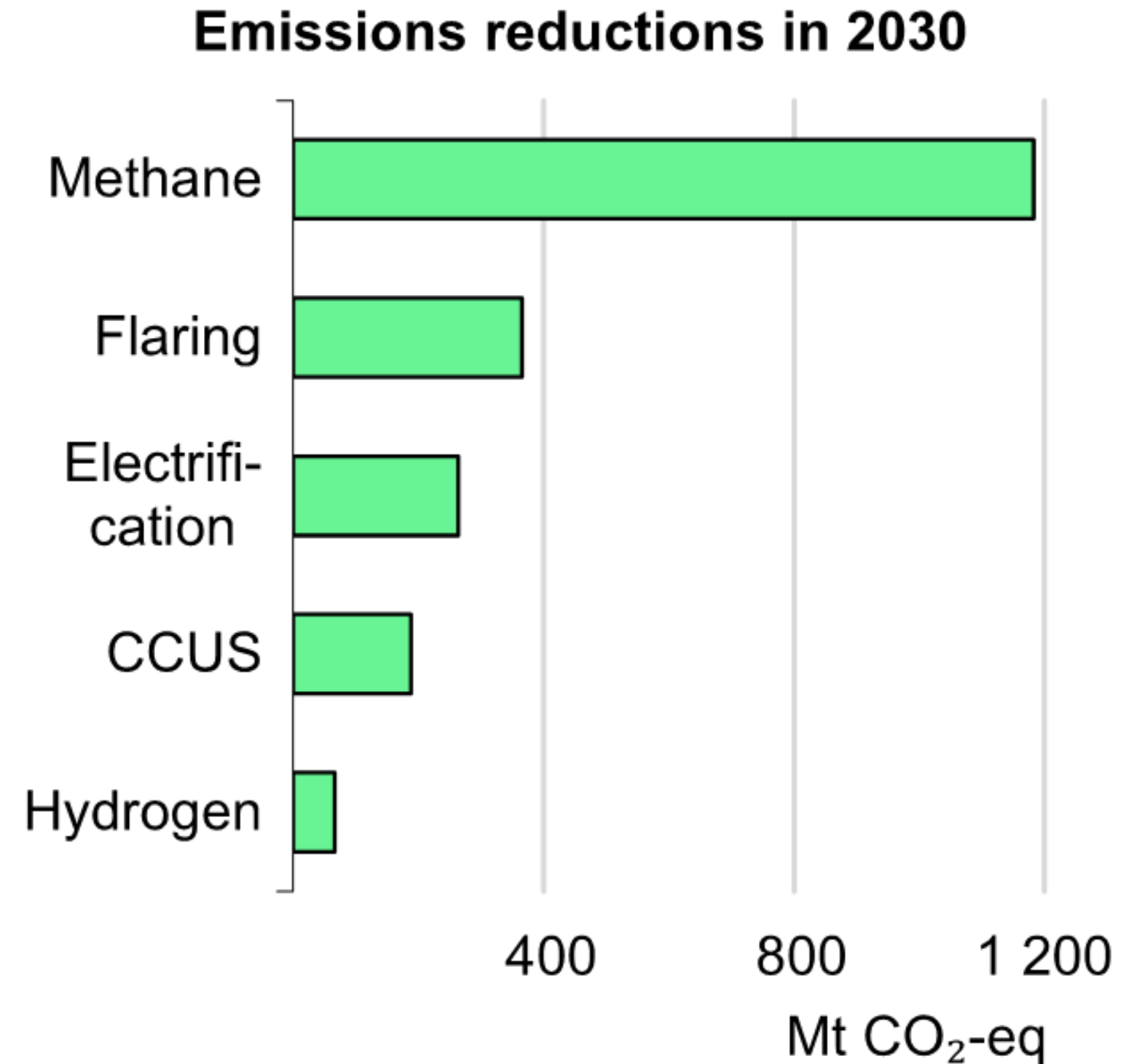
- Energy efficiency improvement _____
- Use of renewable energy sources _____
- Methane emissions: _____



