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 2021

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."

بلديـــــــة رأس الخيمـــــــــة
Ras Al Khaimah Municipality

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 fourth 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, 2021 was a year of recovery from the COVID-19 pandemic. The pandemic increased global interest in sustainability, and this effect is expected to remain in the medium term. Recent federal government announcements, including confirmation of the UAE hosting COP28 in 2023 and the ambition to reach net-zero emissions by 2050, have heightened the position of sustainability in government priorities. The energy sector is a particular priority, as one of the largest contributors to UAE's greenhouse gas emissions.

In this economic and policy context, the objectives and mission of the EE&R Strategy gain importance. The expected upgrade of the energy sustainability roadmap of the UAE, in light of the new net-zero ambition, will create opportunities to enhance the EE&R Strategy – both in breadth of activities and depth of intervention.

In the meantime, I am happy to convey that 2021 was a very successful year for the EE&R Strategy. More than 1,000 new Barjeel-compliant buildings were commissioned and more than 100 existing buildings were contracted for retrofit this year. Strong progress was made on energy management, as seven government entities reached energy management certification readiness, representing 30% of the overall energy consumption of the government. An important milestone was also achieved by Public Services Department's Works Agency by completing the replacement of all conventional street lights with LEDs.

Some key enablers of the EE&R Strategy were also activated in 2021. The Green Public Procurement Program was successfully adopted by 13 government entities. Upskill, our training program for energy sustainability was launched in partnership with four leading training providers. Lastly, new financing solutions for sustainable products and services were introduced in partnership with RAKBANK.

In 2022, we have already planned several new developments across all the programs. A pilot sustainable community is being designed as a model for future community development. Several distributed renewable energy and water reuse projects are in advanced stages of design and approval. The Energy Efficiency and Renewables Office (Reem) of Ras Al Khaimah Municipality will continue to enhance its capabilities to support further development and acceleration of the programs.

I hope you enjoy reading this report, and we look forward to greater achievements in 2022.

Table of Contents

EXECUTIVE SUMMARY

1 EXECUTIVE SUMMARY

This is the fourth annual report of the Energy Efficiency and Renewables Strategy of Ras Al Khaimah, for the year 2021. 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 benefits of sustainability for health and well-being of individuals and for competitiveness of businesses are being recognised in mainstream policy discourse.

A dedicated organisational set-up, including the EE&R Committee, Reem (within Ras Al Khaimah Municipality), Program Owners (responsible government entities for each program) and supporting entities, continued to ensure effective strategy implementation in 2021. The most notable achievements of the year are:

1. Completion of more than 1,000 Barjeel-compliant buildings in Ras Al Khaimah,
2. Contracting of retrofit projects for more than 100 buildings,
3. Achievement of ISO 50001 (energy management system) certification readiness in seven Ras Al Khaimah government entities,
4. Adoption of Green Public Procurement by 13 Ras Al Khaimah government entities, and
5. Completion of the retrofit to LED of all street lights (400+ km) managed by Ras Al Khaimah's Public Services Department.

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 support long-term success of the strategy. Notable among them are the following:

1. **Enhancing policy and regulation**, including initial discussions on development of a building energy efficiency rating scheme, contracting standards for solar projects, street lighting standards and financing mechanisms for energy efficiency projects;
2. **Raising awareness**, through the organisation of and participation in multiple industry events and continued execution of the 'Energy Saving Tips' campaign to educate the general public on simple actions that can save energy and water at home and at work;
3. **Building capacity**, including ongoing Barjeel training for engineers and consultants and development of a wider training program, Upskill, to enhance local capabilities in the field of energy efficiency and renewable energy.

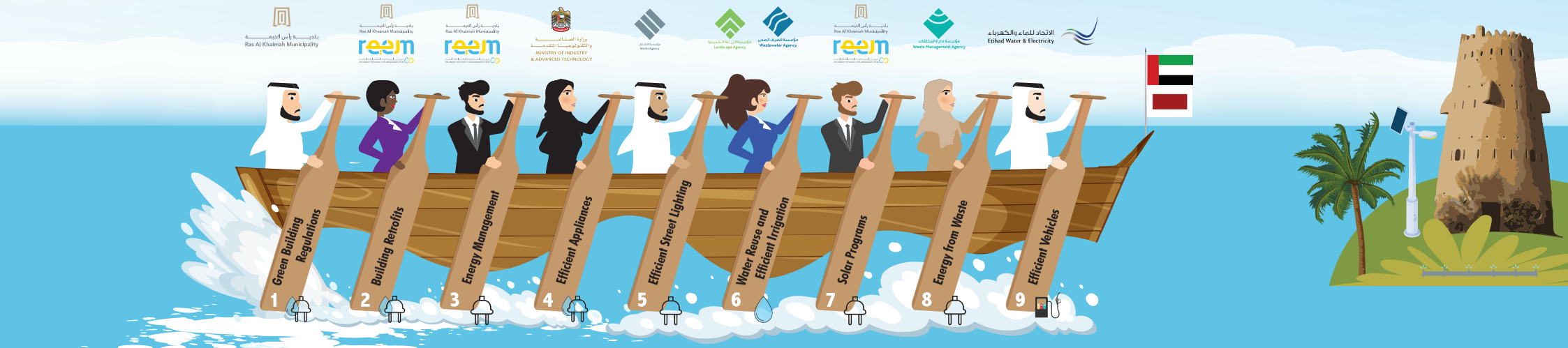
30% Energy Savings

20% Water Savings

20% Renewables

RAS AL KHAIMAH ENERGY EFFICIENCY & RENEWABLES STRATEGY 2040

Ras Al Khaimah Energy Efficiency and Renewables Strategy 2040



Awareness and Capacity Building

Financing Mechanisms

Research and Innovation

Information Systems

Policy and Regulation

2017 Baseline Year

2025 5% 2% 2%

2030 10% 7% 5%

2040 30% 20% 20%

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.

The representation in the previous page illustrates the various programs of the strategy moving in synergy, taking Ras Al Khaimah forward to a modern and more sustainable world. Figure 1 shows the strategy targets over time until 2040. Figure 2 demonstrates alignment of the strategy with the Sustainable Development Goals (SDGs).

In the aftermath of the COVID-19 pandemic, sustainability and particularly sustainable energy has been in the spotlight, both globally and in the UAE. This is demonstrated by the Glasgow Climate Pact signed in COP26, to which the UAE is a signatory. Following COP26, over 90% of the world's GDP is now covered by time-bound commitments to net-zero greenhouse gas emissions. The UAE also announced, shortly before COP26, its ambition to reach net-zero emissions by 2050.

