حكومة رأس الخيمة
Government of Ras Al Khaimah

بلديـــــة رأس الخيمـــــة
Ras Al Khaimah Municipality

RAS AL KHAIMAH ENERGY EFFICIENCY & RENEWABLES STRATEGY 2040

ANNUAL REPORT 2022

His Highness Sheikh Saud bin Saqr Al Qasimi
UAE Supreme Council Member and Ruler of Ras Al Khaimah

"Energy and water are essentials of our lives and prosperity. They are an integral part of the social and economic development that we aspire to, so we must preserve and invest in them. The application of modern technology and the use of modern building materials in addition to the use of renewables will provide opportunities for all sectors to benefit from energy and water at a lower cost."

His Highness Sheikh Mohammed bin Saud bin Saqr Al Qasimi
Crown Prince of Ras Al Khaimah and Chairman of the Executive Council

"Competitiveness in energy and water costs is key to our development. Efficiency and care in the use of energy and water as well as the adoption of renewable sources of energy support competitiveness of our economy and conservation of the natural resources of our emirate."

His Excellency Munther Mohammed bin Shekar Al Zaabi
Director General, Ras Al Khaimah Municipality and
Chairman, Energy Efficiency and Renewables Committee

"As humanity faces the storms of the present and struggles with evolving scenarios on the horizon, we must turn to the beacon of sustainability to reach a better tomorrow. With the Energy Efficiency and Renewables Strategy 2040, Ras Al Khaimah contributes to the energy sustainability goals of the UAE and of the world, while providing concrete benefits to residents and businesses in the emirate."

FOREWORD

Andrea Di Gregorio
Executive Director, Reem,
Ras Al Khaimah Municipality

This is the fifth annual report of the Ras Al Khaimah Energy Efficiency & Renewables Strategy 2040 (EE&R Strategy). Established under the patronage of His Highness Sheikh Saud bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah, the strategy aims to support the competitiveness and sustainability of Ras Al Khaimah's economy over the long run, by pursuing efficiency in energy use and availability of reliable and cost-effective renewable energy supply.

For the broader economy of Ras Al Khaimah and the UAE, 2022 was a year of growth, offering a favourable ground for expansion of sustainability programs. On the strategic front, the UAE Ministry of Climate Change and Environment (MoCCaE) made significant progress in defining its policy roadmap towards net zero emissions by 2050, including for the energy sector. We are prepared to begin implementing the new roadmap and enhancing the EE&R Strategy to support and complement it. As preparations began to host COP28 in 2023, both the government and the private sector continued to invest in capacity building around sustainability.

This is apparent in the number of cross-sectoral groupings or organisations conceived on the theme of decarbonisation in 2022. Notable among these are the National Dialogue on Climate Action (NDCA), led by the UAE Ministry of Climate Change and Environment (MoCCaE), the UAE Alliance for Climate Action (UACA), led by Emirates Nature - WWF and the Advancing Net Zero (ANZ) Volunteering Team, a professional volunteering organisation. We are proud that Ras Al Khaimah has been represented in and is contributing to all of these organisations, as we believe that they have an important role in creating an ecosystem that supports efforts towards emissions reduction.

2022 was a year of strong performance for the EE&R Strategy. More than 700 new Barjeel-compliant buildings were commissioned and more than 100 existing buildings were contracted for retrofit in this year. We hosted the first RAK Energy Summit in October 2022, attended by close to 900 leaders, decision makers and executives from the UAE and abroad. The summit provided a platform for experts and solution providers to showcase their products, meet with local decision makers and discuss the energy transition of the region. By the end of 2022, the Government of Ras Al Khaimah also became the first government in the world to achieve ISO 50001 certification of its energy management systems across all its entities and departments.

Several new initiatives were activated in 2022. A new energy advice service for homeowners, under the name of Manzily Energy Advice, was launched, and has been provided free of charge by Ras Al Khaimah Municipality. A competition was launched for SMEs and start-ups to bring their unique solutions in energy management, industrial efficiency and decentralised energy systems to the region. Lastly, a program for specialised industrial energy audits was launched with the participation of leading industrial companies.

In the field of awareness for the youth, a new mobile game, called Manzily, was launched to promote energy and water conservation behaviours and measures.

In 2023, after 5 years of implementation, the EE&R Strategy will undergo its planned review which is a significant exercise, in consideration of the UAE's commitments to net zero emissions by 2050.

In parallel, we plan to expand our new initiatives, particularly Manzily Energy Advice and the industrial audits, while continuing to develop existing programs. Reem, the Energy Efficiency and Renewables Office of Ras Al Khaimah Municipality will further enhance its capabilities in preparation for further development of the programs in the coming years.

We hope you enjoy reading this report, and we look forward to greater achievements in 2023.

TABLE OF CONTENTS

1
EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

This is the fifth annual report of the Energy Efficiency and Renewables Strategy of Ras Al Khaimah, for the year 2022. The strategy comprises nine programs supported by five enablers, is fully integrated into the broader Ras Al Khaimah Vision 2030, and is aligned with the federal agenda on energy, water and the environment. It supports competitiveness of the Ras Al Khaimah economy by reducing costs and increasing availability of energy and water, while also building local capabilities in related sectors. The strategy is increasingly relevant today, as the contributions of sustainable energy to climate change mitigation, health and well-being of individuals and competitiveness of businesses are being more and more recognised in mainstream policy discourse.

A dedicated organisational set-up, including the EE&R Committee, Reem (within Ras Al Khaimah Municipality), Program Owners (government entities responsible for each program) and supporting entities, continued to ensure effective strategy implementation in 2022. The most notable achievements of the year were:

1. Completion of more than 700 Barjeel-compliant buildings in Ras Al Khaimah,

2. Contracting of more than 100 buildings for retrofits with more than 100 additional buildings in the pipeline,

3. Achievement of ISO 50001 (energy management system) certification for all Ras Al Khaimah government entities, making it the first government in the world to do so,

4. Launch of an industrial audit initiative, with 7 entities registered, representing about 40% of the total industrial electricity consumption of Ras Al Khaimah

5. Activation of a wind resource assessment study for Ras Al Khaimah,

These accomplishments represent a growing pipeline of projects expected to result in significant energy and water savings in the coming years. Apart from those listed above, several enablers were further enhanced to facilitate long-term success of the strategy. Notable ones among them include the following:

1. **Enhancing policy and regulation**, including completion of the first phase for the development of a building energy rating system, development of contracting standards for solar projects, street lighting standards, financing mechanisms for energy efficiency projects, and launch of green public procurement initiatives such as "single-use plastic no more" and "go paperless";

2. **Raising awareness**, through the organisation of the first RAK Energy Summit, participation in multiple industry events, the launch of an energy sustainability game (Manzily) to educate the youth on simple actions that can save energy and water in their home, and an ongoing 'Energy Saving Tips' campaign;

3. **Building capacity**, including ongoing Barjeel training for engineers and consultants, development of a wider training program, Upskill, to enhance local capabilities in the field of energy efficiency and renewable energy, extension of business set-up incentives to renewable energy consultancies and SMEs in the fields of smart energy management and industrial IoT and launch of RAK Energy Innovation Competition (SME Edition) to attract innovative start-ups and SMEs to address regional challenges in the fields of energy management, industrial efficiency and decentralised energy systems; and

4. **Leveraging information systems**, including the GIS Center's spacial analytics services, their SDI database of geospatial information, and Reem's own energy model to measure and verify energy savings and greenhouse gas emissions, and conduct studies on the potential for outdoor comfort and renewable energy across the emirate.

2

RAS AL KHAIMAH ENERGY EFFICIENCY & RENEWABLES STRATEGY 2040

30%
Energy Savings

20%
Water Savings

20%
Renewables

Ras Al Khaimah Energy Efficiency & Renewables Strategy 2040

Figure 1: Ras Al Khaimah Energy Efficiency & Renewables Strategy 2040

2. RAS AL KHAIMAH ENERGY EFFICIENCY & RENEWABLES STRATEGY 2040

2.1 Ras Al Khaimah's Energy Efficiency & Renewables Journey

The EE&R Strategy was established in 2018 under the patronage of His Highness Sheikh Saud bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah. Its overarching objectives are to improve competitiveness and sustainability of the Ras Al Khaimah economy, while also building local skills, capabilities and a diverse market for products and services related to energy efficiency and renewables. It sets a target of 30% energy savings, 20% water savings and 20% contribution from renewable energy sources by 2040, compared to a 2017 baseline.

Figure 1 (boat graphic) illustrates the various programs of the strategy moving in synergy, taking Ras Al Khaimah forward to a modern and more sustainable world. Figure 2 (charts) shows its targets over time until 2040.

