

2022 ANNUAL REPORT

CHAIRMAN'S MESSAGE

It is indeed a privilege for me to assume the role of Chairman for the Regulatory and Supervisory Bureau for Electricity and Water of Dubai (RSB), a position astutely served by H.E. Ali Bin Abdullah AlOwais since its inception in 2010. His impressive 13-year tenure is characterized by steadfast guidance and adaptability, contributing significantly to Dubai's Independent Water and Power Producer (IWPP) Programme.

Under his stewardship, the RSB successfully established a regulatory framework for Dubai's IWPP sector. His forward-thinking approach and leadership also broadened the mandate of the RSB, fostering close collaboration with the Dubai Supreme Council of Energy (DSCE) on Dubai's Demand Side Management Programme.

Moving towards a more sustainable future, the team initiated the ESCO accreditation scheme and gained the Executive Council Resolution, authorizing the RSB to regulate district cooling. The benefits of these endeavors are marked by over 1,750GWh of electrical savings, a huge contribution to Dubai's ongoing effort towards achieving Net Zero.

At present, the RSB serves as a competent independent regulator, issuing licenses, permits, and accreditations to 68 varied entities within the electricity, water, or cooling sectors. As I take on this role, I'm acutely conscious of the responsibility it comes with. I am comforted by the support from my esteemed Board members and our capable team. We are collectively committed to furthering the Bureau's mission in this pivotal sector, persisting in our shared aspiration of a sustainable future.

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H.H Sheikh Mohammed bin Zayed Al Nahyan

President of the United Arab Emirates



H.H Sheikh Mohammed bin Rashid Al Maktoum

Vice President and Prime Minister of the United Arab
Emirates and Ruler of Dubai

ABOUT THE RSB

Our vision is to become a leading example of regulatory practice in the Gulf region. Our mission is to support Dubai's economic, social, and environmental objectives through development of an effective, independent, and transparent regulatory regime for the emirate's electricity, water and district cooling sectors.

The RSB was established by Executive Council Resolution Number 2 of 2010. We work under the auspices of the Dubai Supreme Council of Energy, developing regulatory frameworks to support Dubai's development through secure and affordable energy supply and efficient energy use, while meeting environmental and sustainability objectives.

Supporting the implementation of the Dubai Integrated Energy Strategy 2030 and Clean Energy Strategy 2050 is central to our role. By 2030 the aim is to raise energy and water efficiency by 30% and the electricity generation mix, currently dominated by gas, is to be transformed, particularly by the addition of large and small scale renewables.

We licence and regulate independent power & water producers, ensuring new entrants to the sector deliver safe, reliable, and efficient services. Private sector participation in electricity and water production brings technology, expertise and capital to the energy sector and is governed by Law Number 6 of 2011.

In 2021, the RSB became the regulator of Dubai's district cooling market following the promulgation of Executive Council Resolution 6 of 2021.

We develop and administer frameworks to encourage greater energy efficiency in buildings. Our energy service company (ESCO) and energy auditor accreditation schemes are designed to build trust and make the process of contracting for energy services smoother for accredited entities and their clients.

EXECUTIVE SUMMARY REVIEW OF 2022

Our primary focus remained on developing and implementing a comprehensive regulatory framework for district cooling. By year-end, we had successfully crafted detailed regulations after extensive consultation with industry experts and stakeholders. We made these regulations public, covering all aspects of the district cooling service model. We granted 30 permits, 14 to District Cooling Service Providers, one of which was to a new entrant, and 16 to Billing Service Providers.

The highly anticipated Initial Public Offering (IPO) by Empower transformed the government entity into a Public Joint Stock Corporation. Consequently, Empower became subject to the requirement of obtaining a permit. This inclusion of Empower within the regulatory framework means that the entire sector falls under regulatory oversight.

By the end of the year, the total number of permit holders had reached 30, collectively catering to a customer base exceeding 200,000 units. These services were provided through 134 plant rooms, interconnected via 99 district cooling systems, with a combined authorized cooling capacity of 2.1 million tons.

The cooling sector's performance continued to show substantial progress, achieving a third consecutive year of record-breaking electrical efficiency at 0.84kWh/TRh. This coupled with a market share of 25%, resulted in over 1TWh of savings reported under the Dubai Demand Side Management Programme 2030.



IWPP - The IWPP programme continued to flourish as licenced electricity generation capacity grew to 5.7 GW.

Independent generators contributed 8.3% of Dubai's total grid requirements.

The RSB's ESCO accreditation scheme has become the brand standard for energy service companies operating in Dubai and at the end of the year there were 25 accredited companies: 14 fully accredited and 11 provisionally accredited.

During the year, 26 applications for new or renewed accreditations were made to the RSB, 19 were granted as the RSB continued to demand the highest levels of competency in delivering energy performance projects.

We commenced regular site visits to licensees with a view to maintain open dialogue and to review efforts to maintain high standards of health and safety.



SUSTAINABLE ELECTRICITY GENERATION

The operational capacity at Mohammed bin Rashid Al Maktoum (MBR) Solar Park, the largest single-site solar park in the world, reached 2GW in 2022. The site is planned to host 5GW of clean solar energy generation capacity by 2030.

Shuaa Energy 3 connected another 300MW to the grid and expects to commission its third and last phase of 300MW in 2023. The PV plant, is expected to deliver 10% additional capacity, as with Phase A of the project which has already been commissioned.

Shuaa Energy 1 and Shuaa Energy 2 continued to produce at full capacity, with peaks reaching 205MW and 870MW respectively. Shuaa Energy 2 licensed capacity was increased from 800MW to 870MW.

Noor Energy 1, the combined photovoltaic (PV) and concentrated solar power (CSP) plant at MBR Solar Park, continued to operate its 217MW PV capacity commissioned in 2021, and installed 200MW of parabolic troughs to be commissioned early 2023. The entire 950MW plant is expected to be operational by 2024.

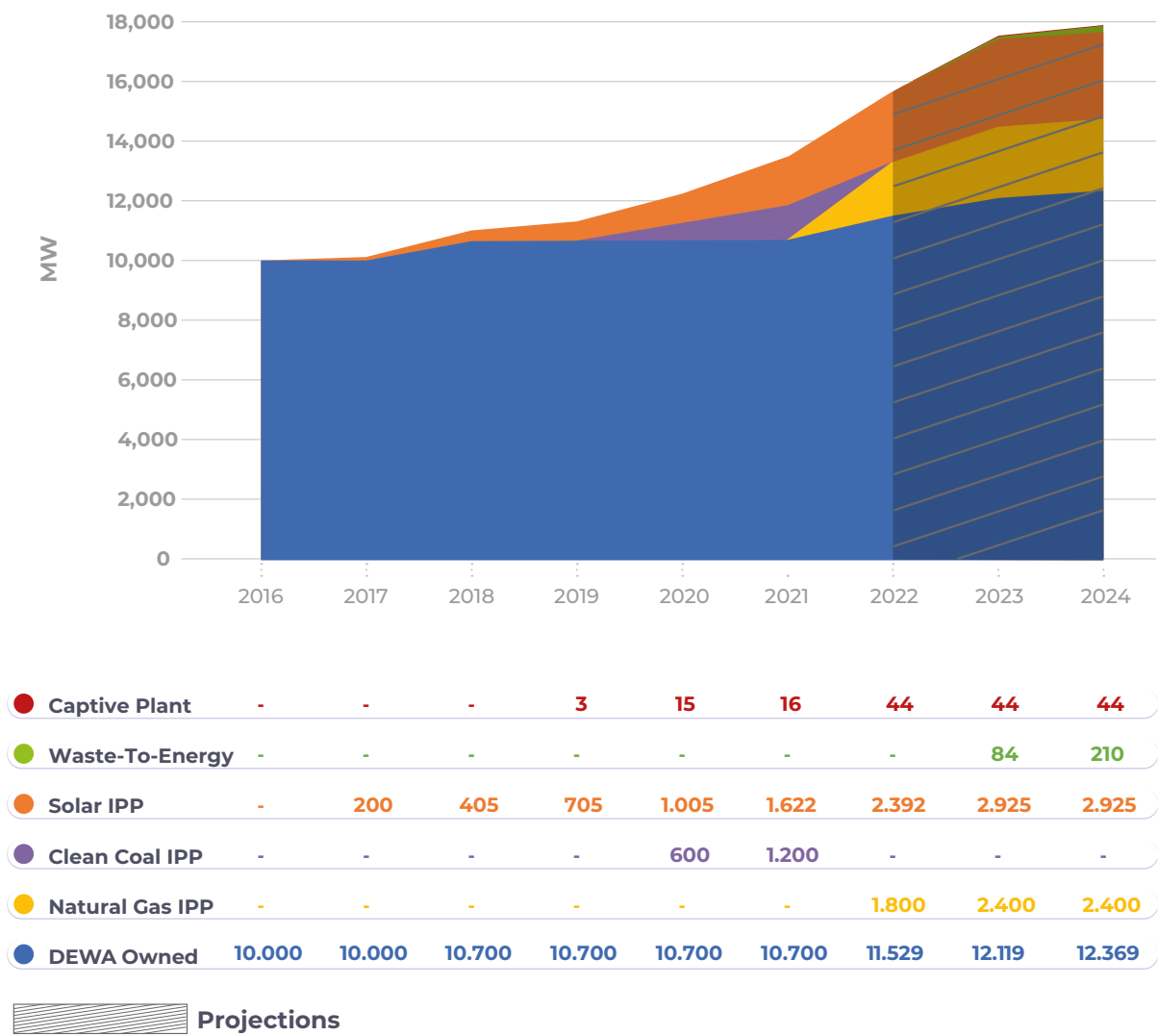


Figure 1: Evolution of Dubai's electricity generation capacity



The RSB amended Hassyan Energy license to reflect the recent decision to run the plant on natural gas instead of coal. Half of the plant's 2,400MW capacity was operational in 2022 and the other half is expected to connect to the grid in 2023.

In addition to those utility-scale installations, rooftop solar capacity across the Emirate reached 500MW in 2022 under DEWA's Shams Dubai initiative. These installations are not included in our generation capacity figures since distributed solar is accounted for as an energy saving measure, rather than production.

Figure 1 shows the evolution of Dubai's electricity generation capacity from 2016 through to 2022 and a forecast till 2024 when all currently licensed capacity will be fully commissioned.

As capacity has been added, so has the share of production from renewable sources has been increased.

Our licensees, utility scale and captive generation, contributed 4,422 GWh of clean energy in 2022, or 8.3% of the total grid requirement, more than quadrupling in just four years (Figure 2). This increasing contribution sets a positive trend on the path to net zero emissions by 2050.