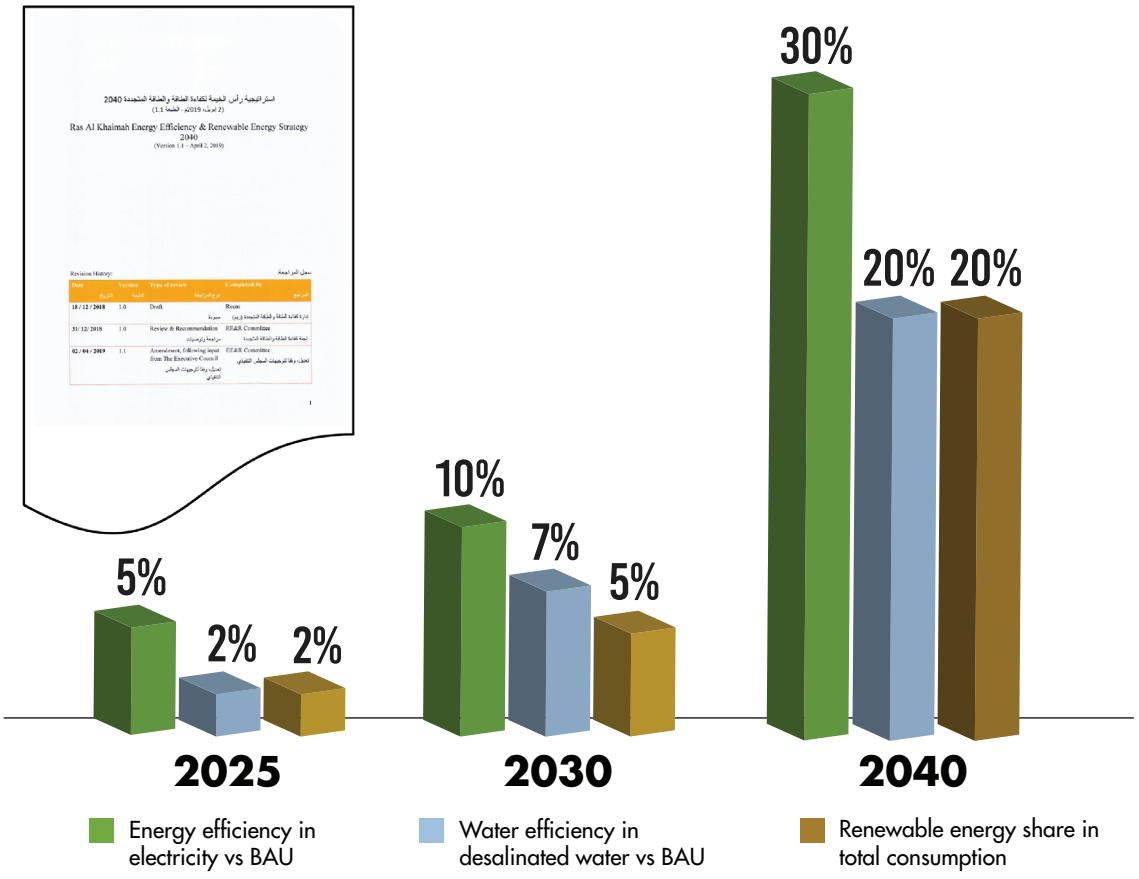


Figure 1: The EE&R Strategy document and the agreed intermediate targets

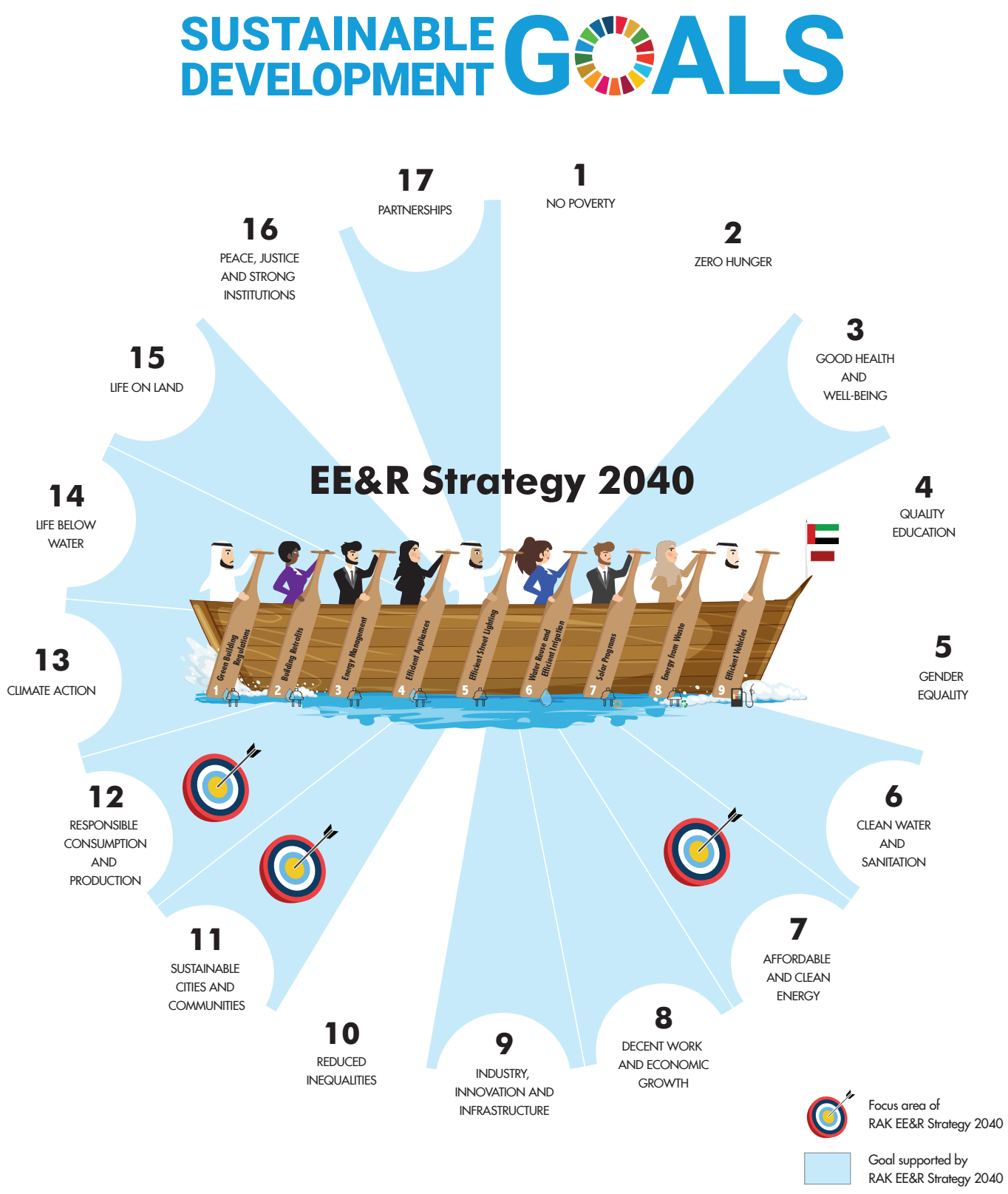


Figure 2: Assessment of EE&R Strategy 2040 contribution to the UN Sustainable Development Goals

The UAE and Ras Al Khaimah are soon expected to renew their strategies and roadmaps to achieve this ambition and realign with broader sustainability priorities. Towards this aim, Reem has already conducted several expert workshops and has summarised its ideas for the next phase of energy sustainability in the region in a foresight paper.

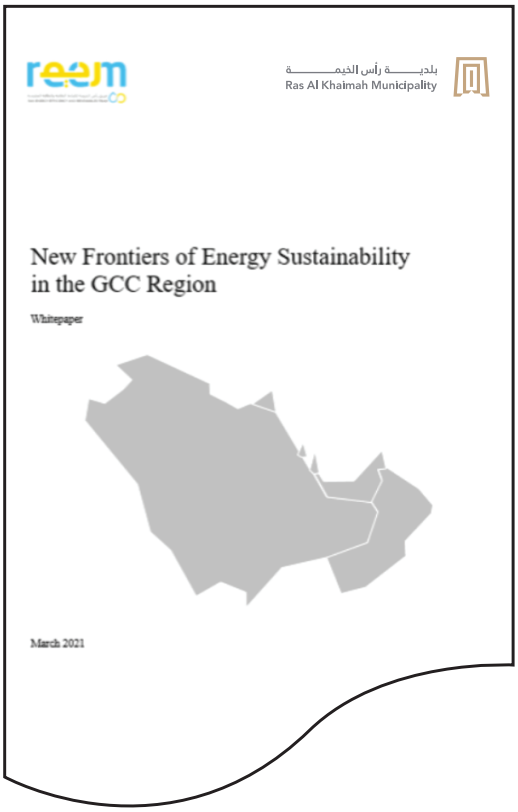


Figure 3: Foresight paper on energy perspectives

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:

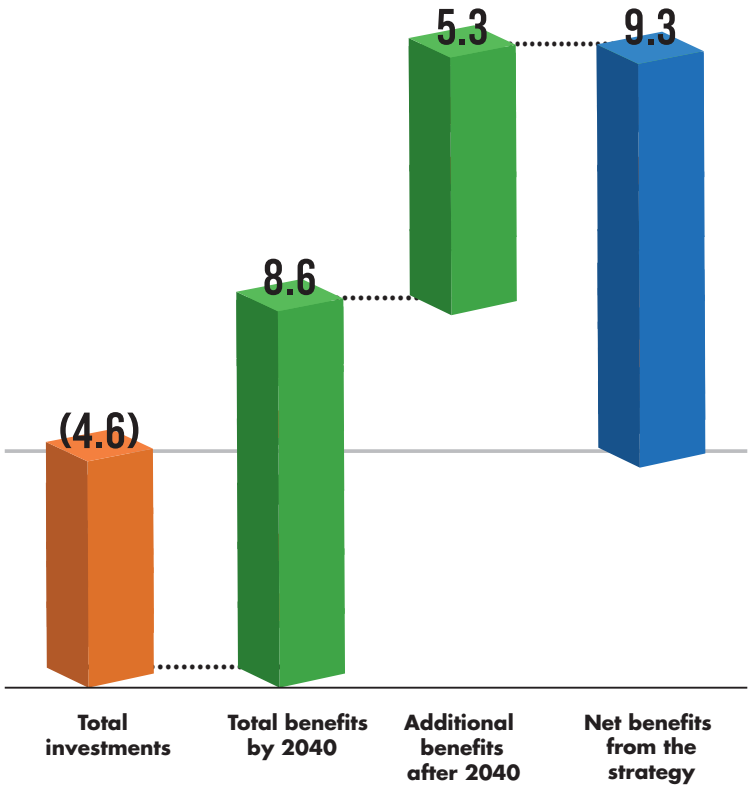


Figure 4: Benefits and costs of the EE&R Strategy (AED billion, present value in 2018)

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.

2.3 EE&R Strategy Governance

A dedicated organisational set-up has been put in place 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 2021, to discuss the status of strategy implementation and the development of new initiatives.

Figure 6: EE&R Committee meeting

MEMBERS OF THE ENERGY EFFICIENCY & RENEWABLES COMMITTEE

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

Mark Bruno
Executive Director,
PSD Wastewater Agency,
Member

H.E. Ahmed Al Hammadi
Director General,
Public Services Department
Member

Savvas Othon
Executive Director,
PSD Landscape Agency
Member

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

Ahmed AlSayed Ban
Executive Director,
PSD Works Agency
Member

2.3.3 Implementation Responsibilities

Each program of the EE&R Strategy is assigned to a Program Owner entity 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 of each program are shown in Figure 7.

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

Figure 7: 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 through its contributions in raising awareness about the benefits of efficiency and through capacity-building programs such as the development of a green procurement policy.

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

Figure 8: Enablers and supporting entities

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 8 shows supporting entities for each strategy enabler.

2.4 Progress & Achievements

2.4.1 Main Achievements since Strategy Launch

Program Owners have achieved significant progress towards the goals of the EE&R Strategy since its launch in 2018. A summary of these achievements is provided in Figure 9:

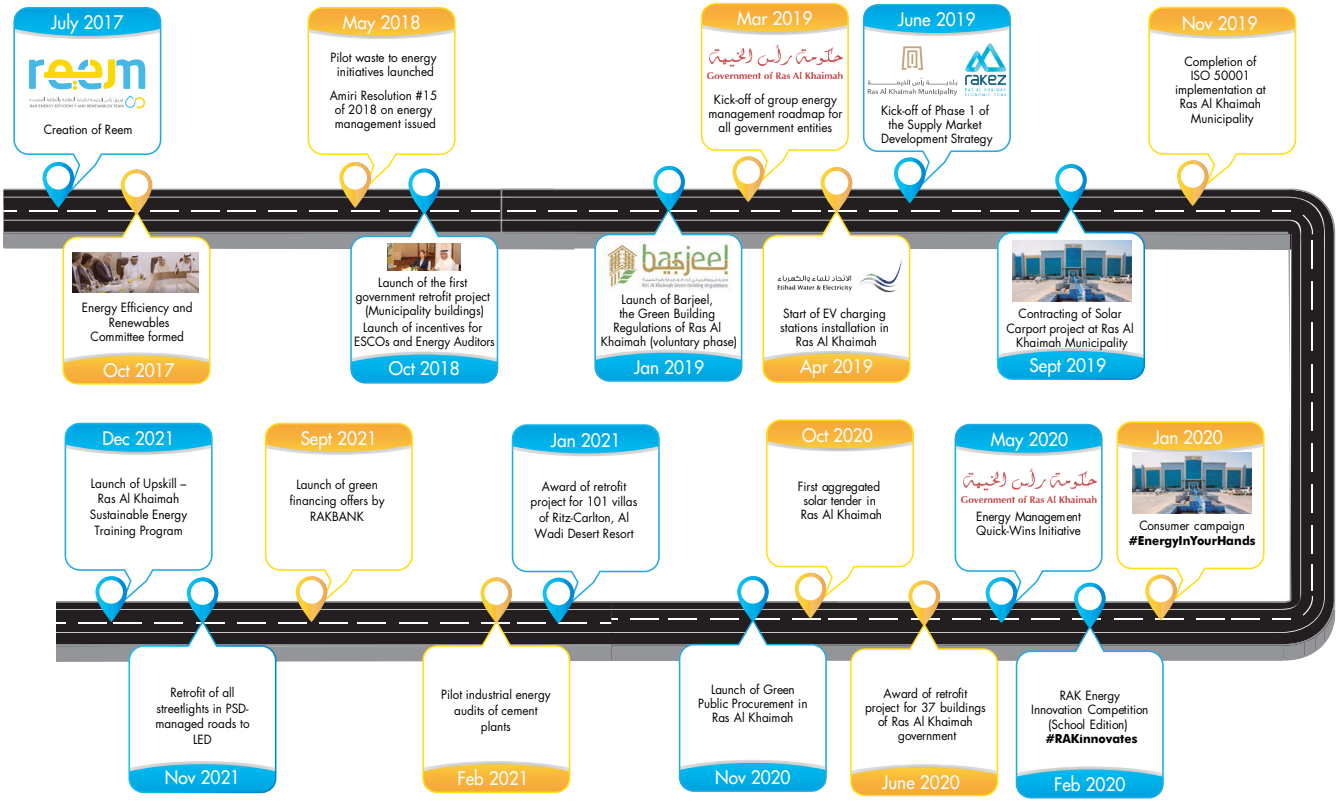


Figure 9: Initial acheivements of the EE&R Strategy by 2021 end

The following roadmap represents the main planned milestones in the strategy until 2040:

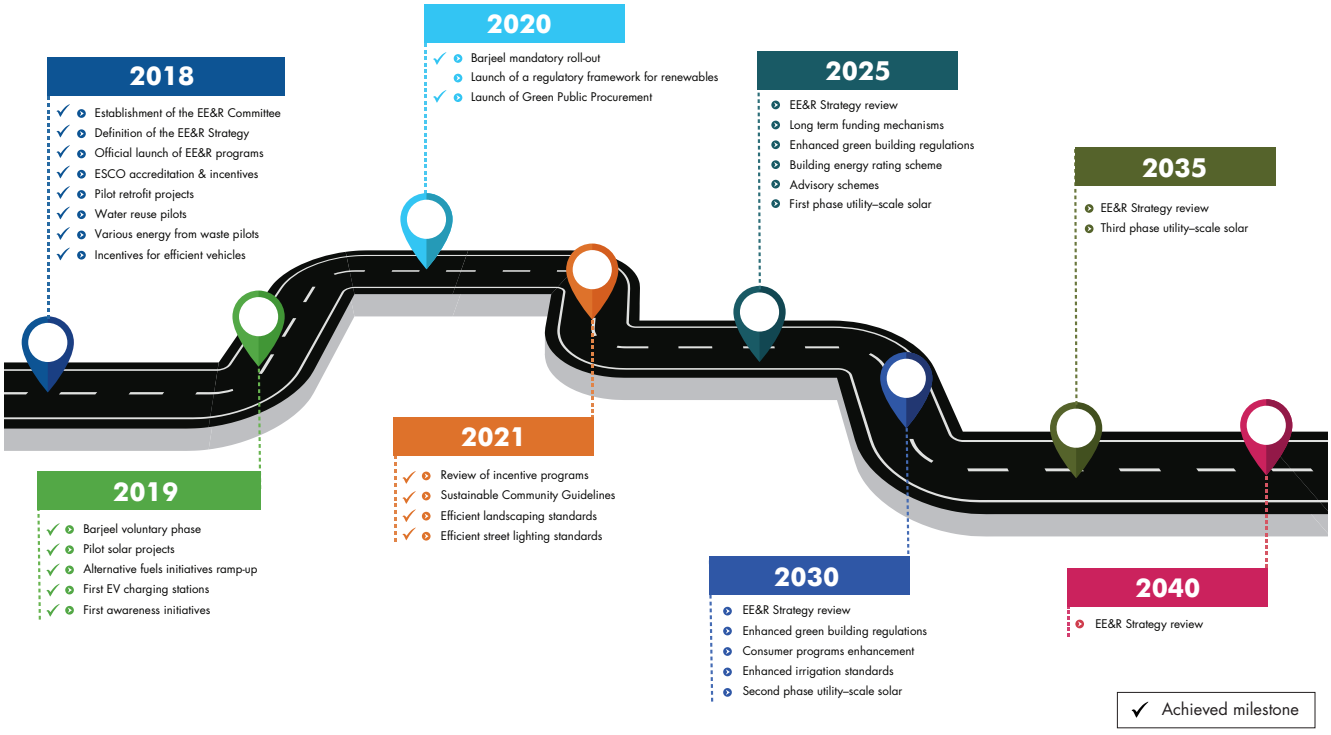


Figure 10: EE&R Strategy roadmap

2.4.2 Progress of Strategy Implementation in 2021

In the aftermath of the COVID-19 pandemic, implementation of the strategy has resulted in a series of achievements in 2021, the most notable of which are:

1. Completion of more than 1,000 Barjeel-compliant buildings in Ras Al Khaimah,
2. Contracting of retrofit projects for more than 100 buildings,
3. Achievement of ISO 50001 (energy management system) certification readiness in seven Ras Al Khaimah government entities,
4. Adoption of Green Public Procurement by 13 Ras Al Khaimah government entities, and
5. Completion of the retrofit to LED of all street lights (400+ km) managed by Ras Al Khaimah's Public Services Department.

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 among them are the following:

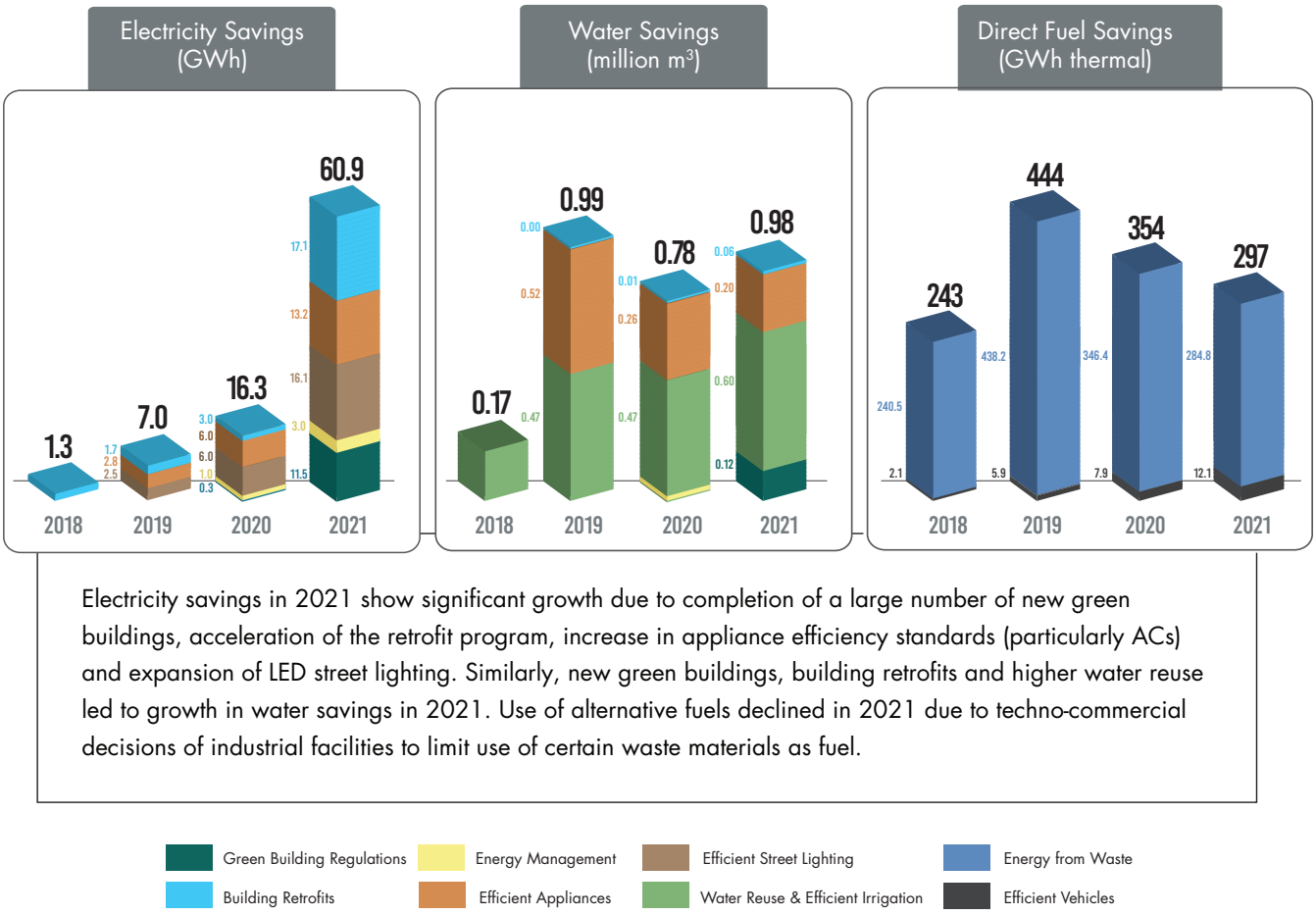
1. **Enhancing policy and regulation**, including initial discussions on development of a building energy efficiency rating scheme, contracting standards for solar projects, draft street lighting standards and financing mechanisms for energy efficiency projects;
2. **Raising awareness,** through the organisation of and participation in multiple industry events and continued execution of the 'Energy Saving Tips' campaign to educate the general public on simple actions that can save energy and water at home and at work;
3. **Building capacity,** including ongoing Barjeel training for engineers and consultants and development of a wider training program, Upskill, to enhance local capabilities in the field of energy efficiency and renewable energy.

2.4.3 Energy & Water Savings

In total, over 60 GWh of electricity and nearly 1 million m^3 of water were saved in Ras Al Khaimah throughout 2021. All programs are now showing firm results in terms of savings.

Apart from electricity and water, direct savings of 297 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 10,000 cars being taken off the road for a year.

A detailed breakdown of the measured and verified savings by program is provided in Figure 11:



Electricity savings in 2021 show significant growth due to completion of a large number of new green buildings, acceleration of the retrofit program, increase in appliance efficiency standards (particularly ACs) and expansion of LED street lighting. Similarly, new green buildings, building retrofits and higher water reuse led to growth in water savings in 2021. Use of alternative fuels declined in 2021 due to techno-commercial decisions of industrial facilities to limit use of certain waste materials as fuel.

Figure 11: Annual energy and water savings achievements by program

2.4.4 Greenhouse Gas Inventory

The Paris Agreement commits all countries to reduce their greenhouse gas (GHG) emissions to mitigate climate change. The UAE has reaffirmed its commitment to the Paris Agreement by submitting its revised Nationally Determined Contribution (NDC) in 2020, with an ambitious target to reduce GHG emissions by 23.5% compared to forecasted business-as-usual emissions by 2030. The UAE is also maintaining a national GHG inventory to track progress of the country towards its commitment.

The EE&R Strategy is expected to directly support GHG emissions reduction in Ras Al Khaimah, by promoting renewable energy, waste-to-energy technologies and by reducing the combustion of fossil fuels in vehicles and industry. Significant reduction of indirect emissions would also take place due to savings in electricity and water consumption in Ras Al Khaimah. Further effective action against climate change requires a robust system for GHG emissions monitoring. With this in mind, Reem has initiated a process to systematically estimate GHG emissions in Ras Al Khaimah on a periodic basis, to support future emissions reduction strategies.

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 for 2021, 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 this year. Notable exclusions include emissions from international transportation, land use, agricultural activities and GHG capture by vegetation.