IEA: ROADMAP FOR OIL AND GAS DECARBONISATION

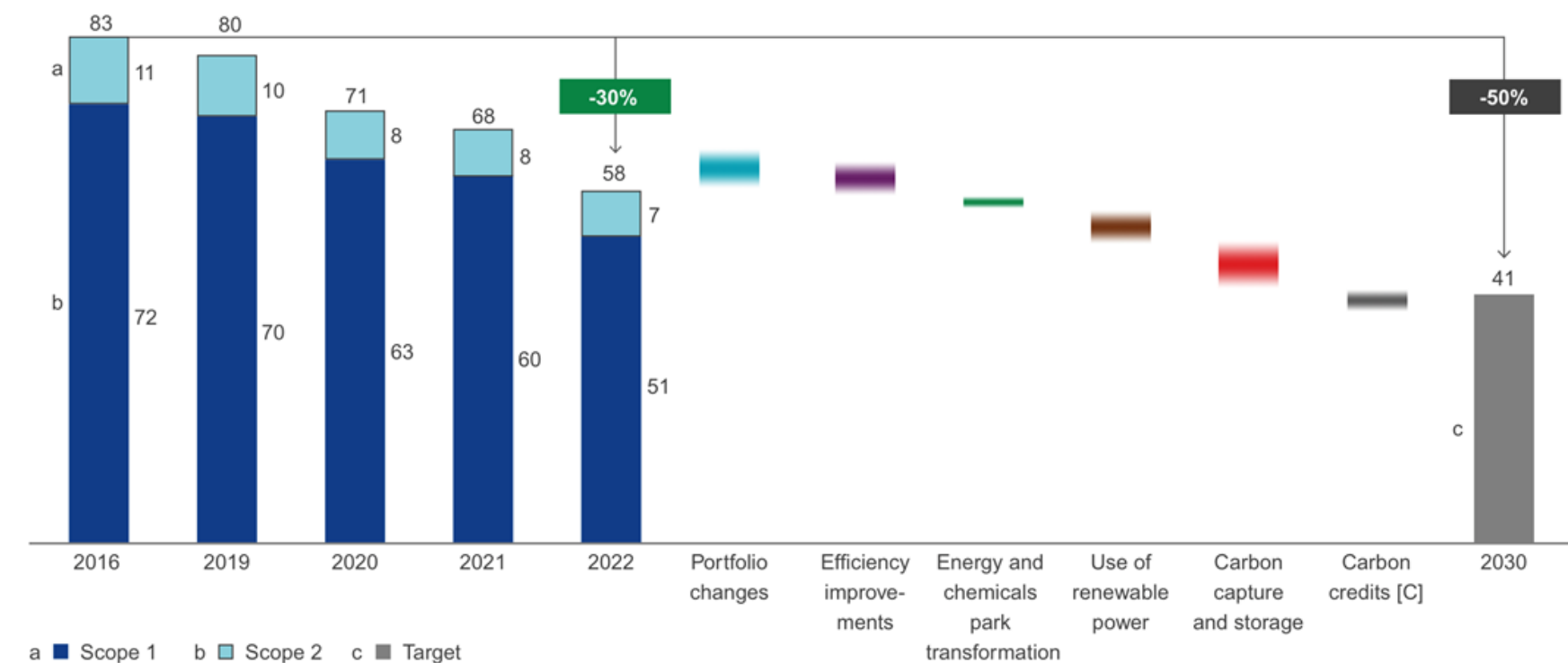
To achieve a 50% reduction in emission intensity, 5 measures are needed:

- 1.Reduction of methane emissions - the largest reduction possible
- 2.Elimination of all non-essential flaring
- 3.Electrification of extractive enterprises with low emission electricity
- 4.Equipping oil and gas processes with carbon capture, utilization, and storage (CCUS)
5. Expanding the use of green hydrogen in refineries