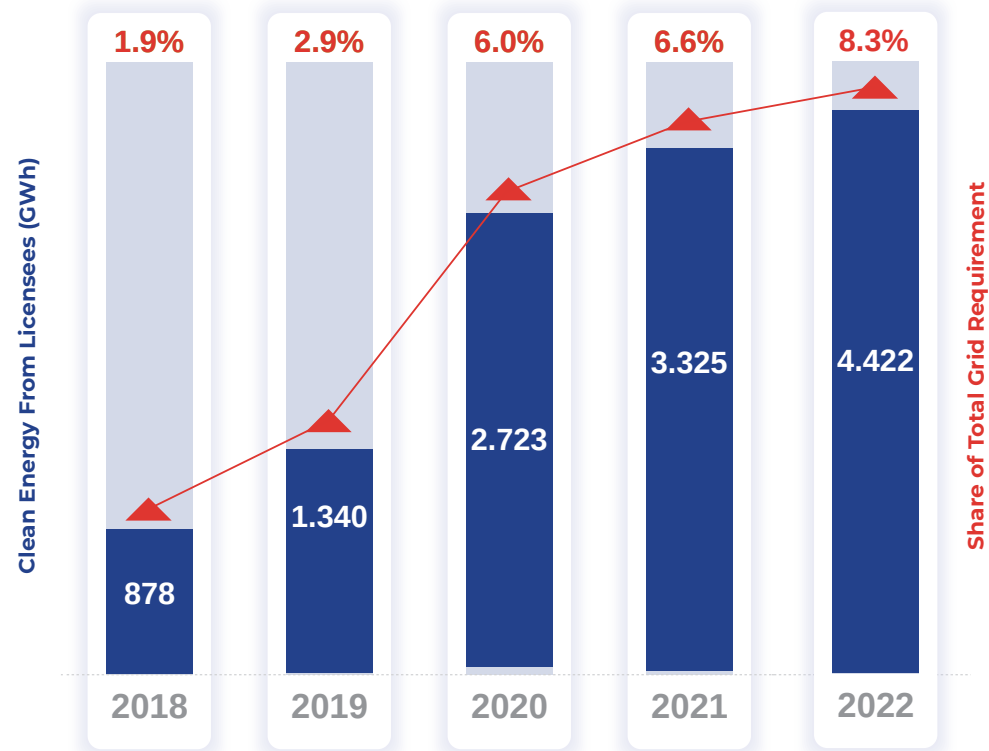


Figure 2: Clean energy production 2018 - 2022

Health & Safety

The health and safety data reported by our licensees from their construction and operational activities show a total of 32,769,970 manhours worked with no serious injuries in 2022.

During this time, there were 197 near misses. In addition, there were three Lost Time Injuries (LTI).

The data suggests that while the companies have had some incidents, they have generally maintained a good level of safety, with no serious harm coming to employees. However, it is still important for the companies to

continue to implement measures to prevent accidents and promote a safe work environment.

We calculate the accident frequency rate as the number of incidents divided by the number of man-hours worked multiplied by 100,000.

	Manhours	32,769,970
Incidents	Number	Accident Frequency Rate
Near Misses	197	0.6
LTIs	3	0.009
Serious Injuries	0	0
Fatalities	0	0

Table 1: Health and safety performance



ENERGY SERVICES MARKET

After nine successful years, the RSB's ESCO accreditation scheme continued attracting interest with 25 accredited companies: 14 fully accredited and 11 provisionally accredited.

During the past year, 26 applications have been made to the RSB, 19 of which have successfully met the scheme's criteria and the remaining 7 were rejected as they failed to do so.

The total number of accredited energy auditors by year end was 12 companies, two of which were accredited over the course of the year.

ESCOs continue to offer energy performance contracts (EPC) where either the client finances investment and savings are guaranteed, or investments are made by the ESCO and savings shared.

Around 19% of the total investment reported to the RSB since 2014 has gone into non-EPC projects, where savings are not guaranteed, and capital investment is made by clients. These investments are targeting around a third of the total savings (Figure 3).

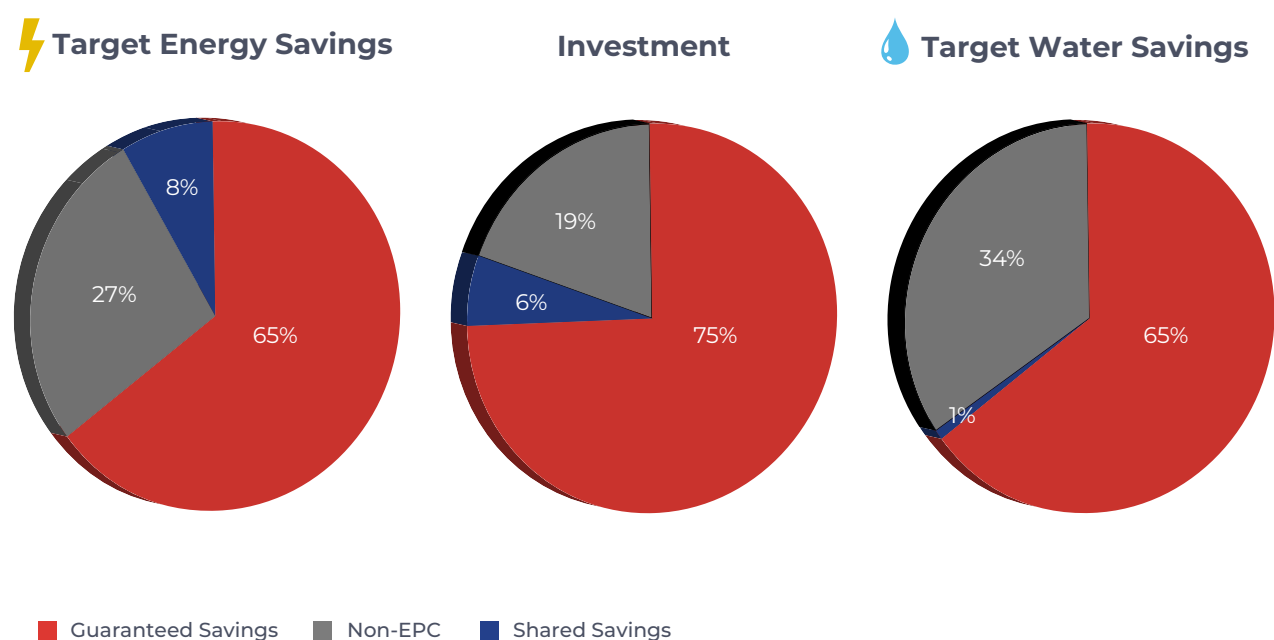


Figure 3: Investment and Savings Shares by Contract Type



Continued Growth

For 2022 accredited ESCOs reported a total of 380 projects, 34 of which were newly reported in that year (Figure 4). These new projects had associated investment of AED 58.9 million, bringing the total investment in the sector to AED1.1 billion since 2014.

Continuing to retire projects which ESCOs cease to report on, we dropped 20 of the 2021 reported projects from 2022's savings figures, bringing the total of retired projects to 50. The investment value of these projects continues to be included in cumulative investment figures.

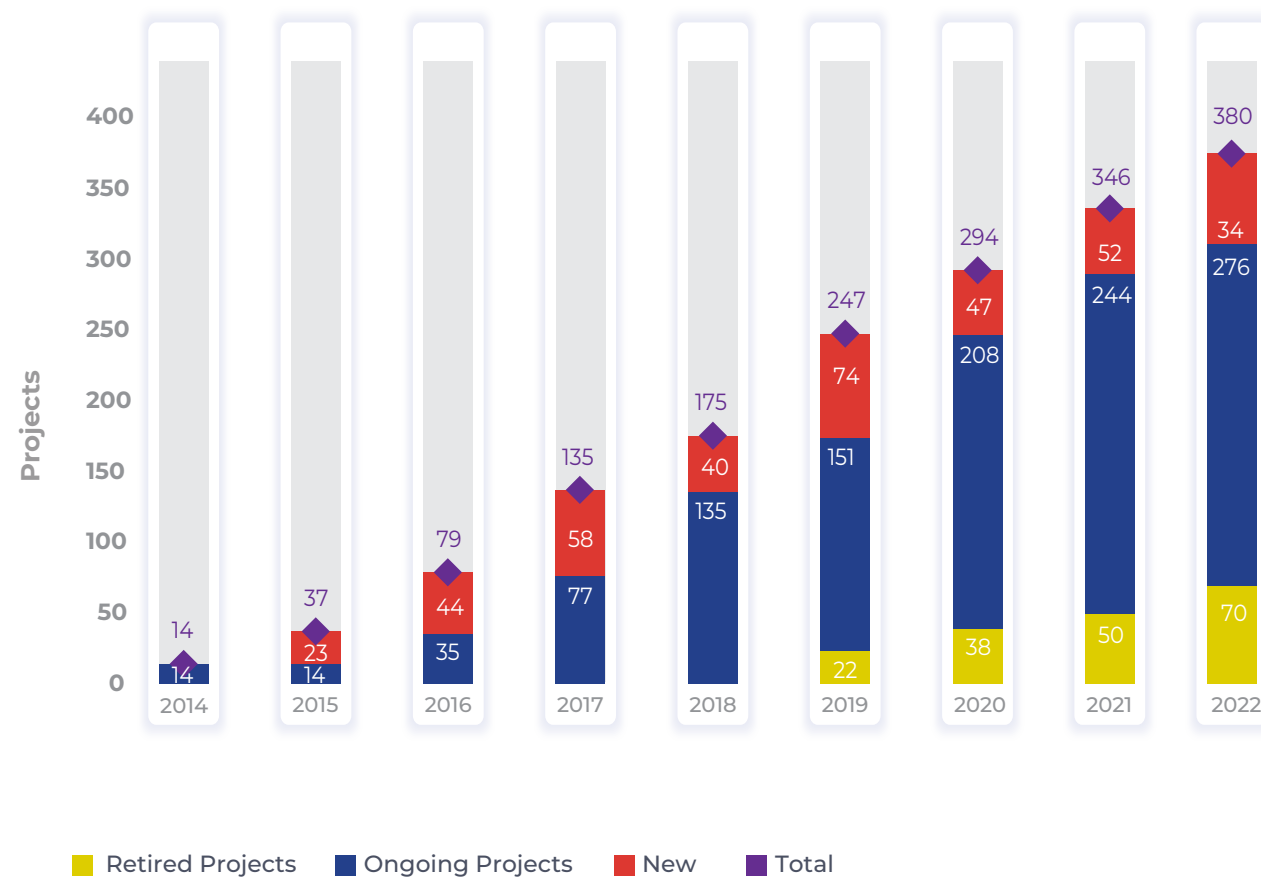


Figure 4: ESCO Projects

Tangible Savings

We receive data on both the target and achieved savings for each project. Target energy savings per annum for 2022 outstripped the previous year, with 615GWh from existing projects and a further 38GWh from new projects, totalling 652GWh.

In addition, achieved water savings grew from 347MIG in 2021 to 432MIG in 2022 where only 0.2 MIG were generated from new projects.