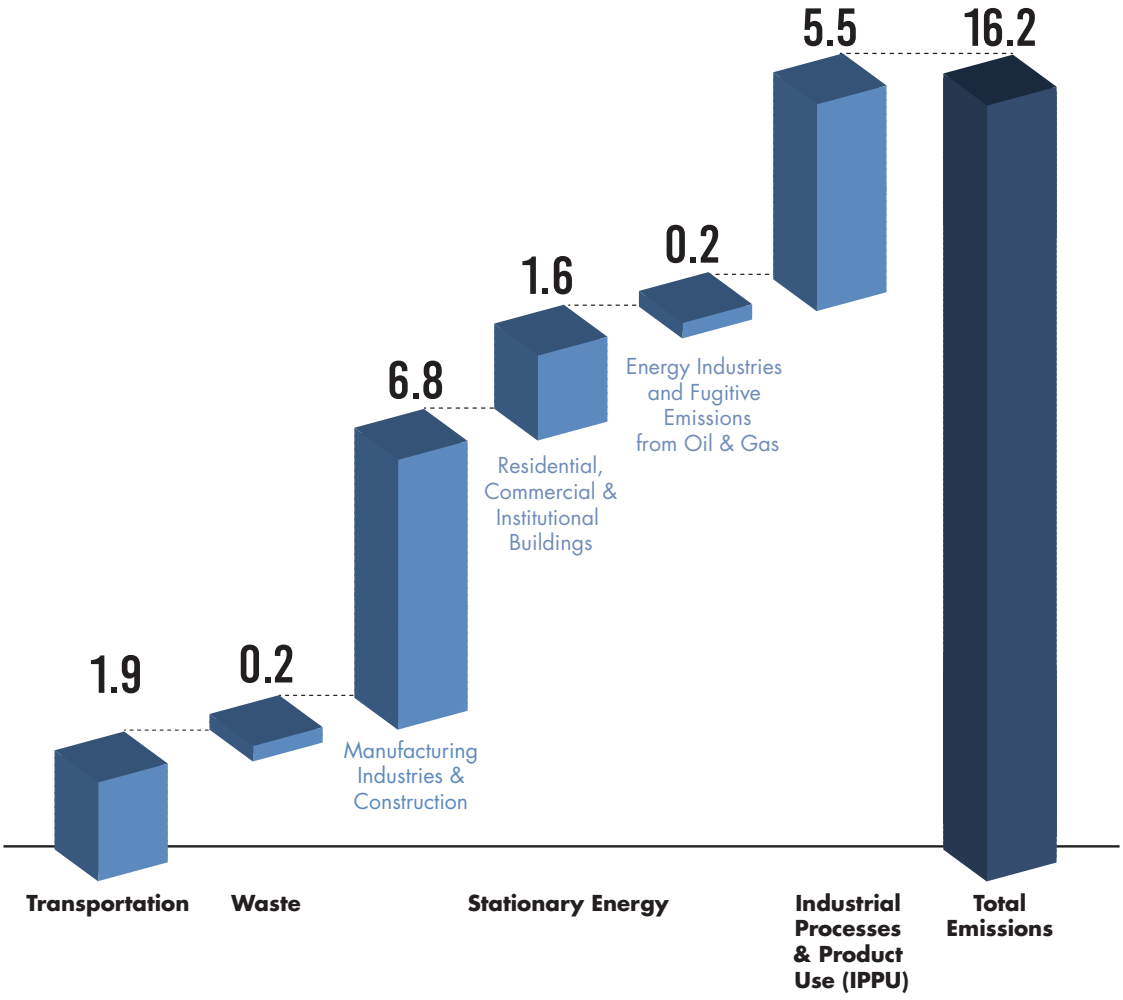


Figure 12: Estimated greenhouse gas footprint of Ras Al Khaimah by sector in 2021 (million tonnes of CO_2 equivalent)

THE NINE PROGRAMS

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

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.

Abdulla Samhan
CEO, Technical Sector,
Ras Al Khaimah Municipality

بلديـــــة رأس الخيمـــــة
Ras Al Khaimah Municipality

2021 marked a very successful year for Barjeel, with the construction of more than 1,000 Barjeel-compliant buildings in Ras Al Khaimah. More than 2,000 Barjeel-compliant buildings were permitted in 2021, and will be constructed over the coming years. In addition, the Barjeel application and inspection process received minor updates, which further streamlined verification of compliance during design and construction.

Achieving our ambition of net-zero emissions by 2050 is likely to require a dramatic upgrade of building and community standards across the UAE. We are proud to have supported the Ministry of Energy and Infrastructure in developing national green building regulations towards this goal. Within Ras Al Khaimah, we have initiated development of a building energy rating system. A rating system incentivises improvement of both new and existing buildings by providing recognition to highly energy efficient buildings in the market.

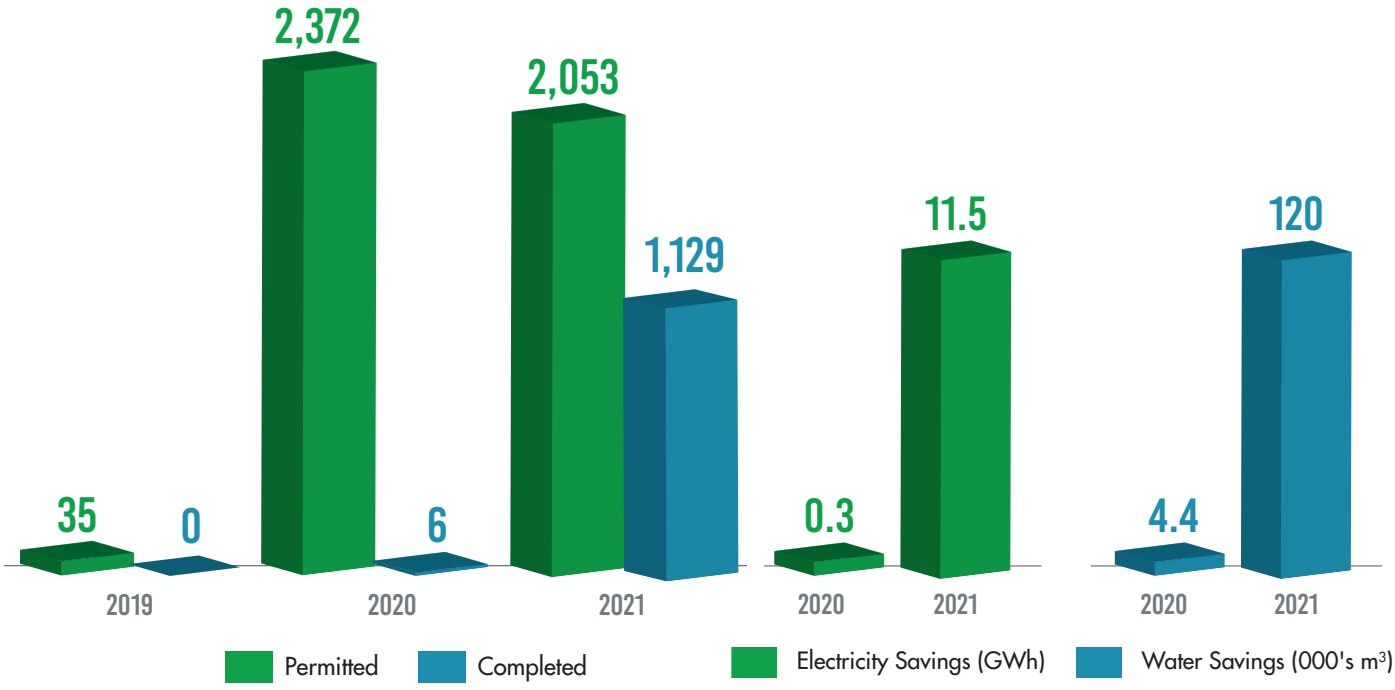


Figure 13: Number of buildings permitted and completed in accordance with Barjeel

Figure 14: Energy and water savings from Barjeel buildings

Muna Al Taweel
Executive Director,
Land and Property Sector,
Ras Al Khaimah Municipality

> "The team has studied several examples of building energy rating systems globally and has built a strong understanding of such systems. We are excited to develop and implement this system in Ras Al Khaimah to improve transparency of the real estate market while also supporting our sustainability goals."

In addition to initiatives addressing individual buildings, the Municipality has developed guidelines for sustainable communities addressing the public realm across four areas of improvement in communities: livability, mobility, energy and resource efficiency. These guidelines, together with new urban planning guidelines, will be implemented over the coming years, following testing on a pilot community. A dedicated team comprising experts from the Municipality and Public Services Department has been set up to execute this project.

3.2 Building Retrofits

Program Owner: Ras Al Khaimah Municipality – reem

Supporting Entity: مكتب الاستثمار والتطوير – Investment & Development Office, Government of Ras Al Khaimah

The Building Retrofits Program was established with the purpose of generating energy savings in existing buildings through comprehensive retrofits focused on the main energy consuming systems. The program has continued its development following the first contract signature in 2018 and has exceeded its annual targets in 2021.

Ongoing retrofit projects at the end of 2021 included Phase 2 of the Department of Finance retrofit project (12 buildings), and the Ritz-Carlton, Al Wadi Desert Resort (100+ buildings).

Notable upcoming projects in tendering or contracting stages include RAK Airport, AURAK and RAK Hospital campuses. These are expected to be contracted in 2022. A large pipeline of 100+ additional buildings has been established and is in various stages of development.

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

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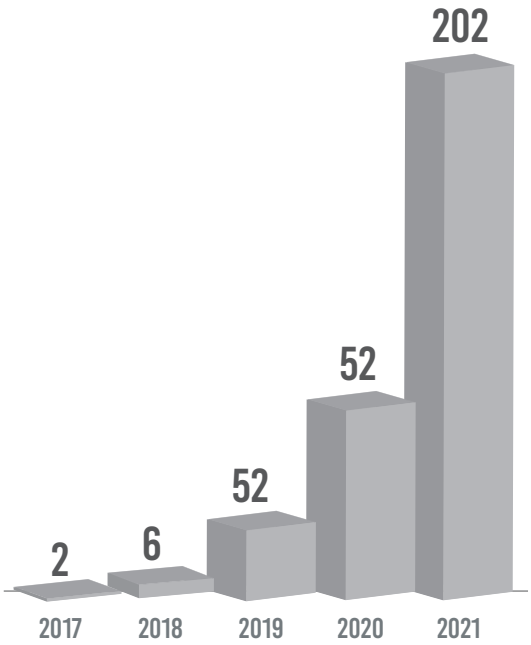

Figure 15: Number of buildings contracted for retrofits

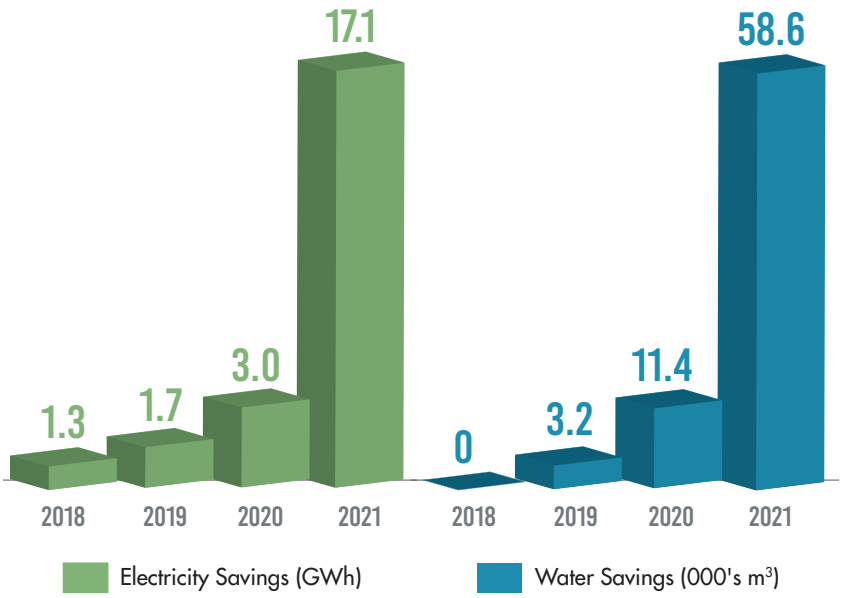

Figure 16: Energy and water savings from retrofits

In addition to government and semi-government buildings, 2021 marked an uptake in the retrofit of privately owned buildings on an energy performance basis. We hope that the private sector continues to recognise the value of energy performance contracting. It helps improve building asset quality, provides more value for building occupants, and ultimately helps improve real estate value.

As part of the Building Retrofits Program, Reem also administers Ras Al Khaimah's ESCO Accreditation Scheme, to accredit Energy Service Companies (ESCOs) wishing to participate in any retrofit tenders and contracts managed by Reem. These ESCOs undergo a qualification process to be considered accredited, and Reem's retrofit project tenders are only issued to accredited ESCOs. There were 22 accredited ESCOs at the end of 2021, the list of which is available publicly on the Reem website. This number has been increasing year on year, showing the growing interest from energy services providers in the Ras Al Khaimah market.