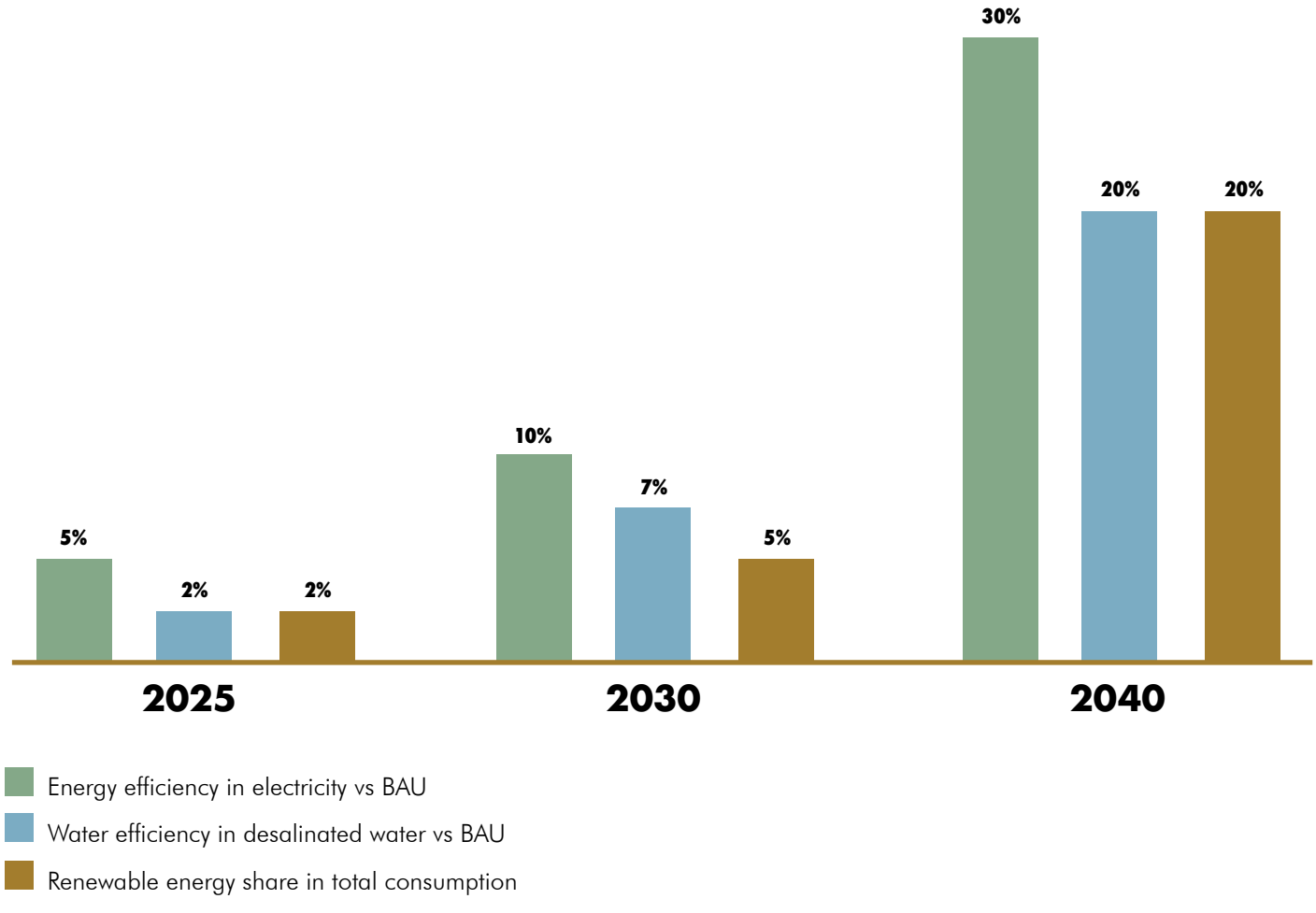


Figure 2: The EE&R Strategy agreed intermediate targets

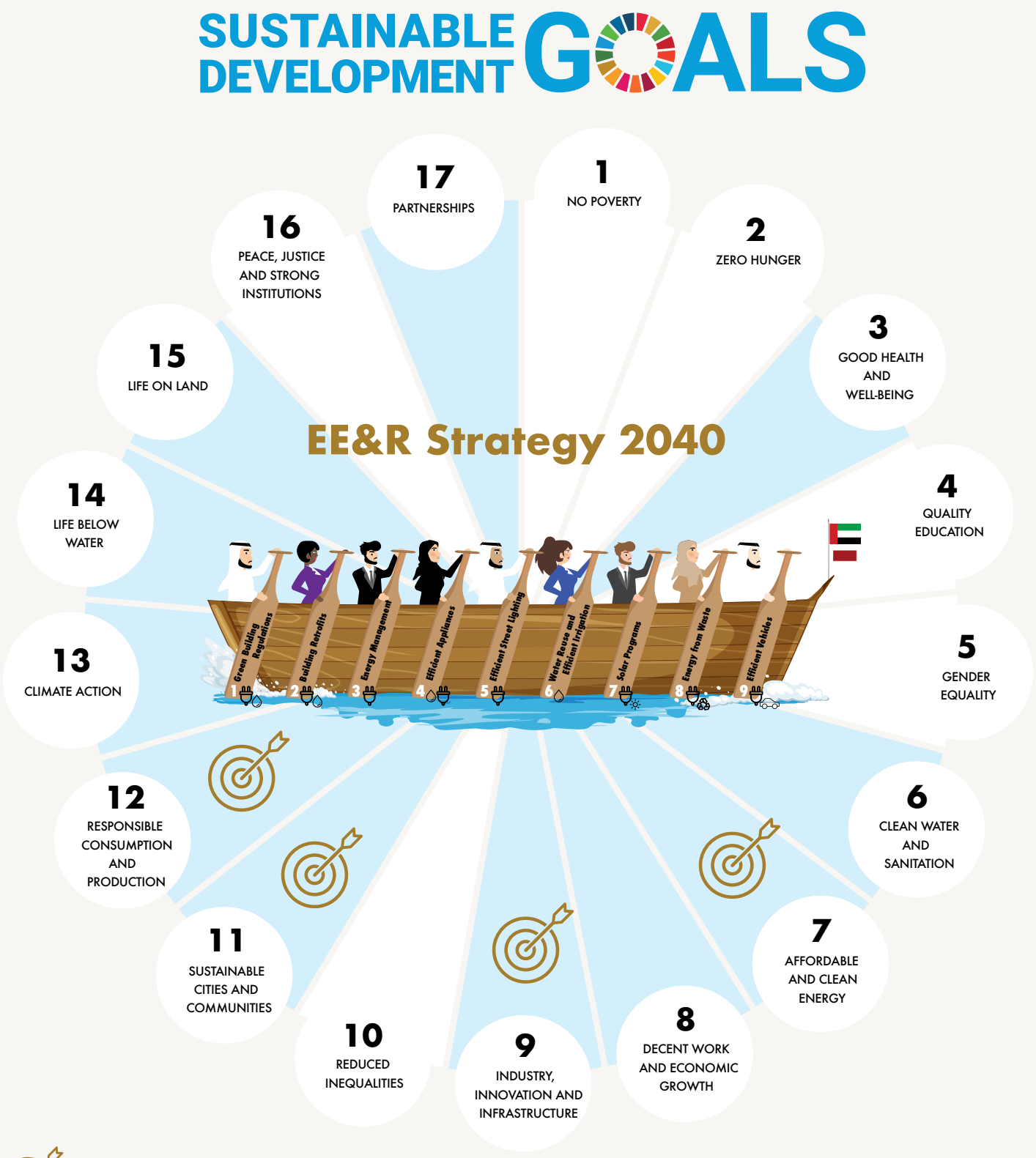


Figure 3: Assessment of EE&R Strategy 2040 contribution to the UN Sustainable Development Goals

Figure 3 (SDGs) demonstrates the alignment of the strategy with the Sustainable Development Goals (SDGs) of the United Nations.

Over 90% of the world's GDP is now covered by time-bound commitments to net-zero greenhouse gas emissions. In 2021, the UAE announced its ambitions to reach net-zero emissions by 2050, becoming the first country in the MENA region to make such a commitment.

In 2022, the UAE Ministry of Climate Change and Environment developed a national roadmap for the UAE towards net zero emissions by 2050. With this in mind, Ras Al Khaimah is soon expected to renew its strategy to support and contribute to this ambition and realign with broader sustainability priorities.

2.2 Benefits of the EE&R Strategy

The main objective of the EE&R Strategy is to support reliable and cost-competitive access to energy and water resources for consumers in Ras Al Khaimah by reducing the energy intensity of the economy and increasing the use of renewable resources.

The EE&R Strategy is expected to bring more than AED 9 billion of net benefits to the economy of Ras Al Khaimah on a present value basis. These savings come primarily from reduced energy and water costs, reduced maintenance costs and delayed investment costs.

Other significant benefits of the EE&R Strategy include the following:

1. Social benefits: the EE&R Strategy will improve the positioning of Ras Al Khaimah as an attractive place to live and work in. Additional jobs will be created for both national and expat communities in the manufacturing and service sectors connected to energy and water industries.

2. Economic and market benefits: the economic savings brought by the strategy will free up funds that may be reinvested for the benefit of Ras Al Khaimah and its local economy. The strategy will build additional economic resilience against price fluctuations of various conventional fuels. Increased competitiveness will attract more businesses and industries, while further entrenching existing businesses in Ras Al Khaimah. Local markets will be created for energy efficiency and renewables products and services, which will contribute to GDP growth and create opportunities for private sector development. Enhanced work environments, efficient equipment and proper maintenance practices will improve the overall productivity of the economy. The strategy will benefit the real estate sector as the added value of efficient buildings is expected to gradually translate into price and rental premiums. The tourism sector will benefit from an image of leadership in environmental and economic sustainability.

3. Environmental, health and safety benefits: implementation of the EE&R Strategy will also create better living and working conditions through healthier indoor and outdoor environments in Ras Al Khaimah. It will, additionally, promote safety by replacing old equipment while reducing the use of hazardous substances. Environmental benefits, on the other hand, will come from better waste management practices, treatment and reuse of wastewater, use of electric and fuel-efficient vehicles and use of local plant species.

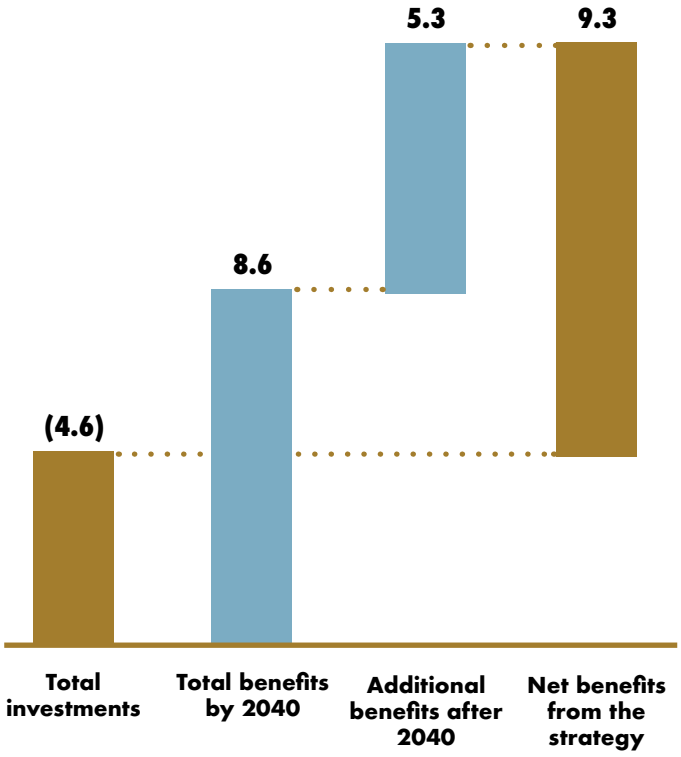


Figure 4: Benefits and costs of the EE&R Strategy (AED billion, present value in 2018)

2.3 EE&R Strategy Governance

A dedicated organisational set-up has been established to ensure effective strategy implementation. This includes Reem, the Energy Efficiency & Renewables Committee, and the government entities responsible for implementation of each of the programs and initiatives of the EE&R Strategy.

2.3.1 Reem

Reem, the Energy Efficiency & Renewables Office of Ras Al Khaimah Municipality, is the government office dedicated to driving and reporting on the implementation and continuous update of the EE&R Strategy. Its main organisational functions are the following:

Figure 5: Main functions of Reem

2.3.2 Energy Efficiency & Renewables Committee

The Energy Efficiency & Renewables Committee guides and supports Reem in the implementation of the EE&R Strategy. The committee met six times in 2022, to discuss the status of strategy implementation and the development of new initiatives.

The Chairperson of the committee is H.E. Munther Mohammed bin Shekar, Director General of Ras Al Khaimah Municipality.

Members of the Energy Efficiency & Renewables Committee

H.E. Munther Mohammed bin Shekar
Director General,
Ras Al Khaimah Municipality
Chairman

Ahmed Alsayed Ban
Executive Director,
PSD Works Agency
Member

H.E. Khaled Fadel Al Ali
Director General,
Public Services Department
Member

Mark Bruno
Executive Director,
PSD Wastewater Agency,
Member

H.E. Dr. Saif Al Ghais
Director General,
Environment Protection and
Development Authority
Member

Savvas Othon
Executive Director,
PSD Landscape Agency
Member

H.E. Eng. Esmaeel Hasan Al Blooshi
Director General,
Ras Al Khaimah Transport Authority
Member

Eyad Ismail
Group Director of Engineering,
Ras Al Khaimah Economic Zone
Member

Salim Bin Rabee'a
Executive Director,
Electricity Directorate,
Etihad Water and Electricity
Member

Nitin Johar
Chief Financial Officer,
Investment and Development Office
Member

Oussama Al Natour
Executive Director,
PSD Waste Management Agency
Member

Andrea Di Gregorio
Executive Director,
Reem, Ras Al Khaimah Municipality
Member and Secretary

2.3.3 Implementation Responsibilities

Each program of the EE&R Strategy is assigned to a Program Owner, selected based on its mandate and expertise. The Program Owner is the entity responsible for the overall execution of the initiatives of that program, and is accountable for the achievement of program targets and operational objectives. In most cases, supporting entities are also identified to assist the Program Owner through the activation of program enablers or the execution of some initiatives within the program. The Program Owners and supporting entities are shown in Figure 6.

Program	Program Owner	Support
1. Green Building Regulations	Ras Al Khaimah Municipality	RAKEZ
2. Building Retrofits	reem	IDO
3. Energy Management	reem	RAKEZ
4. Efficient Appliances	Ministry of Industry & Advanced Technology	reem
5. Efficient Street Lighting	Works Agency	Etihad Water & Electricity
6. Water Reuse & Efficient Irrigation	Wastewater Agency, Landscape Agency	reem
7. Solar Programs	reem	Waste Management Agency, IDO
8. Energy from Waste	Waste Management Agency	Wastewater Agency
9. Efficient Vehicles	RAK Transport Authority	reem, Etihad Water & Electricity

Figure 6: Program owners & supporting entities for all programs

H.E. Dr. Saif Al Ghais
Director General,
Environment Protection and Development Authority

"Energy efficiency and renewable energy are essential for our fight against climate change and environmental degradation. The Environment Protection and Development Authority supports the EE&R Strategy in raising awareness about the benefits of efficiency and through capacity-building programs such as the development of a green procurement policy."

Some supporting entities are assigned to develop and enhance cross-program enablers that support the foundations of multiple programs and the strategy as well. Figure 7 shows supporting entities for each strategy enabler.

Enabler	Supporting Entity
Awareness and Capacity Building	reem, RAKEZ, Environment Protection & Development Authority
Financing Mechanisms	Ras Al Khaimah Government Department of Finance, IDO
Research and Innovation	
Information Systems	Electronic Government Authority
Policy and Regulation	

Figure 7: Enablers and supporting entities

2.4 Progress & Achievements

2.4.1 Main Achievements over the course of the Strategy

Significant progress has been achieved towards the goals of the EE&R Strategy since its launch in 2018. A summary of these achievements is listed below:

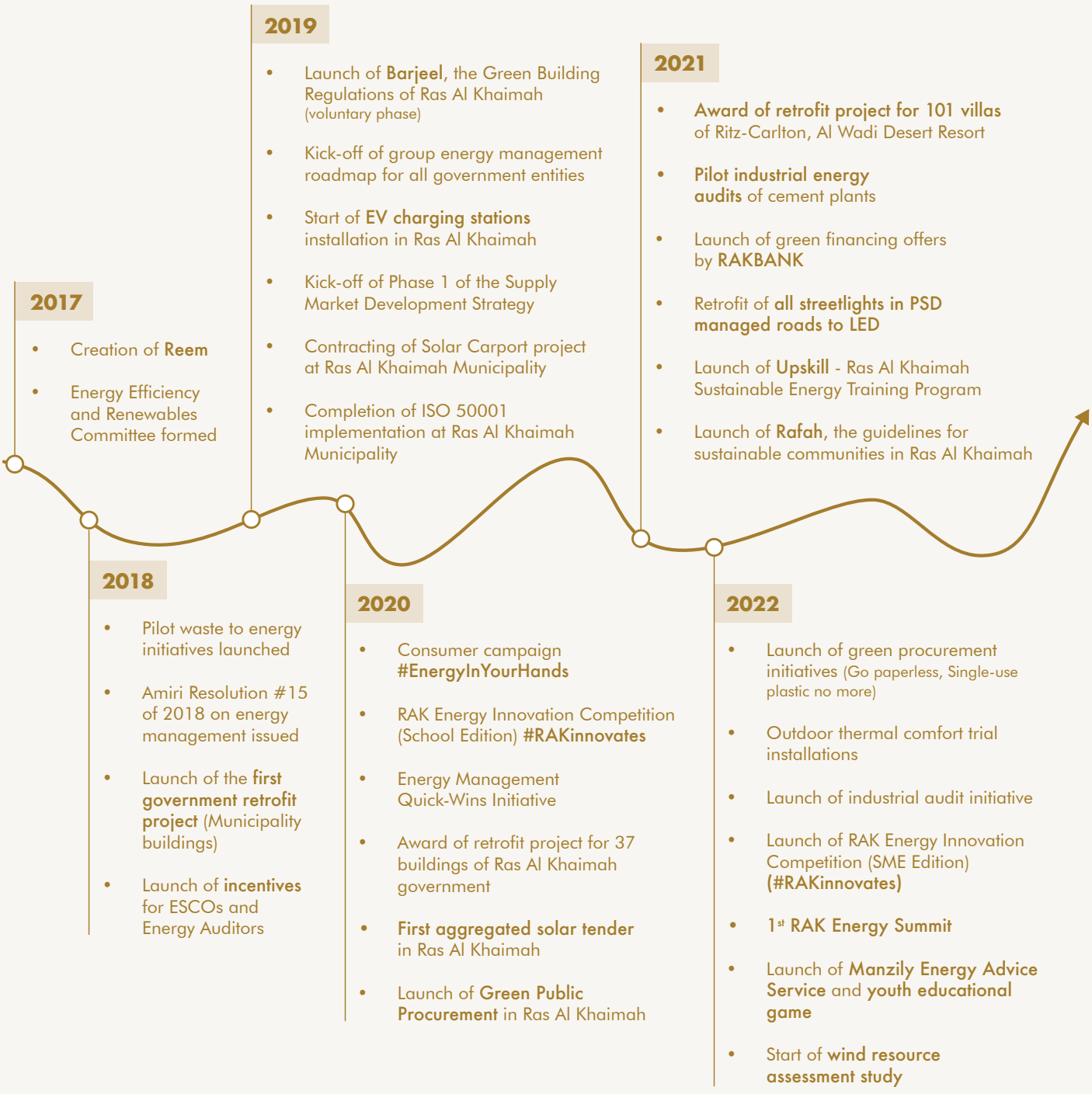


Figure 8: Initial acheivements of the EE&R Strategy by year end

The following roadmap is our expectation of future milestones in the strategy until 2040:

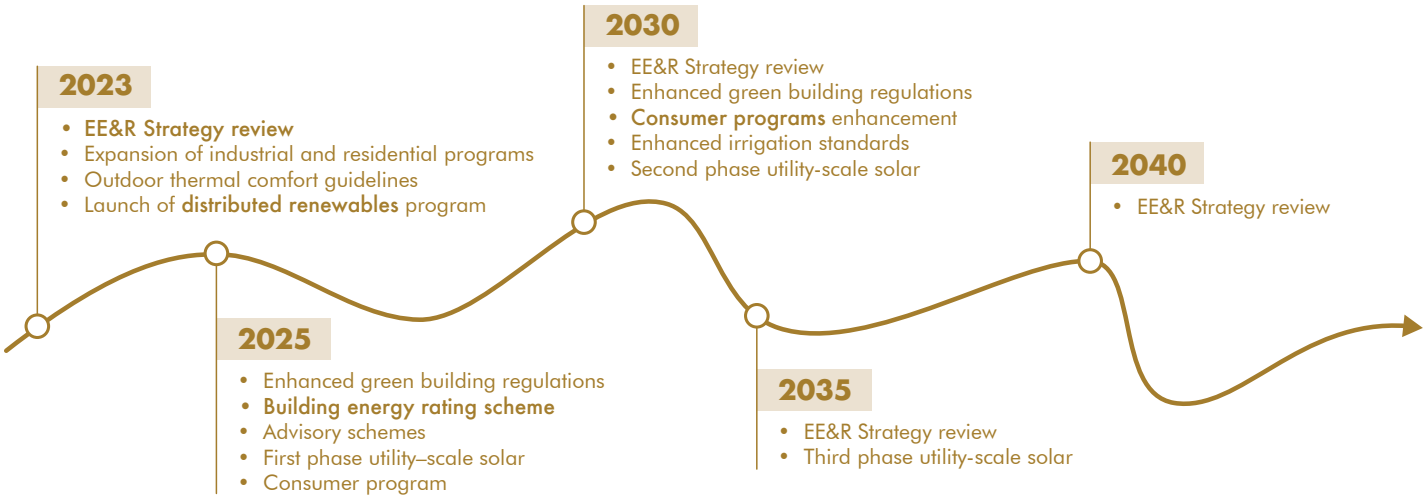


Figure 9: EE&R Strategy roadmap

2.4.2 Progress of Strategy Implementation in 2022

Implementation of the strategy has resulted in a series of achievements in 2022, the most notable of which are:

1. Completion of more than 700 Barjeel-compliant buildings in Ras Al Khaimah,

2. Contracting of more than 100 buildings for retrofits with more than 100 additional buildings in the pipeline,

3. Achievement of ISO 50001 (energy management system) certification for all Ras Al Khaimah government entities making it the first government in the world to do so,

4. Launch of an industrial audit initiative, with 7 initial participants representing about 40% of the total industrial electricity consumption of Ras Al Khaimah. 7 auditing companies were empaneled for the first phase of the initiative and,

5. Activation of a wind resource assessment study for Ras Al Khaimah.

These accomplishments represent a growing pipeline of projects expected to result in significant energy and water savings in the coming years. Apart from those listed above, several enablers were further enhanced to facilitate long-term success of the strategy. Notable ones among them include the following:

1. **Enhancing policy and regulation,** including completion of the first phase for the development of a building energy efficiency rating system, development of contracting standards for solar projects, street lighting standards, financing mechanisms for energy efficiency projects, and launch of green procurement initiatives such as "single-use plastic no more" and "go paperless";

2. **Raising awareness,** through the organisation of the first RAK Energy Summit, participation in multiple industry events, launch of an energy sustainability game (Manzily) to educate the youth on simple actions that can save energy and water in their home and an ongoing 'Energy Saving Tips' campaign;

3. **Building capacity,** including ongoing Barjeel training for engineers and consultants, development of a wider training program, Upskill, to enhance local capabilities in the field of energy efficiency and renewable energy, extension of business set-up incentives to renewable energy consultancies and SMEs in the fields of smart energy management and industrial IoT and launch of RAK Energy Innovation Competition (SME Edition) to attract innovative start-ups and SMEs to address regional challenges in the fields of energy management, industrial efficiency and decentralised energy systems; and

4. **Leveraging information systems,** including the GIS Center's spacial analytics services, their SDI database of geospatial information, and Reem's own energy model to measure and verify energy savings and greenhouse gas emissions, and conduct studies on the potential for various forms of renewable energy across the emirate.

2.4.3 Energy & Water Savings

In total, over 97 GWh of electricity and nearly 1.5 million m^3 of water were saved in Ras Al Khaimah throughout 2022. All programs are now showing firm results in terms of savings. Apart from electricity and water, direct savings of 350 GWh thermal of fossil fuel energy were achieved by the Energy from Waste and Efficient Vehicles Programs. These direct savings of fossil fuels are equivalent to more than 13,000 cars being taken off the road for a year. A detailed breakdown of the measured and verified savings by program is provided in Figure 10.

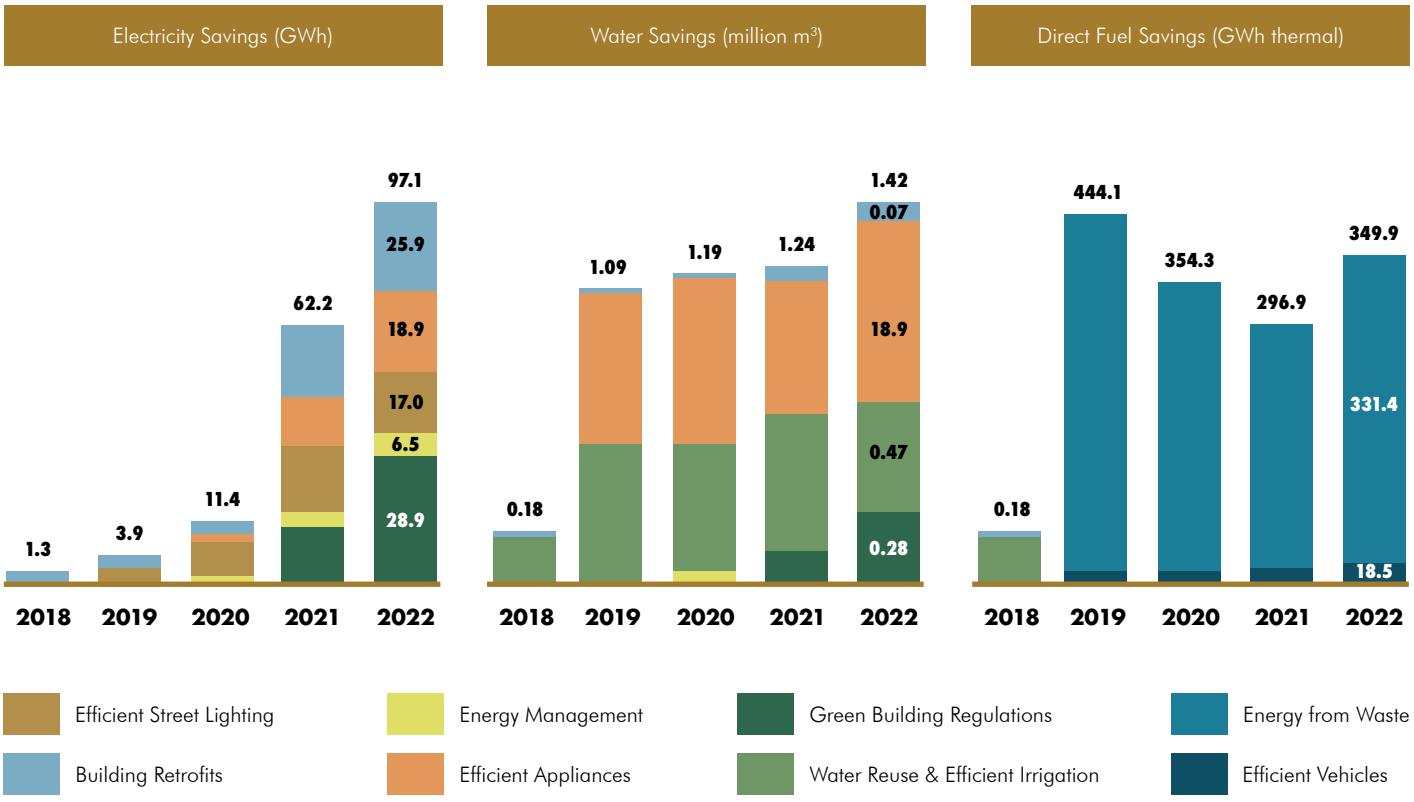


Figure 10: Annual energy and water savings achievements by program

2.4.4 Greenhouse Gas Inventory

Ras Al Khaimah completed a GHG inventory for the year 2021, in accordance with the GHG Protocol for Cities. The BASIC level of reporting was adopted, covering three main target sectors: stationary energy use (i.e. buildings), internal transportation and waste generated in Ras Al Khaimah. In addition to the requirements of the BASIC level, emissions from industrial processes (referred to as IPPU) were also estimated and included for 2021. Notable exclusions are emissions from international transportation, land use, agricultural activities and GHG capture by vegetation.

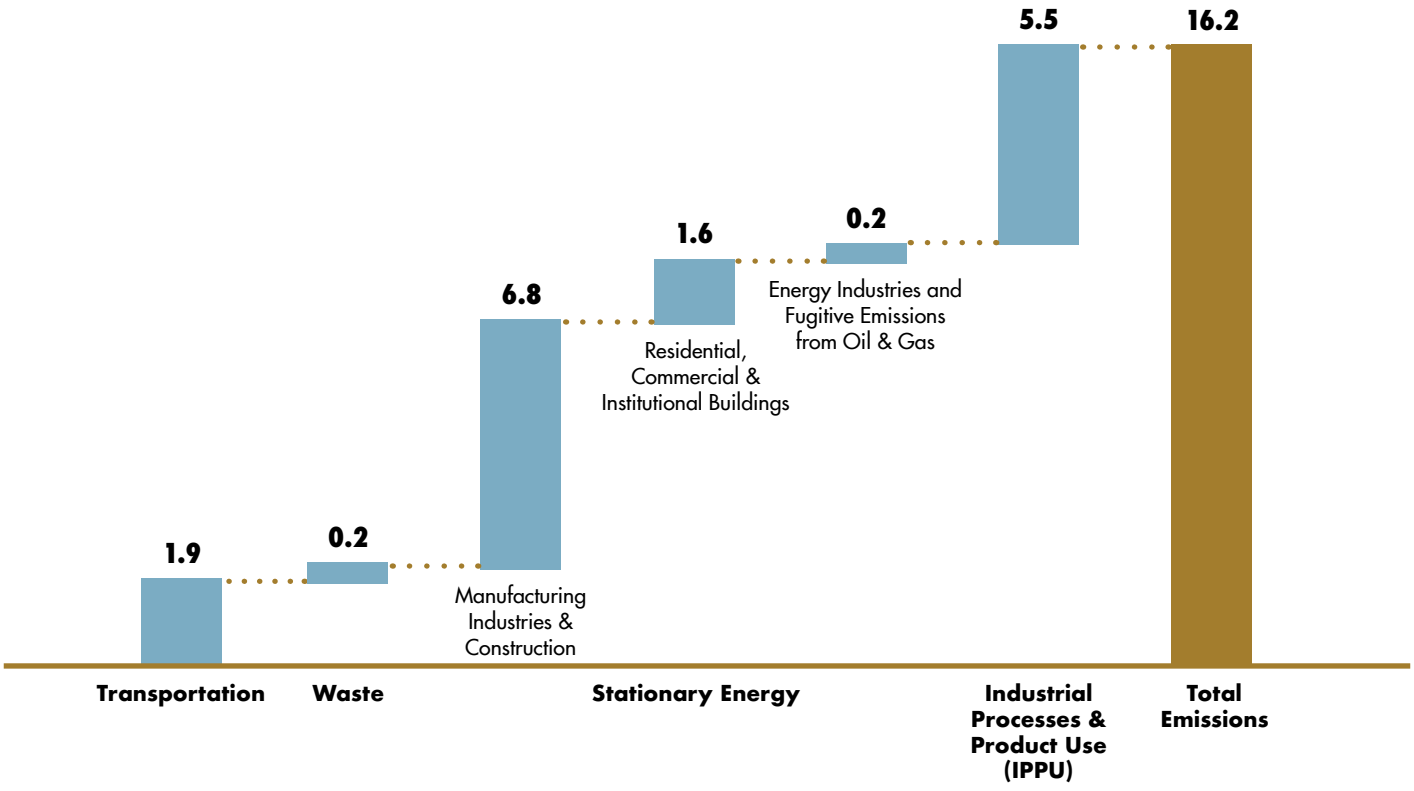
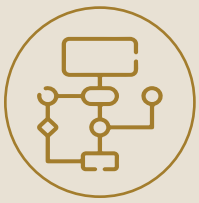


Figure 11: Carbon Footprint of Ras Al Khaimah by sector in 2021 (million tonnes of CO_2 equivalent)

3
THE NINE PROGRAMS



3.1 Green Building Regulations

Program Owner: بلديـــــة رأس الخيمـــــة Ras Al Khaimah Municipality

Supporting Entity: rakez RAS AL KHAIMAH ECONOMIC ZONE

Abdulla Samhan
Executive Director, Urban Planning and Development Sector, Ras Al Khaimah Municipality

Barjeel, the Green Building Regulations of Ras Al Khaimah, sets minimum sustainability standards for new buildings in the emirate. Buildings permitted under these standards are expected to consume 30% less energy and water compared to a typical building in Ras Al Khaimah, resulting in lower utility bills.