Figures 5 and 6 illustrate the increase in savings, both targeted and achieved, from 2014 to 2022.

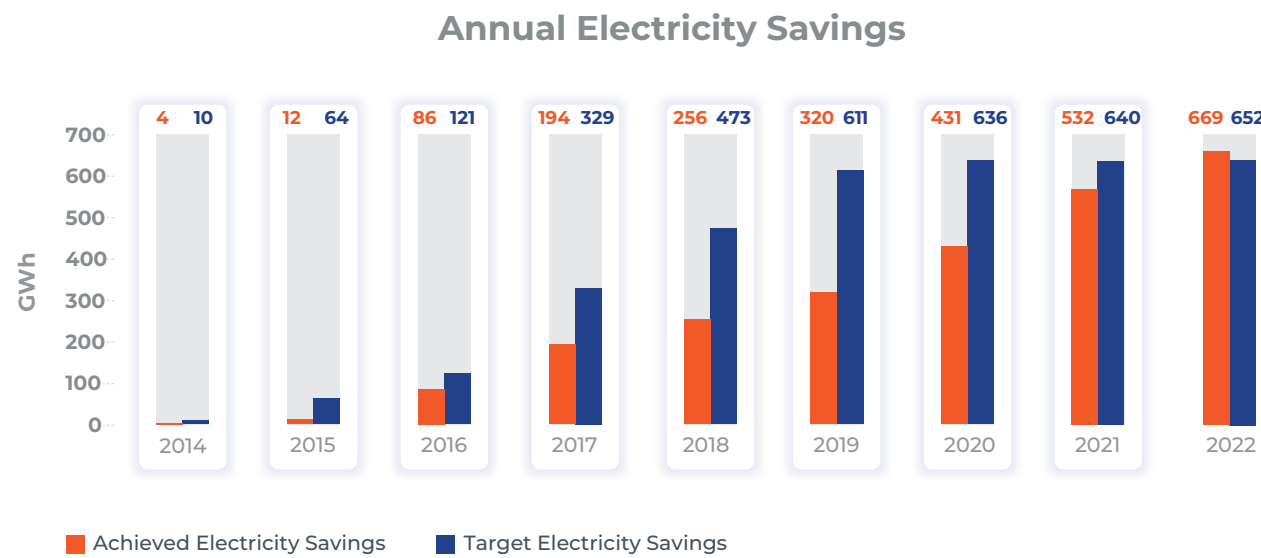


Figure 5: Energy Savings

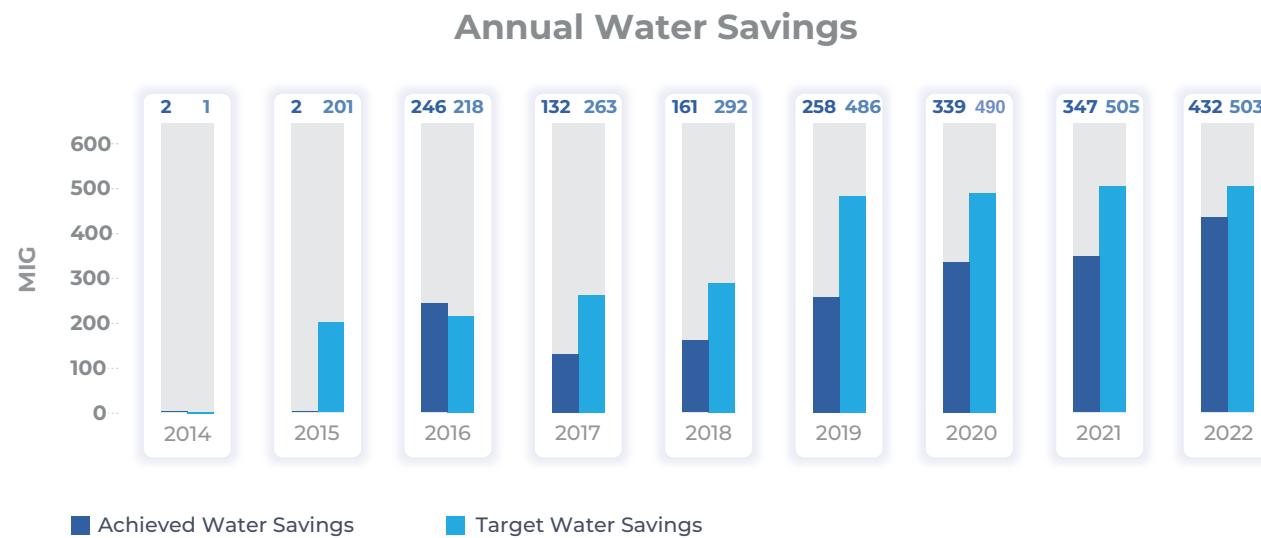


Figure 6: Water Savings

Etihad ESCO

Etihad Energy Services (EES) reported an investment figure of AED6.6 million to fund new projects, representing 55% of total investment for the year. EES's 2022 newly reported projects have target savings per annum of 4.8GWh.

Figure 7 shows a comparison between Etihad Energy Services (EES) EPC activities and those of private ESCOs. EES's 23 projects employed 67% of the cumulative investments in EPC activity to date and covered 678 buildings versus 286 covered by private ESCOs. In terms of energy savings, EES projects' share of the savings targeted by EPC activity was 57%, whereas they achieved 55% of the corresponding actual energy savings in 2022. They were responsible for 79% of target water savings and 73% of actual savings.

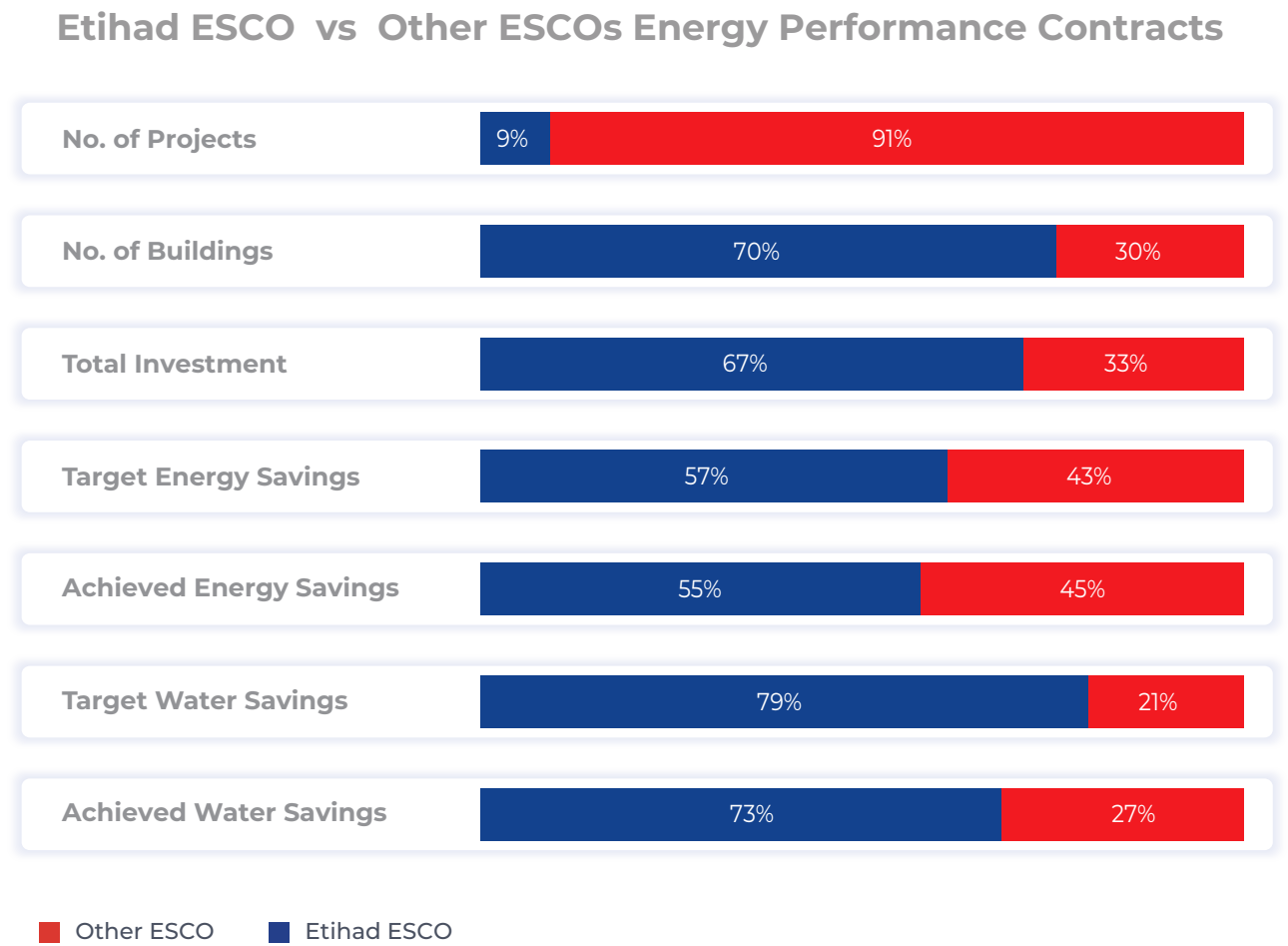


Figure 7: Balance of EES and other ESCO projects

Investment Returns

The payback period for retrofit projects was calculated at 3.3 years as shown in Figure 8. Non-EPC projects aim for 2.3 years in payback, whereas EPC projects remain at 3.7 years to achieve payback, on average.



Figure 8: Payback periods



Investment by Conservation Measure

A breakdown of the total investment by conservation measure showed 91% of investments in retrofit projects still go into cooling and lighting systems, with 60% spent on cooling related measures and 31% on lighting (Figure 9).