Reem also coordinates an incentive program for ESCOs and Energy Auditing Companies (EACOs), in close liaison with Ras Al Khaimah Economic Zone (RAKEZ) and Ras Al Khaimah Department of Economic Development (DED). Its purpose is to allow ESCOs and EACOs to establish a local presence in Ras Al Khaimah under more favourable conditions, and benefit from an early mover advantage in the market. By the end of 2021, two additional companies were approved for availing of incentives under this program. This number is expected to grow as this program has been extended until late 2024, and has been expanded to include additional company types.

3.3 Energy Management

Program Owner: Ras Al Khaimah Municipality – reem

Supporting Entity: RAKEZ – Ras Al Khaimah Economic Zone

The Energy Management Program aims to promote more systematic energy management practices such as those defined by ISO 50001, among high-energy users in the industrial, commercial and government sectors in Ras Al Khaimah. The EE&R Strategy envisages the government as a champion of energy management practices. In line with this vision, entities of the Government of Ras Al Khaimah are among the first to implement energy management practices through this program.

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

reem | بلديـــــة رأس الخيمـــــة Ras Al Khaimah Municipality

The context of the COVID-19 pandemic had provided an opportunity to accelerate adoption of energy management quick-wins in the government. Building on this momentum, in 2021, Reem began implementation of a comprehensive energy management system in all government entities. By the end of 2021, energy management systems in seven government entities reached a certification-ready level, as shown in Figure 17. A certification body has been appointed to verify compliance and officially certify these and 13 other entities in 2022.

حكومة رأس الخيمة – دائرة الطيران المدني
Government of Ras Al Khaimah – Department of Civil Aviation

النيابة العامة في رأس الخيمة
Public Prosecution of Ras Al Khaimah

غرفة رأس الخيمة
R.A.K CHAMBER

محاكم رأس الخيمة
Ras Al Khaimah Courts

بلديـــــة رأس الخيمـــــة
Ras Al Khaimah Municipality

الديوان الأميري
Ruler's Court

مؤسسة محمد بن سعود القاسمي الإنسانية

Figure 17: Government entities that are ISO-50001 certification ready at the end of 2021

Considering total electricity and water consumption of the government, 4.5% savings were achieved in 2021 across a variety of facilities, including offices, treatment plants, slaughterhouses, staff accommodations and others, compared to the baseline in 2017.

Based on the learnings from the program, Reem has recently published a report. It describes the journey of the Government of Ras Al Khaimah in energy management, and offers conclusions that may support other governments in the region working in the field. Additional detailed guidelines on implementation of ISO 50001-compliant energy management systems in government entities are being developed and are expected to be released in 2022.

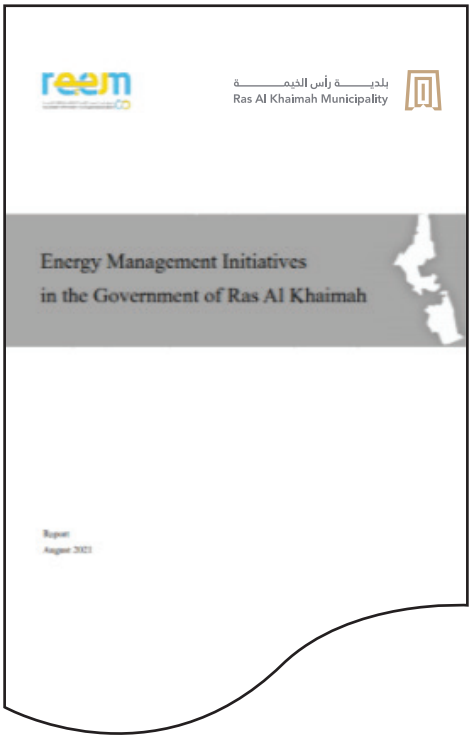

Figure 18: Report on implementation of energy management in Ras Al Khaimah government

In the industrial sector, two pilot energy audits were conducted for industrial facilities in Ras Al Khaimah to test the concept and obtain feedback. These audits were able to uncover attractive opportunities for energy efficiency in the facilities' industrial processes, which the facilities have now planned to implement over the coming years. Reem is currently building a plan, together with RAKEZ and DED, for rollout of a wider program of industrial audits in Ras Al Khaimah to support more industries to realise such opportunities. Empanelment of industrial auditing service providers was in progress at the end of 2021, with the program expected to be rolled out in 2022.

ENERGY PRINCIPALS

Ahmed Sharara
Environment Protection and Development Authority

Alexander John
Department of Civil Aviation

Ammar Zuhair
General Resources Authority

Amna Alshehhi
Sheikh Mohammed Bin Saud Project for Maintenance and Social Services

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 Qassimi Foundation for Policy Research

Khadija Al Shehhi
Antiquities and Museums Department

Khaled Issa
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Mayed Al Shamsi
Amiri Diwan

Nada Ali Saleh
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Nawal Alshimely
Ras Al Khaimah Courts Department

Reem Al Hammadi
Ras Al Khaimah Center for Statistics and Studies

Riyadh Naeem
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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

Figure 19: Energy management team of Ras Al Khaimah government

3.4 Efficient Appliances

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

Supporting Entity: Ras Al Khaimah Municipality, reem

Over 20% of the total electricity consumption of Ras Al Khaimah is attributed to major home appliances such as room air-conditioners, clothes washers/dryers, refrigerators/freezers, water heaters, and other basic appliances we find in every home. The performance of these appliances varies greatly where efficient appliances deliver the same output with less energy or water consumed.

The Ministry of Industry and Advanced Technology (MoIAT) is responsible for the development of standards, regulations, and conformity assessment programs. One of these is the Energy Efficiency Standardization and Labelling (EESL) program which combines Minimum Energy Performance Standards (MEPS), that set required performance levels, and comparative labelling, that empowers consumers to decide on purchases based on appliance performance. To complement this, a comprehensive Efficient Appliances Program has been adopted in Ras Al Khaimah to raise awareness on the benefits and overall impact of utilising highly efficient products and appliances.

Eng. Farah Al Zarooni
Acting Assistant Undersecretary for Standards & Regulation, Ministry of Industry and Advanced Technology

UNITED ARAB EMIRATES MINISTRY OF INDUSTRY & ADVANCED TECHNOLOGY

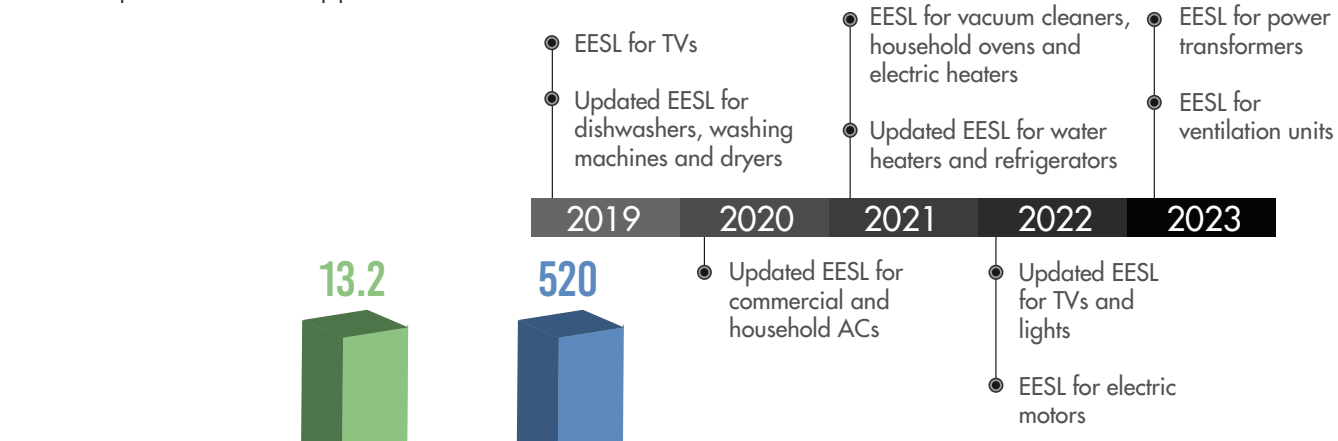


Figure 21: Timeline of EESL issuance and update

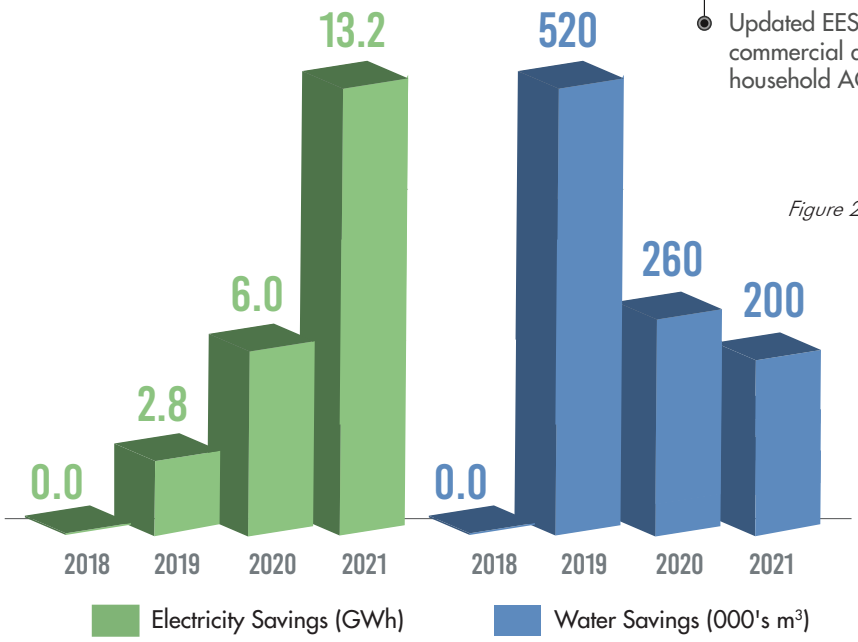


Figure 20: Energy and water savings from enforcement of efficient appliance standards

The EESL program that began in 2011 regulating room air-conditioners, dynamically broadened its scope to include other major home appliances as well as water consuming products such as kitchen and bathroom fixtures. Designed to assess performance based on the country's unique climate conditions and usage practices, the EESL program requires appliances and products to meet minimum performance levels (1-star rating) for them to be supplied into the country. The program is periodically reviewed and upgraded in collaboration with industry experts and international best practices to prevent influx of inefficient products, rejected from other markets, to access our local market.

Public awareness also plays a major role in maximising impact of this program. Through the "Energy Saving Tips" campaign of the Municipality, the importance of taking advantage of efficient appliances and products is being effectively delivered to consumers and contributes to higher understanding and appreciation of energy and water savings. Additional mechanisms and campaigns are continuously being explored such as programs that aim to replace old and inefficient products with efficient ones. Active measures are enforced through borders, retail outlets, and local markets to ensure that only compliant products are made available to consumers.

Figure 22: Examples of energy saving tips

3.5 Efficient Street Lighting

Program Owner: مؤسسة الاشغال Works Agency

Supporting Entity: الاتحاد للماء والكهرباء Etihad Water & Electricity

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. With the planned expansion of street lighting over the coming years, it is important to consider energy efficiency improvements in street lights. We have now replaced all existing streetlights under PSD management with LEDs.