As of 2022, more than 1,800 Barjeel-compliant buildings have been built with more than 6,200 permitted for construction in the coming years. In 2022, we have initiated development of a building energy rating system. This system will be used to incentivise improvement of both new and existing buildings by providing recognition to highly energy-efficient buildings in the market.

The first phase of this project (development of a regulatory approach) has been completed in 2022 and we are now in the second phase of survey and analytical modelling which will support the detailed design. Going beyond buildings, the Municipality has developed guidelines for sustainable communities addressing the public realm in communities across four areas of improvement: livability and mobility, energy, water and resource efficiency. These guidelines, along with new urban planning guidelines will be implemented over the coming years following testing at a pilot community. Project execution is underway with a dedicated team comprising experts from the Municipality and Public Services Department.

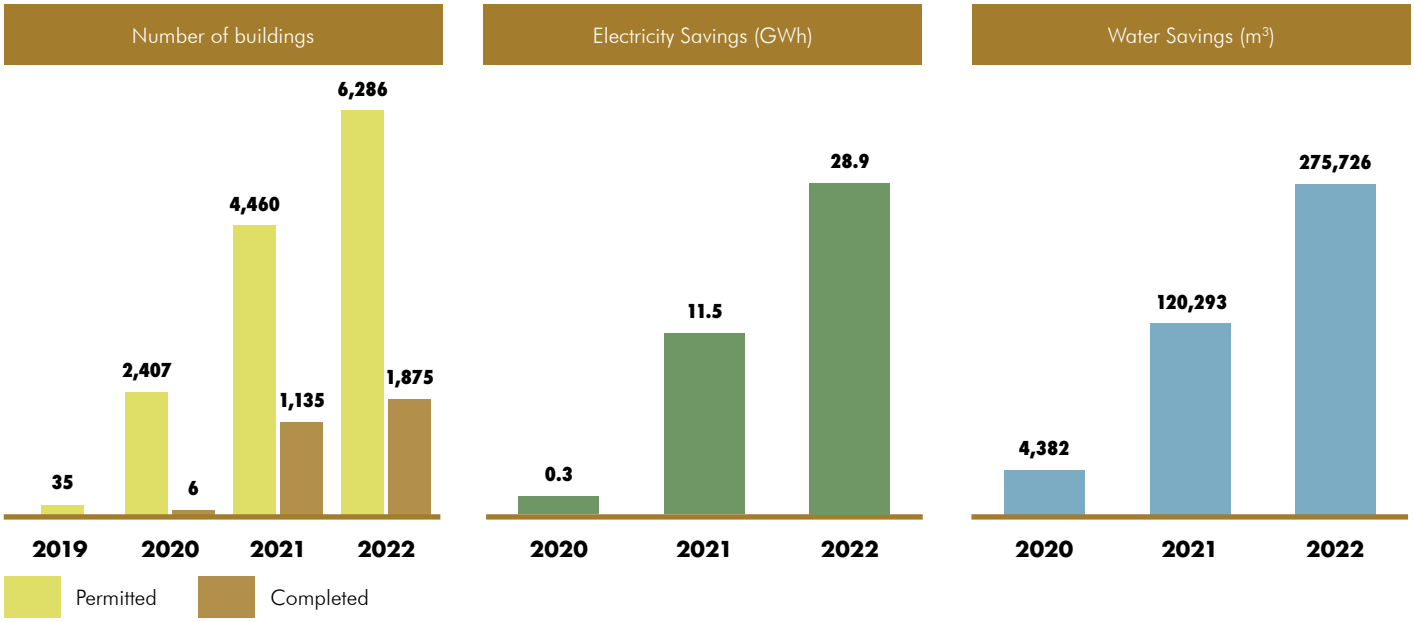


Figure 12: Number of buildings permitted and completed in accordance with Barjeel (cumulative)

3.2 Building Retrofits

Program Owner: Ras Al Khaimah Municipality – reem

Supporting Entity: IDO Investment & Development Office of Ras Al Khaimah

Pablo Izquierdo
Manager, Energy Services, Reem, Ras Al Khaimah Municipality

The Building Retrofits Program was established with the purpose of generating energy savings in existing buildings through comprehensive retrofits focused on major energy consuming systems. The program has developed rapidly following a first project in 2018. At the end of 2022, ongoing retrofit projects included Phase 3 of the Department of Finance retrofit project (22 buildings), AURAK campus (19 buildings), Phase 2 of the Ritz Carlton Wadi Desert Resort (70+ buildings) and 1 building of RAK Bank.

Future projects include a retrofit of RAK Airport and a large pipeline of 100+ semi-government buildings.

Ras Al Khaimah's ESCO Accreditation Scheme continued to support the local market by verifying the expertise and financial stability of Energy Service Companies (ESCOs) in the market. Reem's retrofit project tenders are only issued to accredited ESCOs. At the end of 2022, 24 ESCOs were accredited, the list of which is available on the Reem website.

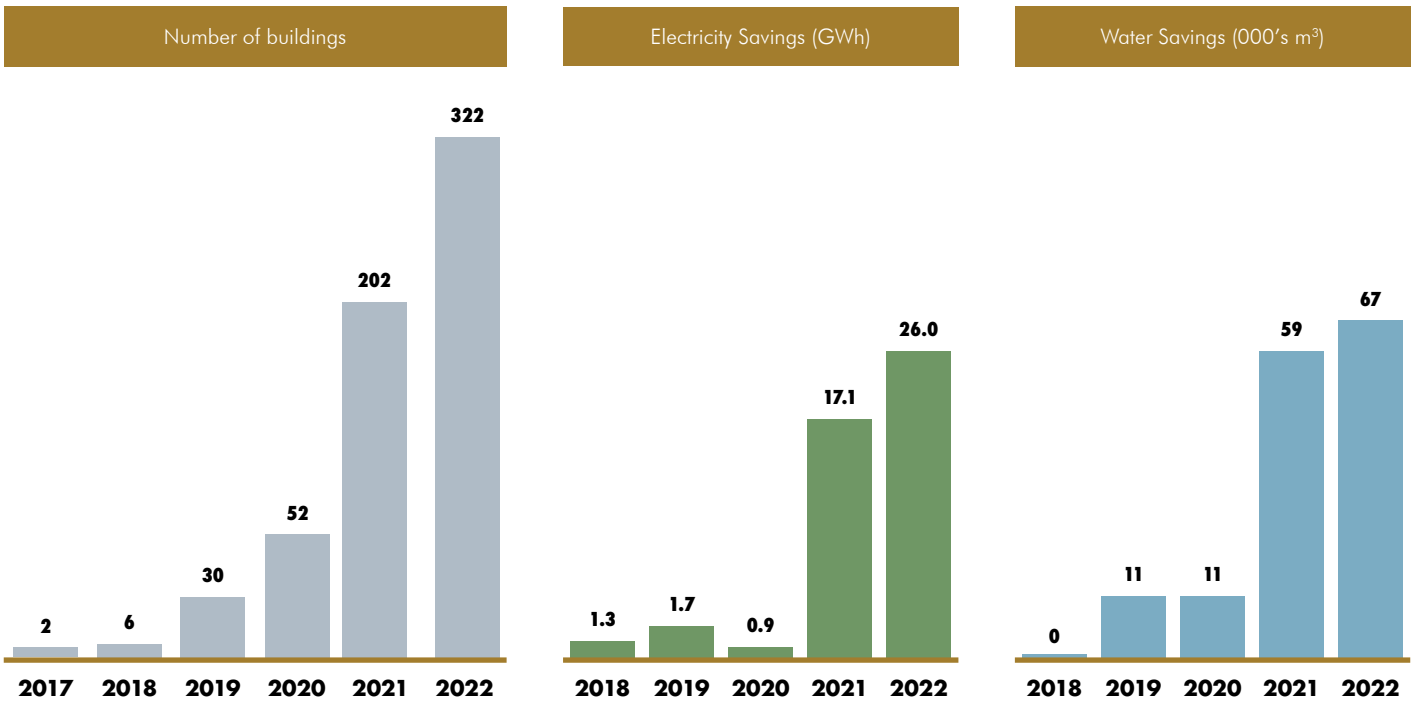


Figure 13: Number of buildings contracted for retrofits (cumulative)

While these programs address the commercial and government sectors. Reem is working towards promoting energy efficiency in the residential sector.

A new initiative was launched in 2022 under the name of Manzily Energy Advice Service, which foresees the provision of free energy advice for homeowners.

Homeowners can benefit from a quick assessment of opportunities for home improvements towards energy and water savings, improved indoor air quality, thermal comfort and noise insulation. The assessment is conducted by an expert nominated by Ras Al Khaimah Municipality, while implementation of recommendations is supported through a database of suppliers and contractors.

"We were pleased with the Municipality's new Home Energy Advice Service at our home. The session was effective and quicker than expected. The auditors were competent and polite, and with their help we identified many improvements that we would have missed otherwise. We recommend this service to anyone who wants to improve and modernise their home."

Abdullah Mohammad Ahmed Aqeel
Homeowner, Ras Al Khaimah

3.3 Energy Management

Program Owner: Ras Al Khaimah Municipality – reem

Supporting Entity: rakez – Ras Al Khaimah Economic Zone

Mahra Alhoot
Energy Engineer, Reem,
Ras Al Khaimah Municipality

The Energy Management Program aims to promote more systematic energy management practices such as those defined by ISO 50001, in high-energy users in the industrial, commercial and government sectors of Ras Al Khaimah.

The EE&R Strategy envisages the government as a champion of energy management practices. As a result, by the end of 2022, 20 entities of the Government of Ras Al Khaimah achieved the ISO 50001 energy management certification making Ras Al Khaimah Government the first in the world to achieve this certification for all its entities. Reem has supported these government entities in establishing best practices in energy management and green procurement, through a combination of training, advisory and project management (Upskill program).

Detailed guidelines on implementation of ISO 50001-compliant energy management systems are under development and are expected to be released in 2023.

Industries in Ras Al Khaimah are being addressed through the recently launched Industrial Energy Audit Initiative which aims to support local companies in identifying opportunities for energy savings and reduction of emissions. Reem engages with local industrial companies through voluntary agreements, offering support for specialised audits and a knowledge sharing platform in exchange for an obligation of participants to report on energy consumption and implementation of identified energy efficiency measures. Several expert industrial auditors have been empanelled by Reem to conduct these audits for a variety of sectors such as quarries, cement, ceramics, glass, packaging, and more. At the start of this initiative, seven main industries, representing about 40% of the industrial electricity consumption, committed their participation and audits of their facilities are in progress.

FTI Falcon Technologies International · SR Stevin Rock · RAK Rock · Future Glass · Eternity Technologies · RAK Ports · RAK Ceramics

Figure 14: First participants in the Industrial Energy Audit Initiative

Deep-dive: Energy management in the Government of Ras Al Khaimah

Adoption of energy efficiency in the government was mandated through a directive, Amiri Resolution No. 15 of 2018, setting an overall target of 20% energy and water savings by 2022, compared to a 2017 baseline for all government entities and state-owned enterprises.

Immediate action was taken to retrofit the main buildings of the Municipality and of RAKEZ, the free zone, in 2018-2019.

The onset of the pandemic, in 2020, offered the opportunity to focus more on consumption behaviours, taking advantage of some new opportunities, such as reduced use of office spaces due to the introduction of remote work. A coordinated approach led to the adoption of quick-wins, resulting in about 10% energy savings on a whole-government basis with nearly no investment. These results encouraged participating entities to take more durable steps, through the implementation of complete energy management systems (EnMS) in line with ISO 50001. These include, among others, energy policies, targets, monitoring and reporting tools, periodic audits, monthly workshops, and management meetings to ensure that the pursuit of energy optimisation opportunities are part of the planning and management processes of each organisation.

In parallel, the retrofit of government buildings was accelerated. A group sourcing approach was adopted to retrofit 46 buildings of the government, through energy performance contracting. The approach brought economies of scale and allowed to include in the scope even smaller buildings that were not targetable individually. A total investment of AED 14 million was made, guaranteeing a payback in 3.5 years.

