حكومة دبي
GOVERNMENT OF DUBAI

مكتب التنظيم والرقابة لقطاع الكهرباء و المياه
RSB FOR ELECTRICITY & WATER

ANNUAL REPORT 2019

REGULATORY & SUPERVISORY BUREAU
FOR ELECTRICITY & WATER

ANNUAL REPORT 2019

Regulatory & Supervisory Bureau
P.O. Box. 121555, Dubai

www.rsbdubai.gov.ae

H. H. SHEIKH KHALIFA BIN ZAYED AL NAHYAN

PRESIDENT OF THE UNITED ARAB EMIRATES

H. H. SHEIKH MOHAMMED BIN RASHID AL MAKTOUM

UAE VICE PRESIDENT AND PRIME MINISTER, AND RULER OF DUBAI

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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 and water sector.

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 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 to the benefit of all in Dubai. Private sector participation in electricity and water production is expected to bring technology, expertise and capital to the energy sector and is governed by Law Number 6 of 2011.

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.
We work to promote the adoption of efficient cooling solutions, including district cooling.

Ali Bin Abdullah Al Owais,
Chairman

Dr. Riad Belhoul,
Vice Chairman

Ahmad Al Muhairbi,
Member

Qusai Al Shared,
Member

Mustafa Al Yousuf,
Member

Graeme Sims,
Executive Director

ANNUAL REPORT 2019

MESSAGE FROM THE CHAIRMAN

It is only a little over five years ago that the competitive tendering process for Dubai›s first independent power project, a 200 megawatt photovoltaic plant, concluded with a then record low price of 5.85 US cents per kilowatt hour. At the time many questioned whether prices at this low level were sustainable. Yet, less than five years later Dubai's latest solar PV IPP achieved a new record low of just 1.70 US cents per kilowatt hour, a reduction of over 70%. It is small wonder then that power planners are having to turn their mind to a world characterised by an abundance of low cost solar power, with the demand and system management challenges that brings.

Less well-publicised over the past five years have been the efforts of some of Dubai's industrial companies to improve the efficiency and sustainability of their energy production and use. In this year's report we highlight the licences we granted in 2019 to Al Khaleej Sugar, National Cement and Al Rawabi Dairy Company. Each has taken a different approach to solving their energy needs, but all are to operate combined heat and power plant, with high thermal efficiency, and two are able to make use of a renewable feedstock, with the consequent beneficial environmental impact.

We also report on the continued progress of our ESCO accreditation scheme and the retrofit projects it supports. Investment since we launched the scheme is approaching AED1 billion, expected to result in savings of 620 gigawatt hours and 486 million imperial gallons, with projects paying back their investment in just three years on average.

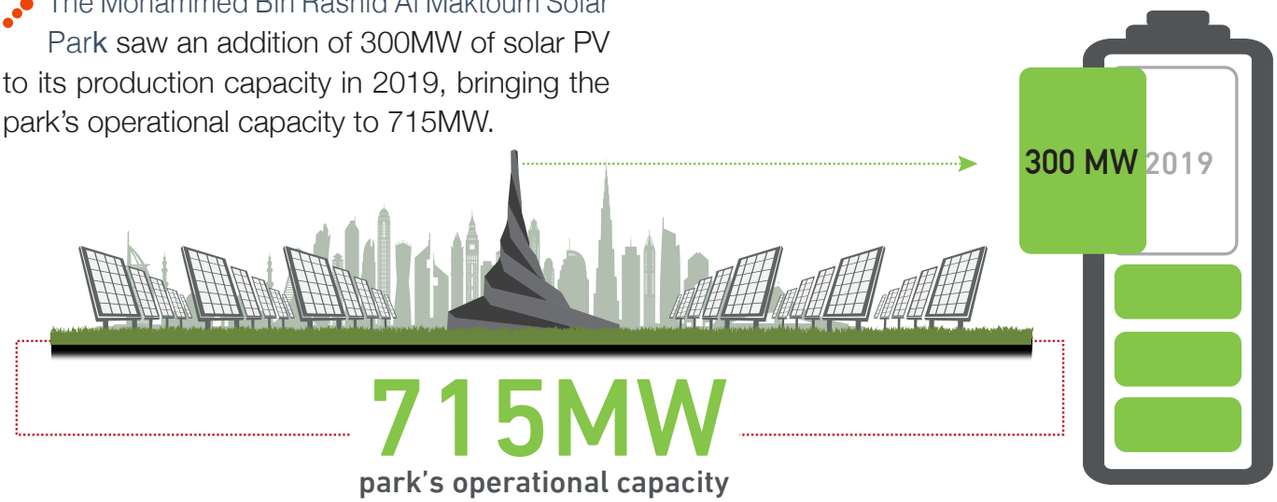
We congratulate all our stakeholders for their achievements in helping achieve Dubai's energy strategy. And I would like to thank the Supreme Council of Energy, my fellow board members, and the RSB staff for their continued commitment, support and professionalism.

ALI BIN ABDULLAH AL OWAIS
CHAIRMAN

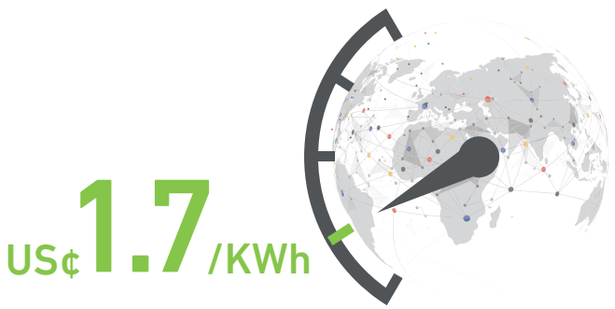
CHAPTER 1

EXECUTIVE SUMMARY

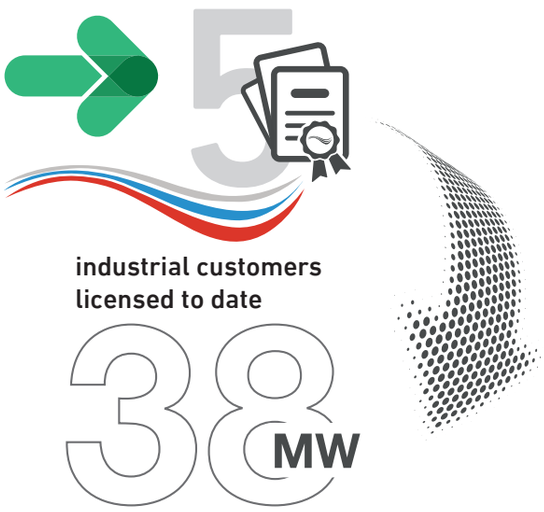
The Mohammed Bin Rashid Al Maktoum Solar Park saw an addition of 300MW of solar PV to its production capacity in 2019, bringing the park's operational capacity to 715MW.

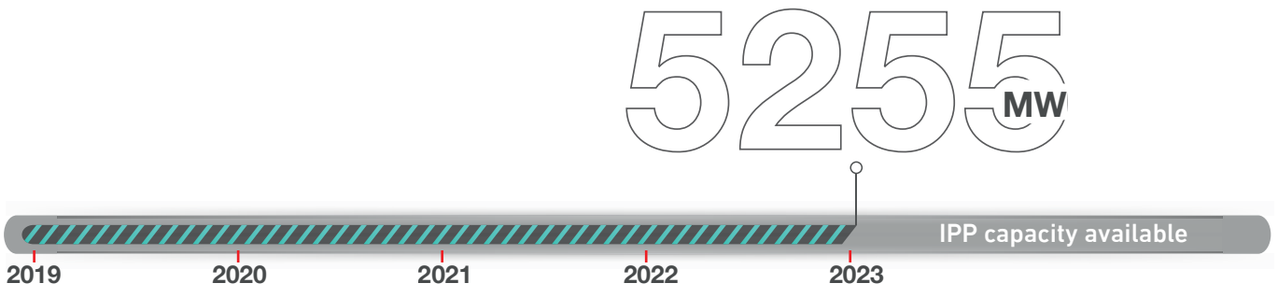


DEWA achieved a world record bid of US1.70¢/KWh for the 900MW fifth phase of the Solar Park through a partnership with a consortium led by ACWA Power and Gulf Investment Corporation. The plant is planned to become operational in stages starting in the second quarter of 2021.



