Ras Al Khaimah Integrated Sustainabilty Strategy 2050

April, 2025

بلديـــــــة رأس الخيمـــــــــة
Ras Al Khaimah Municipality

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Date	Section(s)	Type of review	Completed By
10 / 04 / 2025	All	Draft	Sustainable Energy Sector (Reem), Ras Al Khaimah Municipality
	All	Review and approval	Ras Al Khaimah Sustainability Committee

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1 Executive Summary

Ras Al Khaimah Integrated Sustainability (RIS) Strategy 2050 sets a comprehensive framework for transforming the emirate's energy and environment sectors. The strategy is part of *Ras Al Khaimah (RAK) Vision 2030* and supports the UAE's net zero commitments.

Building on RAK Energy Efficiency & Renewables Strategy 2040 (*EE&R Strategy*), the *RIS Strategy* expands and deepens its scope to address energy security, environmental protection, industrial competitiveness and decarbonisation.

The strategy focuses on enhancing the reliability and cost-effectiveness of energy and water through gas supply enhancements, utility-scale and distributed renewable energy projects, and regulatory improvements. It prioritises environmental sustainability by strengthening air quality measures, protecting natural resources, and preserving biodiversity and marine ecosystems. Additionally, it takes a proactive approach to climate change mitigation by promoting energy-efficient buildings, sustainable transport solutions, industrial decarbonisation, and low-carbon agricultural practices.

Implementing the strategy is contingent on the setup of the RAK Sustainability Committee, which comprises key government entities. The committee will drive implementation of the *RIS Strategy* and will be responsible for working with Programme Owners to achieve the targets for each programme.

The strategy projects significant economic, social, and environmental benefits, including an estimated AED 6.5 billion in net gains, reduced greenhouse gas emissions, lower energy costs, and job creation across green industries.

Delivery of the efforts outlined in the strategy will position Ras Al Khaimah as a leader in sustainability, ensuring long-term resilience, economic growth, and environmental stewardship.

2 Background

2.1 Ras Al Khaimah Vision 2030

RAK Vision 2030 is a strategy to guide the emirate toward sustainable economic growth, social development, and environment stewardship. The strategy focuses on enhancing key sectors such as manufacturing, tourism, real estate, utilities and public infrastructure to create a diversified and globally competitive economy.

By 2030, the strategy aims to attract over 3 million annual visitors, expand and modernise public infrastructure, achieve 10% electricity savings and divert over 80% of waste from landfills. It also prioritises the protection of natural habitats and biodiversity, enhancement of airport infrastructure, and positioning of Ras Al Khaimah as a top region for ease of doing business.

2.2 RAK Energy Efficiency and Renewables Strategy 2040 (*EE&R Strategy*)

RAK Energy Efficiency and Renewables Strategy 2040 (EE&R Strategy) was issued in 2018, with the objective to ensure reliable and cost-competitive access to energy and water resources for Ras Al Khaimah's consumers. This was achieved by reducing the energy intensity of the economy and promoting the use of renewable energy resources.

The *EE&R Strategy* targeted reducing electricity and water consumption (by 30% and 20% respectively) and supplying at least 20% of electricity demand from renewable energy sources by 2040 compared to business as usual.

The *EE&R Strategy* consisted of 9 programmes, supported by 5 enablers. Each programme addressed a different type of efficiency or renewable energy generation measure.

Since its launch in 2018, the *EE&R Strategy* has achieved some important milestones until 2024:

- Activation of 1 new natural gas source and significant progress in exploration of local natural gas resources;
- Annual energy savings of 125 GWh across the economy, representing 1.8% of the business-as-usual energy consumption of Ras Al Khaimah;
- Completion of more than 4,500 Barjeel-compliant buildings in Ras Al Khaimah;
- Contracting of more than 400 buildings for retrofits with more than 100 additional buildings in the pipeline;
- Annual energy production from waste of 230 GWht, representing 0.8% of Ras Al Khaimah's primary energy demand.
- Capacity development to locally treat 100% of Ras Al Khaimah's hazardous and medical waste from 2024.
- Conversion of 100% of street lighting to LED by 2023.
- Significant improvements in wastewater treatment and landscaping, leading to 70% TSE reuse and replacement of 0.4 million cubic meters per year of potable water with TSE.

- Master-planning of wastewater, landscaping and stormwater systems, supporting visibility of current and future urban infrastructure needs.
- Development of best-in-class government capabilities in energy management, with the government of Ras Al Khaimah being recognised as the first in the world to achieve ISO50001 certification across all entities.

3 Opportunity for Strategy Expansion

3.1 Attracting New Industry and Tourism

Ras Al Khaimah is going through an unprecedented growth in industry and tourism, resulting in the construction of new infrastructure, communities and buildings. This presents a unique opportunity to embed sustainability at the core of new projects, ensuring long-term competitiveness and resilience. By strengthening energy sustainability efforts, Ras Al Khaimah has the chance to position itself as a leading destination for related businesses, attracting more businesses to the region and enhancing the emirate's economic potential.

Expanding the strategy to focus on air quality, water and soil management, and biodiversity conservation will enhance the emirate's appeal as a destination for environmentally conscious tourism as well as contribute to the long-term health and well-being of its communities.

As an industry-driven economy, Ras Al Khaimah is home to the largest bulk handling port in the Middle East and serves as a key manufacturing and logistics hub for the UAE, with leading facilities in cement, glass, ceramics, metals, and pharmaceuticals. This presents a strategic opportunity to accelerate industrial decarbonisation. Early action in energy-intensive sectors will enhance the competitiveness of local businesses in an increasingly carbon-conscious global market. Aligning with national and international net-zero commitments will also prepare industries for evolving regulations and trade policies, ensuring that Ras Al Khaimah remains a competitive and attractive destination for investment and economic growth.

3.2 Modernising the Urban Environment

The ongoing accelerated urban development in Ras Al Khaimah presents a pivotal opportunity to modernise the built environment by integrating sustainability, energy efficiency, and smart technologies into new and existing buildings and infrastructure.

As the city expands, adopting climate-responsive designs, high-performance building materials, and renewable energy solutions will significantly enhance resilience while reducing operational costs and environmental impact. An expansion of Barjeel, the green building regulations of Ras Al Khaimah, will take a broader approach that includes adopting smart construction techniques and low-carbon materials that will shape a more sustainable urban landscape.

Modernising the built environment also means leveraging digital innovations, such as energy monitoring systems and data-driven building management tools, to optimise performance and reduce waste. By embedding these principles into ongoing urban expansion, Ras Al Khaimah will create a future-ready emirate that balances rapid development with long-term sustainability, economic growth, and improved quality of life for its residents.

3.3 Supporting Federal Net Zero Commitments

Hosting COP28 triggered an expansion of the United Arab Emirate's net zero commitments, including tripling renewables capacity and doubling energy efficiency by 2030.

Additionally, the UAE has introduced a comprehensive plan, targeting a cumulative reduction of 2.9 gigatons of industrial carbon emissions by 2050.

The industrial sector contributes about 30% (AED 11 billion)[1] of Ras Al Khaimah's GDP. In the context of these federal plans, the *EE&R Strategy* required a comprehensive review, with an increased focus on industrial efficiency and decarbonisation.