As a result of the improvements in assets and consumption behaviours, overall savings of 23.5% were achieved on the utility bills vs. the 20% target. Equally important, in view of future developments and continuous improvement, was the upgrade of organisational capabilities in energy management. As a result, by the end of 2022, 20 entities of the Government of Ras Al Khaimah achieved ISO 50001 energy management certification, making **Ras Al Khaimah government the first in the world to achieve this certification for all of its entities.**

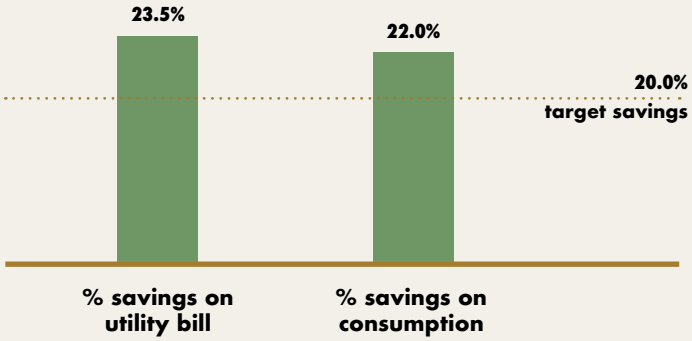


Figure 15: Savings in government vs. Amiri Resolution No. 15 of 2018 target

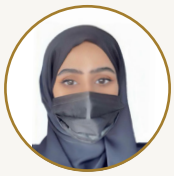
Figure 16: Government entities that are ISO-50001 certifed by end of 2022

Energy Principals of Ras Al Khaimah Government

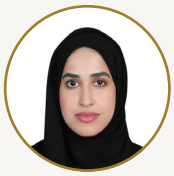
Ahmed Sharara
Environment Protection and Development Authority

Alexander John
Department of Civil Aviation

Ammar Zuhair
General Resources Authority



Amna Alshehhi
Mohammed Bin Saud Al Qasimi Foundation



Athari Alneaimi
Ras Al Khaimah Customs Department

Awatef Embasi
Public Prosecution Department

Ebrahim Albelooshi
Department of Protocol and Hospitality

Jawaher Alshehhi
Electronic Government Authority

Jehan Al Kurdi
Ras Al Khaimah Government Media Office

Jessielyn Aduana
Sheikh Saud bin Saqr Al Qasimi Foundation for Policy Research

Khadija Al Shehhi
Antiquities and Museums Department

Khaled Issa
Department of Finance

Mayed Al Shamsi
Ruler's Court

Amna Al Malek
Ras Al Khaimah Human Resources Department

Nawal Alshimely
Ras Al Khaimah Courts Department

Fatemah Altenaiji
Ras Al Khaimah Center for Statistics and Studies

Riyadh Naeem
Emirates Club

Samer Jamoul
Ras Al Khaimah Municipality

Samira Sulaiman
Ras Al Khaimah Public Services Department

Vishnu Girija
Ras Al Khaimah Chamber of Commerce

Yaqoob Al Zaabi
Ras Al Khaimah Department of Economic Development

3.4 Efficient Appliances

Program Owner: UNITED ARAB EMIRATES MINISTRY OF INDUSTRY & ADVANCED TECHNOLOGY

Supporting Entity: Ras Al Khaimah Municipality, reem

H.E. Dr. Farah Al Zarooni
Assistant Undersecretary, the Standards and Regulations Sector, UAE Ministry of Industry and Advanced Technology (MoIAT)

Over 20% of electricity consumed in Ras Al Khaimah is attributed to the use of major household appliances such as air-conditioners, refrigerators/ freezers, washing machines, and water heaters. The UAE Ministry of Industry and Advanced Technology (MoIAT) is responsible for establishing energy and water efficiency standards across the UAE. In support of this initiative, a comprehensive "Efficient Appliances Program" is adopted in the emirate of Ras Al Khaimah promoting highly efficient appliances to maximize the benefits from these efficiency standards.

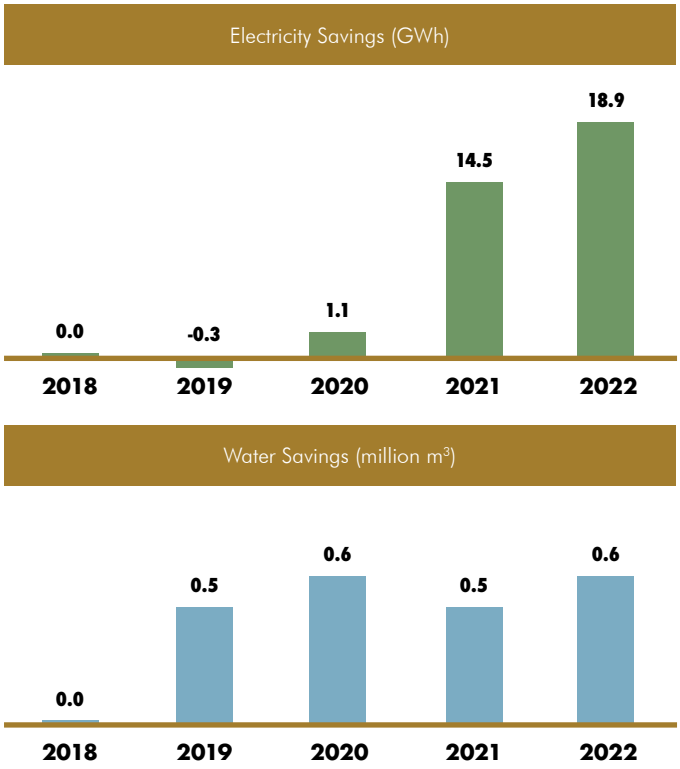


Figure 17: Energy and water savings from enforcement of efficient appliance standards

The "Efficient Appliances Program" is primarily driven by the performance standards enforced by MoIAT under the Energy Efficiency Standards and Labeling (EESL) program. The EESL program strategically combines Minimum Efficiency Performance Standards (MEPS), requiring appliances to meet minimum performance levels to be allowed entry into the UAE and comparative labeling. Launched in 2011 to regulate room air-conditioners, the EESL program has expanded to cover 11 major household appliances such as washing machines, dryers, water heaters, TVs, lighting, commercial air-conditioners, and water fixtures. Comparative labeling rates these appliances based on their performance (1-5 stars, 5 being the most efficient) to empower consumers in making smart decisions during purchase. These standards are regularly

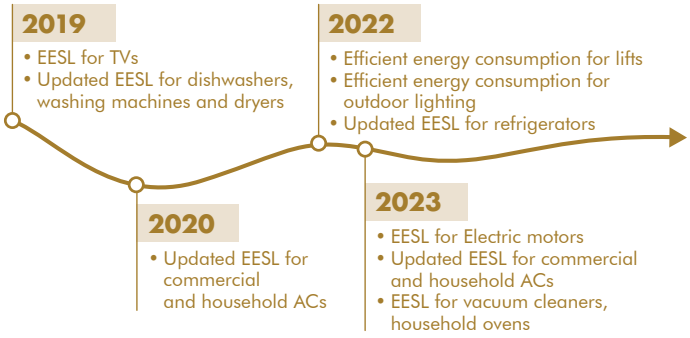


Figure 18: Timeline of EESL issuance and update

evaluated and levels updated to ensure up-to-date testing and performance levels requirements at par with international markets. A key driver for the success of this program is public awareness. The Municipality is running an "Energy Savings Tips" campaign to inform residents on the importance of appliance efficiency. New initiatives such as the Manzily game and the Manzily Energy Advice Service also support public awareness.

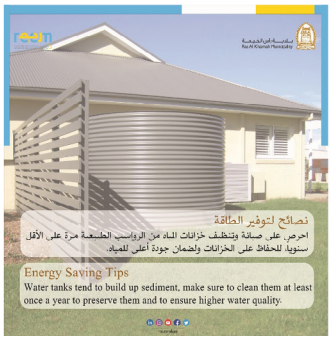


Figure 19: Examples of energy saving tips

3.5 Efficient Street Lighting

Program Owner: مؤسسة الأشغال Works Agency

Supporting Entity: الاتحاد للماء والكهرباء Etihad Water & Electricity

Ahmed Alsayed Ban
Executive Director,
Works Agency,
Public Services Department

Urban communities benefit from street lighting through enhanced road safety and outdoor comfort. With this in mind, Ras Al Khaimah Vision 2030 targets achieving 65% coverage of street lighting across all roads in Ras Al Khaimah.

Today, more than 400 km of lit roads across Ras Al Khaimah are managed by the Works Agency of the Public Services Department. All existing streetlights under PSD management have been replaced with LEDs. In 2022, new streetlights were installed on 8 km of a new road approaching Jebel Jais from Wadi Haqeel.

While most public roads are managed by the Works Agency, about 97 km of roads in industrial zones and private master communities are managed by RAKEZ, RAK Ports and other master developers. These have largely already adopted efficient street lighting practices, with 87% of their streets lit with LEDs. RAKEZ street lights are also integrated with dimmers, resulting in additional savings.

On the regulatory front, internal standards for street lighting were developed by the Works Agency. These standards consider both the energy efficiency of lighting as well as light pollution reduction and have been applied to all new street lighting projects starting from 2022.

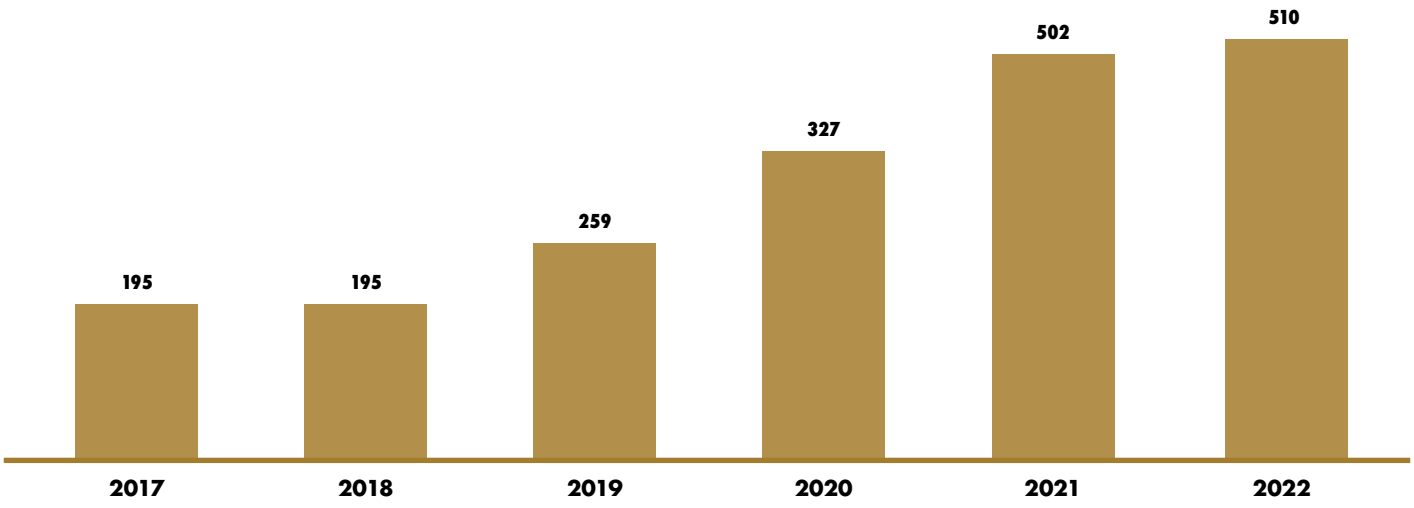


Figure 20: Roads with efficient LED street lighting (km)

3.6 Water Reuse & Efficient Irrigation

Program Owner:

Supporting Entity:

Mark Bruno
Executive Director,
Wastewater Agency
Public Services Department

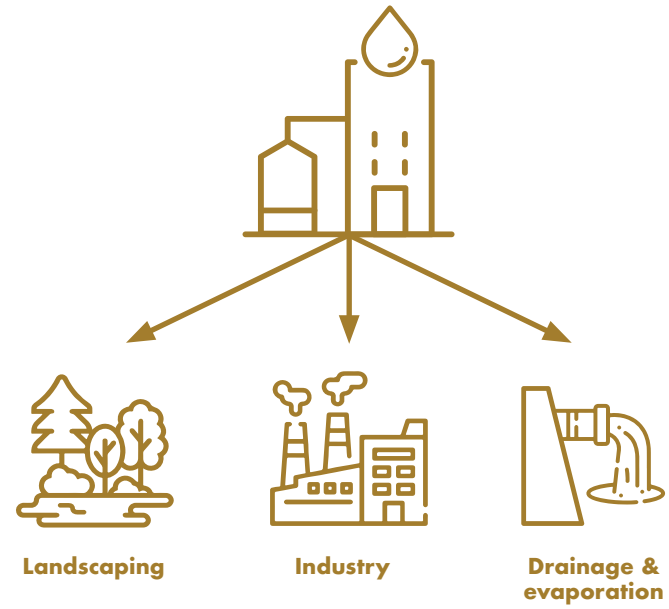
Savvas Othon
Executive Director,
Landscape Agency
Public Services Department

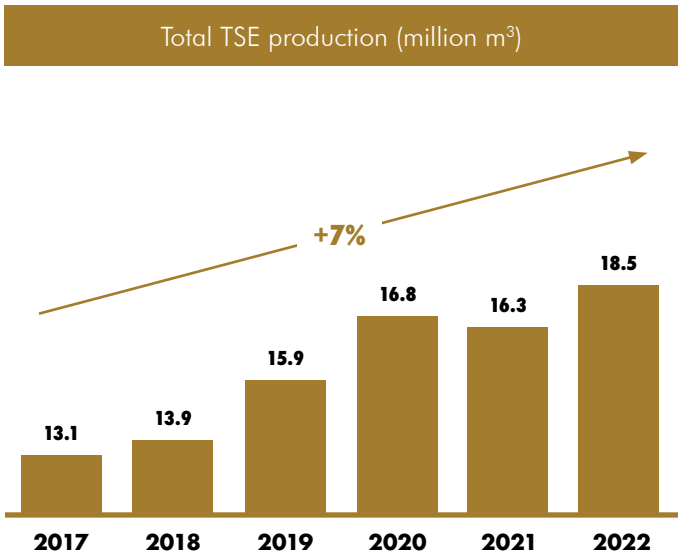
The Water Reuse and Efficient Irrigation Program promotes efficient landscaping and irrigation practices and subsequently more effective use of treated wastewater (TSE). The program targets 95% reuse of TSE by 2030 in support of Ras Al Khaimah Vision 2030.