As for smaller scale projects, three new licences were granted to captive plant supplying two factories and a dairy farm. Al Khaleej Sugar, one of the world's largest sugar producers, received a generation licence in April. In October the RSB granted a generation licence to National Cement Company and a month later the year's third licence was granted to Al Rawabi Dairy Company. Taken together, the five licences granted to date to industrial customers amount to 38MW, and all involve the joint production of heat and power.



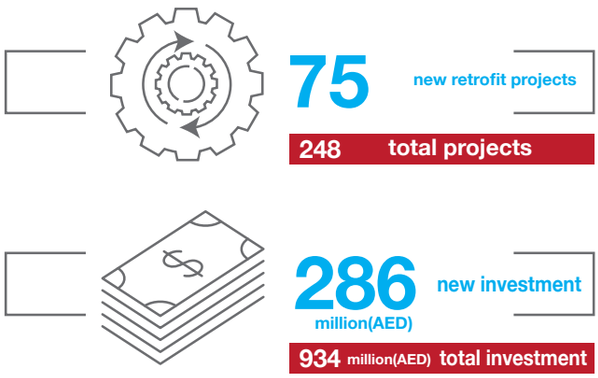


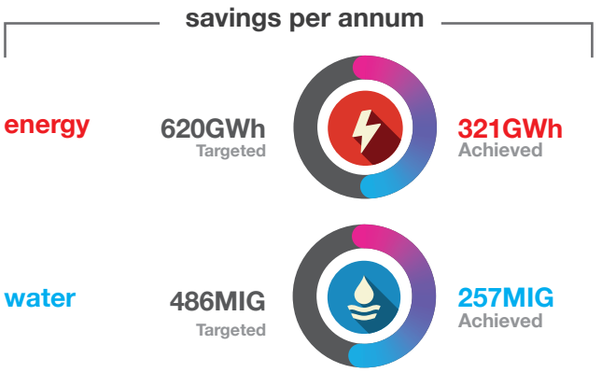
Independent power producers will represent almost a third of the power capacity available to DEWA by the time they are all commissioned in 2023, a total of 5,255MW.

We continued to collect reports on operational data and health and safety performance from our licensees. Operational plant reported only two near misses in 2019 while employing 215 staff and 557,322 man-hours. These plant contributed 1,340GWh of clean energy or 2.9% of the grid's total requirement, up from 1.9% in 2018.

Changes to the IWPP Code and Renewables Standards, mainly related to enhancing consistency and harmony within the documents and adding cyber security requirements, were approved by the RSB Board and reflected in the code and standards in May. Another extensive review of the code took place in 2019, looking into its applicability to independent water producers. The proposed enhancements were due to be approved and published early 2020.

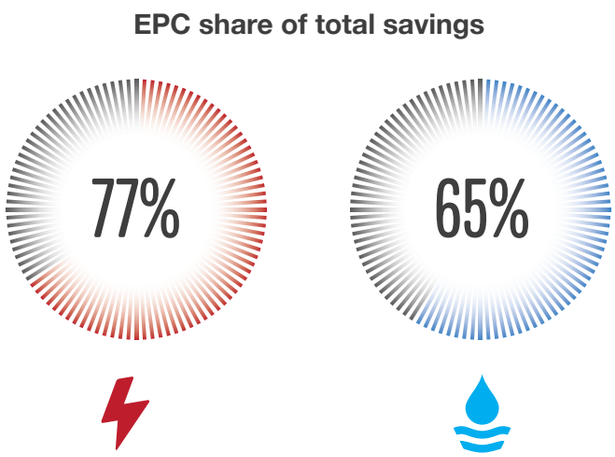
2019 was the RSB's ESCO accreditation scheme's sixth year and by year end there was a total of 31 accredited ESCOs and 19 accredited energy auditors.





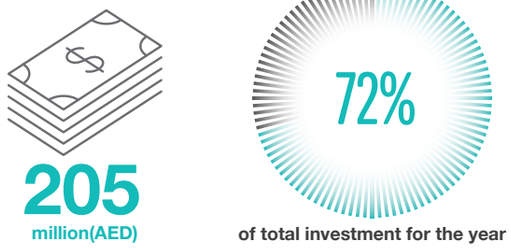
The RSB continues to collect in-depth project data from accredited companies on an annual basis. For 2019 accredited ESCOs reported a total of 248 projects, 75 of which were newly reported in that year. These new projects had associated investment of AED286 million, bringing the total investment in the sector to AED934 million since 2014. Target energy savings per annum for 2019 increased by 31% from the previous year, totaling 620GWh. In addition, target water savings grew from 292MIG in 2018 to 486MIG in 2019, an increase of 66%. Retrofit projects in 2019 achieved 321GWh in energy savings and 257MIG in water savings.

We saw significant increase in the use of the guaranteed savings form of energy performance contracting (EPC) in 2019. In investment terms EPC activity constituted 81% of the total. When it came to targeted savings, EPC projects claimed 77% of the total energy savings and 65% of the total water savings.



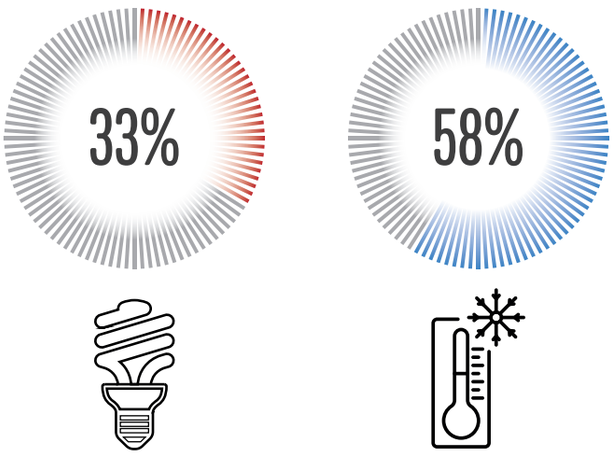
Etihad Energy Services (EES) reported an investment figure of AED205 million to fund new projects, representing 72% of total investment for the year. EES's 2019 newly reported projects alone have target savings per annum of 130GWh and 127MIG.

EES share for 2019



The payback period for retrofit projects was three years on average. A breakdown of the total investment by conservation measure showed that the vast majority of investments in retrofit projects went into the cooling and lighting systems of buildings, with 58% spent on cooling related measures and 33% on lighting. Investment in water conservation measures remains low, constituting only 1% of the total.

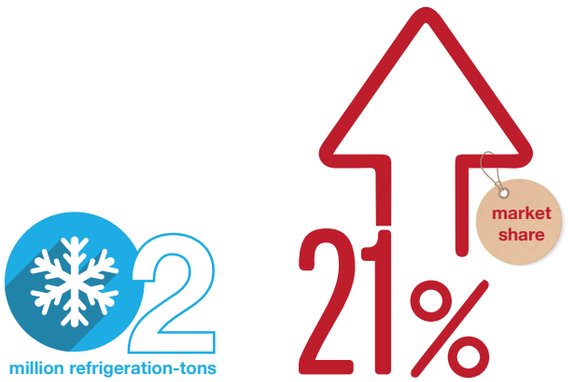
Share of Investment



Three modifications to the ESCO accreditation scheme were introduced in 2019. We retained certification by the Indian Bureau of Energy Efficiency on the list of accepted credentials, provided the certification is kept up-to-date. Additionally, the requirement for available equipment was made clearer and the assessment of an applicant's financial strength was limited to a demonstration that the applicant is a going concern.