The *RIS Strategy* will support the transition to cleaner fuels, while utility-scale and distributed renewables, complemented by storage will advance the shift towards 50% clean energy by 2050. The strategy is also in line with the UAE's National Hydrogen Strategy, which aims to position the country as a leading producer of blue and green hydrogen by 2031, as it foresees exploration of sustainable hydrogen solutions in support of the energy transition of the emirate.

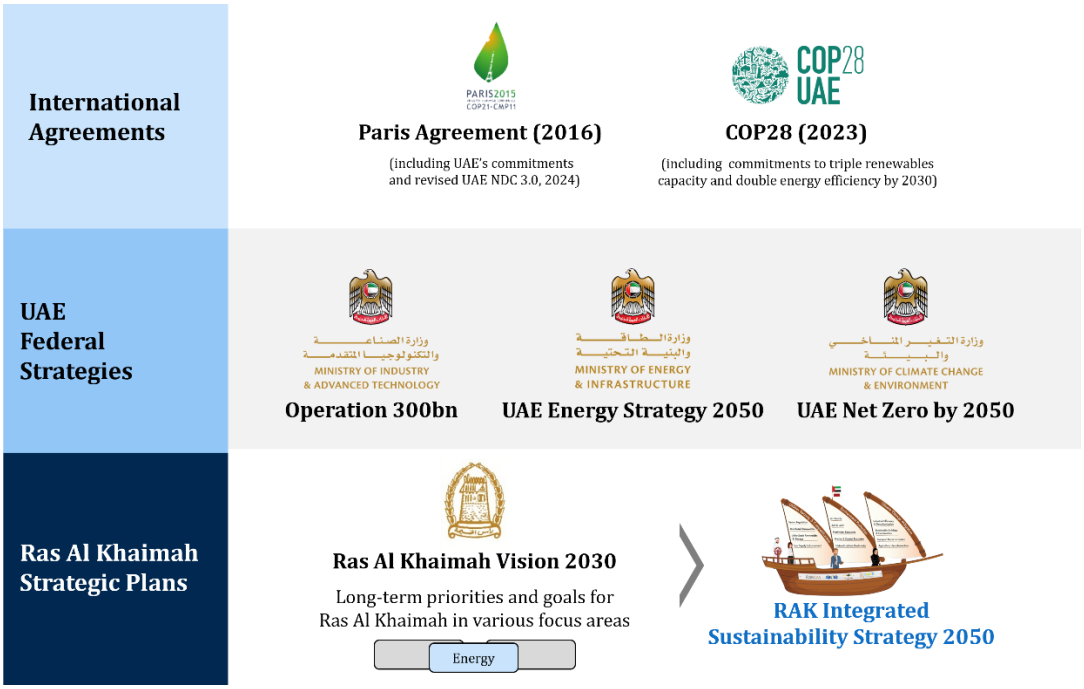

Figure 1 - Summary of RIS Strategy Alignment

[1] Data as of 2017

3.3.1 Greenhouse Gas (GHG) Emission Analysis

The *EE&R Strategy* has been focussing on efficiency improvements aiming to reduce electricity consumption. However, GHG inventories conducted for Ras Al Khaimah show that a significant portion of emissions (over 80%) originate from the industrial sector, with cement production accounting for more than half of these emissions.

The *EE&R Strategy* covers various programmes, including energy efficiency of new and existing buildings, industrial energy efficiency, electric vehicle adoption and improving appliance efficiency. Forecasts predict that continuation of the *EE&R Strategy* would stabilise emissions growth and prevent it from accelerating. However, it would not achieve a significant reduction in emissions. This can only be realised by addressing the largest sources of emissions, through implementation of the new strategy (*RIS Strategy*).

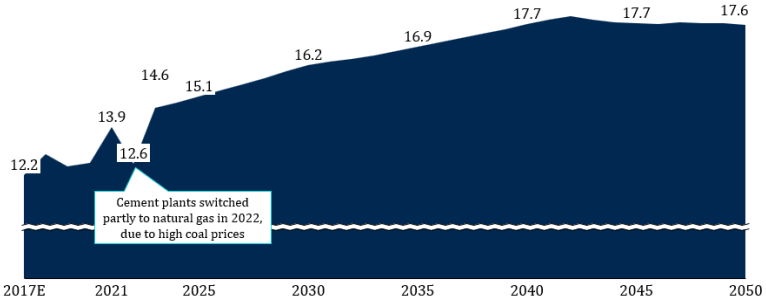

Figure 2 – Ras Al Khaimah's GHG emissions forecast - BAU (million tons, CO_2e)

While the industrial sector is addressed through the energy management programme of the *EE&R Strategy*, this programme does not adequately cover emissions from cement production or the use of conventional fuels. Given the source of these emissions, it became necessary to deepen the scope of the strategy to account for these activities.

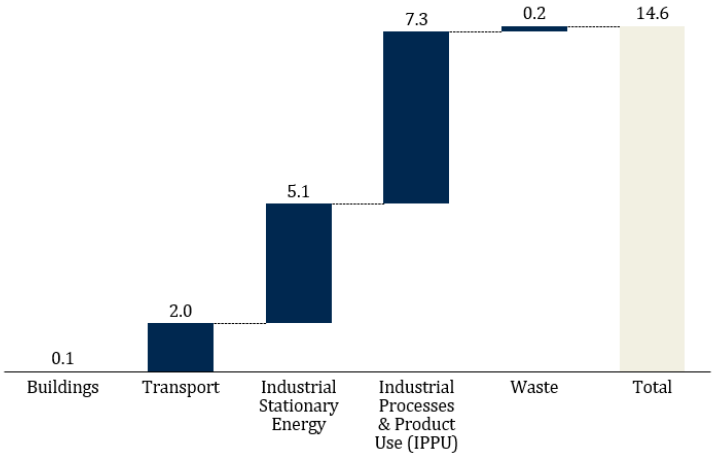

Figure 3 – Ras Al Khaimah's GHG Inventory in 2023[2] (million tons, CO_2e)

[2] Our inventory does not yet include emissions from industrial product use, fertiliser use, livestock, land use change, and forestry (IPCC categories: Product Use and LULUCF). These categories are not expected to have a significant contribution to the total emissions of Ras Al Khaimah.

4 Overview of Ras Al Khaimah Integrated Sustainability (RIS) Strategy 2050

The strategic opportunities highlighted in the previous chapter are the bases for the establishment of the *RIS Strategy* around a set of goals, organised in three discrete pillars. These are illustrated in *Figure 4* below:

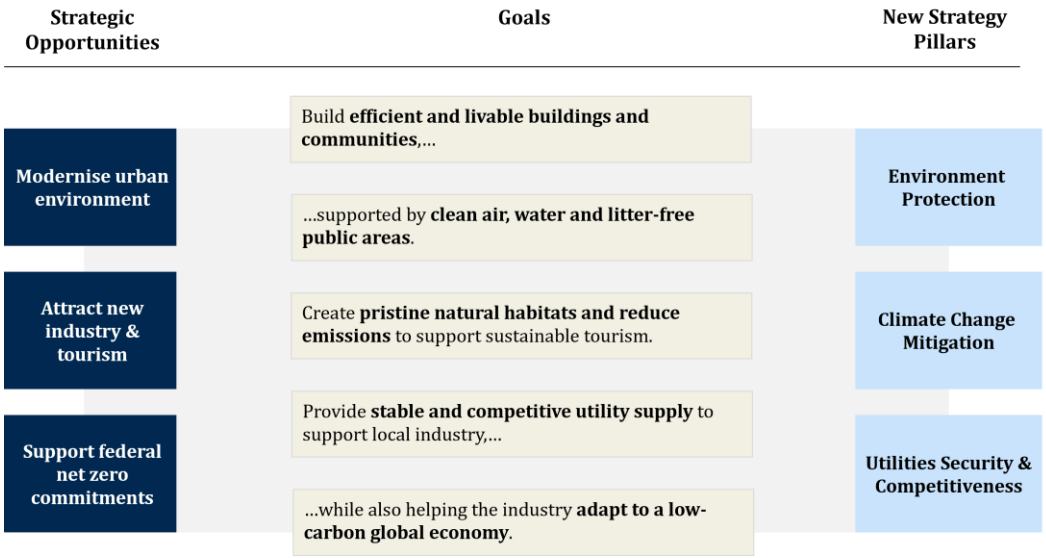

Figure 4 – Turning strategic opportunities into pillars of the RIS Strategy

The existing focus area for Energy, Renewables and Utilities within *RAK Vision 2030* will be replaced by the new strategic pillars to ensure alignment between *RAK Vision 2030* and the *RIS Strategy*. This is illustrated below:

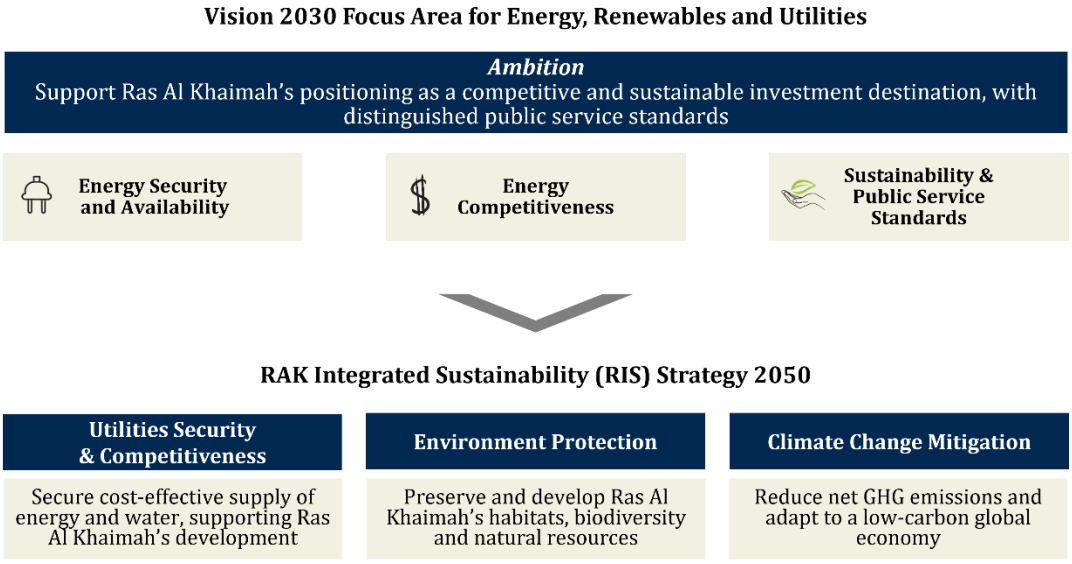

Figure 5 – Update of Vision 2030 focus areas

4.1 Objectives

RAK Integrated Sustainability Strategy 2050 comprises 3 key objectives:

1. Maintain a secure and cost-competitive supply of energy and water to drive Ras Al Khaimah's sustainable development;
2. Protect and enhance the environment to preserve Ras Al Khaimah's unique natural heritage and support a high quality of life for residents;
3. Reduce greenhouse gas emissions to support competitiveness of Ras Al Khaimah's economy in a low-carbon global market.

4.2 Strategy Programme Summary

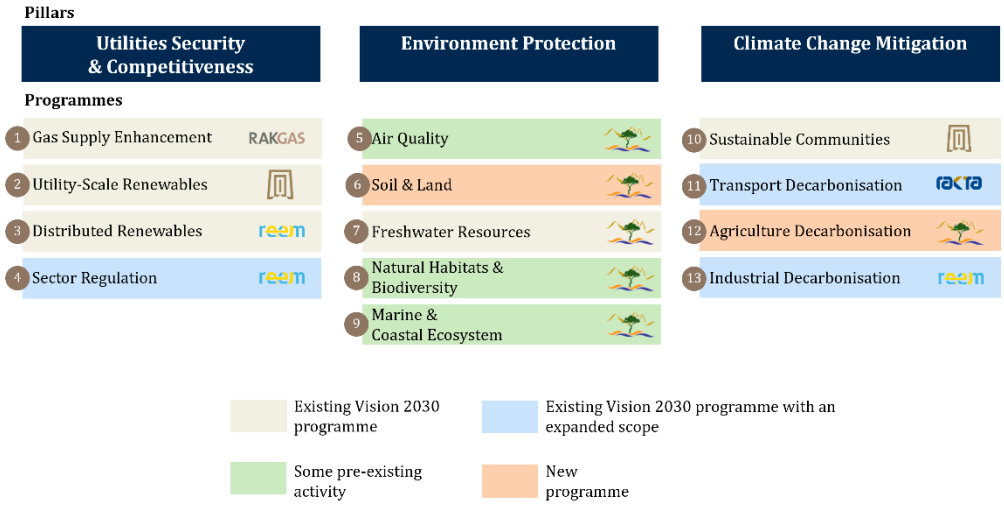

Figure 6 – Mapping of existing, expanded and new programmes within RIS Strategy

The strategy contains 13 specific programmes, under each of the newly created strategy pillars.

Due to the increase in scope of the strategy from the *EE&R Strategy*, each programme can be seen as any of the following:

- an existing programme from the *EE&R Strategy* (with or without an expanded scope);
- a programme expansion from some pre-existing activity;
- a new programme.

5 Governance

5.1 Key Stakeholders

Each programme of the RIS Strategy is assigned to a Programme Owner, selected based on its mandate and expertise. The Programme Owner is responsible for the overall execution of the initiatives of that programme and is accountable for achieving programme targets and operational objectives. In most cases, Supporting Entities are also identified to assist the Programme Owner through the activation of programme enablers or the execution of some initiatives within the programme. Some of the Supporting Entities are assigned to develop and run cross-programme enablers that support the foundations of multiple programmes and the strategy as a whole.

Outlined in *Table 1* is a map of responsibilities for each programme, positioning stakeholders as Programme Owners or Supporting Entities. *Table 2* provides a description of the main *RIS Strategy* stakeholders and their general activities.