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

مؤسسة الاشغال Works Agency

While most public roads are managed by the Works Agency, about 92 km of roads in the 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 85% of their streets lit with LED lights. In 2021, RAKEZ went further in improving the efficiency of their street lighting, by switching off the lights for a few hours of the nights when traffic is lowest. This saved an additional 10% of the energy consumption of the lights.

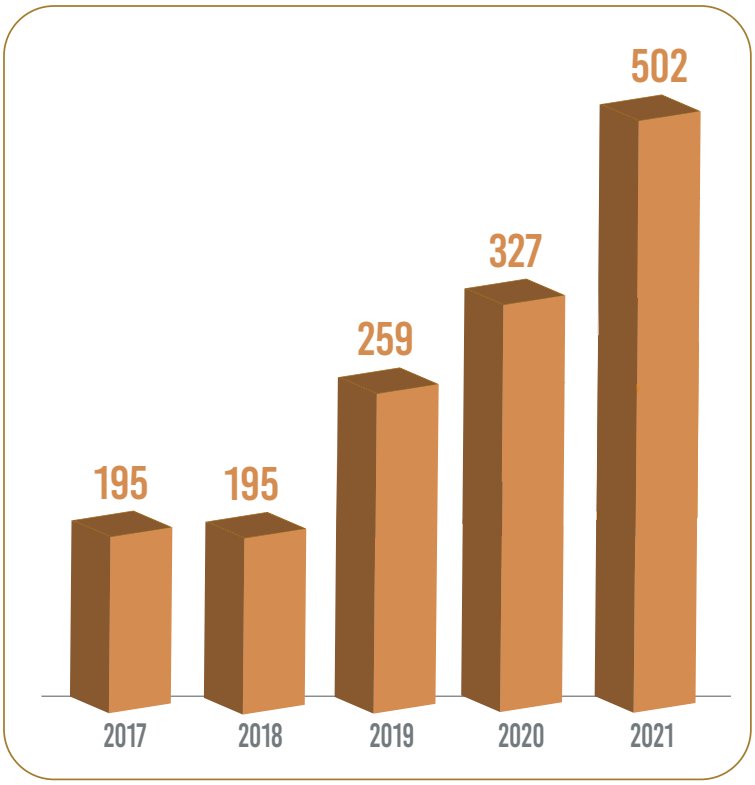


Figure 23: Roads with efficient LED street lighting (km)

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

3.6 Water Reuse & Efficient Irrigation

Program Owner: مؤسسة الصرف الصحي Wastewater Agency; مؤسسة الزراعة التجميلية Landscape Agency

Supporting Entity: بلدية رأس الخيمة Ras Al Khaimah Municipality; reem

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.

Mark Bruno
Executive Director,
Wastewater Agency,
Public Services Department

مؤسسة الصرف الصحي
Wastewater Agency

Savvas Othon
Executive Director,
Landscape Agency,
Public Services Department

مؤسسة الزراعة التجميلية
Landscape Agency

In 2021, the Wastewater Agency prepared to implement Ras Al Khaimah's wastewater masterplan, by kicking off design efforts towards Phase 1 of the masterplan. Initial work has begun to construct a TSE polishing (Reverse Osmosis) plant by a private sector partner. This is expected to begin operations in 2022 and will boost TSE usage in the longer term. Additionally, the design of approximately 50 km of primary TSE network throughout Sectors 4 and 6 of Ras Al Khaimah has commenced with the design of a new Centralised Sewage Treatment Plant that will be located adjacent to the existing Al Jazeera Landfill site. This TSE network will connect to existing networks in residential and mixed-use developments like Marjan Island, Al Hamra, and Mina Al Arab creating one integrated network. It will also lay the backbone for further TSE network expansion in these areas in the future.

The Landscape Agency continued to deploy efficient landscaping projects in 2021. About 60% of the landscape has now been upgraded to automated smart irrigation, from being previously manually controlled. Such upgrades and others will continue in the coming years to bring existing landscapes up to the irrigation standards established for new landscaping.

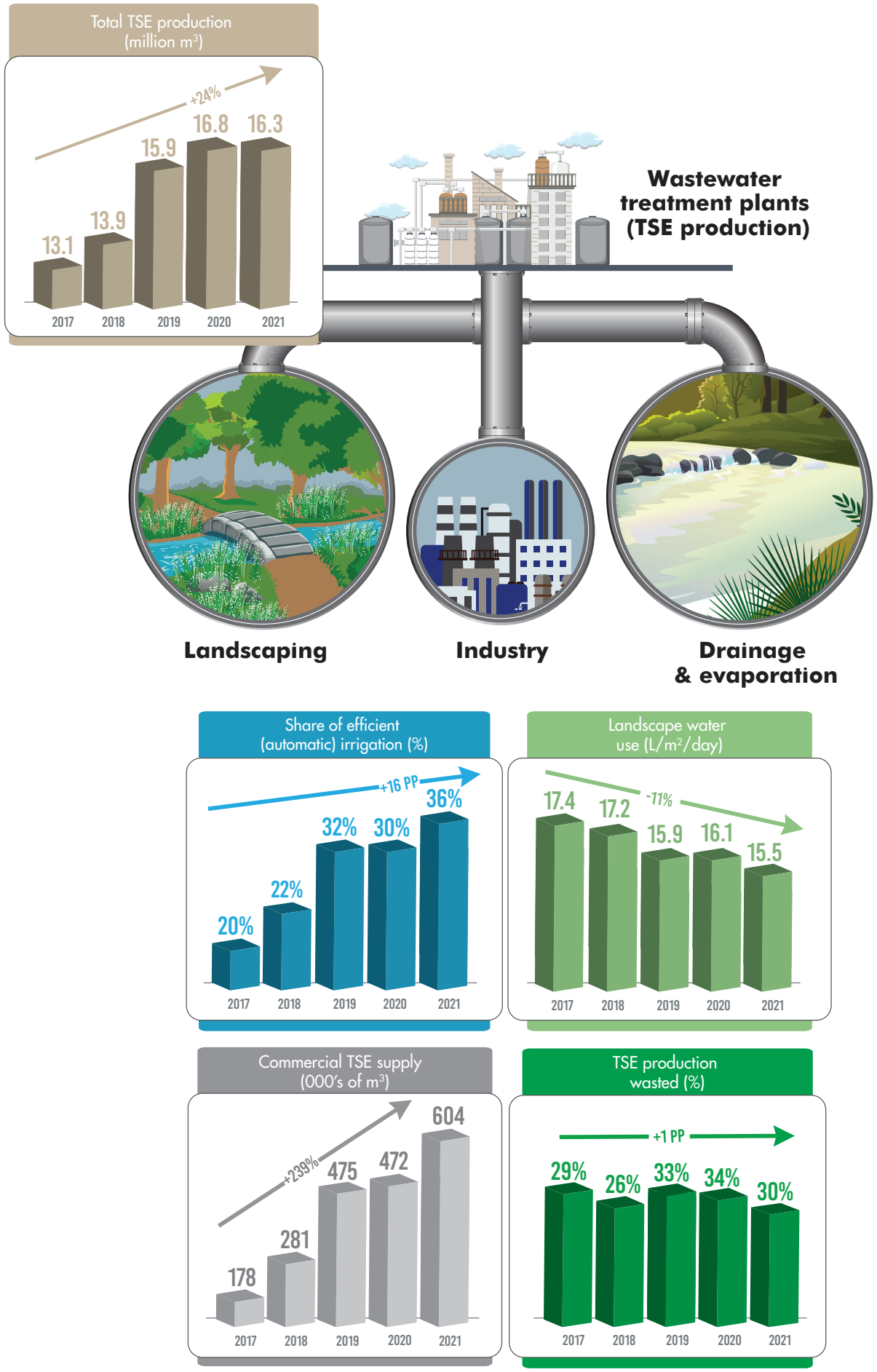


Figure 24: Wastewater flows in Ras Al Khaimah

3.7 Solar Programs

Program Owner: Ras Al Khaimah Municipality, Reem

Supporting Entities: Investment & Development Office, Government of Ras Al Khaimah; Waste Management Agency

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.

Anoop Babu
Manager, Renewable Energy
Reem,
Ras Al Khaimah Municipality

Our first installation, a 230 kWp carport at the Municipality head office continues to supply about 15% of the building's energy needs. While a regulation for distributed solar installations to the grid is still under development at a federal level, provisional permissions have been granted by Etihad Water and Electricity Company (Etihad WE) for an initial phase of zero-export distributed solar projects. This led to the emirate's first aggregated solar tender for connection of distributed solar PV projects. In 2021, this tender was concluded with the selection of a solar PV developer to execute multiple projects. We expect about 6 MWp of these projects to be developed in 2022.

Many new buildings completed in 2021 are also ready for future solar installations, given the solar readiness requirements set out in Barjeel. Incentives for renewable energy companies to set up in Ras Al Khaimah have been approved and this is expected to accelerate growth of the market in this sector.

Other applications of renewable energy are also being explored. Reem has initiated a wind resource assessment study, for which a wind measurement campaign is expected to begin in 2022. In 2021, preliminary studies were also initiated on the potential for ocean energy, green hydrogen, 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

The Waste Management Agency is responsible for the safe and timely collection, recycling, treatment, and disposal of all the 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 Energy from Waste Program was planned in two phases: an initial phase of studies and pilots, and a subsequent phase of implementation (2021 onwards), when the waste treatment options selected in the first phase are implemented.

We are now transitioning to the implementation phase of the plan. Some waste treatment technologies have been prioritised for implementation. These include refuse-derived fuel (RDF), composting, biodiesel production from used cooking oil and landfill gas to electricity. Other waste streams, such as camel waste, wood waste, waste tires and textile waste are already being processed into fuels for supply to local cement plants. In 2021, we reinforced our existing controls and processes for medical waste, with the commissioning of a dedicated medical waste incinerator. Expansion of this facility is planned in 2022.

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

مؤسسة إدارة المخلفات
Waste Management Agency

Figure 25: Primary energy from waste (GWh thermal)

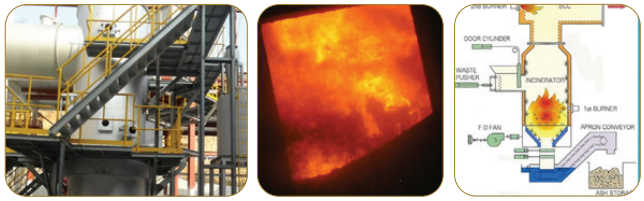


Figure 26: Medical waste incinerator in Ras Al Khaimah

An integral enabler of the Energy from Waste Program is segregation of waste. An upgraded materials recovery facility completed in 2020 has enabled initial segregation of municipal solid waste and recovery of useful materials, including potential sources of fuel. A future construction and demolition (C&D) waste recycling plant would enable recovery of sand and aggregates from construction waste, and also the diversion of additional waste to energy outcomes. Starting from 2020, source-segregation of C&D waste has become mandatory at all large construction sites, in line with waste segregation requirements defined by Barjeel. Together with Reem, we are now studying a roadmap toward source segregation in the commercial and residential sectors as well.

3.9 Efficient Vehicles

Program Owner: الاتحاد للماء والكهرباء Etihad Water & Electricity

Supporting Entity: بلدية رأس الخيمة Ras Al Khaimah Municipality reem

The Efficient Vehicles Program addresses energy efficiency in the transportation sector of Ras Al Khaimah by promoting the use of vehicles with a lower energy consumption including conventional fuel-efficient, hybrid and electric vehicles. A core part of the program is around encouraging early adoption of electric and hybrid vehicles in the vehicle fleet of the emirate with a target to reach 50% of the total vehicle sales in Ras Al Khaimah by 2040.

