



WORLD ENERGY COUNCIL
CONSEIL MONDIAL DE L'ENERGIE



مؤسسة البترول الكويتية
Kuwait Petroleum Corporation

Investing in the Future: Kuwait Petroleum Corporation's Strategy to Manage its GHG Emissions and Capture Low GHG Opportunities

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**CARBON CAPTURE & STORAGE & CLEANER FOSSIL FUELS STRATEGIES
IN THE MIDDLE EAST & NORTH AFRICA:
WHERE WE ARE & WHERE WE ARE GOING**

**Organized by:
WORLD ENERGY COUNCIL (WEC)
CLEANER FOSSIL FUELS SYSTEMS (CFFS) COMMITTEE**

Outline

- Need for GHG Emissions Management Strategy
- Methodology for creating KPC's GHG Strategy
- KPC GHG emissions footprint
- Identification of potential emission reduction opportunities within KPC
- Leveraging international carbon financial markets
- Developing the right operating model for KPC to implement its strategy



In a time of global concern about climate change, a GHG emissions management strategy is consistent with KPC's business aspirations

KPC Business Aspirations

- Be a highly profitable and performance driven company
- Develop and support the Kuwaiti economy and be a positive role model for Kuwait
- Achieve high performance, operational excellence and continuous improvement
- Manage operations with world-class HSSE standards
- Meet Kuwait's current and future energy demand, pursue alternative and renewable energy sources and participate in conservation efforts
- Improve portfolio management to ensure optimum synergies /integration and value added across businesses
- Be a fast adopter of the latest technology

- Consistent with these business aspirations, KPC is responding to the global challenge of climate change by creating a GHG emissions management strategy



It is also consistent with KPC's emissions reduction efforts to date

Examples of KPC GHG Emission Reduction Projects to Date

Oil Production

- Initiatives to reduce flaring (reduced from 17% in 2005 to 2.6% in 2009)

Refining

- Flare gas recovery at Shuaiba
- Leak detection and repair
- Vapour recovery trials at two depots and one filling station

Overall

- Company-wide energy conservation policy implemented



The development of our GHG emissions management strategy follows a five step approach

KPC's Approach for the GHG Emissions Management Strategy



- Measurement of KPC's GHG footprint and business as usual emissions growth

- Define KPC's objectives which set the context of the strategy

- Identify and assess emission reduction opportunities including options for CCS/EOR

- Prioritise emission reduction opportunities according to their potential and practical implementation considerations

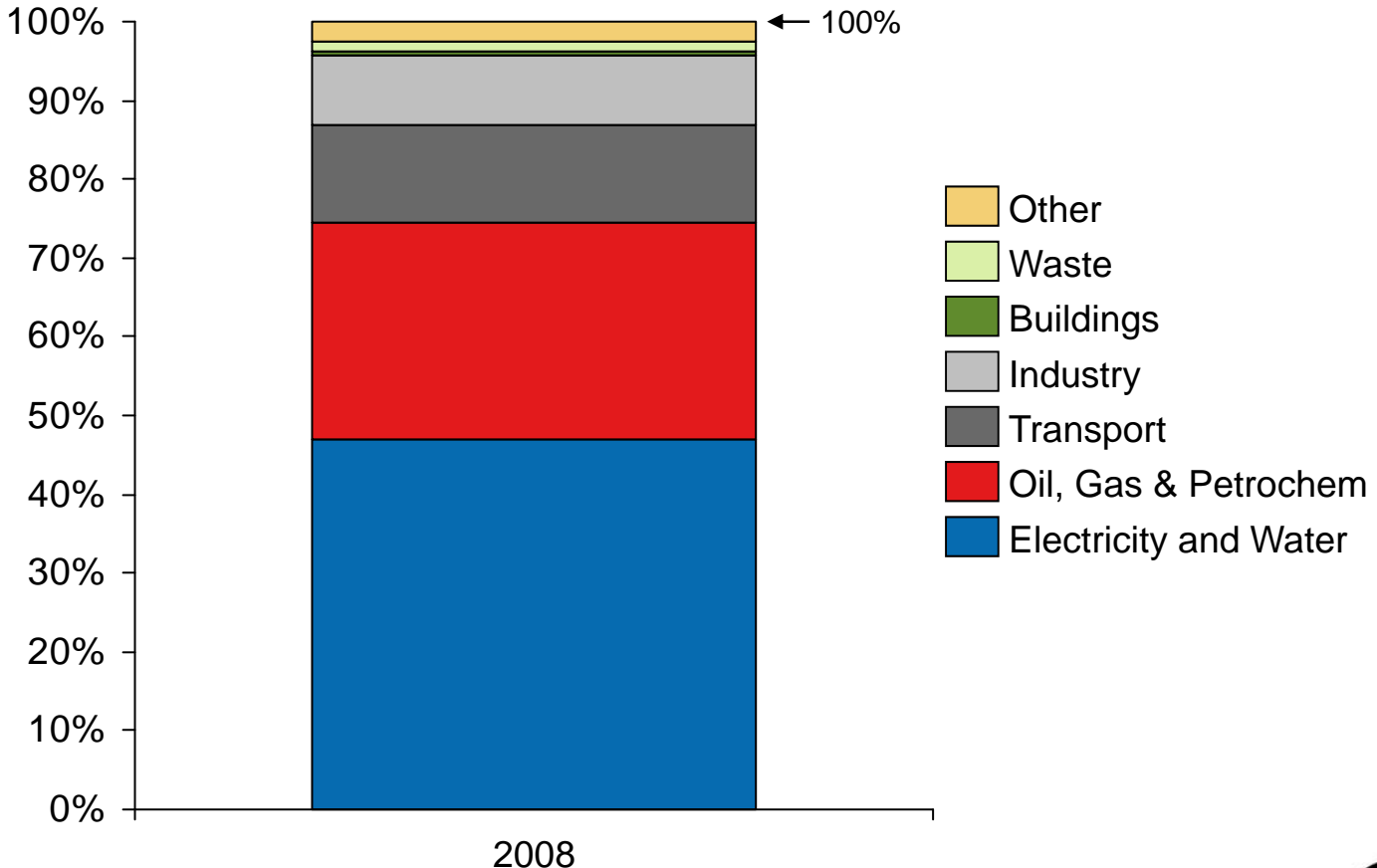
- Access international carbon markets
- Develop operating model and performance management framework
- Identify training and capacity building needs