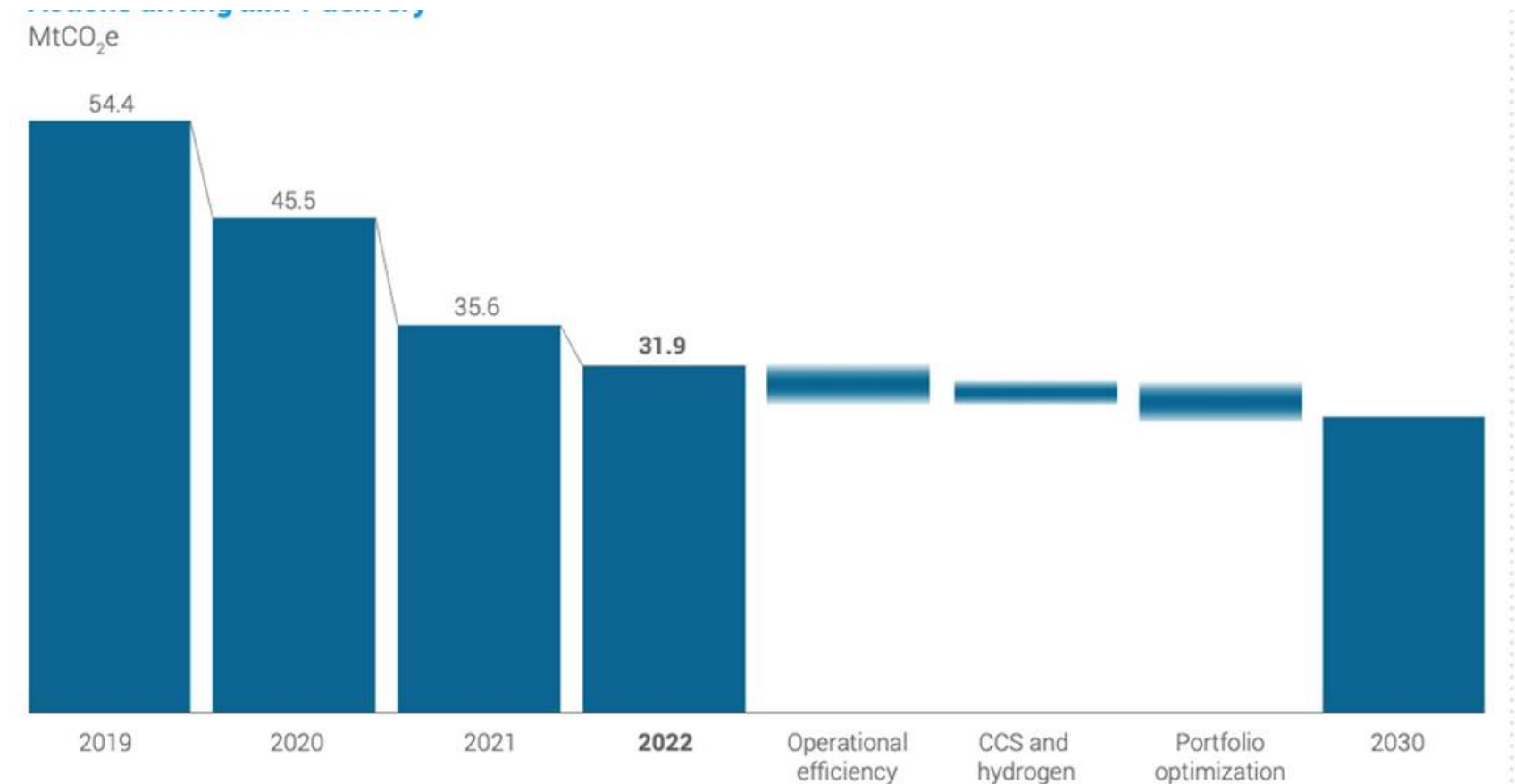
"SHELL'S DECARBONIZATION STRATEGY AIMS TO REDUCE EMISSIONS INTENSITY (SCOPE 1 AND 2) BY 50 PERCENT BY 2030."

- Making changes to the portfolio: acquisitions and investments in new low-carbon projects.
- Improving energy efficiency.
- Converting the remaining integrated refineries into low-carbon energy and chemical parks
- Using more renewable power.
- Development of carbon capture and storage Technology (CCS)



BRITISH PETROLEUM DECARBONIZATION STRATEGY AIMS TO REDUCE EMISSIONS INTENSITY (SCOPE 1 AND 2) BY 50 PERCENT BY 2030."