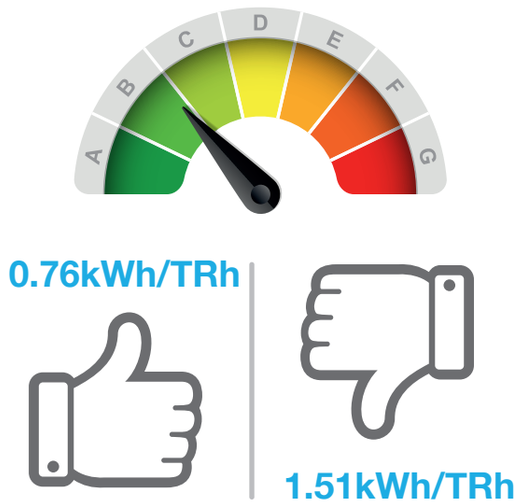
Towards the end of the year the Supreme Council of Energy completed a refresh of the DSM strategy. This included expanding the «District Cooling» (DC) programme to an «Efficient Cooling» programme. This will require a focus on cooling technologies other than just DC and other factors contributing to the overall efficiency with which cooling is delivered.

- Water-cooled cooling technologies continue to offer the highest energy efficiency, especially when cooled using recycled water, so we are pleased to report an increase in the market share of DC to 21%. Dubai's DC capacity increased to over two million refrigeration-tons, and output was up 2.9%. The reduction in demand for cooling from other technologies meant overall demand, inclusive of DC, was down 1.2% on the previous year.



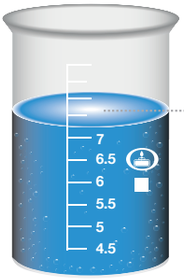
- Three schemes introduced in 2019 set new standards for cooling load density, with the average load for the best scheme under 99W/m^2. These schemes improved the average from 141W/m^2 to 135W/m^2.

- Three of the six most energy efficient plant are reporting for the first year. The average efficiency of the six best plant was 0.76kWh/TRh, well ahead of the 2030 energy efficiency target of 0.82kWh/TRh. At the other end of the scale, the average efficiency of the six worst performing plant was 1.51kWh/TRh. Energy efficiency for the sector remained at 0.90kWh/TRh.



- There were five additional thermal energy storage plant reported in 2019, of which three were newly commissioned and two were from a company's first return. Those additions brought the total number of thermal energy storage facilities to 14.

- Water efficiency remained constant at 7.6L/TRh. There is no improving frontier performance on this measure, that is to say the best performing plant are not making year on year improvements, with performance hovering around 6L/TRh.

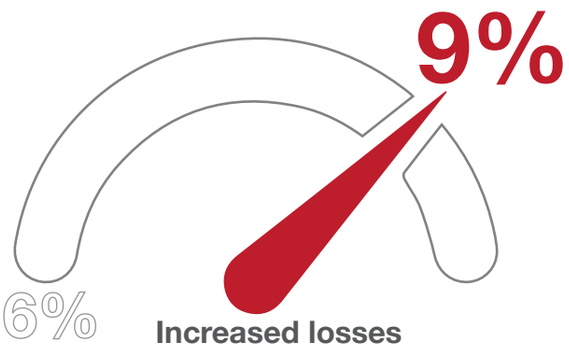


7.6L/TRh
water efficiency

- Total supply of recycled water remained constant at 5,000 megalitres but, with the addition of new plant yet to be connected to the recycled water network, the proportion of water demand met by recycled water dropped by 2% to 24%.

5,000ML
supply of recycled water

- Losses, measured as the difference between sales and production, were 9%, up from 6% in 2018. Increased losses occurred at three of the DC providers.



Increased losses

- Unit prices rose to AED1.18/TRh driven by the lower demand per square meter of floor space.

- We also estimated what a typical customer with average demand occupying a unit of 200m^2 would expect to pay in cooling charges for the year. In 2019 this estimated typical bill fell by 8.1%, which reflects the lower cooling load density offered in new DC schemes and lower consumption.

CHAPTER 2

SUSTAINABLE POWER PRODUCTION

The Mohammed Bin Rashid Al Maktoum Solar Park saw an addition of 300MW of solar PV to its production capacity in 2019 when Shuaa Energy 2 commissioned its second phase, bringing the plant's operational capacity up to 500MW and the park's to 715MW. Shuaa Energy 2 continued work on its third and last phase of 300MW and Noor Energy 1 installed the world's highest Concentrated Solar Power (CSP) tower on site as part of its 950MW CSP+PV plant.

There were no additions to independent power producer (IPP) licences in 2019, but one amendment to Shuaa Energy 2's licence to reflect a change of one of the plant's operation and maintenance subcontractors.

DEWA is implementing the 900MW 5th phase of the Solar Park using solar PV. DEWA achieved a world record bid of US1.70¢/KWh for this phase through a partnership with a consortium led by ACWA Power and Gulf Investment Corporation. The plant is planned to become operational in stages starting in the second quarter of 2021.

The levelised cost of electricity generated from solar PV has dropped significantly worldwide over the past few years, and this has been especially evident in Dubai where several world records were recorded through bids for PV plant. Figure 1 illustrates this drop from US5.85¢/KWh in January 2015 to US1.70¢/KWh in November 2019.

As for smaller scale projects, three new licences were granted to captive plant supplying two factories and a dairy farm. Al Khaleej Sugar, one of the world's largest sugar producers, received a generation licence in April for a 20MW gas-fired combined cycle power plant. In October the RSB granted a generation licence to National Cement Company for its 6MW waste heat recovery plant. National Cement uses coal and bio-waste to generate steam for its cement production process and can boost its operational efficiency by recovering waste heat and thus raise steam to meet some of its electricity needs, reducing its carbon footprint. A month later, the year's third licence was granted to Al Rawabi Dairy Company to produce 1.3MW from a biogas combined heat and power plant. Al Rawabi's solution will help mitigate issues related to waste from 13,000 cattle at its farm in Al Khawaneej while helping the dairy producer meet some of its electricity demand.

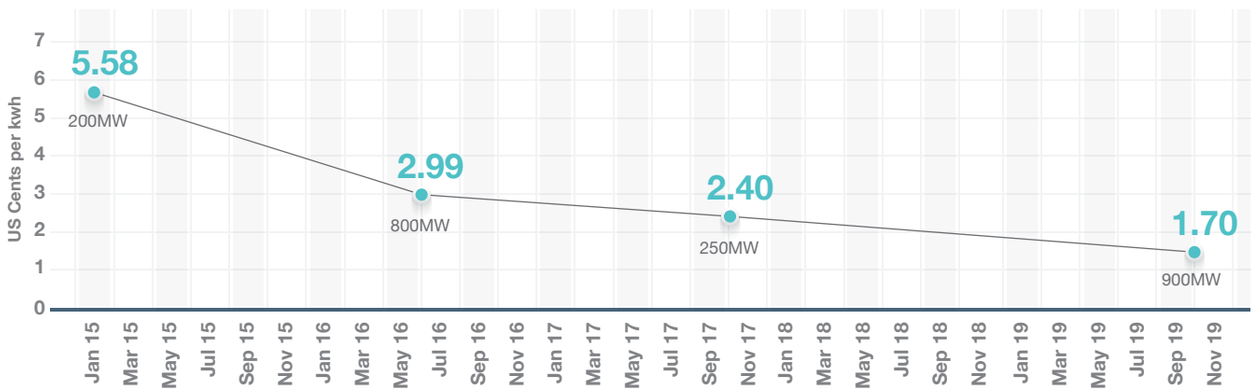
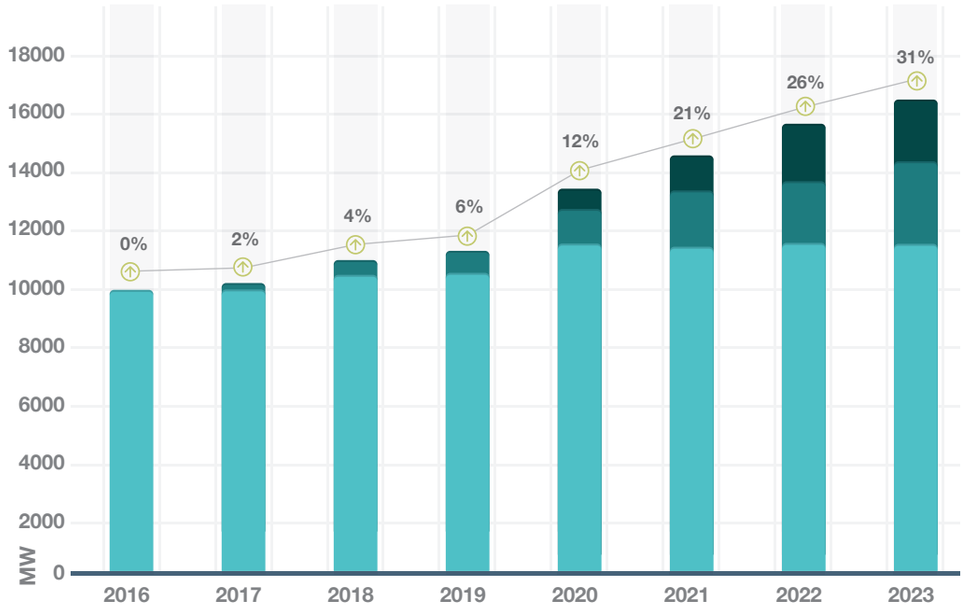


Figure 1

Taken together, the five licences we have granted to industrial customers amount to 38.3MW and all involve the joint production of heat and power.