As of 2021, a total of 20 charging stations have been installed across Ras Al Khaimah. Vehicle purchases in Ras Al Khaimah are steadily recovering following the pandemic, and penetration of electric and hybrid vehicles continues to increase. These purchases continue to be incentivised through discounted insurance provided by RAK Insurance and free charging in Etihad WE charging stations.

The Government of Ras Al Khaimah continued exceeding the targets of Amiri Resolution No. 34 of 2018. Of the 174 vehicles procured in 2021, 87% are efficient, including 53% electric and hybrid vehicles. Procurement of efficient vehicles is expected to improve with the newly launched Green Public Procurement Guidelines for the government. Reem continues to facilitate such purchase decisions through market research and maintenance of a vehicle database and an integrated cost-comparison tool.

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

الاتحاد للماء والكهرباء Etihad Water & Electricity

20 Public electric vehicle charging stations

1,174 electric & hybrid vehicles registered in Ras Al Khaimah (cumulative)

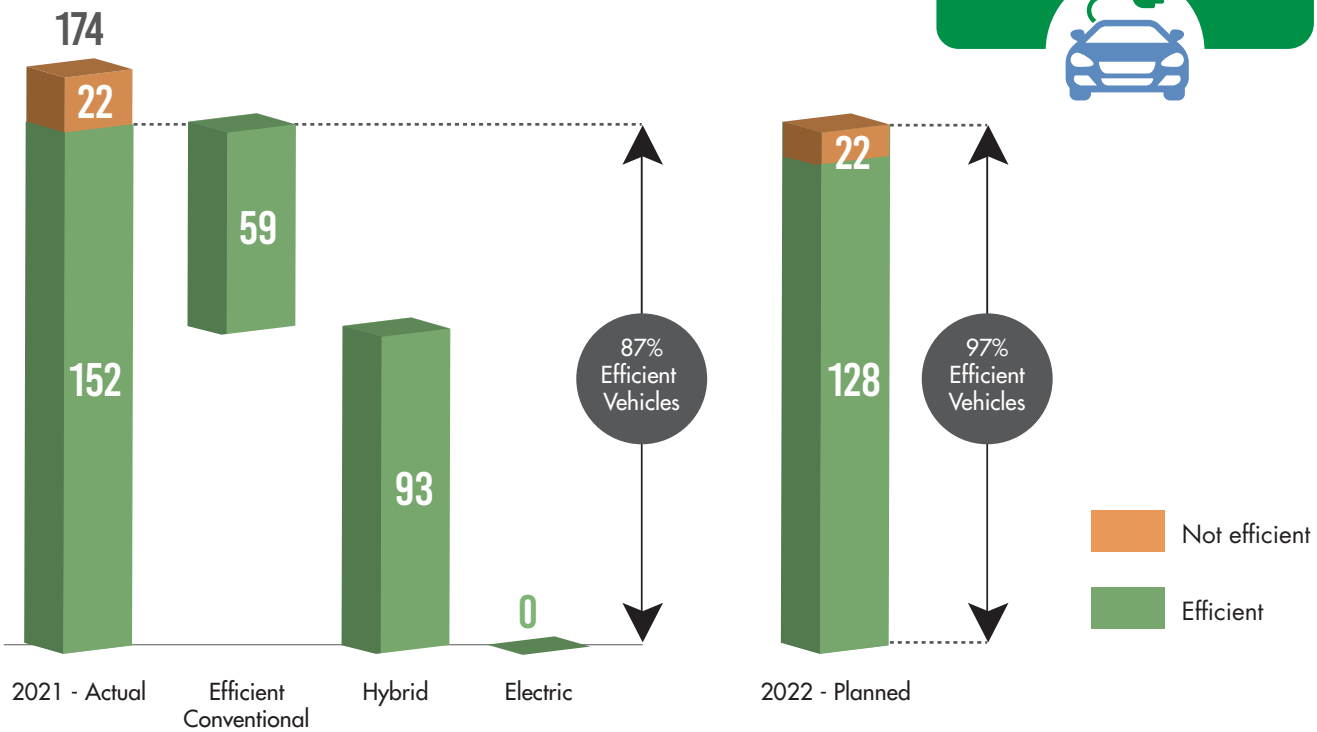


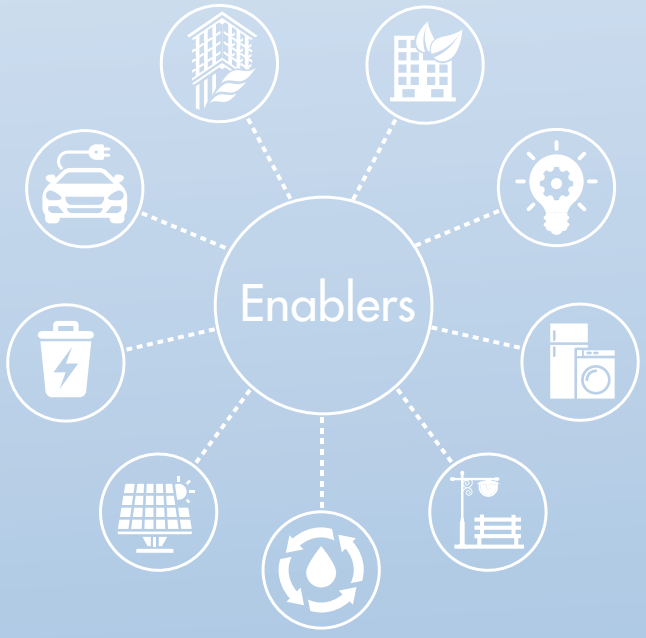
Figure 27: Government vehicle purchases in 2021 and planned purchases in 2022

Figure 28: Electric vehicle charging stations installed in Ras Al Khaimah

Figure 29: Map showing all public electric vehicle charging stations in 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.

Technical standards have been developed by Ras Al Khaimah Municipality for medium and fast electric vehicle charging stations and are available to government and semi-government entities in the emirate, upon request. Signage and infrastructure standards for electric vehicle charging stations are also being discussed with Ras Al Khaimah Police for implementation across Ras Al Khaimah.



EE&R STRATEGY ENABLERS

4 EE&R STRATEGY ENABLERS

4.1 Awareness: Events & Media Coverage in 2021

Several events were organised in Ras Al Khaimah in 2021 to bring stakeholders together. Reem participated in some external events as well to share Ras Al Khaimah's experience in sustainable energy with the regional and global energy community.

In late 2022, we are organising a first international energy conference in Ras Al Khaimah, RAK Energy Summit. The event, held under the patronage of H.H. Sheikh Saud bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah, will serve as a platform for regional and international cooperation in the fields of energy efficiency and renewable energy.

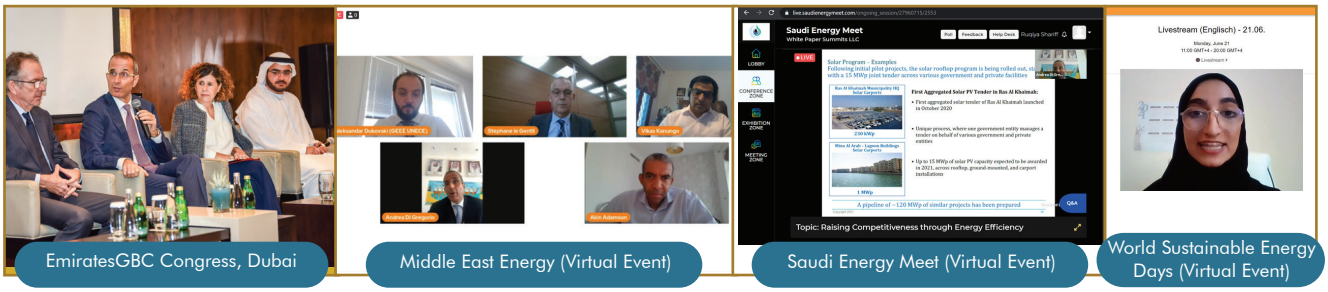
Ruqiya Shariff
Manager, Awareness & Capacity Building, Reem, Ras Al Khaimah Municipality

reem

بلديـــــة رأس الخيمـــــة
Ras Al Khaimah Municipality

Circular Economy Infrastructure (Swiss Pavilion, Expo 2020), Dubai

MENA Energy Meet (Virtual Event)



EmiratesGBC Congress, Dubai

Middle East Energy (Virtual Event)

Saudi Energy Meet (Virtual Event)

World Sustainable Energy Days (Virtual Event)

Driving Building Energy Efficiencies (USA Pavilion, Expo 2020), Dubai

Retrofit Tech, Abu Dhabi

University of Bolton Event, Ras Al Khaimah

RAKTDA Sustainability Pledge, Ras Al Khaimah

Energy Startups Meet, Ras Al Khaimah

WETEX, Dubai

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CREATING AND CONTRIBUTING TO THE ENERGY EFFICIENCY & RENEWABLE ENERGY GOALS OF THE FUTURE

4 - 5 OCTOBER 2022

Al Hamra International Exhibition & Conference Center, Ras Al Khaimah, UAE

The Government of Ras Al Khaimah considers energy efficiency and the adoption of renewable energy as important drivers for the competitiveness and sustainability of its economy. The RAK Energy Efficiency and Renewables Strategy 2040 targets 30% electricity savings, 20% water savings, and 20% renewable energy in the generation mix by 2040.

In order to enhance dialogue within the industry and create cross-learning opportunities across similar strategies globally and regionally, Ras Al Khaimah Municipality is hosting RAK Energy Summit, under the patronage of His Highness Sheikh Saud Bin Saqr Al Qasimi, UAE Supreme Council Member and Ruler of Ras Al Khaimah.

The Summit will take place on 4 - 5 October 2022 at the Al Hamra International Exhibition & Conference Center in Ras Al Khaimah, bringing together key stakeholders from the sustainable energy sector.

Book your place now! For more details, visit www.rakenergysummit.com

تعتبر حكومة رأس الخيمة تبني كفاءة الطاقة والطاقة المتجددة، محركًا مهمًا لتنافسية واستدامة اقتصادها. حيث تستهدف استراتيجية رأس الخيمة لكفاءة الطاقة والطاقة المتجددة 2040 توفير الكهرباء بنسبة 30٪ ، وتوفير المياه بنسبة 20٪ ، ورفع نسبة توليد الطاقة من مصادر الطاقة المتجددة بنسبة 20٪ بحلول عام 2040.

ومن أجل تعزيز الحوار وخلق فرص التعلم المتبادل عبر استراتيجيات مماثلة على الصعيد العالمي والإقليمي، وتحت رعاية صاحب السمو الشيخ سعود بن صقر القاسمي عضو المجلس الأعلى حاكم رأس الخيمة، ستستضيف بلدية رأس الخيمة قمة رأس الخيمة للطاقة.

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4.2 Capacity Building

4.2.1 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, and is a capacity building enabler of the EE&R Strategy. 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.