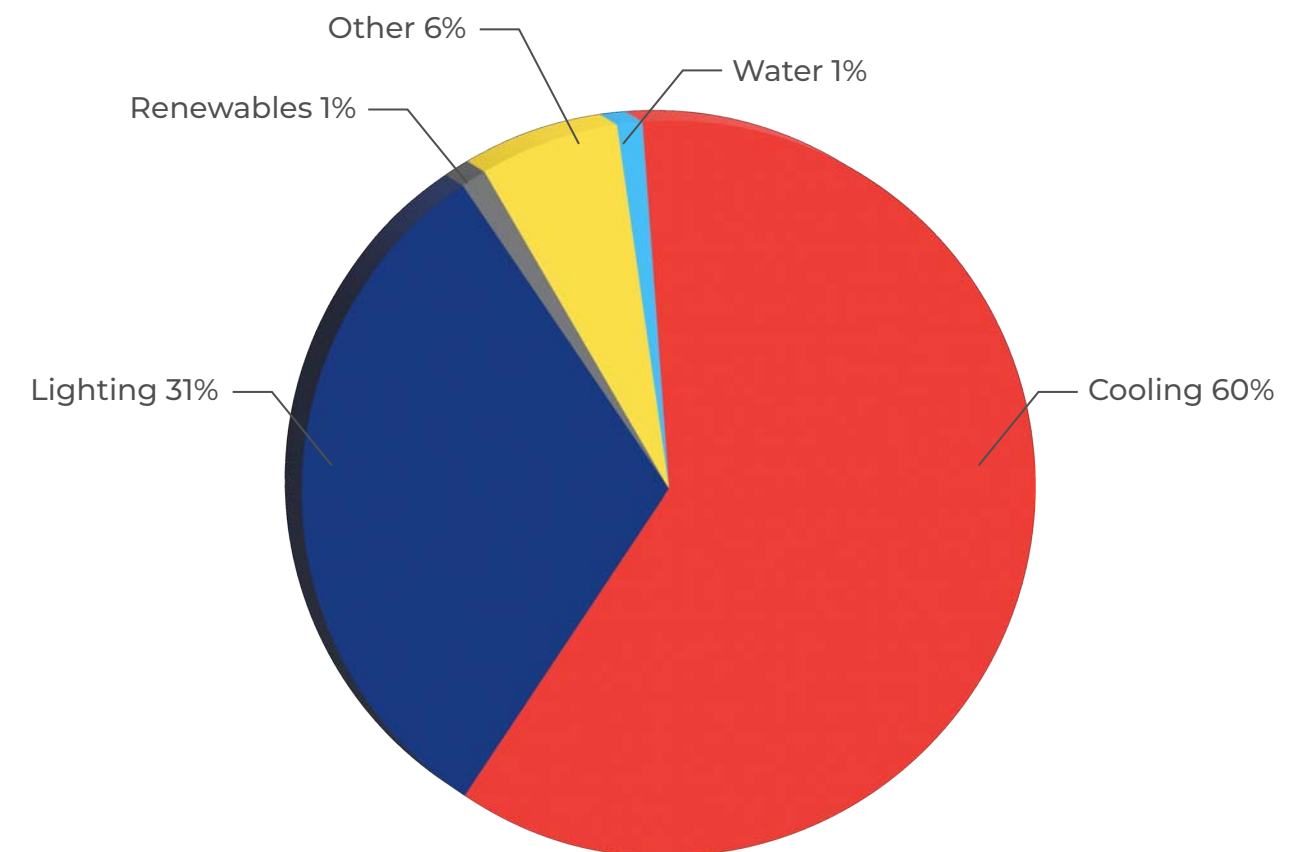
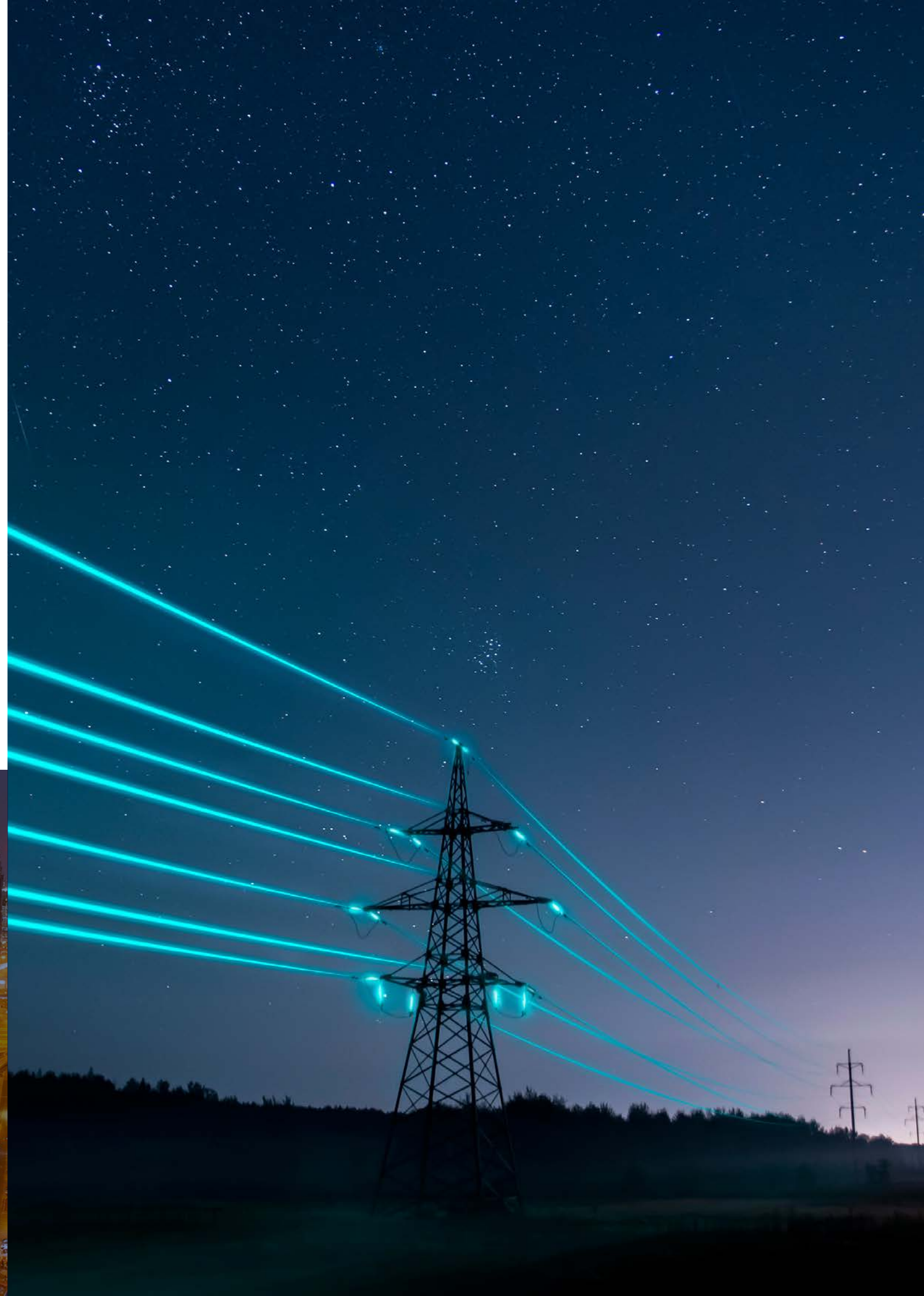
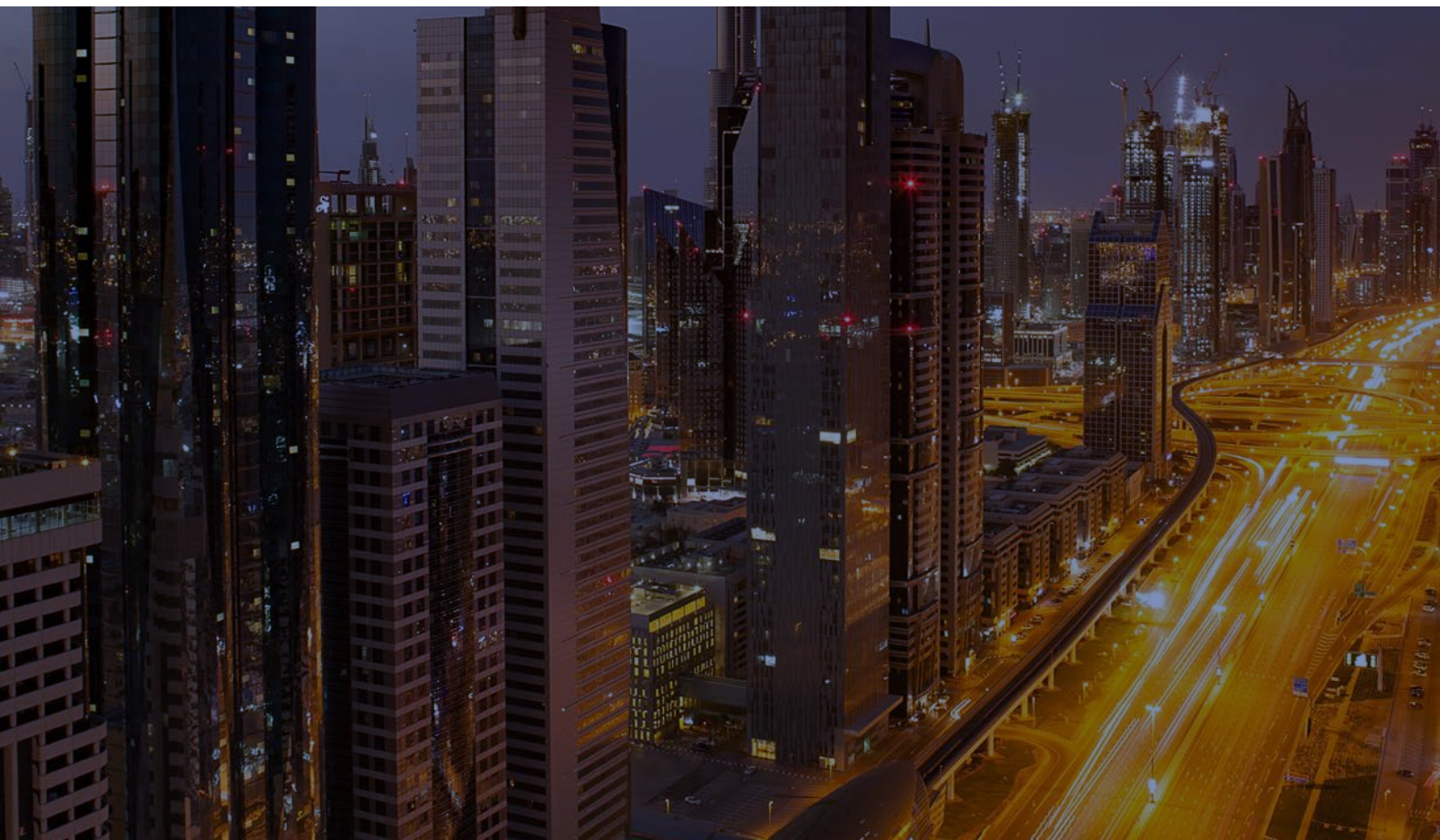


Figure 9: Investment by conservation measure

Energy Rating for Dubai's Buildings

In December 2022 the Supreme Council of Energy approved a pilot launch of a building rating scheme being developed by the RSB. An online tool will help assess the energy and water performance of select existing buildings in Dubai. In collaboration with several government entities and accredited energy auditors, the RSB will be verifying building data, performance, and ratings, with the aim of evaluating the scheme and planning future phases thereof.

The scheme is intended to raise awareness of energy and water performance and encourage improvements in building efficiency. It relies on actual energy and water consumption and Dubai-specific benchmarks to assess performance, in contrast to schemes that assess a building's features, rather than actual performance, or rely on benchmarks from outside the emirate.