	2016	2017	2018	2019	2020	2021	2022	2023
Coal IPP					600	1200	1800	2400
Solar IPP		200	405	705	1005	1822	2322	2855
DEWA Conventional	10000	10000	10700	10700	11515	11515	11515	11515
IPP%	0%	2%	4%	6%	12%	21.5%	26%	31%

Figure 2

As shown in Figure 2, independent power producers will represent almost a third of the power capacity available to DEWA by the time they are all commissioned in 2023, a total of 5,255MW, including the planned phase 5 of MBR solar park. The addition of further capacity is likely before that date as solar PV, in particular, becomes the least cost means of meeting Dubai's energy needs.

We continued to collect reports on operational data and health and safety performance from licensees where applicable. As more generators come onto the system and report their performance, we will be in an increasingly better position to gauge and report industry performance in both health and safety and operational terms.

We request health and safety key performance indicators from those licensees who have started operating their plant. These include the number of:

- near misses: unplanned, undesired events that have the potential to cause injury, damage or loss to a person but do not do so,
- lost time injuries (LTI): incidents that result in a person being unable to work on the subsequent working day,
- serious injuries: incidents that result in permanent partial or total disability or the loss of a limb,
- Fatalities: incidents that result in loss of life.

Operational plant contributed 1,340GWh of clean energy or 2.9% of the grid's total requirement of 46,704GWh, up from 1.9% in 2018.

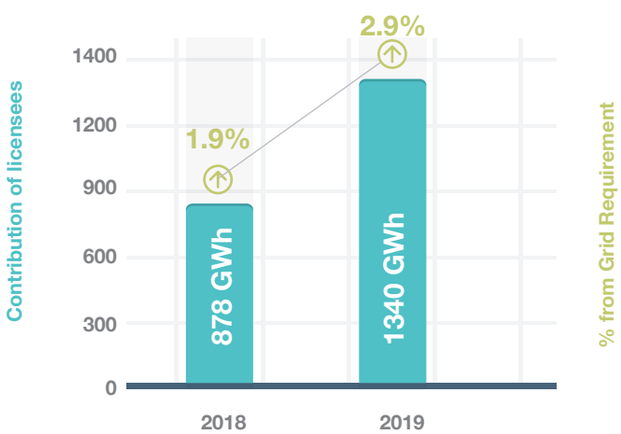


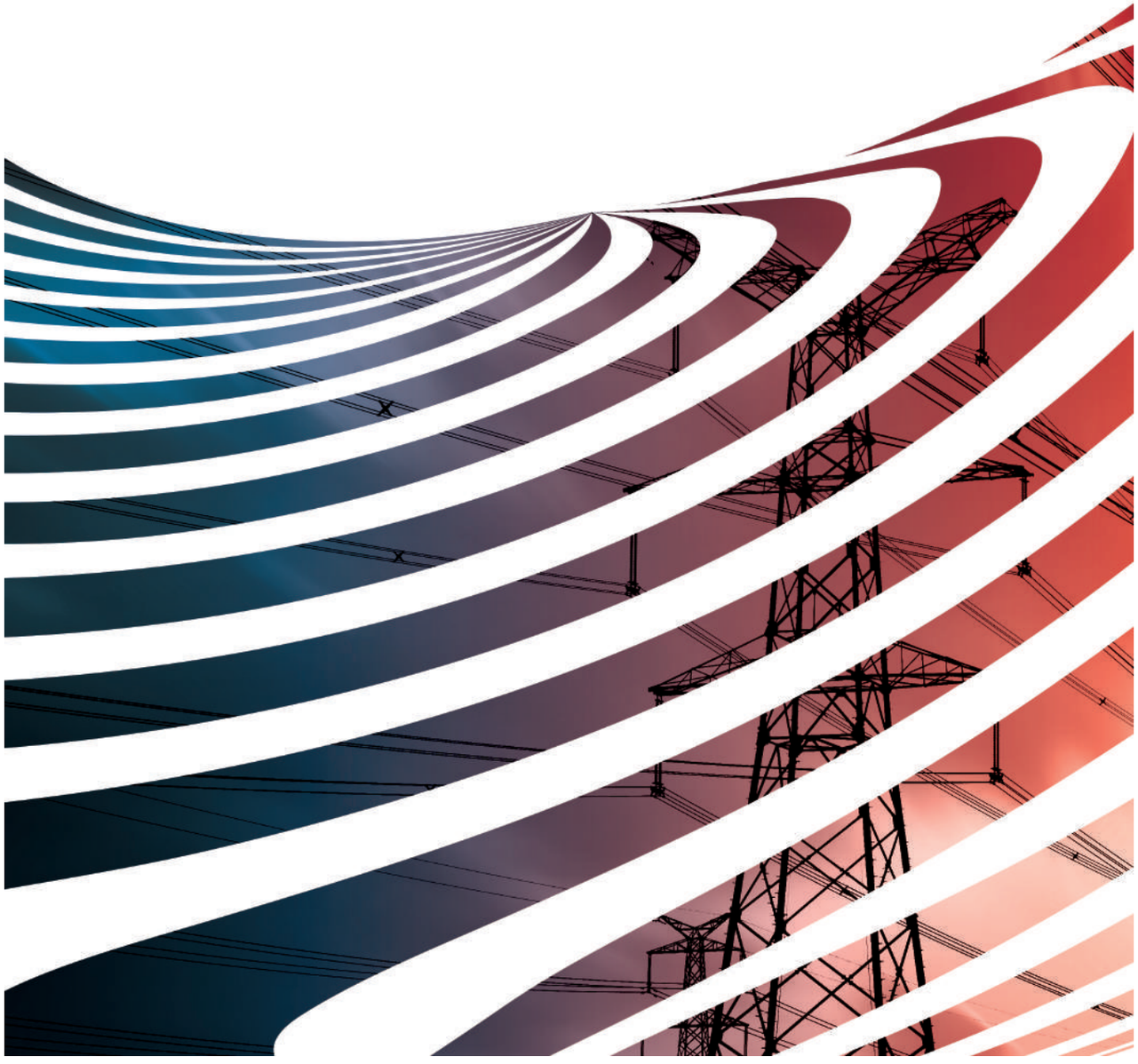
Figure 3

Our licensees' operational plant reported no LTIs or more serious incidents in 2019 across 215 staff and 557,322 man-hours. They reported just two near misses. Whilst this figure is, on the face of it, impressive, it may also reflect a tendency to under-record near misses, which are an important indicator, not just of good health and safety practices but also a culture of identifying hazardous conditions and behaviour.

Last year the RSB reported some changes to the IWPP Code and Renewables Standards resulting from a 2018 study, mainly related to enhancing consistency and harmony within the documents and adding cyber security requirements. These changes were approved by the RSB Board and reflected in the code and standards in May. Another extensive review of the IWPP Code took place in 2019, where the RSB, DEWA and specialised technical and legal consultants looked into the code's applicability to independent water producers employing reverse osmosis desalination technology. The proposed enhancements were due to be approved and published early 2020.