The oil, gas and petrochemical industry is a significant, but not the largest, contributor of Kuwait's GHG emissions

Breakdown of Kuwait's Total GHG Emissions in 2008
(in % by tonnes of CO₂e)

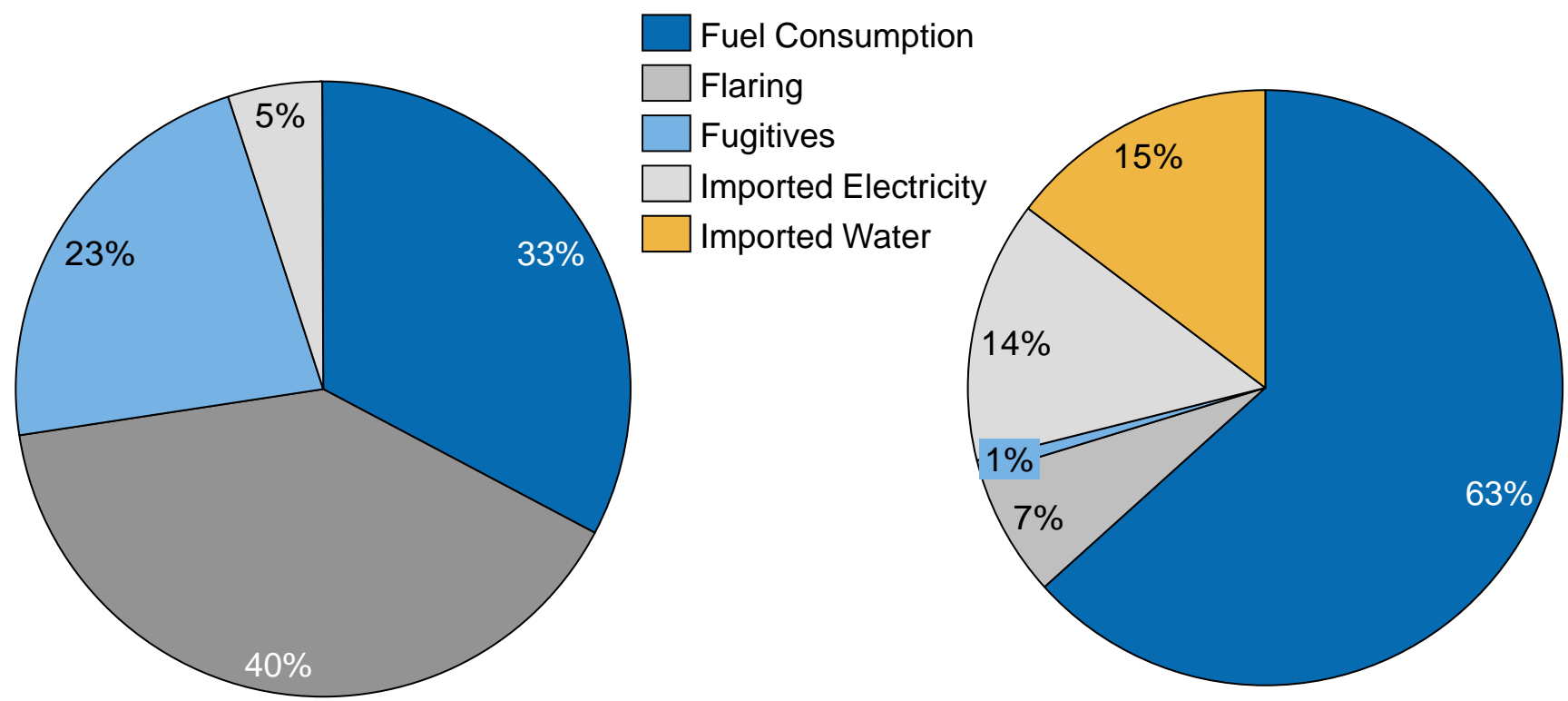




The footprinting highlights the largest sources of KPC's emissions