Table 1: RIS Strategy – Programme resourcing

Pillar	Programme	Programme Owner	Support
Utilities Security & Competitiveness	Gas Supply Enhancement	RAKGAS	RAK Municipality, Reem, RAKPA
	Utility-Scale Renewables	RAK Municipality	Reem, EtihadWE, MOEI
	Distributed Renewables	Reem	EtihadWE, MOEI
	Sector Regulation	Reem	IDO
Environment Protection	Air Quality	EPDA	PSD, MOHAP
	Soil & Land	EPDA	PSD
	Freshwater Resources	EPDA	PSD, RAK Municipality

	Natural Habitats & Biodiversity	EPDA	PSD, RAK Municipality
	Marine & Coastal Ecosystem	EPDA	PSD, RAK Ports
Climate Change Mitigation	Sustainable Communities	RAK Municipality	RAKEZ, RAK Ports, PSD, MOIAT, EtihadWE
	Transport Decarbonisation	RAKTA	RAK Police, RAKGAS, EtihadWE, RAK Municipality
	Agriculture Decarbonisation	EPDA	Reem, MOCCAE
	Industrial Decarbonisation	Reem	RAKEZ, RAKGAS, MOEI, MOCCAE, MOIAT

Table 2: RIS Strategy – Description of key stakeholders

Stakeholder	Logo	Description
RAK Municipality	بلدية رأس الخيمة Ras Al Khaimah Municipality	**Ras Al Khaimah Municipality (MUN)** is a key government entity in Ras Al Khaimah, UAE, responsible for urban planning, environmental management, and public services.
Reem	reem	**Sustainable Energy Sector (Reem)** of Ras Al Khaimah Municipality is the government office dedicated to driving and reporting on the implementation and continuous update of the *RIS Strategy*.
IDO	Investment & Development Office	The **Investment and Development Office (IDO)** is the strategic investment arm of the Government of Ras Al Khaimah.
RAKEZ	rakez RAS AL KHAIMAH ECONOMIC ZONE	**Ras Al Khaimah Economic Zones (RAKEZ)** is a powerhouse business hub for free zone and non-free zone companies.

EPDA		The **Environment Protection and Development Authority (EPDA)** is dedicated to preserving the emirate's natural environment and promoting sustainable development.
PSD		The **Public Services Department (PSD)** in Ras Al Khaimah focuses on enhancing the emirate's infrastructure, environmental sustainability, and public services to improve residents' quality of life.
RAKTA		**Ras Al Khaimah Transport Authority (RAKTA**) is responsible for managing and regulating transportation services in the emirate.
RAKGAS		**RAKGAS** is the oil and gas company of Ras Al Khaimah, responsible for managing the emirate's natural gas resources.
RAK Petroleum Authority		**RAK Petroleum Authority (RAKPA)** is the official regulatory body overseeing the petroleum sector in Ras Al Khaimah.
RAK Ports		**RAK Ports** operates four key maritime hubs on the coastline of Ras Al Khaimah for import and export activities, to and from Ras Al Khaimah all over the world.
EWE		**Etihad Water and Electricity (EWE)** is the key supplier for essential electricity and water services to the northern emirates, including Ras Al Khaimah.
MOEI		The **UAE Ministry of Energy and Infrastructure (MOEI)** oversees the country's energy, infrastructure, housing, and transportation sectors, ensuring sustainable development and resource management.

MOIAT	وزارة الصناعة والتكنولوجيا المتقدمة MINISTRY OF INDUSTRY & ADVANCED TECHNOLOGY	The **UAE Ministry of Industry and Advanced Technology (MOIAT)** focuses on industrial development, innovation, and the adoption of advanced technologies to drive economic growth and sustainability.
MOCCAE	وزارة التغير المناخي والبيئة MINISTRY OF CLIMATE CHANGE & ENVIRONMENT	The **UAE Ministry of Climate Change and Environment (MOCCAE)** is responsible for environmental protection, climate action, food security, and sustainable development policies.

5.2 Supervision and Coordination

Implementation of the *RIS* Strategy requires a dedicated organisational set-up to ensure timely and effective delivery of results. This includes the creation of a dedicated committee, and the identification of government entities responsible for implementation of each of the programmes and initiatives of the *RIS* Strategy.

The institutional set-up of the *RIS* Strategy implementation and its place in the overall institution of the Government of Ras Al Khaimah is depicted in the figure below:

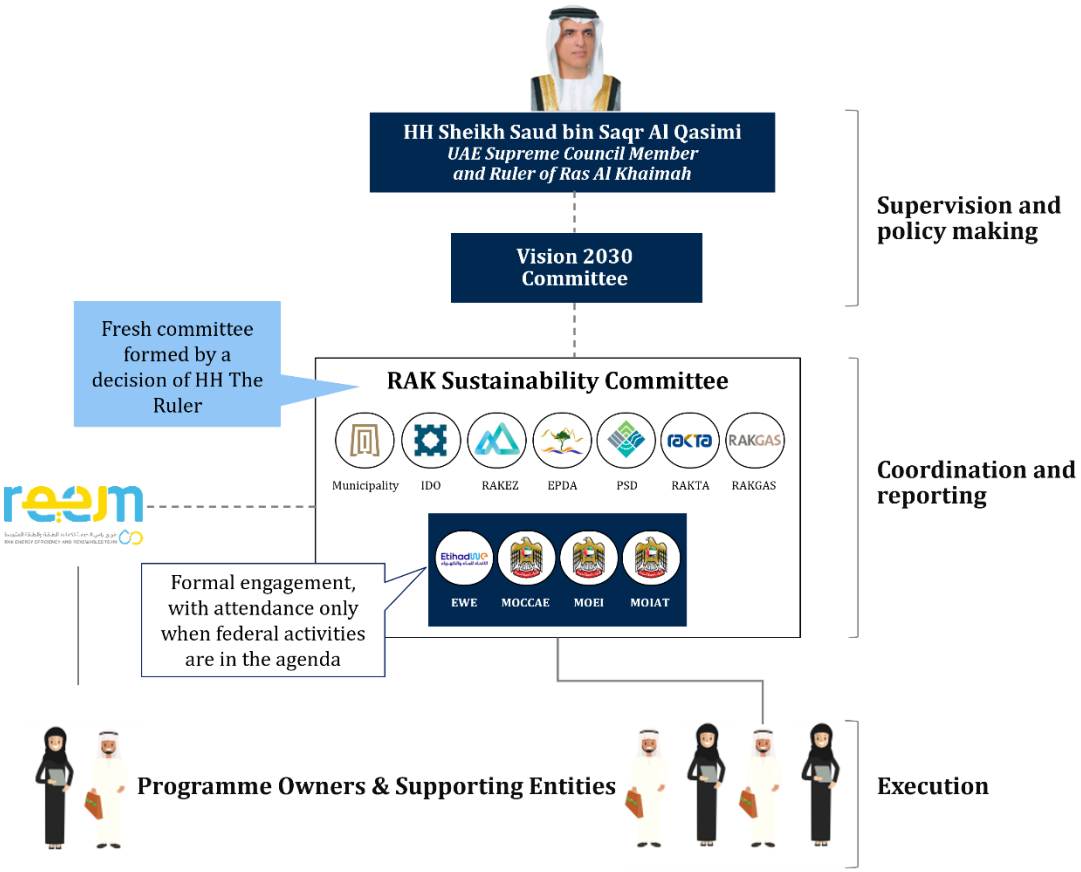

Figure 7 – Institutional set-up of the RIS Strategy within the Government of Ras Al Khaimah

5.2.1 RAK Sustainability Committee

RAK Sustainability Committee shall guide and support the implementation of the *RIS Strategy*, as mandated by *Amiri Decree No. 8 of 2025*. It comprises representatives of those government agencies that are most relevant to the implementation of the *RIS Strategy*, in particular Ras Al Khaimah Municipality (MUN), Public Services Department (PSD), Ras Al Khaimah Economic Zone (RAKEZ), Environment Protection and Development Authority (EPDA), Investment and Development Office (IDO), RAKGAS, Ras Al Khaimah Transport Authority (RAKTA) and Reem.

All Programme Owners and supporting entities represented in the *RAK Sustainability Committee* are also responsible to report through *Reem* on the implementation of their assigned programmes.