CHAPTER 3

THE ENERGY SERVICES MARKET



2019 was the RSB's ESCO accreditation scheme's sixth year of seeking to increase trust in Dubai's energy services market and support the Dubai Supreme Council of Energy's Demand Side Management strategy targets. The scheme has steadily built interest from both service providers and users, with more ESCOs seeking the accreditation mark and more clients looking to work with those who hold it. Similar success has marked the RSB's Energy Auditor accreditation scheme.

By year end there was a total of 31 accredited ESCOs and 19 accredited Energy Auditors. Of the ESCOs nine were fully accredited and 22 provisionally accredited. 23 ESCOs were accredited over the course of the year, five of which were given full accreditation and the remaining eighteen accredited provisionally on a first or renewal basis. Moreover, four Energy Auditors were accredited.

To monitor the success of the scheme and the development of the sector, we continue to collect in-depth project data from accredited companies on an annual basis. This data is analysed and reported in summary form to TAQATI, which acts as programme manager for Dubai's demand-side management programmes. Our own analysis of the information we collect allows us to observe performance by individual ESCOs and performance of the sector in aggregate.

For 2019 accredited ESCOs reported a total of 248 projects, 75 of which were newly reported in that year. These new projects had associated investment of AED286 million, bringing the total investment in the sector to AED934 million since 2014(1).

22 of the projects reported in 2018 were dropped from 2019's savings figures as the ESCOs responsible for them ceased reporting on them. These projects had targeted 28 buildings, 31GWh of energy savings and 9MIG of water savings. Their investment value continues to be included in cumulative investment figures.

(1) Figures are for projects reported by accredited ESCOs in the emirate of Dubai. Historic figures are subject to the year of reporting of them to the RSB by the accredited ESCO.

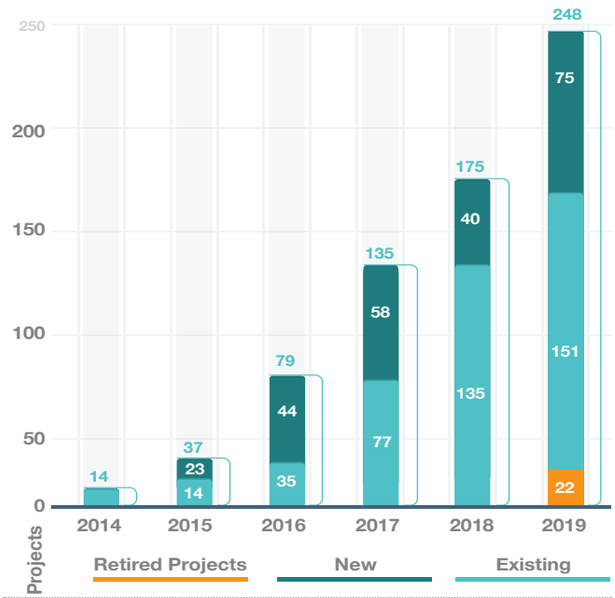


Figure 4

We collect data on both the target and achieved savings for each project. Target energy savings per annum for 2019 increased by 31% from the previous year, with 212GWh coming from new projects, totaling 620GWh. In addition, target water savings grew from 292MIG in 2018, to 486MIG in 2019, an increase of 66%. Retrofit projects achieved 321GWh in energy savings, up from 256GWh in 2018 (a rise of 25%), and 257MIG in water savings compared to the previous year's 161MIG (up 60%). That target savings are higher than achieved savings should come as no surprise, given the rapid growth in the number of projects and that projects take some time to be fully implemented and realise their full saving potential.

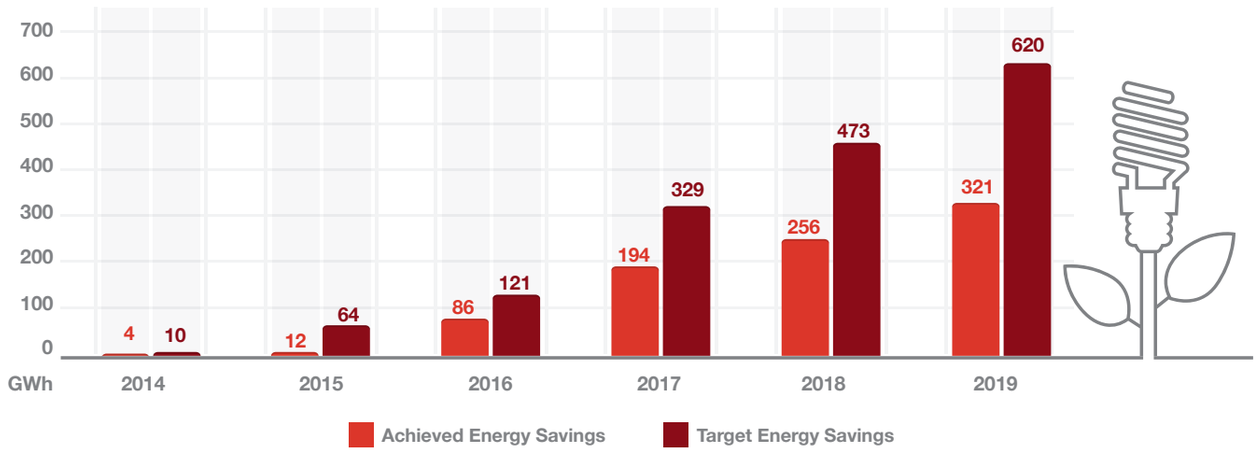


Figure 5

Figure 5 illustrates rapid increase in energy savings, both targeted and achieved, from 2014 to 2019.

Figure 6 shows a modest increase in targeted water savings from 2015 to 2018, followed by a spike in 2019. The drop in achieved water savings from 2016 to 2017 was explained in a previous report and was mainly due to the challenge of maintaining savings from certain efficiency measures that are highly influenced by human behavior.

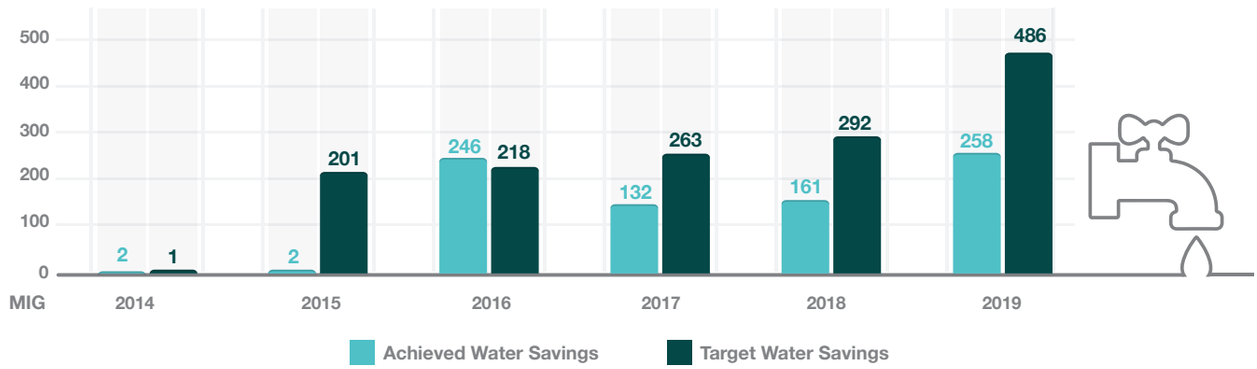


Figure 6

Figure 7 shows the substantial rise in total investment every year since the launch of the scheme, reaching AED934 million in 2019.