KPC Upstream GHG Footprint Breakdown (CO₂ equivalent emissions)

KPC Downstream GHG Footprint Breakdown (CO₂ equivalent emissions)

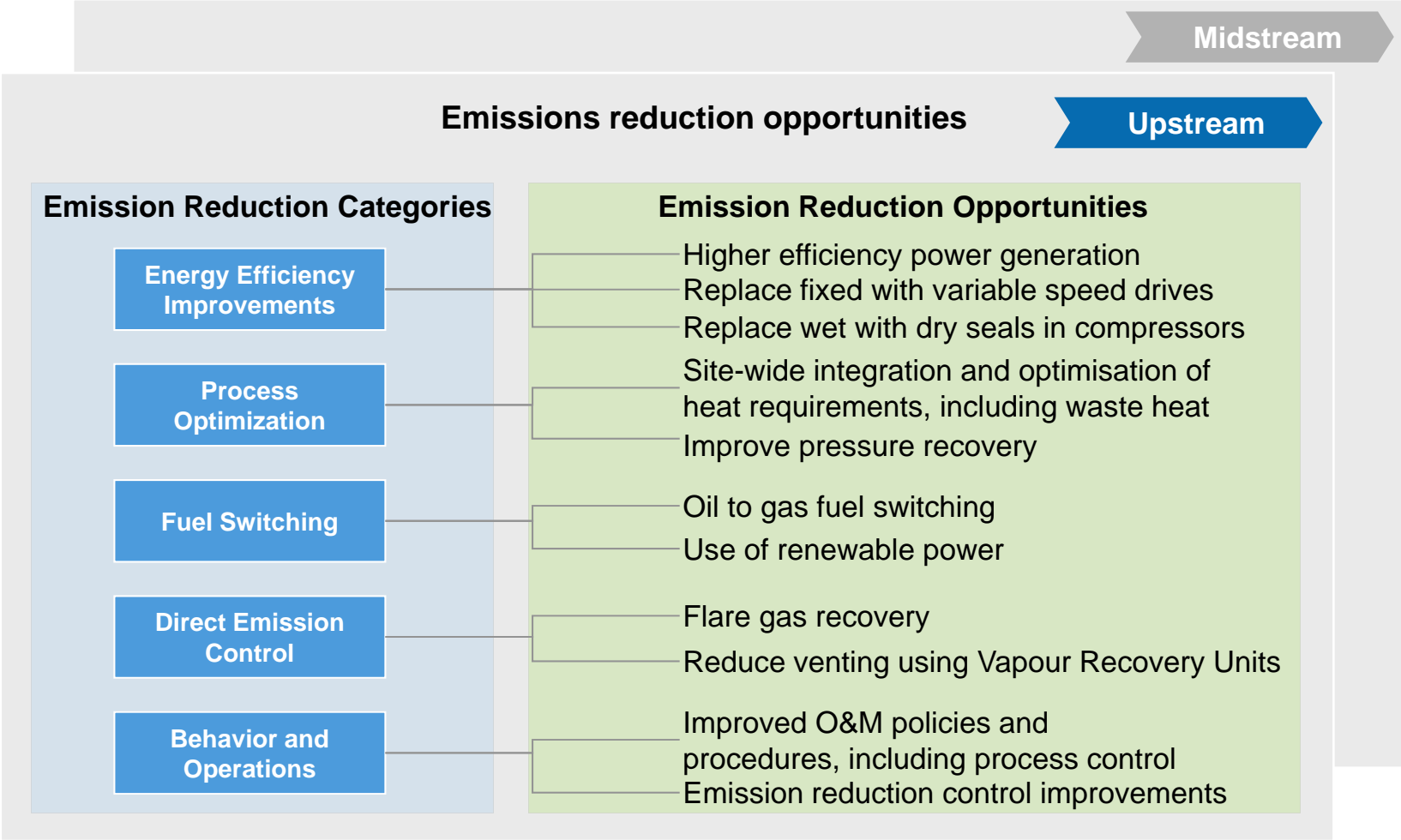


Note: Emissions calculation methodology follows IPIECA and API GHG emissions factors and methodology. These are consistent with UNFCCC guidelines