Asma Alshehhi
Energy Engineer, Reem,
Ras Al Khaimah Municipality

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 30: GPP training workshops

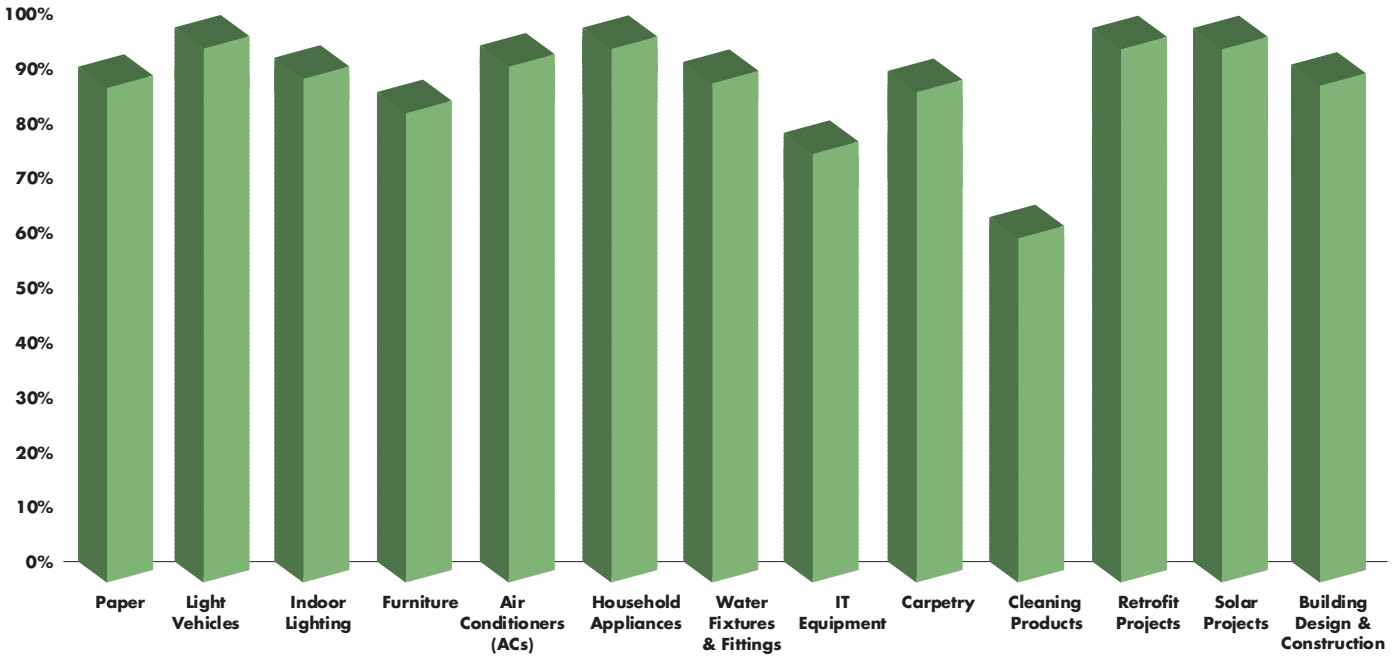

Figure 31: Share of GPP-compliant purchases in Ras Al Khaimah government in 2021 (as reported by 10 departments)

2021 marks the first full year of GPP implementation. 13 government entities have already adopted GPP by issuing an internal GPP policy, mandating application of the GPP process in the purchases of the entity. About 11 mn AED of government purchases have been made based on GPP criteria in 2021.

The first GPP initiatives were also developed in 2021, to address usage of single-use plastics and paper. Reem worked with the Environment Protection and Development Authority (EPDA) and RAKEZ to develop these initiatives, and they were launched in January 2022, in the presence of H.H. Sheikh Ahmed bin Saud Al Qasimi, Chairman of the Public Services Department of Ras Al Khaimah. The charters of these new initiatives are available as part of the GPP Guidelines.

GPP CHAMPIONS

Figure 32: GPP Champions representing government entities that have voluntarily adopted the GPP Guidelines

4.2.2 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 in Ras Al Khaimah. 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.

A total of nine ESCOs have established presence in Ras Al Khaimah to this date through the incentive scheme. Other companies in the broader energy space continued to enter the territory, including innovative technology providers, an example being, the Austrian SAN Group who is committed to developing a solar-powered biotech and renewables hub.

A capacity building initiative for SMEs and start-ups has also been developed, to be launched in 2022 as a second edition of the RAK Energy Innovation Competition. The competition will provide a platform for SMEs and start-ups to showcase their innovative solutions addressing specific energy challenges in Ras Al Khaimah. Areas of interest are particularly in the fields of energy management, industrial efficiency and decentralised energy systems. Senior executives of large government and private organisations in Ras Al Khaimah have volunteered to join the evaluation board for the competition, and will add value to the winning SMEs and start-ups by providing guidance and opening valuable business opportunities.

4.2.3 Partnerships & Collaborations

Throughout 2021, Reem continued to build relationships with additional government entities, industry associations, international organisations and private entities to carry out studies, share know-how, and begin partnerships in support of the EE&R Strategy.

Some of these partnerships were formalised in MoUs. For example, an MoU with Austrian Institute of Technology will help Ras Al Khaimah benefit from their unique expertise in industrial energy efficiency. Another MoU was signed with Energy Efficiency Services Limited (EESL), the largest public ESCO in the world, to learn from their vast expertise in energy efficiency across a number of sectors. An agreement was also signed with RAKBANK to launch green financing mechanisms to promote more sustainable purchase behaviours among residents and businesses in Ras Al Khaimah.

Collaborations with trade delegations from multiple countries such as Sweden, Germany, Denmark and Ireland are ongoing around several programs, including building retrofits, energy management, efficient street lighting, solar programs and supply market development.

Virtual MoU signing between Ras Al Khaimah Municipality and AIT

MoU signing between Ras Al Khaimah Municipality and EESL

Meeting with Irish Delegations

Meeting with Swedish Delegations

Meeting with German Delegations

Figure 33: Partnerships and collaborations

4.2.4 Upskill – Ras Al Khaimah Sustainable Energy Training Program

UPSKILL
Ras Al Khaimah Sustainable Energy Training Program

Upskill, a training program in sustainable energy was launched in late 2021 as an enabler of the EE&R Strategy. Upskill was designed to address the training needs of professionals and residents in Ras Al Khaimah in the field of energy efficiency and renewables by offering recognised trainings and certifications at discounted prices. Courses are available for individuals of different career types and levels.

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The Upskill training platform is featured on the Reem website, where interested participants can avail of a discount on one or more of the 40 listed training courses, by simply filling a form. The discount can then be redeemed when booking the course directly with the respective training provider. Participants can explore courses using the search function, or consider suggested courses based on their career track and topics of interest. The courses were chosen keeping in mind some knowledge gaps identified in the market. They cover beginner to advanced levels of technical topics such as sustainable buildings, industrial energy efficiency, renewable energy, green mobility and finance for technical personnel and students. Specialised courses in sustainable finance are also available for finance professionals. Primers on all these topics are also available to help senior executives become aware of sustainability issues and solutions.

Figure 34: Upskill QR Code

So far, the platform includes courses of several reputed regional and international training providers, such as Clean Energy Business Council (CEBC) from the UAE, Direktin from Italy, Energy Institute from the UK and National Thermal Power Corporation Limited (NTPC) from India. More training providers are welcome to Upskill to create more opportunities for talent development in Ras Al Khaimah.

The program has been benefitting from the support of Ras Al Khaimah Human Resource Department, DED and RAKEZ to encourage participation of employees and all other registered companies in the emirate.

Click here to learn more about the program or scan the QR Code.

4.3 Financing Mechanisms

Well-designed financing mechanisms can improve access to sustainable energy technologies and also make them more attractive. Many green financing mechanisms involve active participation from the government and utilities through issuance of soft loans, on-bill financing, etc. with some requiring direct investment, for example, through targeted consumer programs.

In 2021, Ras Al Khaimah Municipality developed a first set of green financing offerings in partnership with RAKBANK. The offering includes discounted terms for green mortgages, green vehicle loans, as well as favourable financing terms for home retrofit works and renewable energy installations for private residences. Details of the offering and how to avail of it can be found here.

Figure 35: MoU between RAKBANK and Ras Al Khaimah Municipality

FUTURE OUTLOOK

5 FUTURE OUTLOOK

Implementation of all the programs of the EE&R Strategy is being accelerated and scaled up in the ongoing ramp-up phase of the strategy. The year 2022 is expected to show continuation of the efforts made in previous years. By 2023, the overall strategy is expected to be reviewed, following ongoing development of a federal roadmap to achieve net-zero emissions by 2050.

Barjeel will continue to be applied to all new buildings in Ras Al Khaimah. The pilot project for Ras Al Khaimah's Sustainable Community Guidelines will be closely monitored, while a new building rating system is developed. A significant number of government and commercial buildings are expected to be contracted under the Building Retrofits Program. An energy advisory service will see a public roll-out to support energy efficiency in the residential sector, particularly in villas. Energy management systems certification will be completed in several government entities, and an industrial audit program is expected to be launched. The Solar Program is expected to see the contracting of several distributed solar PV projects, resulting from the first aggregated tender. RAK Energy Innovation Competition will be extended to the SME and start-up sectors.

The most important priorities for 2022 are listed below:

1. Further enhancement of the regulatory framework for sustainable urban development
2. Implementation of an energy audit and monitoring framework for industries
3. Expansion of the Building Retrofits Program to additional government and private entities
4. Development of a base of renewable energy capacity
5. Further enhancement of infrastructure for water reuse, public landscaping and waste management
6. Promotion of end-user awareness and engagement across all societal segments through communication, training and incentives
7. Further development of the local market for energy efficient products and services

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:

i. Continuous enhancement of the regulatory framework in support of the programs
ii. Support to building retrofit, energy management and solar PV projects
iii. Exploration of new business models and financing mechanisms for building retrofit and solar PV projects
iv. Development of local market capacity through the building of a project pipeline, incentives, training, awareness campaigns and events
v. Development of new service lines addressing residential and industrial energy users
vi. Continuous optimisation of the M&V, reporting and risk management processes for the EE&R Strategy

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Environment Protection and Development Authority

Etihad Water and Electricity Company

Executive Council of Ras Al Khaimah

Investment and Development Office

RAK Educational Zone

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

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7 GLOSSARY OF TERMS

AC: Air Conditioner

AED: UAE Dirhams

Barjeel: The Green Building Regulations of Ras Al Khaimah

BIG: Billion Imperial Gallons

btu: british thermal units

COVID-19: Coronavirus Disease – 2019

C&D: Construction and Demolition

EE&R Strategy: Energy Efficiency & Renewables Strategy 2040

EER: Energy Efficiency Ratio

EESL: Energy Efficiency Standards and Labels

EmiratesGBC: Emirates Green Building Council

EPDA: Environment Protection and Development Authority

EACO: Energy Auditing Company

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

GWh: Gigawatt-hours

hr: 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

MIG: Million Imperial Gallons

MoU: Memorandum of Understanding

MSW: Mixed Solid Waste

MW: Megawatts

MWp: Megawatts-peak

M&V: Measurement and Verification

PP: Percentage Points

PSD: Public Services Department

PV: Photovoltaic

P.O.: Post Office

RAK Academy: Ras Al Khaimah Academy

RAK Insurance: Ras Al Khaimah National Insurance Company

RAKEZ: Ras Al Khaimah Economic Zone

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

RDF: Refuse-Derived Fuel

RFP: Request for Proposal

RFQ: Request for Quotation

SME: Small and Medium Enterprise

TSE: Treated Sewage Effluent

TWh: Terawatt-hours

UAE: United Arab Emirates

UTICO: Utico FZC

WETEX: Water, Energy, Technology and Environment Exhibition

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