5.2.2 Programme Management and Reporting

Reem shall provide overall programme management, reporting, and support services across all programmes (in addition to its responsibilities as Programme Owner of the assigned programmes), to ensure that the efforts of all entities be coordinated towards the achievement of the long-term objectives. Reem's mandate comprises the following as a minimum:

- Define and maintain the *RIS Strategy* for the emirate of Ras Al Khaimah;

- Provide coordination and support to implementing entities to ensure the strategy remains on track;
- Drive energy transition programmes requiring a specialised and neutral entity (e.g., building retrofits, solar programmes, energy management, other specialised advisory projects);
  Deliver energy transition programme enablers: policy making, awareness and capacity building, financing, research and innovation;
- Promote a local market for products and services functional to the energy transition.

6 Programme Summary

Each pillar of *RIS Strategy* comprises a set of programmes. This section provides a summary of each pillar, alongside associated summaries of each programme.

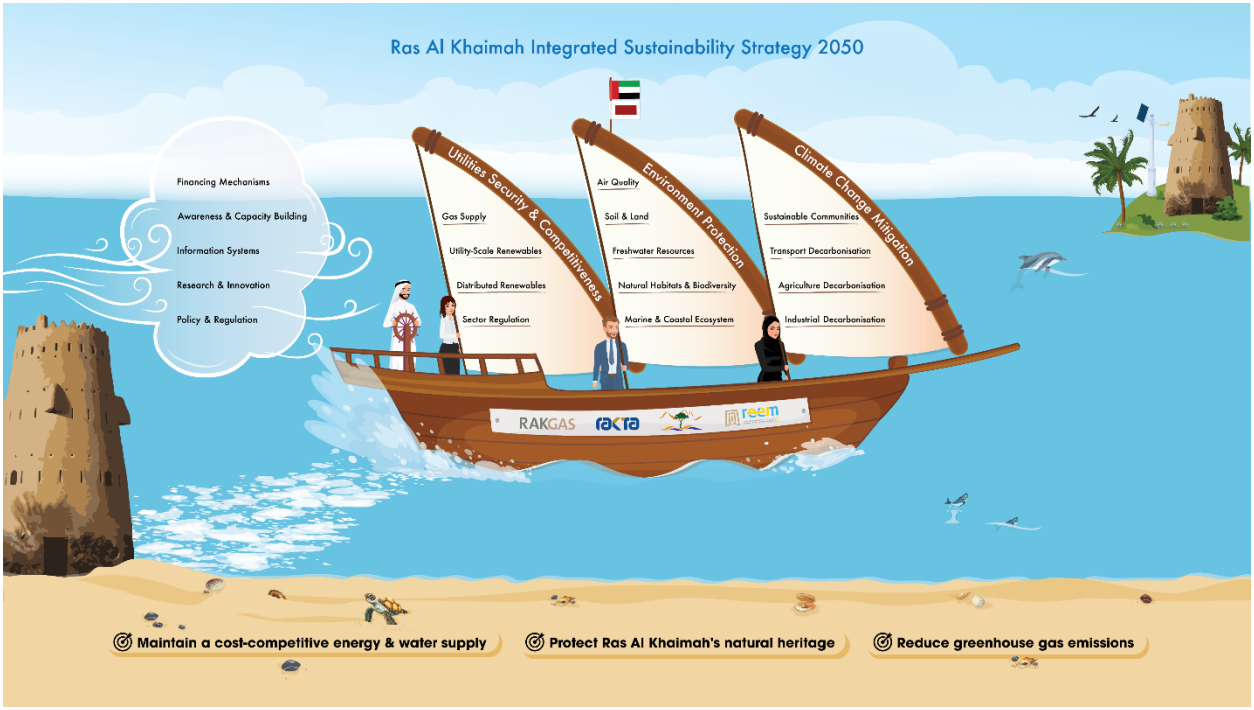

Figure 8 – A visual representation of Ras Al Khaimah's Integrated Sustainability (RIS) Strategy 2050

6.1 Pillar 1 – Utilities Security & Competitiveness

This pillar focusses on securing cost-effective supply of energy and water.

6.1.1 Programme 1 – Gas Supply Enhancement

This programme aims to secure competitive and reliable supply of natural gas to support the growth of the local industry.

With the continued growth of demand from the industrial sector, there is an opportunity to expand the existing natural gas network coverage. An important project is to develop new natural gas pipelines that would increase the gas supply capacity by 30%. This would enable existing consumers to transition to natural gas from coal.

In the long term, additional efforts will be needed to further transition existing and new industries to natural gas. These include local E&P already underway, as well as additional possibilities such as new import agreements and LNG facilities. Natural gas demand is expected to reduce in the long-term as it is gradually replaced by hydrogen and other low-carbon technologies.

Efficiency of natural gas consumption is an important lever to maintain supply availability and cost-competitive usage.

Key initiatives and targets for this programme include:

- Tripling the region's gas capacity by 2030 vs 2023, through development of the natural gas network.
- Reducing business-as-usual (BAU) gas usage by 10% through exploration and deployment of natural gas efficiency initiatives.

6.1.2 Programme 2 – Utility-Scale Renewables

This programme aims to prepare for and facilitate large-scale development of Ras Al Khaimah's renewables resources, to supply and store low-cost and clean electricity for use in Ras Al Khaimah and the UAE.

Ras Al Khaimah Municipality will lead studies and support discussions with federal entities to develop utility-scale renewables and storage capacity. Studies have been conducted to assess land availability for utility-scale solar projects with deployment planned for the coming years. An ongoing wind resource assessment (in Ras Al Khaimah mountains) will help identify the potential of wind generation as a complement to solar. Further assessments are ongoing for the potential of pumped-storage hydro in the mountain areas of Ras Al Khaimah.

The programme will also explore in parallel, additional storage options and more weather-independent sources such as geothermal energy to mitigate the intermittency of solar and wind energy.

Key initiatives and targets for this programme include:

- Commissioning of the first utility-scale solar PV plant by 2030
- Development and deployment of feasible renewable energy and storage schemes – including pumped storage hydro, wind, geothermal and waste to energy

6.1.3 Programme 3 – Distributed Renewables

This programme aims to promote and support deployment of distributed renewables, mainly rooftop and carport solar PV installations, in buildings and industries of Ras Al Khaimah.

Previous assessments of solar PV potential suggest that more than 600 MWp can be installed on rooftops in the long term. Federal Decree-Law No. 17 of 2022, which enables EtihadWE to support the connection of distributed renewables to their grid, is expected to drive growth in the distributed renewables market in Ras Al Khaimah and the wider Northern Emirates.

New buildings will continue to be addressed through mandates for solar readiness within Barjeel. EtihadWE's Distributed Solar System Initiative (DSS) is expected to further activate the market, with additional regulations in 2027 expected to accelerate the pace of deployments. In addition to

regulation, other market development and awareness enablers to promote adoption will be introduced by Ras Al Khaimah Municipality.

In parallel, other renewables will be studied for future deployment where applicable.

Key initiatives and targets for this programme include:

- Deployment of 20MWp of distributed renewables by 2030
- 20% of solar-ready buildings by 2030
- Feasibility assessment and deployment of distributed geothermal energy

6.1.4 Programme 4 – Sector Regulation

This programme aims to support improvement in utility service quality, transparency and fairness.

The programme will operate by:

- Developing a local regulatory framework for utilities regulation.
- Implementing direct regulatory supervision for private electricity, water and district cooling businesses.
- Collaborating with MOEI for federal regulatory support where necessary.