EFFICIENT COOLING

Developing Regulations

Throughout the year, we continued our efforts to enhance the regulatory framework through a process involving design consultations, feedback collection, and publication. As a result, we introduced seven new Regulatory Documents (RDs) to complement the two previously published in 2021.

RD02: Handling Customers in arrears

RD02 establishes a minimum process that permit holders must adhere to when customers face payment arrears. It aims to strike a balance between allowing customers reasonable time to settle their bills while recognizing the need for consistent revenue to sustain cooling services.

RD03: Energy Performance

RD03 sets out the minimum energy efficiency performance criteria for district cooling plants. These criteria are based on historical data collected from district cooling providers before the introduction of the regulatory regime.

RD04a: Billing Service Agreement

RD04a introduces a standard agreement that all permit holders must use when providing billing services for district cooling. Its purpose is to ensure that certain information is provided for all customers that receive billing services for district cooling and that the terms of engagement are fair.

It requires the billing service provider to ensure that the meters on which bills are based remain functional so that customers pay for what they use.

It also allows billing service providers to take action in certain circumstances, where customers fall into arrears so long as they comply with RD02 when taking any action.

RD05: The Customer Charter

This RD mandates all permit holders to develop and publicly share a customer charter outlining their customer service approach. RD05 requires permit holders to establish key performance indicators and measure their performance against them. Permit holders must publish their charters within six months of obtaining a permit.

RD06: Metering Billing and Charges

This RD requires permit holders to ensure district cooling services are provided on a metered basis. Where it is not, permit holders must procure the installation of meters that have stated accuracy performance ratings. Metering is a key area where disputes arise so this RD seeks to ensure their proper operation and maintenance. It also requires data to be shared between service provider and building manager. This requirement is intended to ensure the building manager has all the information he needs to optimize cooling services within the building thus creating an efficient end

RD07: System Data

RD07 outlines the data collected by the RSB during its annual assessment of district cooling performance. This assessment primarily focuses on energy efficiency and billing services provided to buildings.

RD10: Tariffs

Initially published in July, RD10 defines the approach of the DSCE for approving tariffs proposed in permit applications. Initially the DSCE took a grandfathering approach to tariffs and when adjustments were made to DEWA's fuel surcharge tariff, the DSCE updated RD10 standardizing the approach to calculating fuel surcharges in cooling bills and placing a cap on the consumption tariff.

Remaining RDs

After three consultations on a fully fledged **RD04b: Cooling Services Agreement**, there remained a significant gap between what customer representatives wanted and what district cooling providers considered imperative to the financing of the sector. In September, we modified our approach opting to consult on a minimum requirements document. This work continued through to the end of the year.

RD09: Connected Load has remained at a conceptual state throughout the year. We held tripartite meetings with Developers, Permit Holders and Consultants to understand the challenges in setting the connected load at the design phase. However, building owners are hesitant to challenge cooling requirement estimates for fear of having insufficient cooling in the building. We will progress development of this RD in 2023.



End of the Grace Period

The grace period for compliance with the regulatory regime ended on the 30th September and we have been pleased with the efforts made by permit holders to achieve compliance by that time. There was a noticeable uptick in engagement as we approached the deadline with some permit holders applying for exemptions whilst they made adjustments to their systems to ensure compliance.

In November, we wrote to all permit holders setting out our forward plan indicating when we would be monitoring compliance with the various RDs over the period for the remainder of the year and into 2023.

Where permit holders have experienced a genuine challenge in achieving compliance and have demonstrated they are making reasonable efforts to change, we have granted exemptions. Where we have discovered non-compliance and there has been no communication from the permit holder we have first written informing them of the non-compliance and in the absence of any action, we have issued violation notices.

In September we established a working group with other government departments including RERA and the DLD. There are strong synergies between our work regulating district cooling and the real estate sector and we have engaged with these government entities to work towards regulations that are aligned with no overlap nor loop-holes.

We have worked with Dubai Municipality to consider where district cooling may have a part to play in the Urban Plan 2040.

The Permitted Sector

We have successfully concluded the regulatory permitting process aimed at integrating existing market participants within the established regulatory framework. In the year 2022, the RSB issued a total of 14 additional permits. These permits were evenly distributed, with half being allocated to Billing Agents and the other half to District Cooling Service Providers, notably including a newcomer to the sector.

By the conclusion of the year, the total number of permit holders had reached 30, collectively catering to a customer base exceeding 200,000 units. These services were provided through 134 plant rooms, interconnected via 99 district cooling systems, with a combined authorized cooling capacity of 2.1 million tons.

30 Permits	
16	District Cooling Service Providers
14	Billing Service Agents
134	Plant Rooms
99	District Cooling Systems
2.1	Millions Tons of Authorized Capacity



Cooling Degree Days

The trend of increasing cooling degree-days in Dubai is driven mostly by the urban heat sink effect, where densely populated urban areas generate enough heat to create a microclimate, there may also be an influence from climate change. However, 2022 was a slightly cooler year than 2021.

The intensity of the peak summer conditions was similar to previous years, and we would expect this to drive similar peak cooling demand.

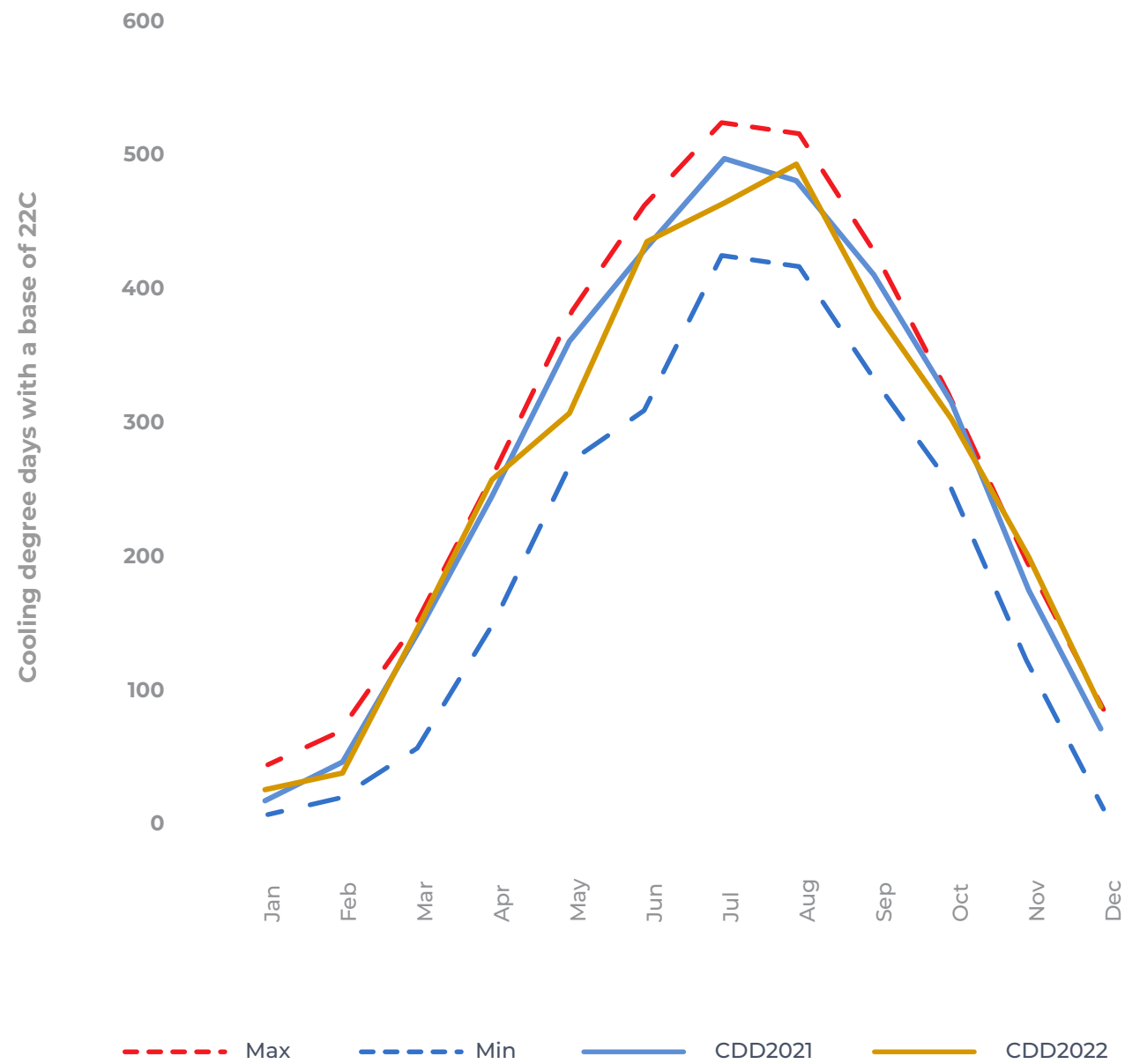


Figure 10: CDD Profiles

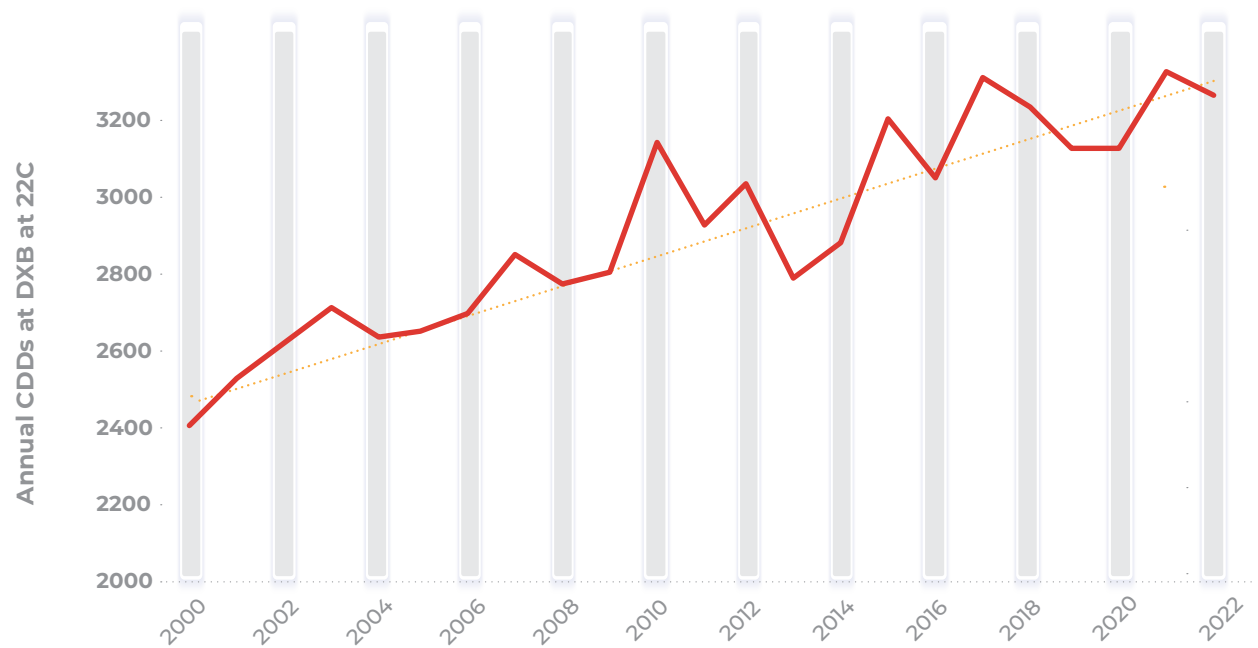


Figure 11: Annual CDDs at DXB



District Cooling Performance

Output and Market share

Output from other cooling technologies dropped slightly resulting in a stable output overall. Output from district cooling providers jumped by 13%, representing a second consecutive year of double-digit growth in output. As a result the market share of district cooling increased to 24.5%.