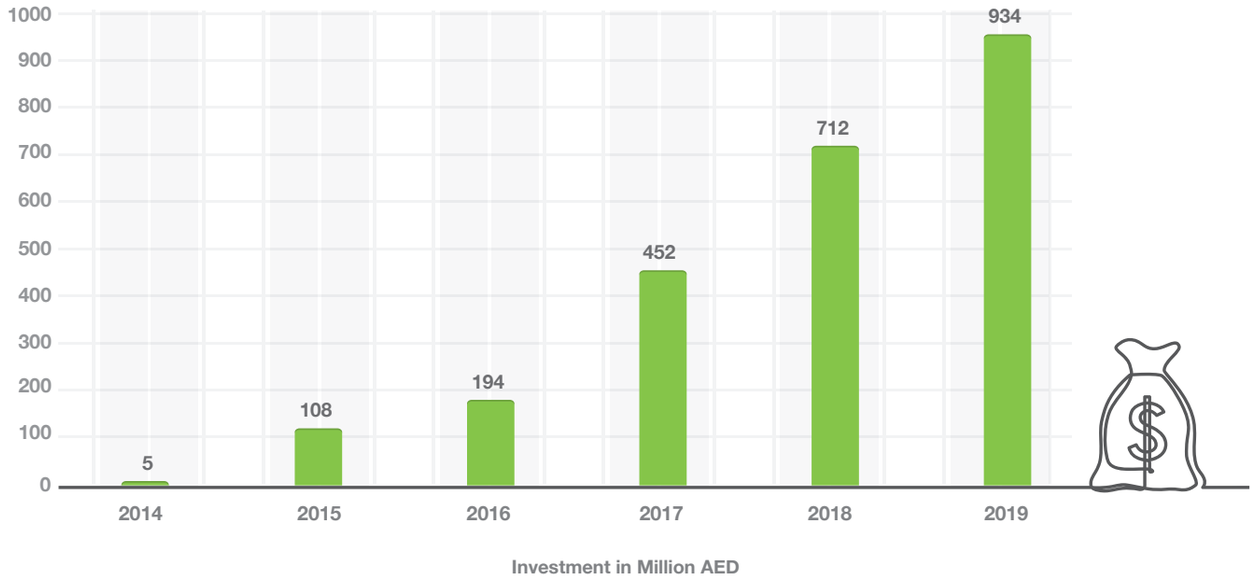


Figure 7

We saw significant increase in the use of guaranteed savings contracts in 2019 from 47 projects to 88, but the low uptake of shared savings contracts, coupled with an increase in non-EPC projects kept the share of EPCs at 56%. In investment terms, however, EPC activity constituted 81% of the total. When it came to targeted savings, EPC projects accounted for 77% of the total energy savings and 65% of the total water savings. (Figure 8)

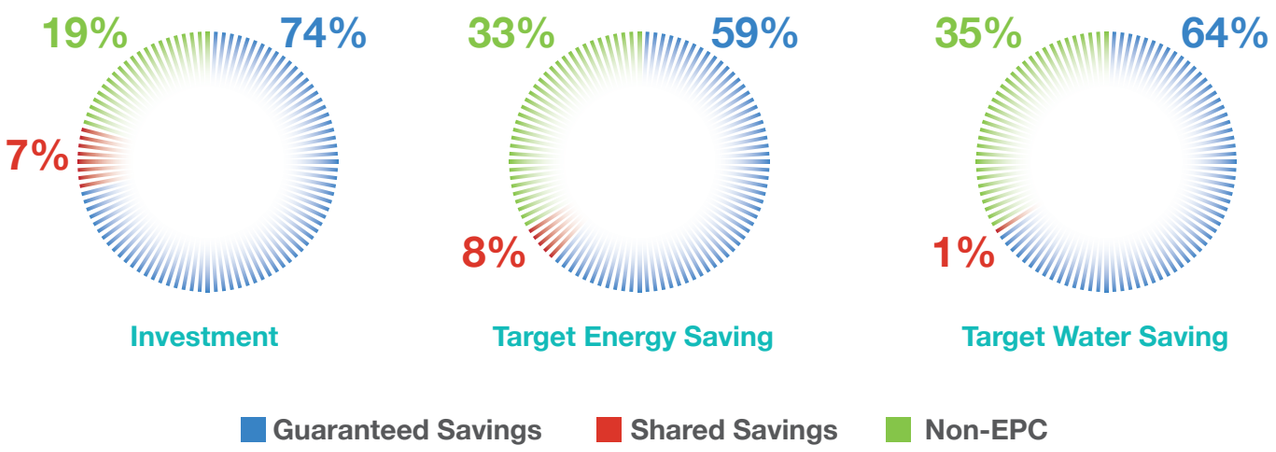


Figure 8

Etihad Energy Services (EES) reported an investment figure of AED205 million to fund new projects, representing 72% of total investment for the year. EES's 2019 newly reported projects alone have target savings per annum of 130GWh and target water savings of 127MIG.

Figure 9 shows a comparison between EES's EPC activities and those of private ESCOs. EES's 14 projects employed 75% of the cumulative investments in EPC activity to date and covered 650 buildings versus 191 covered by private ESCOs. In terms of energy savings, EES projects' share of the savings targeted by EPC activity was 65% whereas they achieved 56% of the corresponding actual energy savings in 2019. They achieved 85% of target water savings and 94% of actual savings. It is worth noting, however, that EES's projects are implemented by accredited ESCOs and hence they have a hand in all the energy and water savings reported.

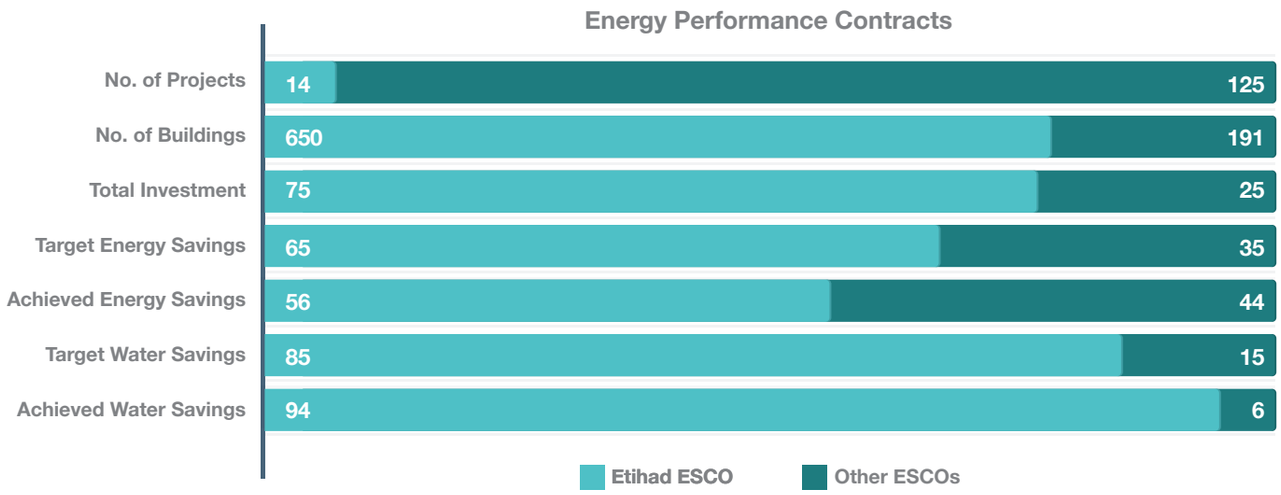


Figure 9

The payback period for retrofit projects reported to the RSB was calculated to be three years as shown in Figure 10. Projects of a non-EPC nature promised to pay back their investment in half that period, at 1.5 years, whereas the reported figures showed that EPC projects will take 3.7 years to achieve payback, on average. However, with EPC projects actual savings are measured and verified, and either guaranteed, or shared with the client with no investment required by them, features unlikely to be offered with non-EPC projects.