6.2 Pillar 2 – Environment Protection

The Environment Protection pillar focuses on preserving natural resources, enhancing ecological sustainability, and mitigating environmental impacts through comprehensive policies, regulations, and initiatives.

6.2.1 Programme 5 – Air Quality

This programme aims to develop the capacity to monitor, analyse, and improve air quality across the emirate. The Environment Protection and Development Authority (EPDA) will enhance its capabilities in analytics to quantify and forecast air quality in Ras Al Khaimah using air dispersion and hotspot modelling techniques.

As part of this programme, EPDA has deployed eight ambient air quality monitoring stations strategically located across the emirate including key industrial zones (Al Ghail, Al Hamra, and Khor Khuwair). Additionally, industrial entities have integrated 17 monitoring stations within their facilities, contributing to a broader network that strengthens regulatory oversight. These stations are directly linked to EPDA's monitoring system, ensuring real-time data collection and analysis.

To further expand coverage, RAK Transport Authority (RAKTA), in collaboration with EPDA, has installed 23 air quality monitoring devices in public transport buses (10 in intracity buses, 13 in intercity buses) under a formal Memorandum of Understanding (MoU).

Insights from monitoring and modelling will guide targeted actions to improve air quality in specific areas. As part of a comprehensive environmental strategy set to be developed in 2026/27 the

potential of region-specific regulations will be explored along with efficient enforcement methods to ensure a cleaner, healthier environment for Ras Al Khaimah.

Key initiatives and targets for this programme include:

- Deployment of air quality monitoring systems to build a data-driven foundation.
- Issuance and implementation of an Air Quality Strategy.
- Integration of air quality policies into urban planning, transport, and industry regulations.
- Sustained AQI improvements and 100% monitoring coverage of residential and industrial zones by 2050.

6.2.2 Programme 6 – Soil & Land

This programme aims to enhance the ability to monitor and manage littering and soil pollution across Ras Al Khaimah. EPDA will establish a system to measure the quantitative, qualitative, spatial, and temporal characteristics of soil resources in the emirate while identifying necessary management and regulatory tools to ensure their long-term sustainability.

As part of a comprehensive environmental strategy set to be developed in 2026/27 EPDA, in collaboration with PSD, will explore the introduction of targeted regulations and efficient enforcement mechanisms to manage pollution levels.

To strengthen capabilities to manage and assess soil quality in the emirate, EPDA will adopt a phased approach starting with research and data collection, followed by the implementation of a structured soil sampling plan every 5 years to characterise soil types and contamination levels. Insights from monitoring and modelling will guide targeted actions in key areas.

Key initiatives and targets for this programme include:

- 80% zone coverage by Terrestrial Natural Resources (TNR) surveys by 2030.
- Issuance and implementation of a comprehensive Soil Quality Strategy.

6.2.3 Programme 7 – Freshwater Resources

This programme aims to build capabilities for monitoring and controlling groundwater and surface freshwater pollution in Ras Al Khaimah. The environmental strategy set to be developed in 2026/27 will include the development of a comprehensive freshwater and groundwater strategy. This will involve analysing the quality, quantity, and trends of groundwater resources in the emirate, as well as defining management and regulatory tools needed to ensure their long-term sustainability. Following completion of this exercise, EPDA may establish and enforce region-specific regulations to effectively mitigate groundwater pollution in Ras Al Khaimah.

Key initiatives and targets for this programme include:

- Establishment of a network of dedicated wells across Ras Al Khaimah to enhance data collection.
- Groundwater salinity of 4 g/L by 2050.

- Long-term water security through policy and technology-driven solutions.

6.2.4 Programme 8 – Natural Habitats & Biodiversity

This programme aims to strengthen monitoring capabilities for Ras Al Khaimah's existing protected areas while establishing new ones to support keystone species. Currently, Ras Al Khaimah has one protected area, Khor Al-Mazahmi (3.2 km^2), home to thousands of mangrove trees and 475 tagged green turtles, while serving as a vital sanctuary for migratory birds such as the Greater Flamingo and Western Reef Heron. Furthermore, its waters act as a productive nursery for diverse fish species and crustaceans, supporting the wider marine food web. Six additional sites have been proposed for protection to safeguard key species such as the hawksbill turtle, green turtle, and Emirati leaf-toed gecko, among others for which at present, limited information is available, as well as to protect ecologically significant areas like Khor Al Hulaiyla, and Wadi Mazraa.

The programme scope currently includes continuous surveys to assess existing flora and fauna, the reintroduction of locally extinct species, and the development of protected areas to ensure survival of resident endangered species. By 2030, the programme aims to stabilise keystone species populations within a 10% variation.

Additionally, night-sky protection regulations implemented by Ras Al Khaimah Municipality and PSD will contribute to the long-term preservation of sensitive habitats. Further refinements to the programme may be introduced following development of the environmental strategy in 2026/27.

Key initiatives and targets for this programme include:

- Comprehensive protected area management plans to ensure effective conservation
- 3 protected areas in the emirate by 2050
- Green coverage expansion by 10% and integration of biodiversity into urban planning by 2050
- Coral reef cultivation and restoration, integrating these efforts into broader biodiversity strategies

6.2.5 Programme 9 – Marine & Coastal Ecosystem

This programme aims to enhance capabilities to monitor and protect Ras Al Khaimah's marine and coastal areas. An immediate step toward this objective is the integration of seawater monitoring activities currently carried out by EPDA, RAK Ports, and Al Marjan Island into a unified, central seawater monitoring system. A detailed study on coastal water characteristics is underway, involving data collection from five dedicated marine stations and over 17 sampling sites in the creek and coastline. Following the development of the environmental strategy in 2026/27, EPDA may develop and implement region-specific regulations and establish a comprehensive roadmap to support the sustainability of marine and coastal ecosystems in Ras Al Khaimah.

Key initiatives and targets for this programme include:

- Collection and analysis of marine water quality data, issuance of policies and strategy.

- Restoration and cultivation activities, and issuance of conservation policies.
- Eco-tourism projects, and issuance of conservation policies.
- Sustained Water Quality Index score of 80 for Ras Al Khaimah's coastline by 2030.

6.3 Pillar 3 – Climate Change Mitigation

The Climate Change Mitigation pillar focuses on reducing carbon emissions and promoting sustainable development through initiatives that target key sectors such as communities, transportation, industry, and agriculture.

6.3.1 Programme 10 – Sustainable Communities

Ras Al Khaimah has made significant movements in advancing sustainable buildings through various initiatives. These efforts include the launch of Ras Al Khaimah's green building regulations "Barjeel", the promotion of high-efficiency equipment, the retrofit of existing buildings to enhance energy efficiency and the introduction of advanced energy management systems. With over 4,000 Barjeel-compliant buildings built and over 300 existing buildings retrofitted, this programme's approach extends beyond individual buildings, aiming to create sustainable, energy-efficient communities by targeting not only buildings but also the broader community infrastructure.

This programme aims to expand the retrofit initiative to encompass all types of existing buildings, including commercial and hospitality structures, with a target of retrofitting at least 5,000 buildings in Ras Al Khaimah by 2050. Additionally, the programme aims to update existing building codes and introduce comprehensive community guidelines to ensure the creation of sustainable and energy-efficient communities. To further drive sustainability and mitigate climate change, the programme promotes the adoption of green procurement practices by developing and implementing green procurement guidelines for government entities. Ras Al Khaimah government is leading by example through the issuance of mandates for energy efficiency *(Amiri Resolution No. 18 of 2024)* and adoption of green procurement practices *(Amiri Resolution No. 19 of 2024)* in government and semi-government entities, as well as for energy auditing of industrial activities *(Amiri Resolution No. 20 of 2024)*.