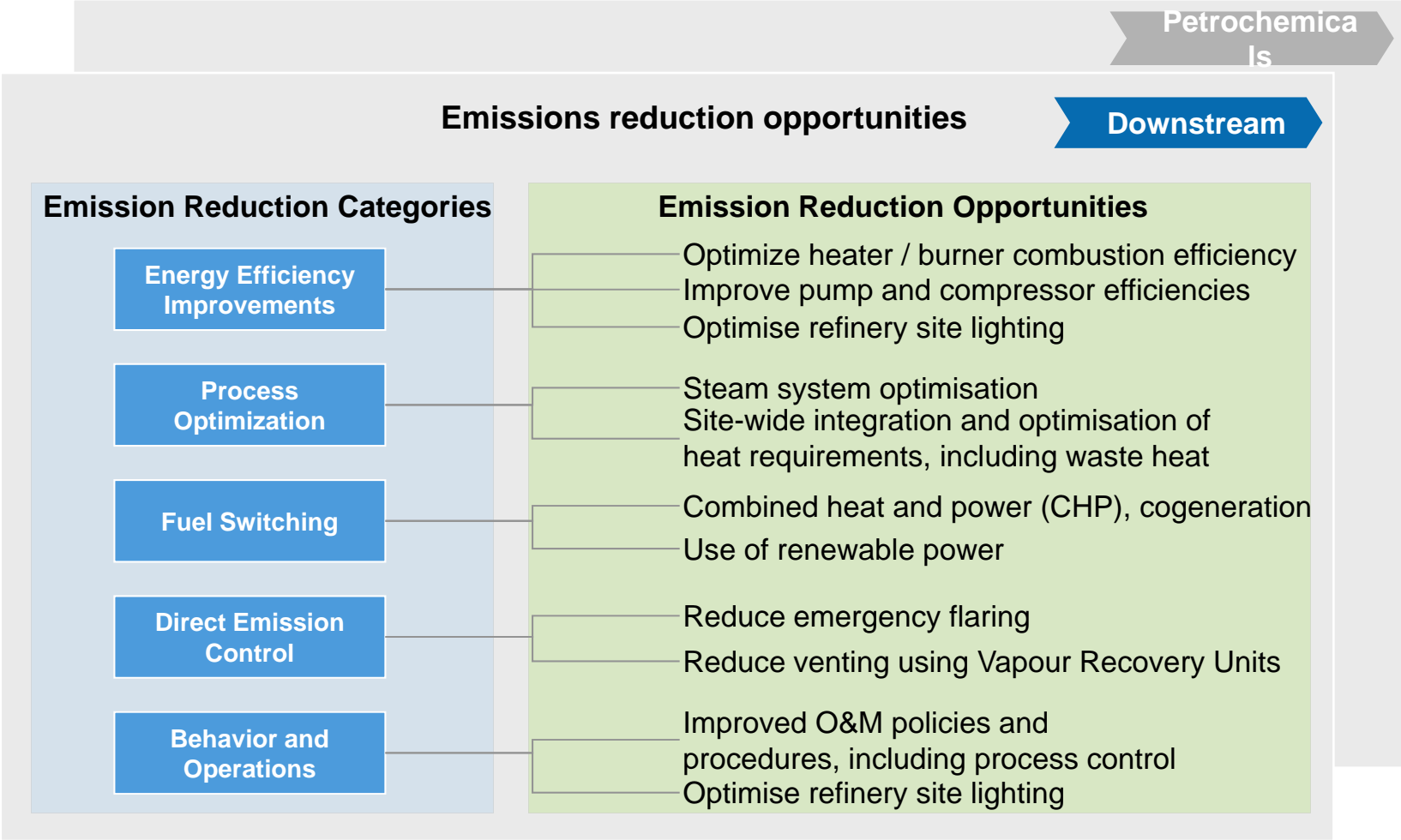


We will identify potential emission reduction opportunities across KPC's operations (1/2)





We will identify potential emission reduction opportunities across KPC's operations (2/2)





We will assess the attractiveness and feasibility of CCS

Key Questions for Carbon Capture and Storage in Kuwait

- Emission Capture Potential**
 - What are the addressable CO₂ sources?
 - Do quantities meet enhanced oil recovery (EOR) or CCS requirements?
- Availability of a Capture Technology**
 - When will suitable capture technologies be available at commercial scale?
- Storage and EOR Potential**
 - Can storage be coupled with EOR?
 - What is the storage capacity available in oil fields and/or aquifers?
- Transport**
 - What would be potential transport solutions?
 - Could existing pipelines be used?
- Economic Attractiveness**
 - Are the integrated economics of CCS/EOR viable?
- Regulatory Framework**
 - What key elements of the regulatory framework are required to support the implementation of CCS?