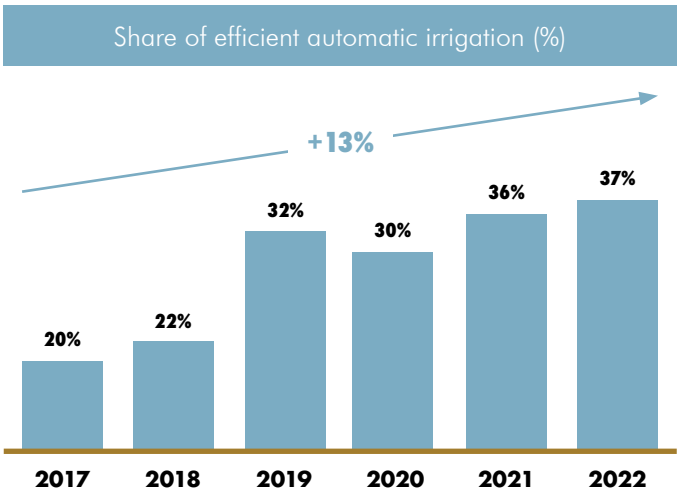
The Wastewater Agency has initiated Phase 1 of an emirate-wide wastewater and Treated Sewage Effluent (TSE) masterplan. This phase includes approximately 50 km of primary TSE network in Sector 6 of Ras Al Khaimah, and a new Centralised Wastewater Treatment Plant. This TSE network will connect to existing networks in residential and mixed-use developments like Marjan Island, Al Hamra and Mina Al Arab creating a single integrated network forming the backbone for further TSE network expansion in these areas in the future. The construction of a TSE reverse osmosis polishing plant under construction by a private sector partner is nearly complete and is expected to begin operations in the third quarter of 2023.

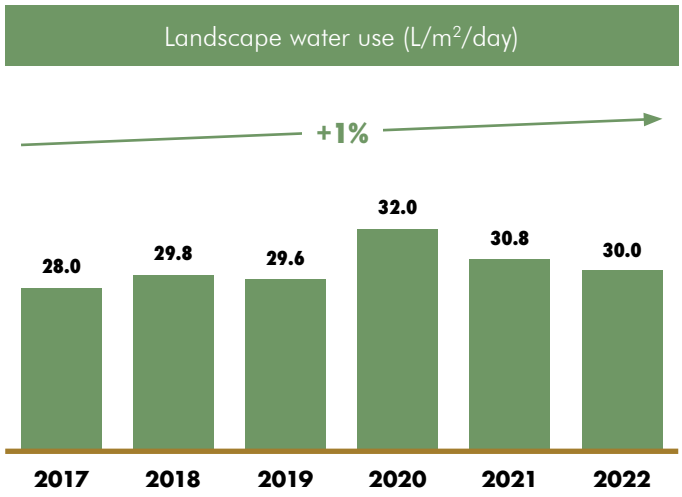
This is expected to boost TSE usage, by allowing it to be used for additional industrial purposes.

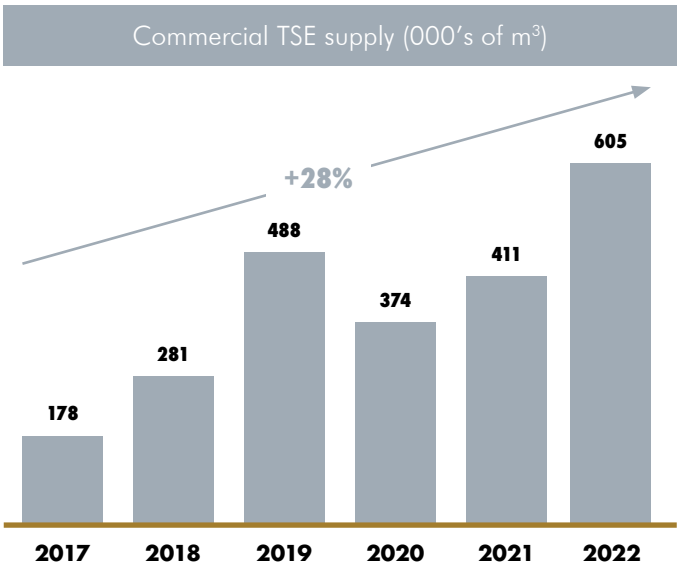
On the landscaping front, the Landscape Agency continued to deploy efficient landscaping projects in 2022. Work was begun on developing a Public Landscaping Manual, that will standardise and guide the deployment of landscaping and greenery in public spaces across the emirate.











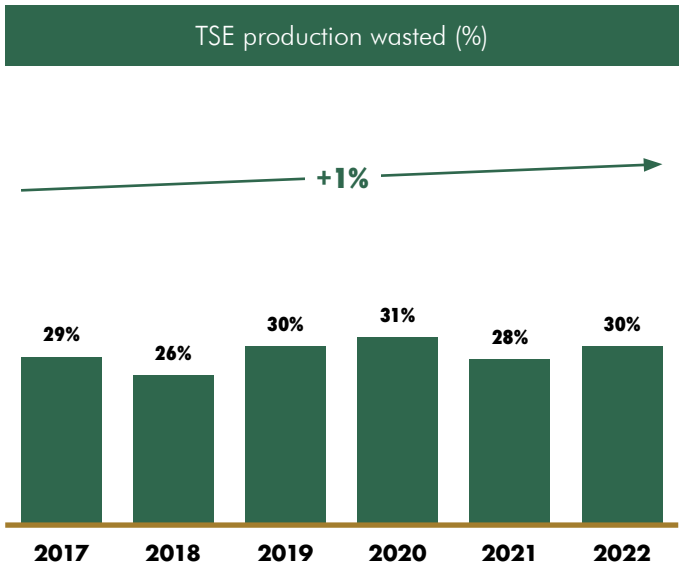


Figure 21: Wastewater flows in Ras Al Khaimah

3.7 Solar Programs

Program Owner: Ras Al Khaimah Municipality – reem

Supporting Entity: Waste Management Agency; IDO Investment & Development Office of Ras Al Khaimah

Utkarsh Jain
Manager,
Renewable Energy, Reem,
Ras Al Khaimah Municipality

The Solar Programs aim to leverage the potential of Ras Al Khaimah's abundance in solar irradiation for cost-effective electricity supply through regulatory enablers, pilot projects and capacity building initiatives. We have set an ambition to reach 1,200 MWp of installed renewable energy capacity in Ras Al Khaimah by 2040, of which 600 MWp is expected to come from distributed installations and the remaining from utility-scale projects.

Our first distributed renewables installation, a 230 kWp solar carport at the Municipality head office, continues to supply about 15% of the building's energy needs.

The most important renewable energy development in 2022 was the issuance of Federal Decree-Law No. 17 of 2022. The law mandates the creation of provisions to facilitate the connection of distributed renewables to Etihad Water and Electricity (Etihad WE)'s network. With this law, we expect the market for grid-connected distributed renewables to open up in the Northern Emirates, including Ras Al Khaimah.

In the meantime, provisional permissions have been granted for zero-export distributed solar projects at Emirates National School and RAK Academy. Of these, one installation of about 800 kWp was completed and operational in 2022 in the Ras Al Khaimah branch of Emirates National School.

Many new buildings completed in 2022 are also ready for future solar installations, given the solar readiness requirements set out in Barjeel. Other applications of renewable energy are also being explored. In 2022, Reem initiated a wind resource assessment study to measure the wind speed in areas of high potential. Stage 1 of the study, a desktop assessment, is completed and Stage 2 will begin in 2023 with installation of a first wind mast for detailed on-site measurement of wind at a selected location.

In 2022, preliminary studies were also initiated on the potential for geothermal energy and agrivoltaics in Ras Al Khaimah, some of which are expected to result in pilot projects in the coming years.

3.8 Energy from Waste

Program Owner: مؤسسة إدارة المخلفات Waste Management Agency

Supporting Entity: مؤسسة الصرف الصحي Wastewater Agency

Oussama Al Natour
Executive Director,
Waste Management Agency,
Public Services Department

The Waste Management Agency is responsible for the safe and timely collection, recycling, treatment, and disposal of all solid waste generated in Ras Al Khaimah. The Energy from Waste Program of the EE&R Strategy was developed as an integral part of the waste management strategy of the emirate.

The program aims to convert waste into energy using a variety of technologies, including:
Fuel production: Several waste streams, such as camel waste, wood waste, waste tires, used cooking oil, and textile waste, are already being processed into fuels for local cement plants.
Medical waste incineration: A dedicated medical waste incineration facility (MIF) will be commissioned in 2023.
Refuse-derived fuel (RDF): This technology converts municipal solid waste into a fuel that can generate electricity or heat. Public-Private-Partnerships (PPP) are being sought for a project.

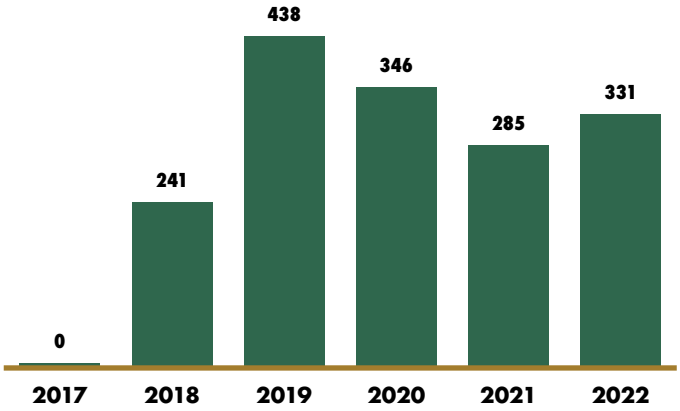


Figure 22: Primary energy from waste (GWh thermal)

Composting: This process converts organic waste into humus, which can be used as a soil enhancer. The Waste Management Agency is evaluating technology to directly convert organic waste into fertilizers through fermentation. Composting services are provided across medium-large hotel(s) along with Food Hubs operated by the Waste Management Agency.

The program also includes a focus on waste segregation, which is essential for the success of the Energy from Waste Program. An upgraded materials recovery facility completed in 2020 has enabled the initial segregation of municipal solid waste and the recovery of valuable materials, including potential fuel sources. However, achieving proper segregation in Ras Al Khaimah requires a long-term regulatory and enforcement journey.

The Energy from Waste Program is integral to Ras Al Khaimah's efforts to reduce its environmental impact and achieve its sustainability goals. The program has the potential to generate significant amounts of energy from waste while also reducing the amount of waste sent to landfills.

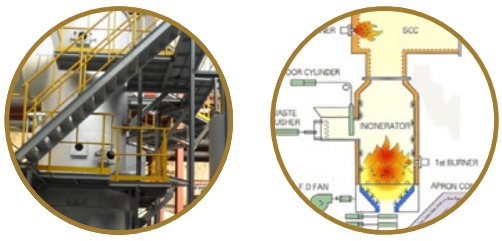


Figure 23: Medical waste incinerator in Ras Al Khaimah

3.9 Efficient Vehicles

Program Owner: هيئة رأس الخيمة للمواصلات RAK TRANSPORT AUTHORITY

Supporting Entity: Ras Al Khaimah Municipality, reem, الاتحاد للماء والكهرباء Etihad Water & Electricity

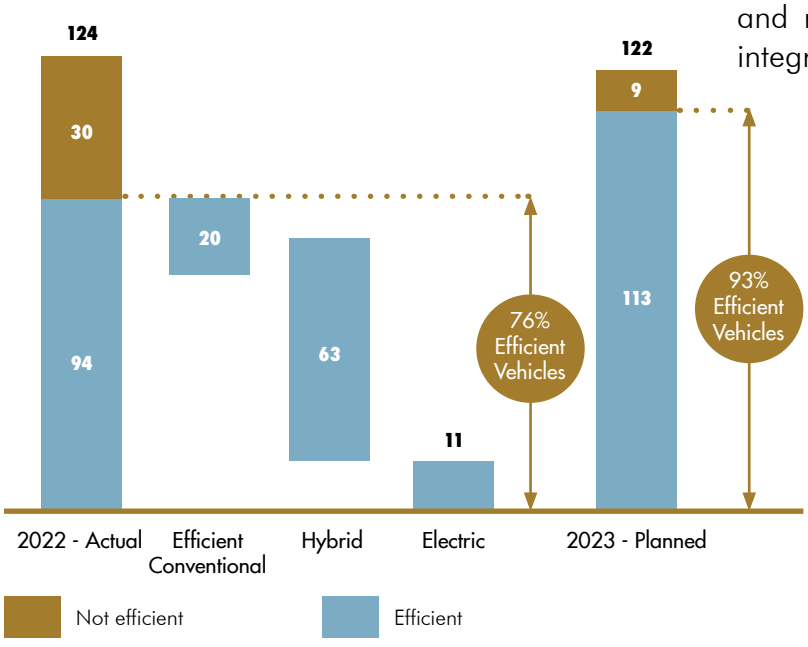
H.E. Eng. Esmaeel Hasan Al Blooshi
Director General, Ras Al Khaimah Transport Authority

The Efficient Vehicles Program addresses energy efficiency in the transportation sector of Ras Al Khaimah by promoting the use of vehicles with lower energy consumption including conventional fuel-efficient, hybrid and electric vehicles. By encouraging early adoption of electric and hybrid vehicles in the emirate, the program targets 50% penetration of EVs and hybrids in the total vehicle sales in Ras Al Khaimah by 2040.

As of 2022, a total of 22 charging stations have been installed across Ras Al Khaimah. A map of all public electric vehicle charging stations in Ras Al Khaimah is available on the Reem website and is continuously updated.

Owners and operators of public charging stations in Ras Al Khaimah may have their stations advertised on the map free of charge by sending a request to Reem. Use of electric vehicles continues to be incentivised through discounted insurance rates and free charging at the 10 charging stations that belong to EtihadWE.

Of the 124 vehicles procured by the Government of Ras Al Khaimah in 2022, 76% were efficient, including 60% electric and hybrid vehicles. These numbers are expected to improve further as the Green Public Procurement guidelines establish higher criteria on light vehicle purchases in the government. Reem continues to facilitate such purchase decisions through market research and maintenance of a vehicle database and an integrated cost-comparison tool.