Key initiatives and targets for this programme include:

- Development and update of building codes
- Execution of building retrofits and replacement programmes
- Implementation of energy management and green procurement practices in government-owned departments and enterprises

6.3.2 Programme 11 – Transport Decarbonisation

Ras Al Khaimah has made significant movement over the last years in terms of greening the transportation sector. Key achievements include issuance of a mandate for efficient vehicle procurement in government fleets and incentives to promote the adoption of efficient vehicles by the

private sector. Currently, over 1,700 electric and hybrid vehicles are registered in Ras Al Khaimah making up 1% of the vehicles on the road.

This programme aims to promote low-carbon transportation through electrification, hydrogen use, and fuel switching. Use of individual light vehicles will be tactically discouraged, while low-carbon vehicles will be incentivised and supported with charging infrastructure. Heavy vehicles will adopt new fuel efficiency standards, with pilots for biodiesel and hydrogen preceding large-scale implementation. Most incentives and fees will be federally led, with financing models for electric vehicle (EVs) and hydrogen infrastructure also explored.

Key initiatives and targets for this programme include:

- Expansion of electric vehicle charging network
- Deployment of electric public transport buses
- Development of micro-mobility network

6.3.3 Programme 12 – Agriculture Decarbonisation

This programme aims to reduce emissions from agricultural activities in Ras Al Khaimah by mandating sustainable fertiliser and livestock consumables and promoting regenerative agricultural practices. Emissions reductions are expected to come from improvements in equipment and processes, the adoption of renewable energy, and low-carbon agricultural practices, such as efficient fertiliser use, regenerative farming, and dietary supplements for livestock.

With Ras Al Khaimah's agricultural sector largely unexplored, there is a significant opportunity to enhance sustainability and productivity. A first key step in this programme is to build a comprehensive agricultural strategy and regulatory framework to gather essential data and design effective emissions reduction interventions.

Key initiatives and targets for this programme include:

- Implementation of agricultural CO_2 emissions quantification tool.
- Awareness sessions on the link between sustainable operations and climate change.
- Collaboration with companies to reduce emissions and promote sustainability.

6.3.4 Programme 13 – Industrial Decarbonisation

This programme aims to decarbonise the industrial sector by enhancing energy efficiency, exploring cement substitutes, transitioning to alternative fuels where feasible, and considering carbon capture as a residual lever in the long run.

In the short term, efficiency improvements will be activated through the recently launched audit mandate *(Amiri Resolution No. 20 of 2024 regarding energy audits in large industrial facilities in Ras Al Khaimah),* while the feasibility of alternative fuels, supplementary cementitious materials (SCMs), and carbon capture, utilisation and sequestration (CCUS) will be studied. In the long term, cement standards will drive the adoption of SCMs, while a federal carbon pricing framework will allow hydrogen to penetrate the fuel mix and encourage the deployment of CCUS.

Key initiatives and targets for this programme include:

- Implementation of industrial audits and reporting *(Amiri Resolution No. 20 of 2024);*
- Development of cement decarbonisation framework;
- Update of building codes, green procurement guidelines.

7 Key Enablers of the *RIS Strategy*

7.1 Awareness & Capacity Building

Dissemination of information and education to influence behaviours in favour of the objectives of the *RIS Strategy* is key to its successful implementation. For this purpose, both general and targeted awareness campaigns will be implemented. Government leadership by example, incentive programmes, rating and labelling schemes shall be employed where possible to nudge consumers towards more efficient purchases and behavioural choices.

All participants in the *RIS Strategy* must possess the competencies required for their role and the programme they take part in. For this reason, capacity building measures such as training, workshops, conferences, and other knowledge-sharing channels shall continue to be organised for both public and private sector stakeholders where necessary.

Private sector capacity building is especially important in the development of a local market for energy efficiency and renewable energy products and services. A favourable supply ecosystem involving individuals and companies will be created through targeted awareness campaigns such as *#Energyinyourhands*, *1 million and 1 trees*, and *single-use plastic free campaigns* for the general public, *Upskill*, a dedicated training platform for Ras Al Khaimah residents, *Eco-Label* for industrial, commercial and public entities, creation of an attractive business set-up environment with incentives for companies in the field, and a recurring *competition to bring in SMEs* from all over the world to address region-specific energy concerns.

7.2 Financing Mechanisms

The measures to be implemented as part of the *RIS Strategy* are selected based on their economic viability with most requiring capital investments.

Specific financing mechanisms shall be explored to encourage participation from investors. The development of standards and frameworks for tendering and contracting, such as group tendering and contractual models for building retrofits and solar photovoltaic projects, will be a key enabler of these financing mechanisms.

Existing incentive mechanisms established under the EER Strategy will continue to support private sector participation and may be built upon or enhanced over time, where additional market stimulus is required.

7.3 Research & Innovation

Research and innovation activities will support the implementation of the *RIS Strategy* in Ras Al Khaimah. In the short to medium term, the focus shall be on commercial studies and innovation to adapt existing mature technologies present elsewhere to the particular conditions of Ras Al Khaimah. Partnerships with other governments and industry bodies in the region will allow Ras Al Khaimah to benefit from the experiences of its regional neighbours in this regard.

For the long term, less mature but promising technologies may be considered for prototype or pilot developments in Ras Al Khaimah. This shall be facilitated by partnerships with those public or private entities that are on the cutting edge of development of the relevant technologies. Some of the key areas identified for such studies include buildings, industry, energy storage, solar heating and cooling, and irrigation.

7.4 Information Systems

Information systems are necessary for the success of the *RIS Strategy*.

The continuous update of the *strategy*, monitoring of progress and achievement, and the development of specific policies and regulations will require the acquisition and analysis of data, for which appropriate levels of automation through IT systems will be sought.

Additionally, specific programmes linked to transactional processes, such as building permit applications and utility metering will require IT support, which will be assessed as part of implementation of those programmes.

7.5 Policy & Regulation

Specific policies and regulations shall be developed to drive the implementation of initiatives and facilitate the development of local markets for products and services functional to the energy transition . These policies and regulations will include but not be limited to the definition of and periodic update of green building standards for new buildings, regulatory frameworks for building retrofits, efficiency standards for appliances, equipment and industrial processes, solar rooftop regulations, and green procurement standards.

In addition, directives and guidelines will be developed to promote government leadership by example in those areas where initial government participation is beneficial, such as building retrofits, energy management, efficient government fleets, and industrial energy efficiency improvements. Support for these policies, directives and and regulations will be sought from His Highness the Ruler of Ras Al Khaimah and the competent authorities in the emirate, including The Executive Council, and other federal authorities.

8 Benefits of the Strategy

The benefits of the *RIS Strategy* were comprehensively evaluated to ensure a well-rounded assessment of its long-term impact. The economic impact of the strategy was assessed on a differential basis by comparing the incremental costs of the proposed measures with those of the business as usual scenario, represented by the ongoing *EE&R Strategy*.