PLANS FOR CCS/EOR PROJECTS

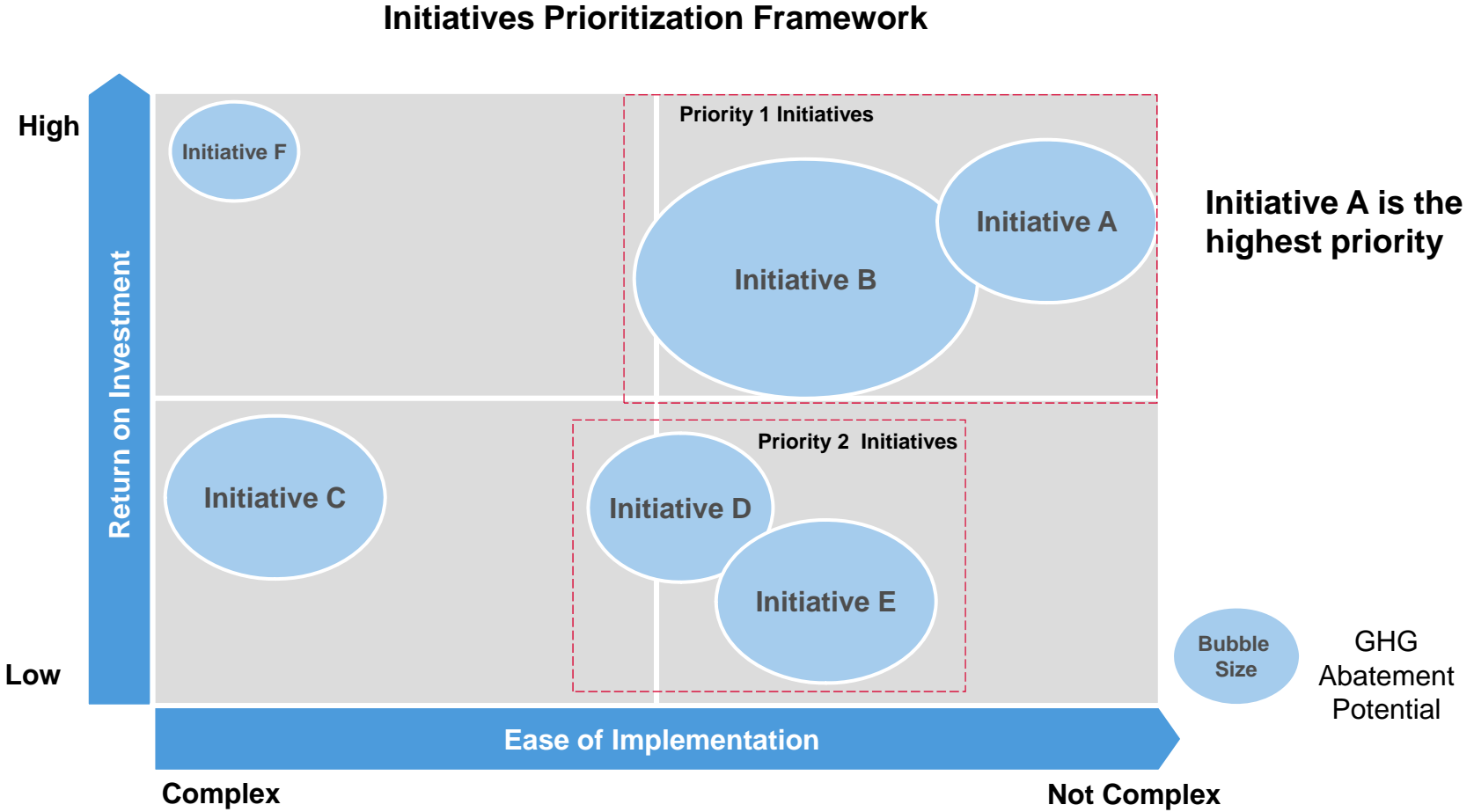
- We have completed the Pre-Appraisal and Appraisal stages.
- We have progressed on EOR Project into the next Select Stage. This will be achieved through a deeper assessment of both the subsurface and surface issues affecting the top EOR candidates.
- The “Select” Stage required significantly more resources from Field Development, Operations and Projects teams.
- Following the Select stage, will be developing pilot design to reduce uncertainties and the effect of the scaled-down nature if the pilot.
- Adequate time spent on pilot design and optimization can lead to earlier full-field implementation and should enhance confidence in scale up to the field wide implementation. The EOR pilot expects to start in upcoming 3 yrs.