- Improving energy efficiency.
- Development of carbon capture and storage Technology (CCS).
- Making changes to the portfolio: acquisitions and investments in new low-carbon projects.



EXXONMOBIL: LIQUEFIED NATURAL GAS (LNG) OPTIMIZATION PROJECT

Project goal: Reduce energy consumption and greenhouse gas emissions in the liquefaction of natural gas for subsequent transportation.

- The Company conducted a thorough audit and analysis of its natural gas liquefaction systems to identify bottlenecks and potential areas for optimisation.
- Implementing modern natural gas liquefaction technologies, such as more efficient heat exchangers and turbines.
- Optimising control and regulation processes using automated monitoring and control systems.
- Implementation of measures to reduce methane leaks
- Targets indicators:
 - Reduction of energy consumption in the natural gas liquefaction process by 15% in the first two years.
 - Reduction of CO₂ and methane emissions by 20% over the same period.
 - Increased efficiency of the natural gas liquefaction system, which also resulted in lower operating costs.



COMPARISON OF ACTIONS

Summary of the action	Energy efficiency and modernisation	Electrification and transition to renewable energy sources (RES).	Reducing methane emissions /leaks.	Utilization of green hydrogen.	Carbon capture and storage (CCS).
Emission reduction potential in %	-25%	-50%	-50%	-100%	-100%
Technological readiness (from 1 to 3)	3	2	3	1	1
Investments	Low	Average	Low	High	High



EVALUATE THE TECHNICAL AND ECONOMIC FEASIBILITY OF IMPLEMENTING DECARBONIZATION ACTIONS AT YOUR ORGANIZATION

Actions	Technologically possible	Economically justified
Energy efficiency and modernization		
Reducing methane emissions and leaks		
Transition to renewable energy sources (RES)		
Utilization of green hydrogen		
Carbon capture and storage (CCS)		



WHAT ACTIONS HAVE ALREADY BEEN IMPLEMENTED AT YOUR COMPANY?



Use of renewable energy sources: _____

Energy efficiency improvement: _____

Reducing methane emissions and leaks: _____

Other actions: _____

ASSESS THE IMPACT THAT THE RISK MAY HAVE ON YOUR ENTERPRISE, AND THE PROBABILITY OF THE RISK MATERIALIZING

Credit Risk Associated with ESG (Environmental, Social, and Governance): Risk of facing higher interest rates and difficulties in accessing financing due to strict ESG compliance requirements.

Regulatory Risk: Risk of potential changes in national climate-related legislation, including greenhouse gas taxation, carbon footprint reduction targets, and potential litigation for non-compliance with regulatory requirements.

Market risk: Risk exposure to carbon taxation in importing countries of production.

Customer Risk: Risk of losing customers due to failure to meet their decarbonization targets as a supplier.

"CLIMATE RISK ASSESSMENT"

- Operational risk due to changes in the amount of precipitation
- Operational risk due to extreme temperatures
- Operational risk due to extreme weather conditions
- Operational risk due to water scarcity

RISKS RELATED TO THE NEGATIVE IMPACT OF CLIMATE CHANGE ON OPERATIONS



ASSESS THE IMPACT THAT THE RISK MAY HAVE ON YOUR ENTERPRISE, AND THE PROBABILITY OF THE RISK MATERIALIZING

Risk	Impact	Probability
Credit risk: Access to capital		
Regulatory risk: Stricter legislation		
Market risk: Taxation of imports		
Customer risk: Loss of markets		
Operational Risk: Changes in precipitation levels		
Operational Risk: Extreme temperatures		
Operational Risk: Extreme weather conditions		
Operational risk: Water scarcity		

RESULTS OF GROUP WORK

- What are the main sources of GHG emissions in your industry?
- What goals do your companies set for themselves?
- Which decarbonization measures do you consider most realistic?
- Which measures have already been implemented?
- What are the main climate risks for your company?