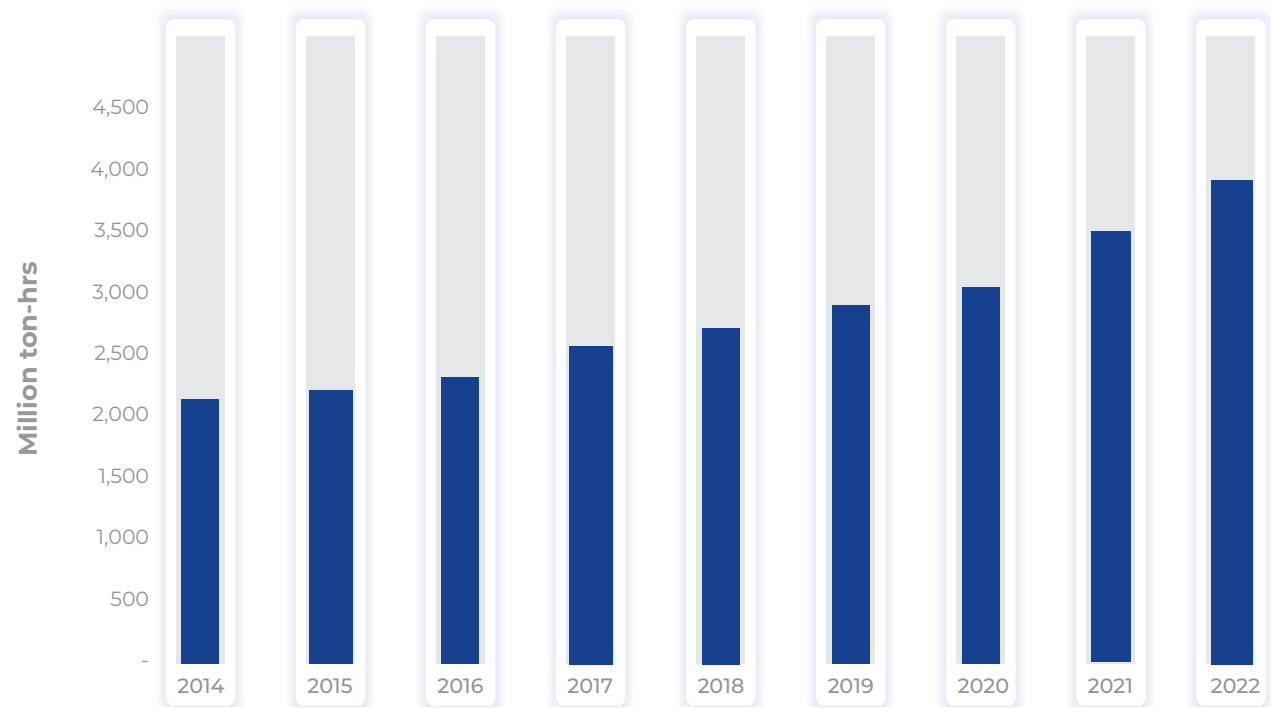


Figure 12: Output from DC Plant in Dubai

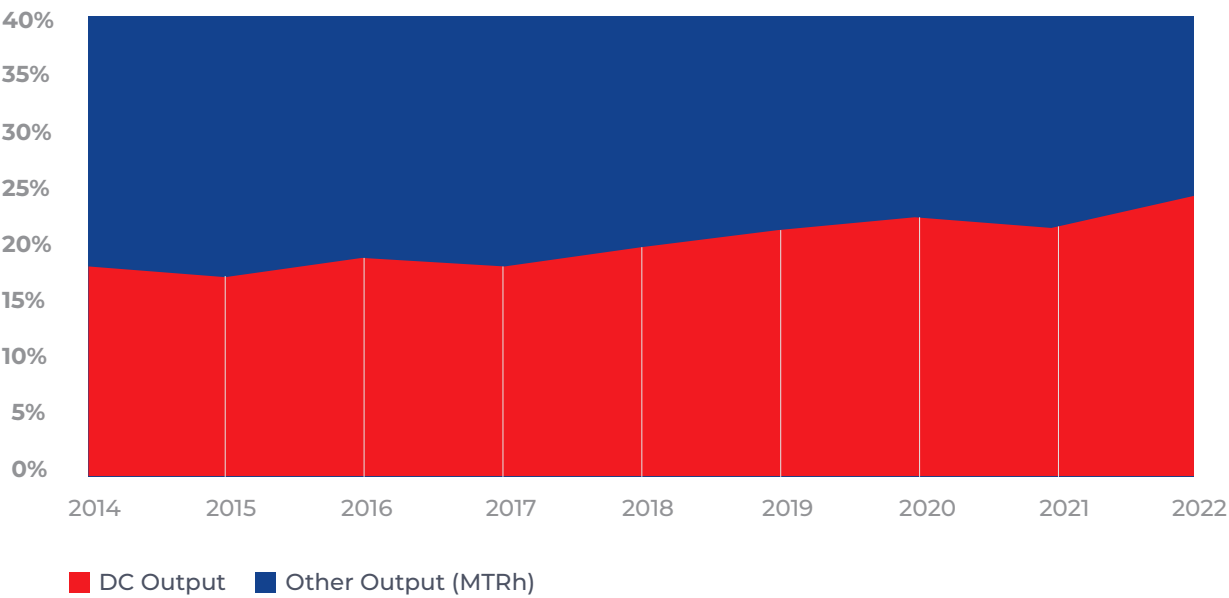
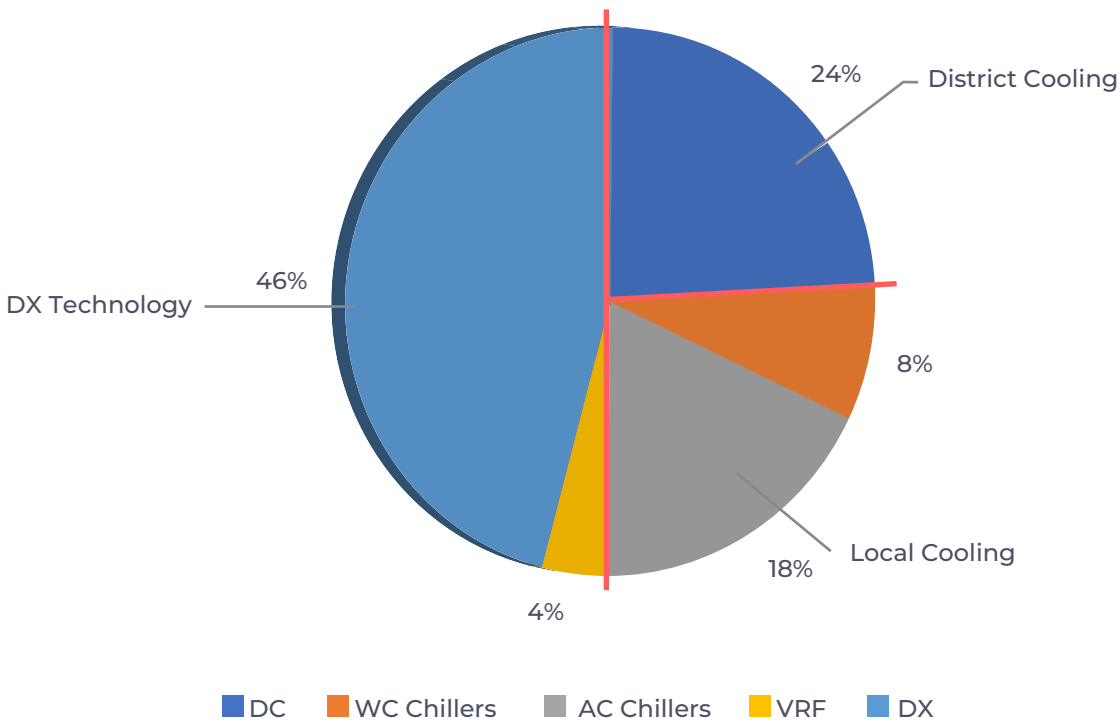


Figure 13: Cooling Output by Technology

Breakdown of cooling technologies in Dubai



DSM Savings

With the increased market share of district cooling comes increased electricity savings which are an important contributor to the DSCE’s Demand Side Management programme. This year savings passed the 1TWh threshold, well ahead of the target of 654GWh