Prioritizing emission reduction opportunities will enable us to define an optimal set of actions

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Note: Ease of implementation based on a weighted assessment of criteria: Technology/People synergies, Risk mitigation for technological maturity
Note: Assumes all initiatives have the same environmental integrity

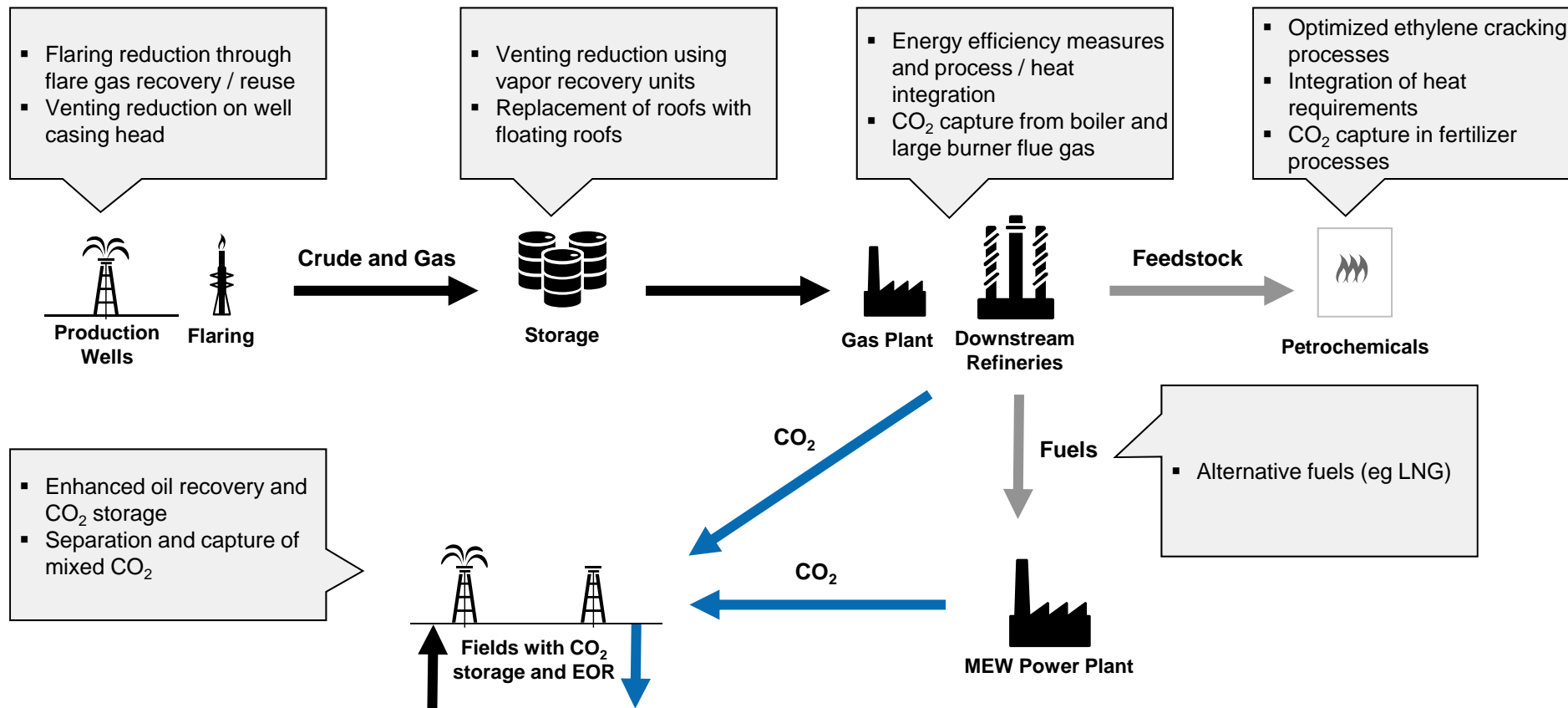




An integrated strategy will be developed for the GHG emissions of all operations

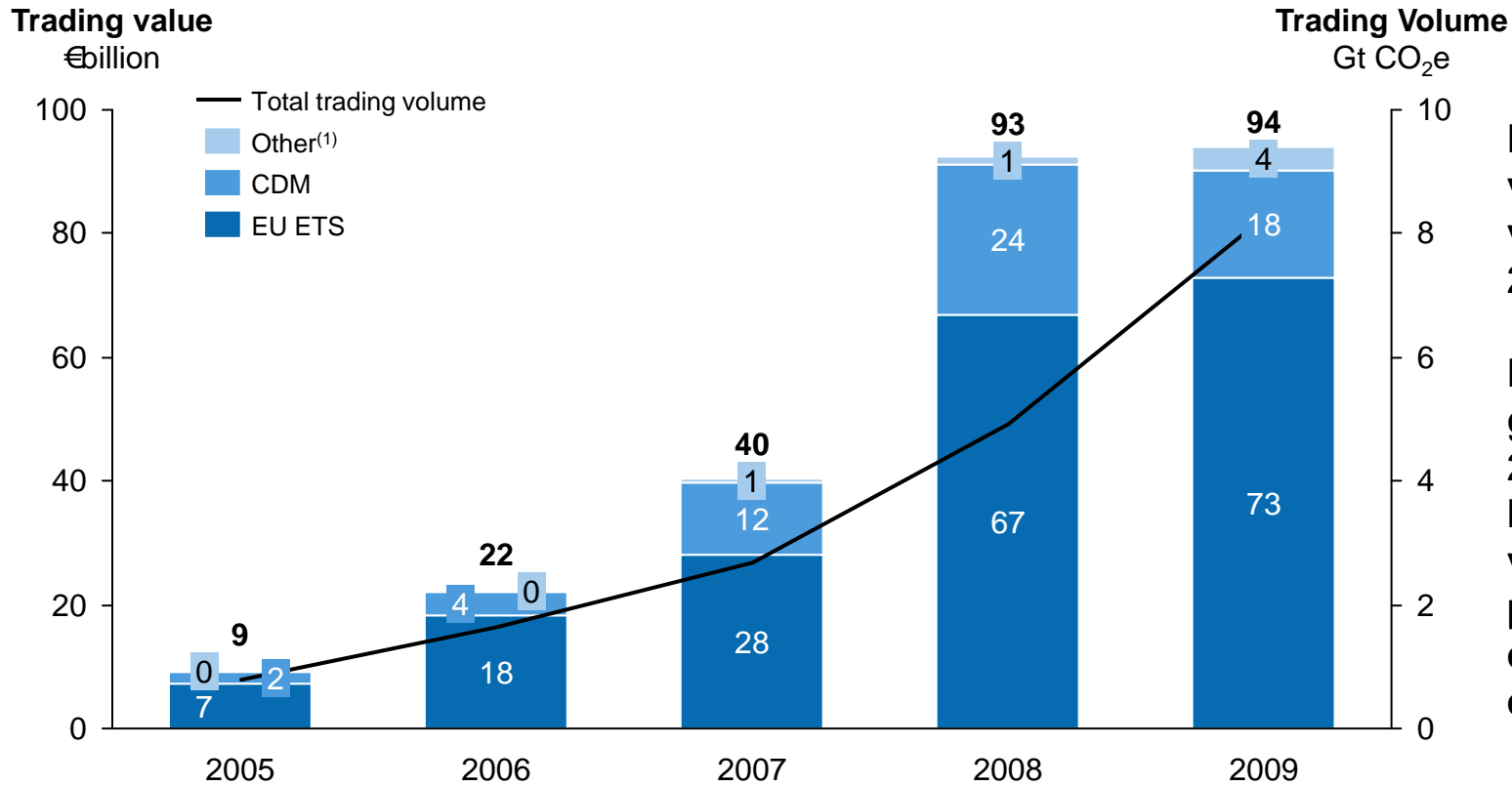