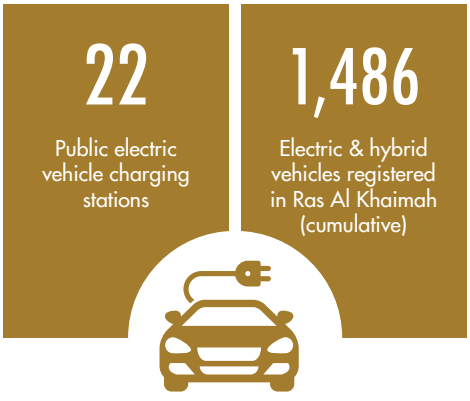


Figure 24: Government vehicle purchases in 2022 and planned purchases in 2023

Figure 25: Intracity buses in Ras Al Khaimah

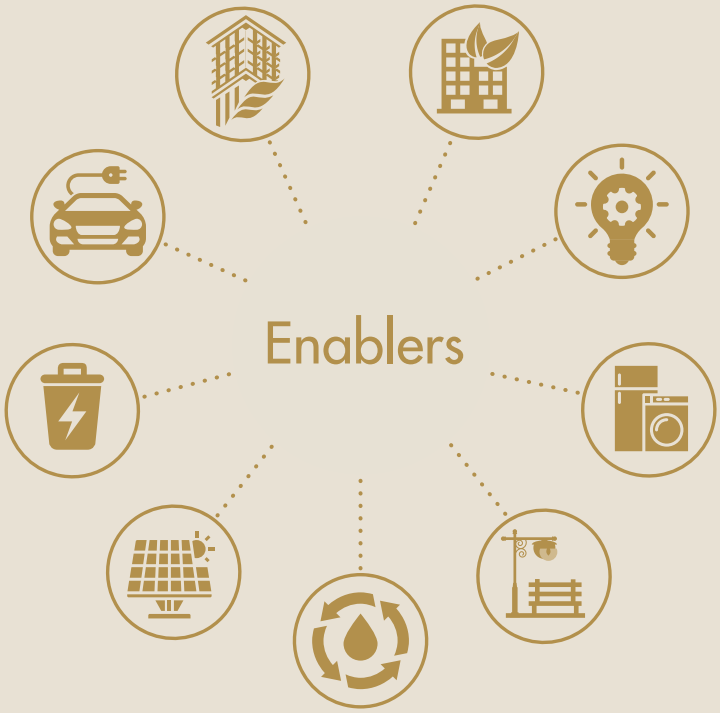
Figure 26: Map showing all public electric vehicle charging stations in Ras Al Khaimah

There is a need to go beyond these achievements to fully capture the potential for efficiency and emissions reduction in the transportation sector. Ras Al Khaimah Transport Authority, with its vision to become a pioneer in sustainable transportation and to create a more vibrant and livable sustainable city, is developing RAK Mobility Masterplan 2023-2030, a strategy for sustainable public transportation that leverages technology, infrastructure and operational advancements.

In 2022, a first set of intracity bus lines have been activated in priority areas, with plans for future expansion.

4

THE ENABLERS



4.1 Awareness: Events & Media Coverage

Program Owner: Ras Al Khaimah Municipality – reem

Ruqiya Shariff
Manager, Awareness & Capacity Building, Reem, Ras Al Khaimah Municipality

Under the patronage and presence of His Highness Sheikh Saud bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah, RAK Municipality hosted the first RAK Energy Summit held over 2 days in October 2022 with high-ranking officials, experts and decision makers in the energy field, from the UAE and around the world. The summit, held under the theme of "Creating and contributing to the energy efficiency and renewable energy goals of the future" was supported by the UAE Ministry of Energy and Infrastructure, the UAE Ministry of Climate Change and Environment, the International Renewable Energy Agency (IRENA), the United Nations Industrial Development Organization (UNIDO), Masdar, and more than 10 government entities in Ras Al Khaimah.

Both days saw strong attendance and participation by government leaders and business executives from the UAE and abroad. Over 900 delegates were in attendance over the two days. The first day was opened with an inspiring speech by His Highness Sheikh Saud bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah, while Her Excellency Mariam bint Mohammed Almheiri, UAE Minister of Climate Change and Environment opened the second day of the summit. Keynote speeches were delivered by H.E. Sharif Al Olama, Undersecretary for Energy and Petroleum Affairs, UAE Ministry of Energy and Infrastructure and by H.E. Munther Mohammed bin Shekar, Director General of Ras Al Khaimah Municipality. The summit included panel discussions and presentations on the future of energy sustainability and renewable energy, shedding light on local and international efforts to curb climate change and shape a better future.

Some key highlights included the presentation of the UAE Energy Management Leadership Awards for 2022 by the UAE Ministry of Energy and Infrastructure. Ras Al Khaimah Municipality was awarded first place, while ADNOC Onshore and ADNOC Offshore were awarded second and third places respectively. The second day of the summit featured the presentation of ISO 50001:2018 compliance certificates to RAK Courts, RAK Public Prosecution, RAK Civil Aviation, RAK Chamber of Commerce and the Ruler's Court of Ras Al Khaimah for their efforts in implementing energy management systems.

Additionally, the summit saw the signing of a retrofit project between RAK Bank and Honeywell, and agreements with Future Architectural Glass, Eternity Technologies, Falcon Technologies, RAK Ceramics, RAK Rock/Stevin Rock, RAK Ports and Union Cement to participate in Ras Al Khaimah's newly launched industrial audit initiative.

Highlights from RAK Energy Summit

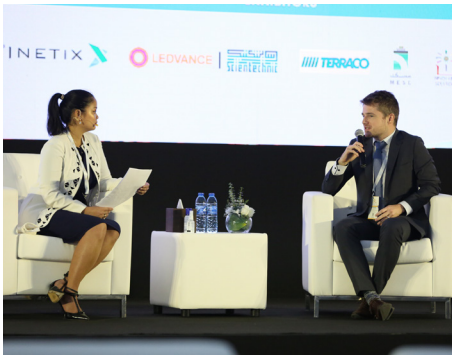
Opening keynote address from H.H. Sheikh Saud bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah

Keynote from H.E. Mariam bint Mohammed Saeed Hareb Almheiri, Minister of Climate Change and Environment, UAE

Keynote from H.E. Sharif Al Olama, Undersecretary for Energy and Petroleum Affairs, UAE Ministry of Energy and Infastructure

VIP exhibition tour

Welcome address from H.E. Munther Mohammed bin Shekar Al Zaabi, Director General, Ras Al Khaimah Municipality

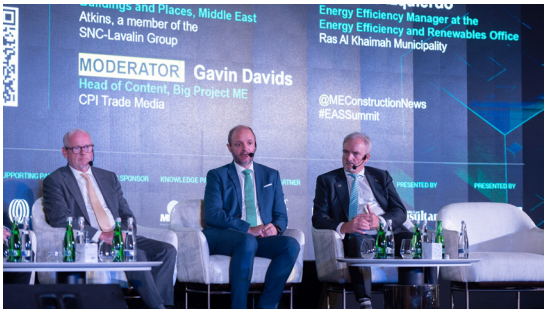


Interactive fire side chats

Presentations and speeches from industry leaders (IRENA, UNIDO, OÖ Energiesparverband)

Participation in Industry Events

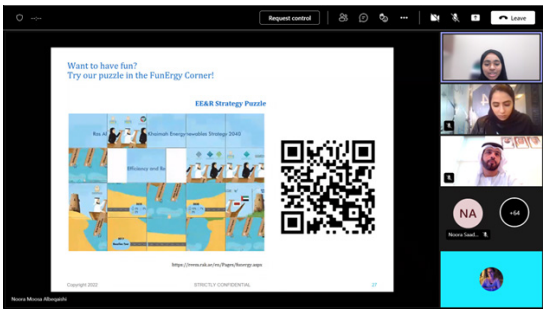
AHK Symposium on Future Energy, Dubai



Energy and Sustainability Summit, Dubai

Eurovent Annual Summit, Dubai

Forbes - Reenergizing the Energy Sector, Virtual



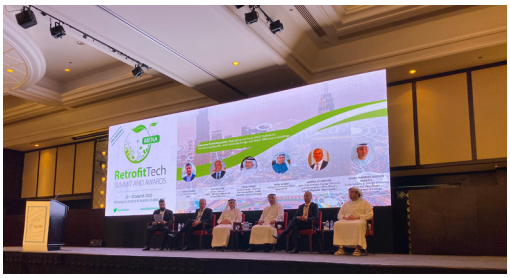
RAK Innovation Week, Ras Al Khaimah

The Arab Green Summit, Dubai

Department of Energy Awareness Workshop, Abu Dhabi

World Sustainable Energy Days, Austria

Middle East Energy, Dubai



RetrofitTech, Dubai

Thermal Comfort Workshop, Ras Al Khaimah

Delivering Net Zero, Dubai

4.2 Awareness: Manzily

While large energy consumers are addressed individually, awareness and educational programs to involve SMEs and residents are yielding encouraging results. A first educational game, Manzily, was launched at RAK Energy Summit in October 2022. The game was built entirely on voluntary efforts from students of American University of Ras Al Khaimah and a private partner, Footprints Games. In the game, players help a family improve their energy consumption at home through behavioural changes and equipment upgrades. Players, particularly children, can learn several sustainable practices by playing all the different levels, and be certified as "Sustainable Energy Ambassadors." Hundreds of students have already experienced the game in several awareness sessions conducted by Ras Al Khaimah Municipality.

Development team

Launch of the game with students from RAK Academy


Work session of volunteers developing the game

Manzily game

4.3 Capacity Building

Program Owner:

Asma Alshehhi
Energy Engineer, Reem,
Ras Al Khaimah Municipality

4.3.1. Green Procurement

Green Public Procurement (GPP) is a process whereby government entities seek to procure products and services with lower lifecycle environmental impact as compared to other functionally similar products and services. GPP was launched in Ras Al Khaimah in November 2020 to drive capacity building among government procurement teams. It supports competitiveness of the economy by reducing energy and water consumption, avoiding greenhouse gas (GHG) emissions and stimulating a local market for sustainable products and services.

The GPP program is supported by specific guidelines issued by Ras Al Khaimah Municipality. By recommendation of the EE&R Committee, Ras Al Khaimah Department of Finance (DoF) was selected as GPP Administrator, responsible for supporting and coordinating implementation of GPP in the government. Implementation of GPP is voluntary at this stage, to allow each government entity to define their own pace and depth of participation.

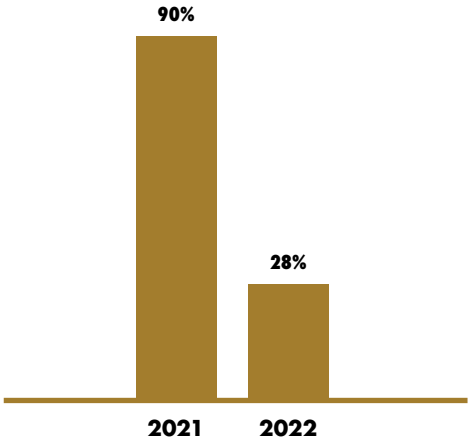


Figure 27: Share of GPP-compliant purchases in Ras Al Khaimah government in 2021 and 2022 (as reported by departments)