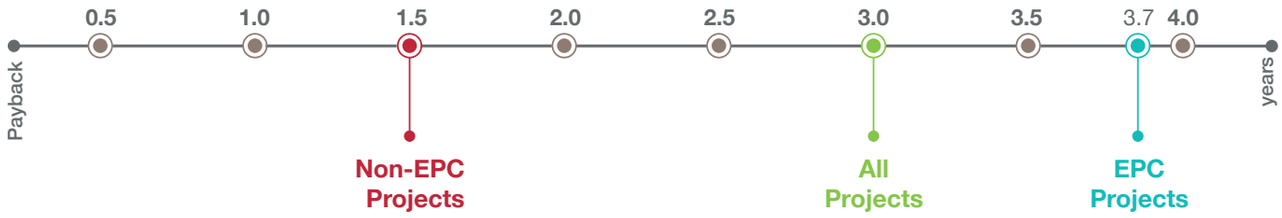
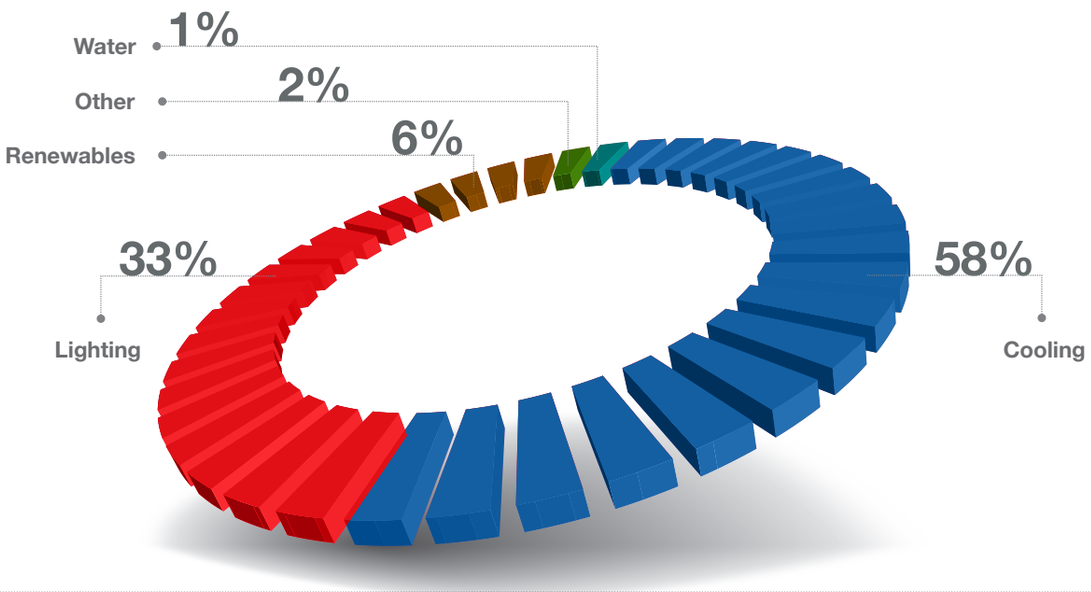


Figure 10

A breakdown of the total investment by conservation measure showed that the vast majority of investments in retrofit projects went into the cooling and lighting systems of buildings, with 58% spent on cooling related measures and 33% on lighting. Investment in water conservation measures remains very low, constituting only 1% of the total funds put into retrofit projects.



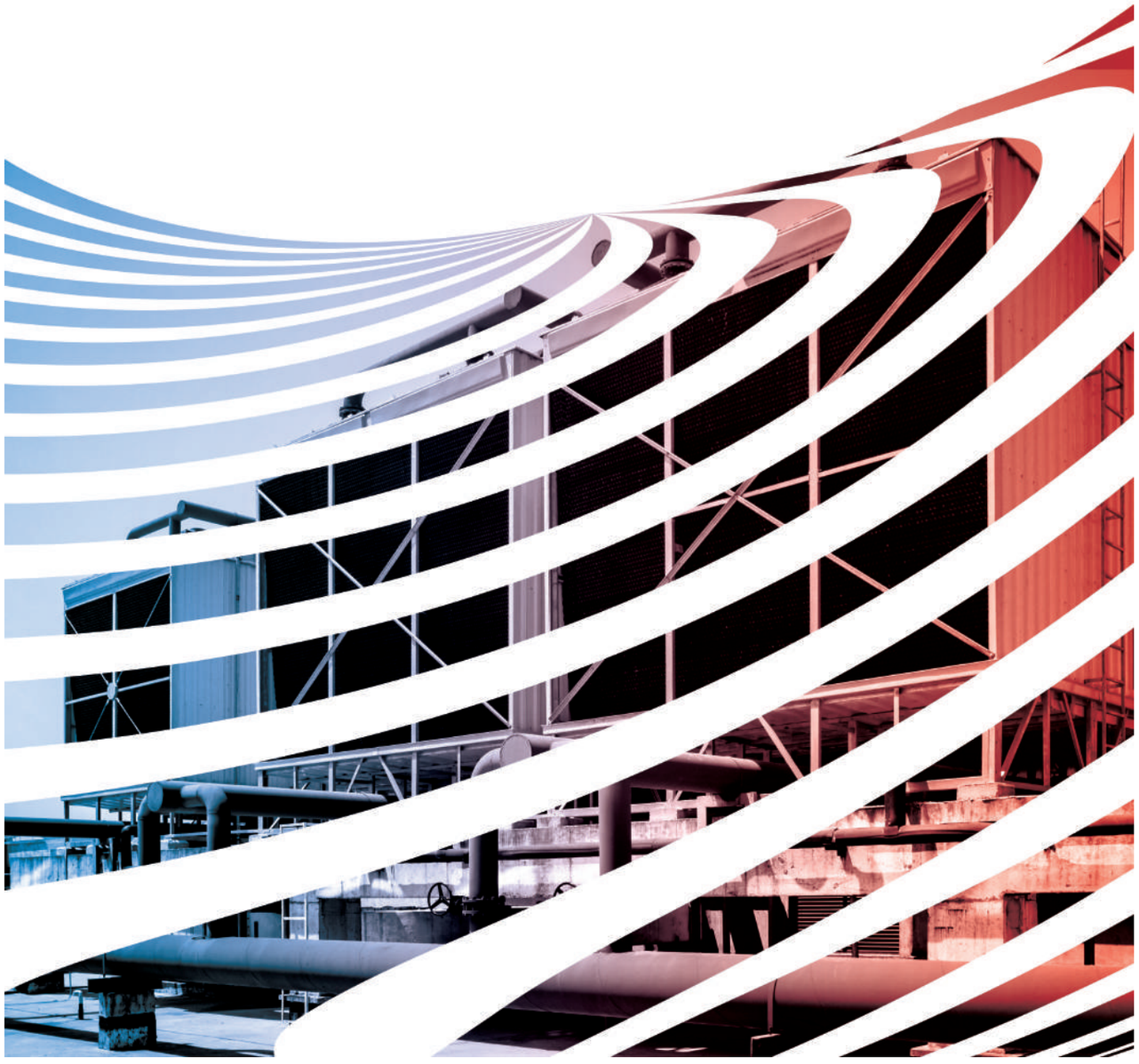
Investment Breakdown by Energy Conservation Measure

Figure 11

As part of the continuous evolution and upgrading of the accreditation criteria, three modifications to the scheme were introduced in 2019. The RSB maintained CEM/CEA certification by the Indian Bureau of Energy Efficiency on the list of accepted credentials, provided the certification is kept up-to-date. Additionally, the RSB made the requirement for available equipment clearer, expecting the applicant to have access to equipment consistent with the scope of ESCO activities they intend to undertake. Finally, the assessment of an applicant's financial strength was modified, limiting it to a demonstration that the applicant is a going concern by way of audited financial statements.

CHAPTER 4

EFFICIENT COOLING



Towards the end of the year the Supreme Council of Energy completed a refresh of the DSM strategy. This included expanding the «District Cooling» (DC) programme to an «Efficient Cooling» programme. This will require a focus on cooling technologies other than just DC and other factors contributing to the overall efficiency with which cooling is delivered, such as the operation and maintenance of cooling systems within buildings, whether served by DC or not. In addition to the anticipated regulatory framework for DC the programme looks to:

1. Develop and support an association of DC operators in Dubai which will seek to deliver further energy savings through improving the awareness of DC, sharing its benefits with consumers and increasing the scope for retrofitting buildings with DC. In addition, the association will look into alternative renewable power sources to support DC.
2. Improve the efficient delivery of cooling of any technology in buildings, by incentivizing facility management companies to deliver energy savings for their clients. At the end of the year the RSB commenced a series of stakeholder meetings with developers, FM companies, ESCOs and others to discuss options for creating an incentive scheme.

We will report on the progress of these initiatives in future annual reports and report savings under the expanded programme.