The aggregated present value of investments required over the period 2026 – 2050 is estimated as approximately AED 18 billion, primarily driven by the Industrial Decarbonisation and Transport Decarbonisation programmes. The net benefit of the strategy in present value terms after deducting investments and associated costs, is expected to be approximately AED 6.5 billion.

The government contribution to the total investment required for implementation of the *RIS Strategy* will depend on the business models adopted for participation in the programmes and is expected to range between 5% and 25% of total investments. Government contributions may include general overheads, awareness and capacity building activities, direct funding of selected efficiency and, emissions reduction activities, renewable energy projects implemented by government entities, and government-supported financing mechanisms such as loans or grants.

The cost and budget estimates presented above are indicative and are intended to support evaluation of the *RIS Strategy*. They do not represent any financial commitment by any of the participating organisations. Each initiative or project implemented under the *RIS Strategy* will be subject to its own detailed assessment of costs and benefits and will be approved by the relevant implementing entities on a case-by-case basis.

In addition to these quantified impacts, implementation of the RIS Strategy is expected to deliver a range of broader social, economic, environmental and technological benefits, as described below:

8.1 Social Benefits

Implementation of the *RIS Strategy* will enhance Ras Al Khaimah's reputation nationally and internationally as an emirate committed to decarbonisation and climate action. This aligns with the United Arab Emirates' commitments under the Paris Agreement and The United Nations Framework Convention on Climate Change.

By improving air, soil, and water quality and promoting the development of a sustainable built environment, Ras Al Khaimah is expected to become an increasingly attractive place to live and work. The strategy will foster local capabilities, technological development in Ras Al Khaimah, and greater social consciousness of the need for conservation, resulting in multiple benefits.

Employment opportunities are expected to be generated across multiple sectors such as green buildings, energy-efficient retrofits , industrial energy efficiency, efficient appliances, low-carbon transport, public transit, waste-to-energy projects, renewable energy development and alternative fuel supply, creating career opportunities for residents.

8.2 Economic and Market Benefits

The *RIS Strategy* is expected to improve economic resilience market growth and private sector development by reducing energy and water costs across all consumer segments in Ras Al Khaimah. By lowering dependence on coal, petroleum, and natural gas, the emirate will be better protected against volatility in global energy markets. Lower energy costs for both government and private consumers will also enhance economic competitiveness. The strategy will also stimulate local markets for products and services functional to the energy transition, contributing to GDP growth, and creating new business opportunities. Improved work environments, efficient equipment, and better maintenance practices will further boost overall economic productivity.

Real estate will benefit in specific sectors as energy-efficient buildings gain value, gradually reflecting higher property prices and rental premiums. Residents who actively participate in the strategy will experience lower energy and water bills, and it will support the industrial and commercial sectors in advancing their cost optimisation programs. The tourism sector will benefit from enhanced sustainability practices, leading to cost savings and strengthening Ras Al Khaimah's position as a preferred destination for environmentally conscious travellers.

Ras Al Khaimah also has the potential to lead in green cement production, positioning itself as a frontrunner in sustainable construction materials. As a significant producer of cement for both domestic and export markets, the emirate can leverage its industrial base to adopt low-carbon technologies, alternative fuels, and more eco-friendly materials. This will reduce emissions and enhance global competitiveness, catering to the increasing demand for sustainable construction materials.

8.3 Environmental, Health & Safety Benefits

Implementation of the *RIS Strategy* will enhance living and working conditions in Ras Al Khaimah by promoting healthier indoor and outdoor environments and improved safety standards. Upgrading outdated equipment, implementing systematic maintenance practices and reducing the use of hazardous substances will contribute to a higher quality of life.

The strategy's environmental benefits will be driven by a strong focus on air quality, freshwater conservation, and the protection of terrestrial and marine ecosystems. This includes improved waste management, treatment and reuse of wastewater, and the promotion of low-carbon transportation. The local biodiversity of Ras Al Khaimah will be strengthened through the use of native plant species and proactive measures to develop and manage protected areas, providing a safe habitat for endangered species.

8.4 Technological Benefits

The *RIS Strategy* supports the adoption of economically viable green technologies, most notably energy efficiency technologies for buildings and industrial facilities, renewable energy technologies, and efficient transportation technologies. It also encourages academic research, commercial studies,

and pilot projects of emerging technologies in related fields supporting innovation and long-term technological advancement in Ras Al Khaimah.

9 Implementation Roadmap

Implementation of the *RIS Strategy* is expected to be ramped up over the next 3 years. This period will focus on advancing existing programmes inherited from the *EE&R Strategy* while initiating new programmes under the *RIS Strategy* to establish the key regulatory frameworks, infrastructure and strategic initiatives required to enable organically scaled implementation over the long term.

To support this transition, several initiatives will be advanced across key areas:

- **Utilities Security & Competitiveness:** Continued development of utility-sector regulation including support for distributed renewables adoption, private utilities licensing for; and assessment of utility-scale renewable energy potential, particularly wind energy and pumped-storage hydropower in Ras Al Khaimah's mountainous areas. Evaluation of gas infrastructure options to support industrial competitiveness will continue.
- **Environment Protection:** Development of a new environmental strategy, complemented by data collection and monitoring initiatives targeting air quality, terrestrial natural resources, and biodiversity.
- **Climate Change Mitigation:** Continued implementation of Barjeel for new buildings and introduction of a building energy rating system for existing buildings; and building retrofit programmes for selected government-owned and commercial properties. Expansion of industrial energy audit programmes in line with *Amiri Resolution No. 20 of 2024* with identification of priority energy-saving measures. Development of a comprehensive agricultural strategy to guide government supervision and decarbonisation efforts. Targeted decarbonisation efforts in the cement and concrete sector, including the development of a tailored framework and roadmap including updates in green cement standards. Continued assessment of carbon sequestration in minerals; and exploratory activity related to natural hydrogen, supported by Exploration and Production Sharing Agreements (EPSAs).

10 Glossary of Terms

Acronym	Description
AED	UAE Dirhams
Barjeel	The Green Building Regulations of Ras Al Khaimah
BAU	Business as Usual
CCU	Carbon Capture Unit
CCUS	Carbon Capture, Utilisation and Sequestration
COP28	28th Conference of the Parties to the United Nations Framework Convention on Climate Change
EPDA	Environment Protection and Development Authority
EPSA	Exploration and Production Sharing Agreement
EWEC	Emirates Water and Electricity Company
E&P	Exploration and Production
EWE	Etihad Water and Electricity Company
GHG	Greenhouse Gas
GWh	Gigawatt-hours
GDP	Gross Domestic Product
ISO	International Organisation for Standardisation
IDO	Investment and Development Office
LED	Light Emitting Diode
LNG	Liquified Natural Gas
MOCCAE	UAE Ministry of Climate Change and Environment
MOEI	UAE Ministry of Energy and Infrastructure
MOIAT	UAE Ministry of Industry and Advanced Technology
PV	Photovoltaic
PSD	Public Service Department
RAK	Ras Al Khaimah
RAKGAS	RAK Gas Company
RAKTA	Ras Al Khaimah Transport Authority
RAKEZ	Ras Al Khaimah Economic Zones
Reem	Sustainable Energy Sector of Ras Al Khaimah Municipality
RIS Strategy	Ras Al Khaimah Integrated Sustainability Strategy 2050
SCM	Supplementary Cementitious Material
TNR	Terrestrial Natural Resources
TSE	Treated Sewage Effluent
UAE	United Arab Emirates
UAQ	Umm Al Quwain