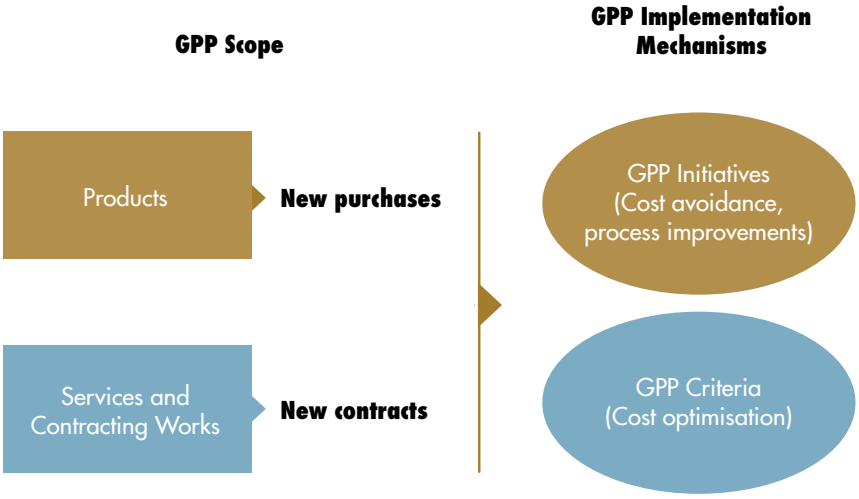


Figure 28: Scope of the GPP guidelines

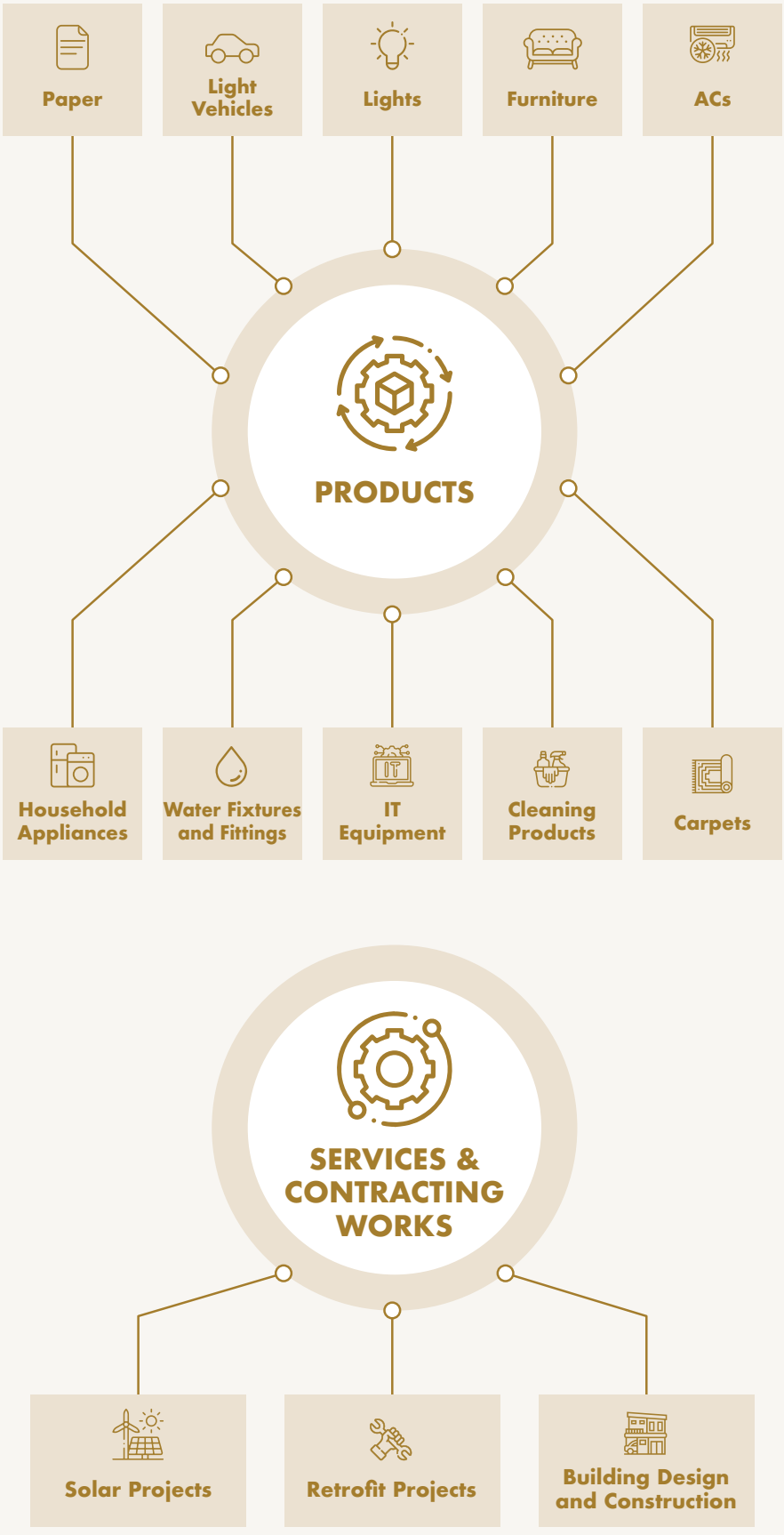


Figure 29: Purchase categories with green criteria in GPP guidelines

2022 marks the second full year of GPP implementation. 16 government entities have already adopted GPP by issuing an internal GPP policy mandating application of GPP guidelines in purchases of the entity. About AED 18 mn of government purchases have been made based on GPP criteria in 2022. The existing business management software of the government, SAP, is being upgraded to support recording and monitoring of green purchases. A cross-learning forum has been established, including monthly progress meetings and quarterly fireside chats with regional and international experts.

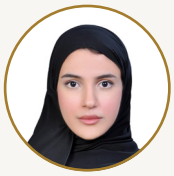
In January 2022, two GPP initiatives were launched to address use of single-use plastics and paper, in the presence of His Highness Sheikh Ahmed bin Saud Al Qasimi, Chairman of the Public Services Department of Ras Al Khaimah. Reem collaborated with the Environment Protection and Development Authority (EPDA) and RAKEZ, the respective initiative leaders, to develop these initiatives. Following launch of these initiatives and stakeholder consultations, a law to ban single-use plastics was drafted, with issuance expected in 2023.

GPP Champions of Ras Al Khaimah

Ahmed Shiha
Ras Al Khaimah Courts Department

Najla Alshehhi
Ras Al Khaimah Municipality

Mousabeh Al Tenaiji
Antiquities and Museums Department

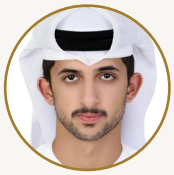


Maryam Alshehhi
Environment Protection and Development Authority

Salwa Alnaqbi
Public Prosecution Department

Shaikha Alshehhi
Ras Al Khaimah Customs Department

Amal Bin Khalaf Almarzouqi
General Resources Authority



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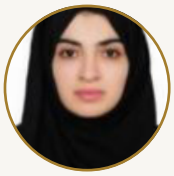

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4.3.2 Supply Market Development

As part of Reem's mandate, efforts are being made towards continuous expansion and improvement of the supply market for goods and services in the energy efficiency and renewables sector. Ras Al Khaimah Municipality has launched a new initiative to attract innovative start-ups and SMEs to the UAE. The SME Edition of RAK Energy Innovation Competition (#RAKinnovates) offers an opportunity for start-ups and SMEs from around the world to get market exposure and form strategic partnerships in the power, water and industrial sectors of the UAE. Shortlisted start-ups and SMEs will be invited for discussions with a large executive panel, comprising top managers from leading government entities and multinationals.

Companies with solutions that address one or more of three regional challenges are eligible to participate. The challenges are in the fields of energy management, industrial efficiency and decentralised energy systems. One winning start-up or SME will be selected for each challenge, and the three winners will receive a cash prize of AED 100,000, an attractive business set-up package from RAKEZ, a commercial pilot project in Ras Al Khaimah upon agreement of scope and terms, and support to business development.

In the meantime, ESCOs and Energy Auditors continue to reap the benefits of incentives offered by RAKEZ and DED in the form of highly discounted business set-up fees. These incentives are now available for additional qualified ESCOs and Energy Auditors for a period of 3 years (until the end of 2024), and have also been extended to cover renewable energy consultancies and SMEs in the fields of smart energy management and industrial IoT. Incentives for establishment have been provided to 13 eligible companies to date.

RAK Energy Innovation Competition
SME EDITION

Prizes

- Exemption of company set-up fees including visas, for 3 years, under benefit packages provided by RAK Economic Zone (RAKEZ)
- Monetary prize worth USD 27,000 (AED 100,000)
- Opportunity for individual sales pitch meetings with leading government entities and businesses
- Opportunity to join a closed door round-table with selected local government entities and businesses to explore potential collaboration opportunities
- A commercial pilot project in Ras Al Khaimah, upon agreement on scope and terms

4.3.3 Upskill - Ras Al Khaimah Sustainable Energy Training Program

Program Owner:

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UPSKILL
Ras Al Khaimah Sustainable Energy Training Program

Upskill, Ras Al Khaimah's training program in sustainable energy, was designed to expand capabilities and expertise in the field of energy efficiency and renewable energy in the emirate. The training program offers trainings and certifications from reputed local and international providers such as Clean Energy Business Council (CEBC), The Green Spoon Management Consultancies, Leoron and Emirates Green Building Council from the UAE, Direktin from Italy, Energy Institute from the UK and National Thermal Power Corporation Limited (NTPC) from India.

Reem is also collaborating with Ras Al Khaimah Human Resources Department, RAK DED and RAKEZ to promote this initiative among government and private sector employees.

Upskill is featured on the Reem website where interested participants from Ras Al Khaimah can avail of a discount on one or more of the 40 listed training courses by simply filling a form. Courses range from technical topics such as sustainable buildings, industrial energy efficiency, renewable energy, and green mobility to finance, for technical personnel and students.

4.3.5 Partnerships & Collaboration

Throughout 2022, Reem continued to build relationships to gain knowledge, share know-how, and gather support for the EE&R Strategy. Some of these partnerships were formalised in MoUs. Agreements were signed with Emirates Green Building Council and The Green Spoon Management Consultancies to expand the training program, Upskill. Agreements were made with the trade councils of Canada, Germany, Denmark, Ireland, Netherlands, Spain and Japan to market the SME competition to an international audience.

Reem has also partnered with AURAK for the development of a centre to study outdoor thermal comfort. The centre would focus on practical applied research in the Middle Eastern context and provide a variety of services such as design advise, education, testing and certification among others.

4.4 Financing Mechanisms

Group financing mechanisms such as those adopted in the Ras Al Khaimah government retrofit project, have proven to be beneficial as they guarantee attractive returns on investment due to scale. This approach also helps cover buildings that would not otherwise be targetable by individual projects.

A first set of green financing offerings for individuals have also been launched by RAKBANK. These include discounted terms for green mortgages, green vehicle loans, as well as favourable financing terms for home retrofit works and home renewable energy installations. Details of the offering and how to avail of it can be found here.

4.5 Information Systems

The GIS Center was established in 2016 within the Municipality, and is responsible for integrating and managing all geospatial data of Ras Al Khaimah on a single platform. GIS Center periodically collects data from more than 15 data custodians, including local and federal government entities and utility companies. This data is then made available to the Municipality and other partner entities for urban planning, development and studies.

The GIS Center is supporting Reem in the development of the energy sector of Ras Al Khaimah through studies and data platforms. A database of building roof polygons and roof materials in Ras Al Khaimah supported development of the renewable energy plans of the emirate. A number of studies related to planning of utility networks including electricity, water and wastewater, besides techno-economic studies related to building energy ratings, solar energy, wind energy, and agriPV have been conducted leveraging the services of the GIS Center.

In 2023, the GIS Center plans to activate a project to study the urban heat island effect in Ras Al Khaimah, in support of the outdoor comfort center recently established by AURAK, in collaboration with the Municipality.

Figure 30: MoU between RAKBANK and Ras Al Khaimah Municipality

5
FUTURE OUTLOOK

5. FUTURE OUTLOOK

Implementation of all programs of the EE&R Strategy is being accelerated and scaled up in the ongoing ramp-up phase. The year 2023 is expected to show a continuation of the efforts made in previous years. We will also begin an update of the overall strategy, following completion by the federal government of a roadmap for the UAE to net zero emissions by 2050.

In 2023, Barjeel will continue to be applied to all new buildings in Ras Al Khaimah, and a potential enhancement of some requirements will also be studied. A first pilot project for Ras Al Khaimah's Sustainable Community Guidelines will enter its implementation phase, while development of a new building rating system gathers pace. Contracting of new retrofit projects for semi-government and commercial buildings is expected under the Building Retrofits Program. Certification of energy management systems will be completed in several independent authorities and semi-government entities. The second edition of RAK Energy Innovation Competition, this time targeted towards SMEs and start-ups, will be deployed in a large number of countries. The most important priorities for 2023 are listed below:

1. Update of the EE&R Strategy to align with the UAE Net Zero by 2050 strategic initiative,

2. Further enhancement of the regulatory framework for sustainable urban development and outdoor comfort,

3. Roll-out of the new initiatives: energy audit and monitoring framework for industries and Manzily Energy Advice Service for residents,

4. Further development of existing programs: extension of the Building Retrofits Program to semi-government entities and mosques; further enhancement of infrastructure and standards to support water reuse, public landscaping, waste recycling and waste to energy; promotion of end-user awareness and engagement across all societal segments through communication, training and incentives.

As program implementation gathers momentum, Reem will continue to monitor and support the EE&R Strategy. The main priorities of Reem in this regard are as follows:

1. Continuous enhancement of the regulatory framework in support of the programs,

2. Support to existing and new building retrofit, energy management and solar PV projects,

3. Exploration of new business models and financing mechanisms for building retrofit and solar PV projects,

4. Development of local market capacity through project pipeline development, incentives, training, awareness campaigns and events,

5. Strengthening of new service lines addressing residential and industrial energy users,

6. Continuous optimisation of the M&V, reporting and risk management processes for the EE&R Strategy.

6
ACKNOWLEDGEMENTS

6. ACKNOWLEDGEMENTS

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Electronic Government Authority

Emirates Green Building Council

Environment Protection and Development Authority

Etihad Water and Electricity Company

Executive Council of Ras Al Khaimah

Investment and Development Office

RAK Transport Authority

Ras Al Khaimah Department of Economic Development

Ras Al Khaimah Department of Finance

Ras Al Khaimah Economic Zone

Ras Al Khaimah Municipality

Ras Al Khaimah Police

Ras Al Khaimah Public Services Department

Ras Al Khaimah Ruler's Office

Ras Al Khaimah Statistics Center

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7. GLOSSARY OF TERMS

AC: Air Conditioner

AED: UAE Dirhams

AgriPV: Agriphotovoltaics

Barjeel: The Green Building Regulations of Ras Al Khaimah

BAU: Business as Usual

EE&R Strategy: Energy Efficiency & Renewables Strategy 2040

EESL: Energy Efficiency Standards and Labels

EPDA: Environment Protection and Development Authority

ESCO: Energy Service Company

MoIAT: UAE Ministry of Industry and Advanced Technology

Etihad WE: Etihad Water and Electricity Company

EV: Electric Vehicle

EVCS: Electric Vehicle Charging Station

GDP: Gross Domestic Product

GIS: Geographic information system

GWh: Gigawatt-hours

H.E.: His /Her Excellency

IDO: Investment and Development Office

IPCC: Intergovernmental Panel on Climate Change

IPPU: Industrial Processes and Product Use

ISO: International Organization for Standardization

IT: Information Technology

km: kilometre

kWh: kilowatt-hours

kWp: kilowatts-peak

LED: Light Emitting Diode

m: metres

m^2: square metres

m^3: cubic metres

MSW: Mixed Solid Waste

MW: Megawatts

MWp: Megawatts-peak

M&V: Measurement and Verification

PP: Percentage Points

PSD: Public Services Department

P.O.: Post Office

RAK Academy: Ras Al Khaimah Academy

RAKEZ: Ras Al Khaimah Economic Zone

Reem: The Energy Efficiency & Renewables Office of Ras Al Khaimah Municipality

RDF: Refuse-Derived Fuel

SME: Small and Medium Enterprise

TSE: Treated Sewage Effluent

UAE: United Arab Emirates

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