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Overview of Emission Reduction Opportunities and Synergies



To enable our strategy, we plan to leverage the growing international carbon finance market

Trading value and volume of global carbon markets
2005-2009, €billion



Large increase in volume and value between 2007 and 2008

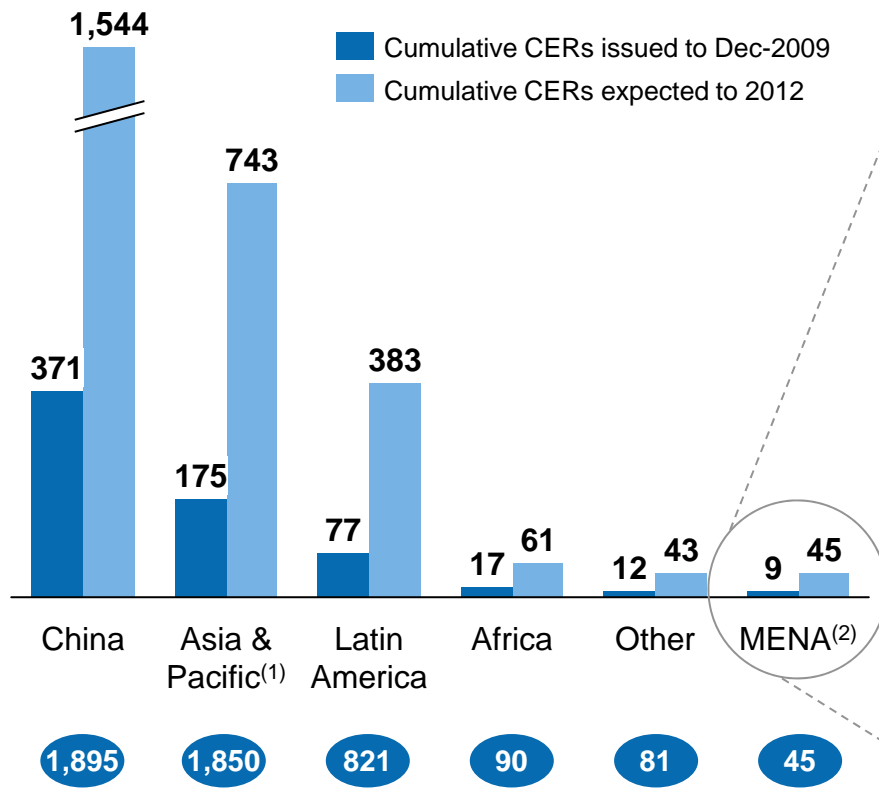
Despite volume growth between 2008 and 2009, little change in value due to price pressures during economic downturn