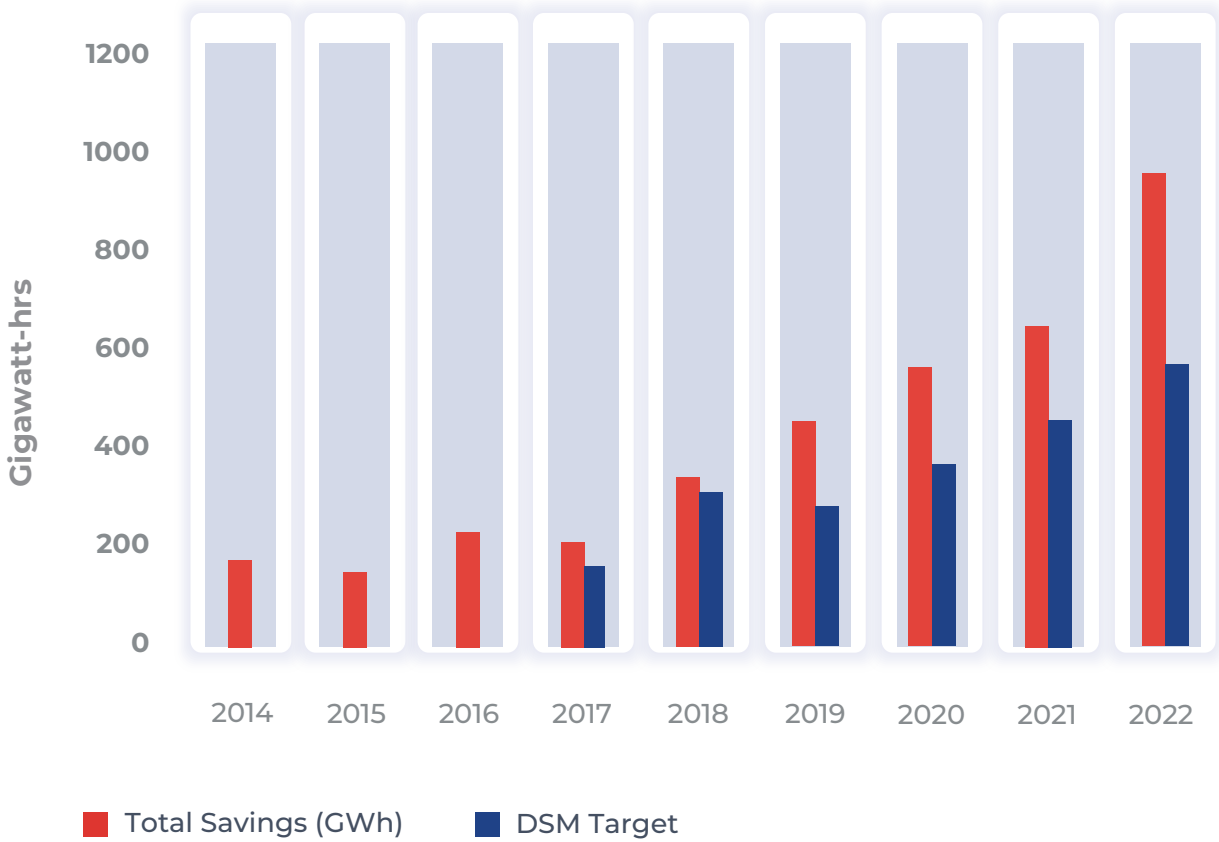


Figure 14: DSM Savings

Electrical Efficiency

District cooling plant continued the recent trend of improved electrical performance. The average electrical efficiency of water-cooled DC Plant in 2022 was 0.852kWh/TRh which is approaching the 2030 target of 0.824kWh. In 2017, we raised concerns that the electrical efficiency of the sector, which stood at 0.914kWh/TRh, had shown no sign of improvement, so we are pleased to see the sector driving improvements in electrical efficiency across their plant rooms.

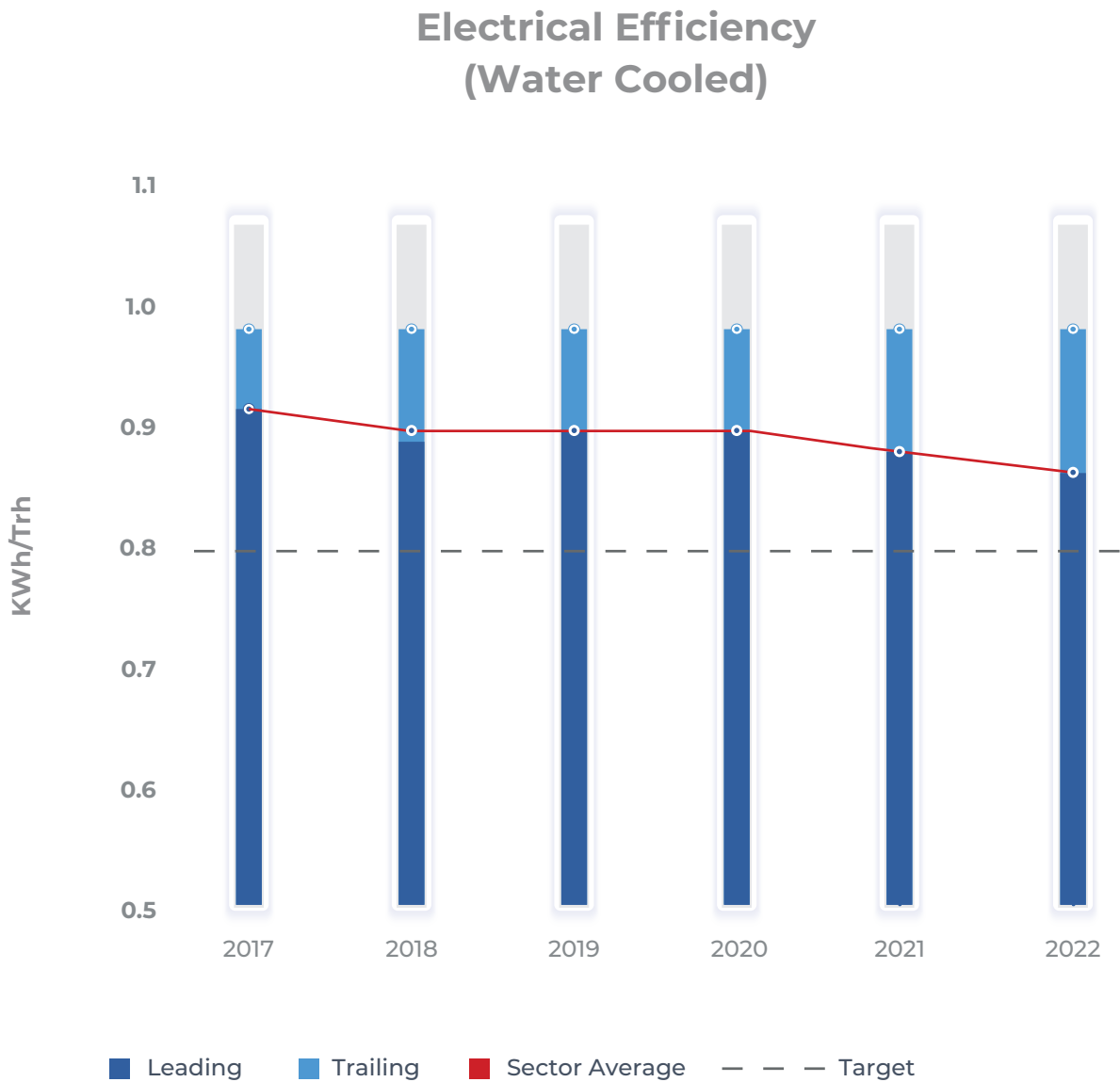


Figure 15: Electrical efficiency of district cooling plant in Dubai

Water Efficiency

Water efficiency has remained stable in the target area of around 7.5litres per ton-hour. It has hovered around this area since 2018. There are still wide variations in the individual performance of water cooled plant. Whilst some plant rooms missed the required threshold set by RD03 other plants continue to set new standards. The five best plant rooms achieved production efficiency better than 0.70kWh/TRh

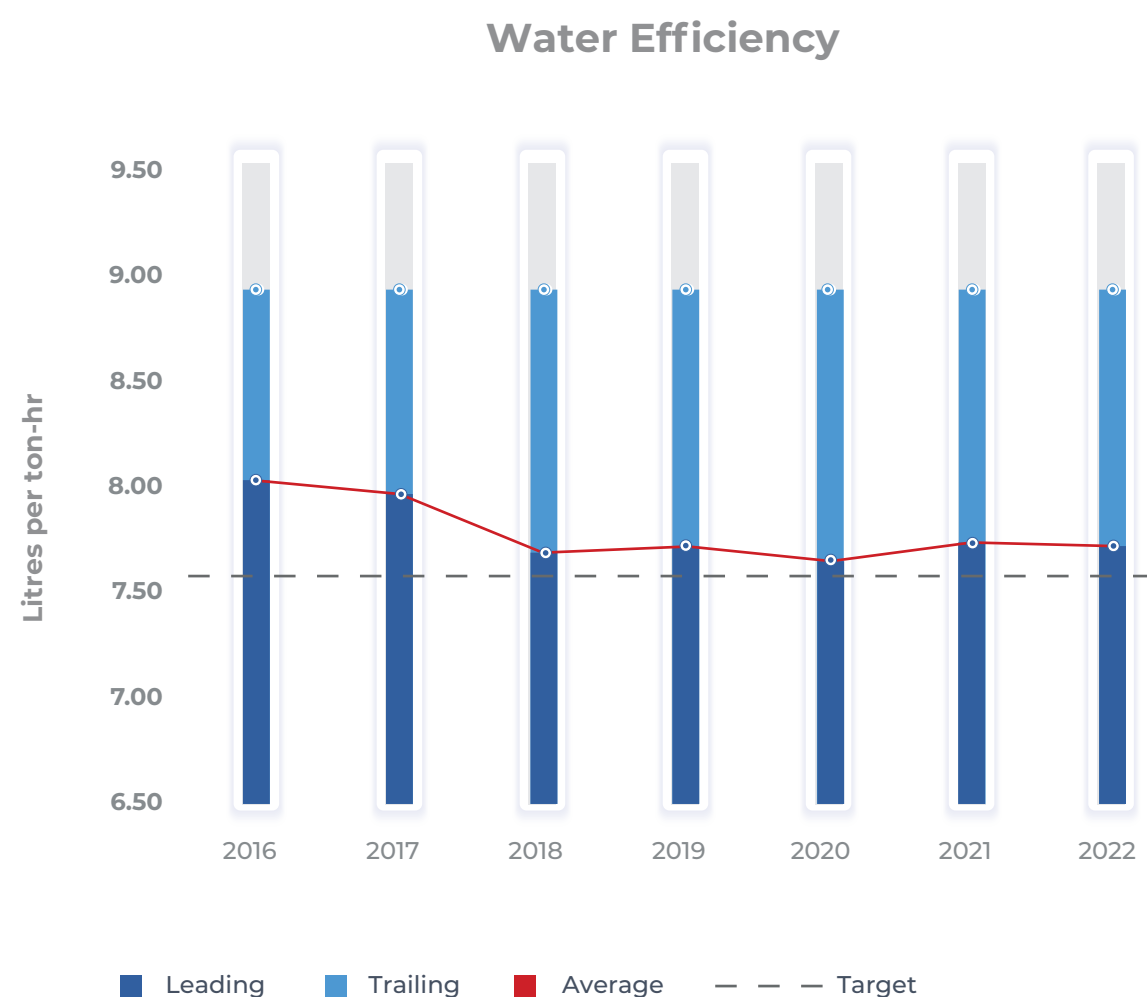


Figure 16: Water efficiency of district cooling

Total Water Use

The sector used 28 million cubic meters of water during the year comprising 21.5 Mm3 from DEWA and 6.8Mm3 from recycled sources. We continue to encourage use of recycled water wherever possible because relying on it, rather than high quality drinking water derived from cogeneration facilities, is more energy efficient.

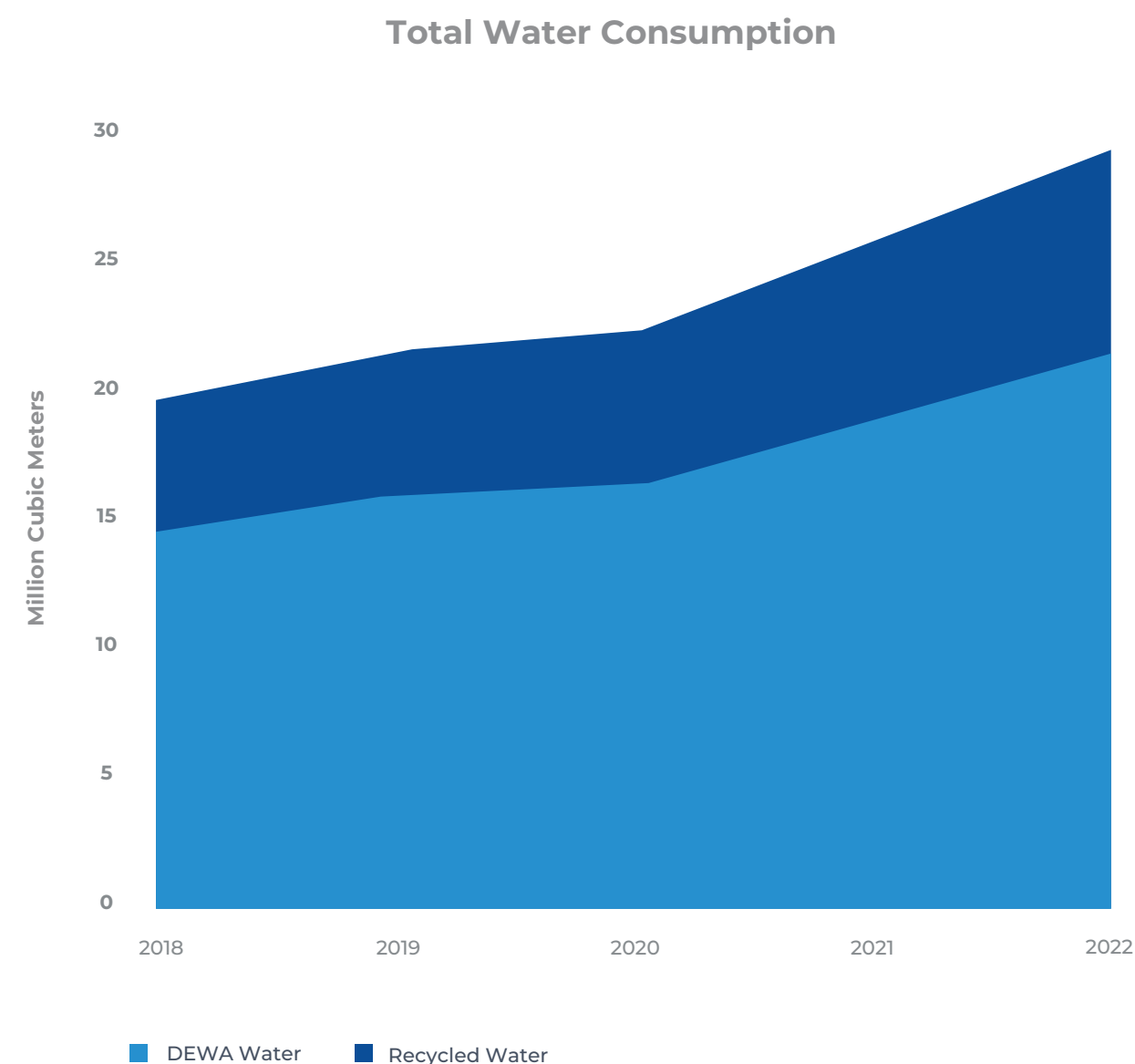


Figure 17: Total water consumption in district cooling

Recycled Water Use

Whilst the proportion of water provided from recycled sources fell to just over 24% from a high of 26% in 2021. The volume of recycled water provided increased by 0.2Mm3 indicating that the district cooling sector may be making the maximum use of the available recycled water resources. We will continue to work with other government entities to increase the availability of recycled water for district cooling, whilst recognizing the other valuable uses of it.

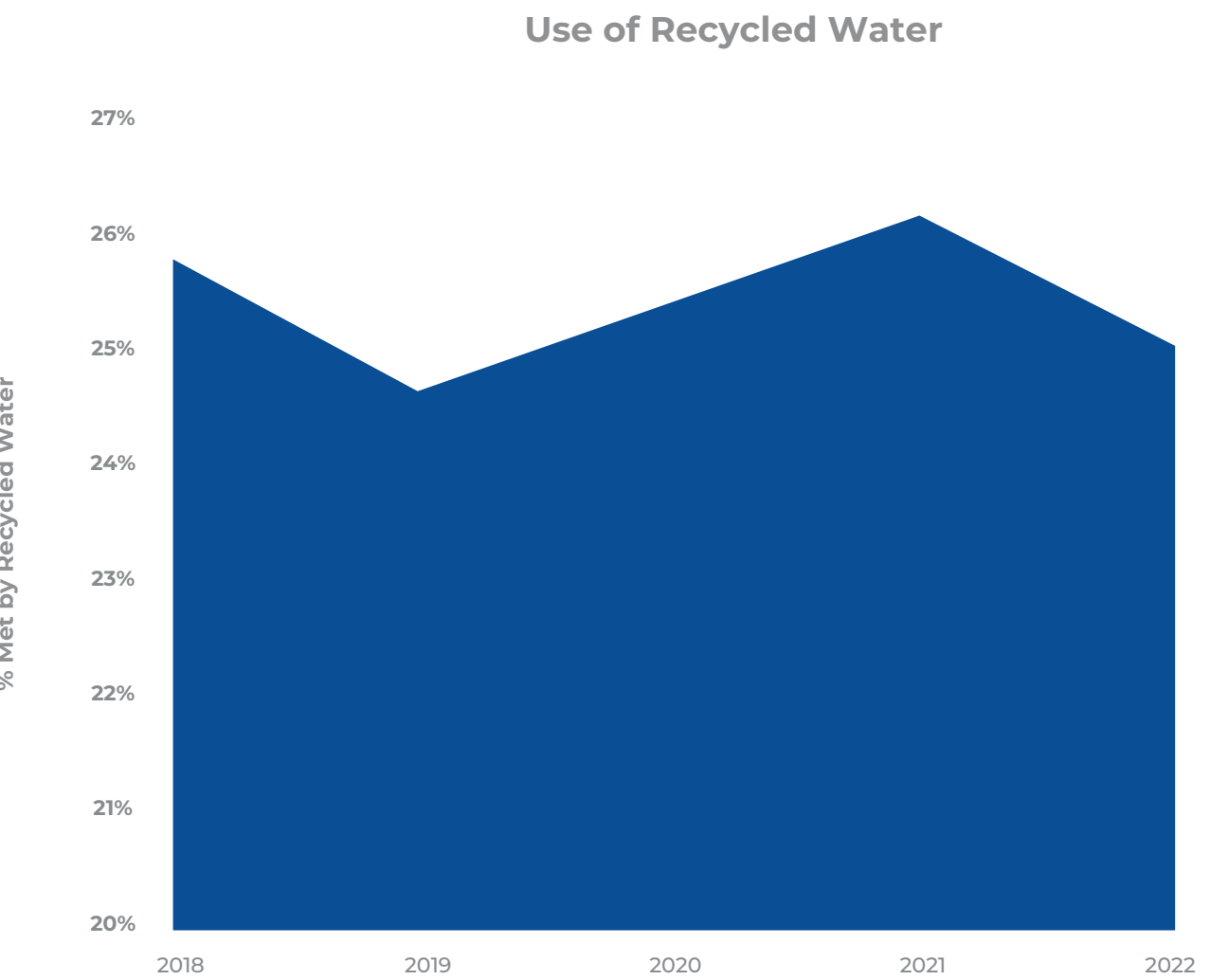


Figure 18: Recycled water share in district cooling

Escalated Complaints

As awareness of the regulatory regime increases the number of complaints escalated to the RSB or DSCE also increase and in 2022 we continued to observe this trend. There were also more instances of speculative complaints.

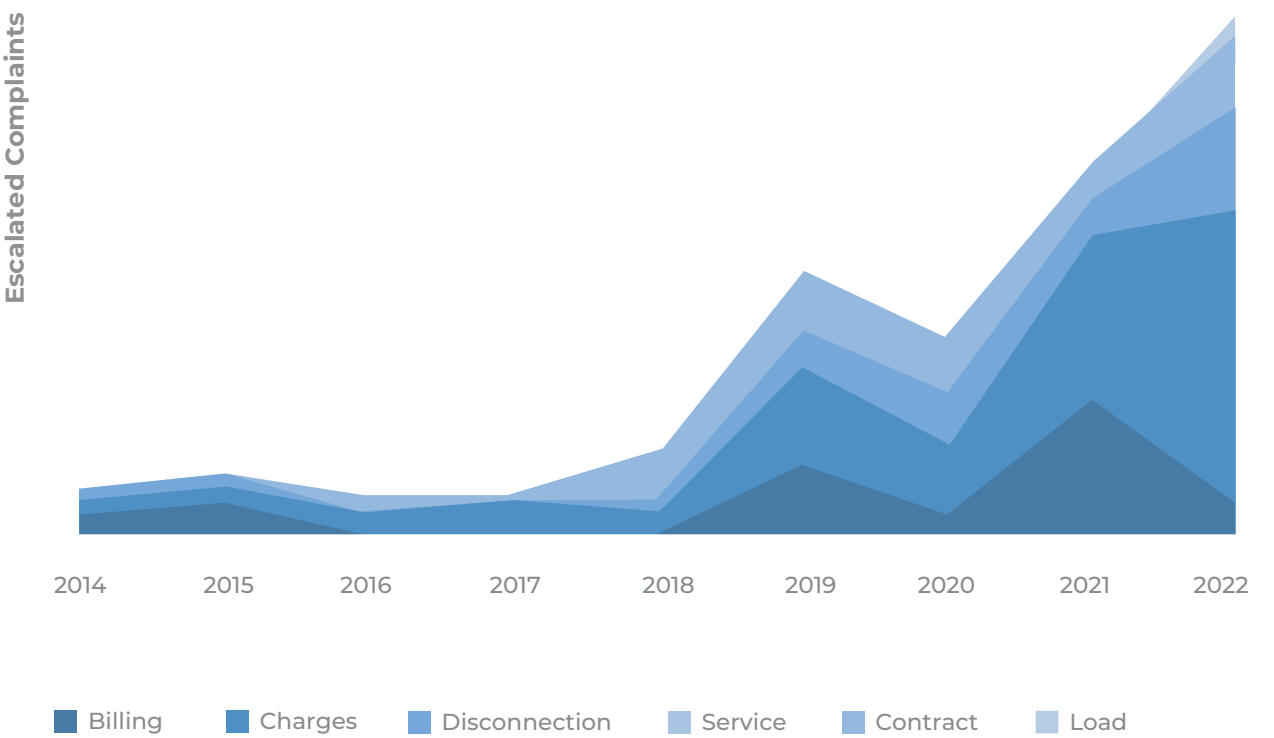


Figure 19: Complaints escalated to the RSB



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