Note: Numbers include secondary CER trading
 1) Other category includes JI, AAU, RGGI and regional carbon markets
 Source: Point Carbon



By developing CDM projects, KPC will address Kuwait's lag behind other countries in the region ...

Emission Reductions through CDM Projects
By host region, cumulative reduction (MtCO₂e) vs. BAU



Emission Reductions through CDM Projects
MENA region

Country	Total 2005 Emissions (MtCO ₂ e)	Reductions through CDM to December 2009 (MtCO ₂ e/y)	Number of CDM Projects	
			Registered	At validation ⁽³⁾
Egypt	163	3.4	4	9
Morocco	47	0.5	5	5
UAE	116	0.6	4	5
Jordan	20	0.7	1	3
Tunisia	23	0.7	2	1
Iran	--	0.7	0	3
Syria	51	0.1	2	0
Qatar	44	2.5	1	0
Kuwait	TBD	0	0	0
Total	464	9.2	19	26

1) Data exclude China
 2) Middle East North Africa, data exclude Israel
 3) At validation category includes CDM projects at registration request and correction request stages
 Source: UNEP Risoe Centre (December 2009); UNFCCC CDM Statistics

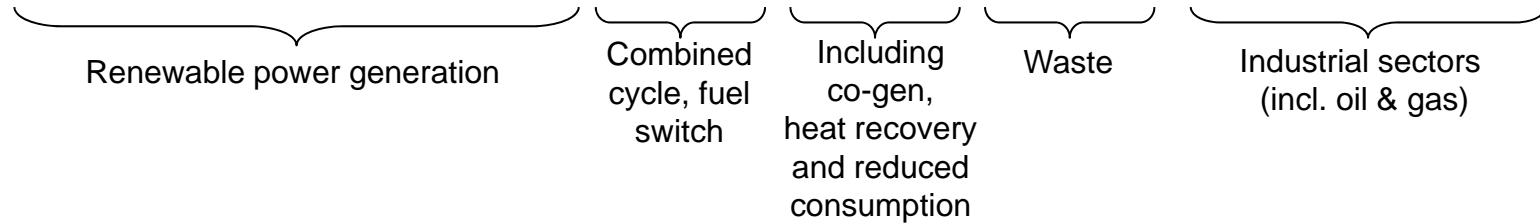


... benefitting where possible from the types of opportunities that our neighbors have already begun to capture

Number of CDM projects in MENA region
Projects and methodologies by host country

■ CDM project type hosted in country
n Number of registered CDM projects

Country	Solar	Wind	Biomass energy	Fossil fuel switch	Energy efficiency	Landfill gas	Fugitive/flaring	N ₂ O	Total
Egypt		1			1	1		1	4
Morocco	1	2	1			1			5
UAE	2				1	1			4
Jordan				1					1
Tunisia						2			2
Syria						2			2
Qatar							1		1
Total	3	3	1	1	2	7	1	1	19



1) At validation includes CDM projects at registration request and correction request stages
Source: UNEP Risoe Centre (December 2009); UNFCCC CDM Statistics





Developing the right operating model and appropriate capabilities will be essential to integrating GHG practices within KPC

Enablers for the Successful Implementation of the Strategy

- Development of an operating model to support the implementation of the GHG emission management strategy, including:
 - Organization design
 - Training, awareness and capability building
 - Performance management framework and measures
 - Processes and systems including ongoing footprint measurement
- Implementation roadmap



KPC, Kuwait and the global community will benefit from KPC's emissions management strategy

Benefits of the GHG Emission Management Strategy

- Better air quality / lower pollution
- Migration to a less carbon intensive economy, increasing export oil volumes and earnings for Kuwait
- Development and implementation of low emission technologies and capabilities
- Playing a role in international efforts to fight climate change
- Value and income generation through savings, waste minimization and/or improved energy efficiencies, as well as image and reputation reinforcement