Whilst June 2019 was the hottest June in the last 20 years and the shoulder months of September and October were relatively warm, overall the year was slightly cooler than 2018 (yet still significantly warmer than 2000).

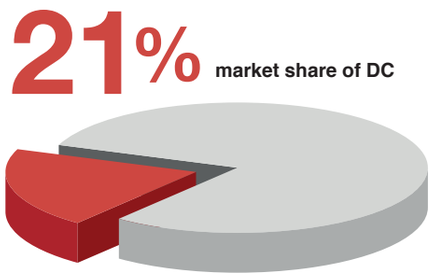
We monitor the performance of the DC sector through data provided to us on a yearly basis. We have collected data from co-operating DC Providers for seven years and over that time we have been able to evaluate trends in performance and the growth of the sector. This year we received data from six DC providers. Unfortunately, one company declined to provide data on 2019, so we have rolled forward its reported data from last year without adjustment to aid comparability between 2019 and earlier years. Data returns sit at the heart of our analysis and performance assessments but it should be noted that the data we receive is not audited by us.

For the most part, the quality of data returns continued to improve and the few queries that we raised were resolved faster than in previous years. This year, however, only one DC operator provided a complete and accurate annual return on time and, whilst most companies provided returns shortly after the due date, the last data returns were not finalized until March, over a month behind the original deadline. We have committed to review the design of the data return to ensure it is no more complex than necessary to complete our analysis.

To improve comparisons with other cooling technologies and wider energy usewe have opted to report SI units, in addition to the combination of metric and imperial measures we have used in previous years.

EFFICIENT COOLING

Water-cooled technologies continue to offer the highest energy efficiency, especially when using recycled water, so we are pleased to report an increase in the market share of DC to 21%. Meanwhile, cooling demand met from other technologies dropped 2.2% in the year.



We estimate that Dubai's DC contracted capacity increased by 3.6% to over two million refrigeration-tons (7,254MWc), and output was up 2.9%. The increased output, driven by new DC schemes along the Al Qudra corridor, was moderated by lower demand per square meter of cooled space. A second consecutive year of cooler weather coupled with energy efficiency initiatives resulted in an 8% drop in demand per square meter.

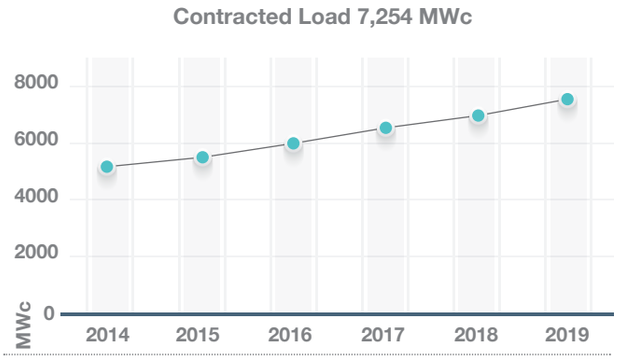
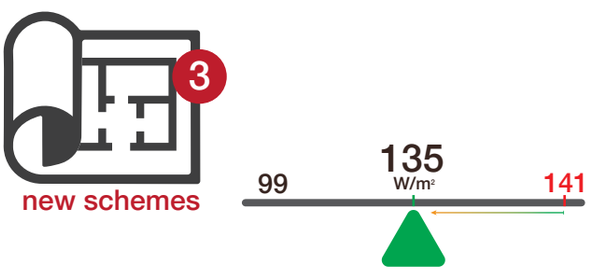


Figure 12

The reduction in demand for cooling from other technologies meant overall demand, inclusive of DC, was down 1.2% on the previous year. Cooling load density (CLD) is an important measure of how well cooling capacity is matched to demand and of the quality of insulation in buildings served by DC. It can also highlight where excessive capacity is contracted for or installed in cooling schemes.

Three new schemes introduced in 2019 set new standards for CLD, with the average load for the best scheme dipping under 99W/m^2. These schemes improved the average CLD from 141W/m^2 to 135W/m^2 and they illustrate the degree to which cooling loads can be reduced where buildings are constructed and operated efficiently.



Because CLDs are rarely adjusted once a DC scheme is established, there is little difference from year to year in the average load. There is an opportunity for DC providers to offer reductions in contracted loads where it is evident that customers have no need of the capacities contracted to them. DC providers may then contract that load to new customers.

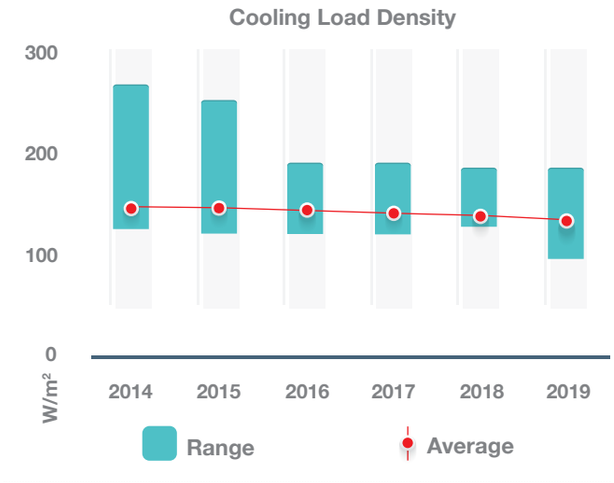


Figure 13

Three of the six most energy efficient plant are reporting for the first year. The average efficiency of the six best plant was 0.76kWh/TRh, well ahead of the 2030 energy efficiency target of 0.82kWh/TRh. At the other end of the scale, the average efficiency of the six worst performing plant was 1.51kWh/TRh. The wide range of performance, with some plant operating no better than standard direct expansion units, highlights the need for some companies to redouble their efforts in driving energy efficiency in their operations. Energy efficiency for the sector overall remained at 0.90kWh/TRh.

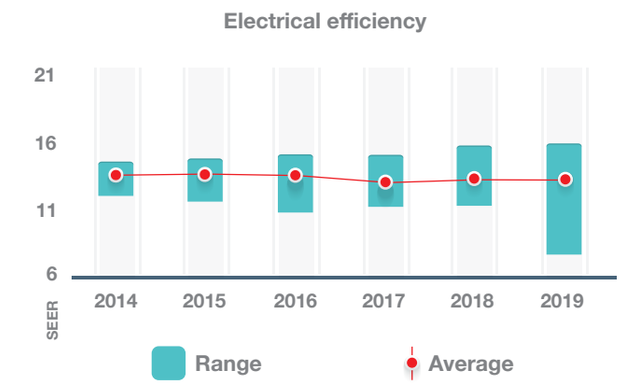


Figure 14

Five additional thermal energy storage plant reported in 2019, of which three were newly commissioned and two were from a company's first return. Those additions brought the total number of thermal energy storage facilities to 14. With the increased contribution of solar PV to the energy mix, supply and demand for electricity become more aligned. Indeed, solar output alone may outstrip demand at peak times in the years to come. This may lead to load management strategies very different to those traditionally adopted.

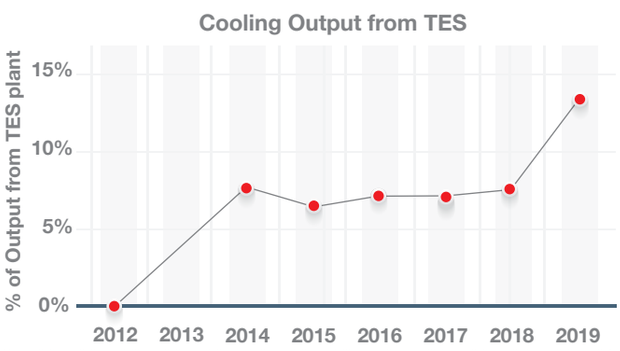


Figure 15

EFFICIENT COOLING

Water efficiency remained constant at 7.6L/TRh. There is no improving frontier performance on this measure, that this to say the best performing plant are not making year on year improvements, with performance hovering around 6L/TRh. We have started collecting additional data to determine the volume of water evaporated in operations. Our aim is to ascertain if this performance is at the frontier of what can reasonably be expected from current DC technology, or if there are opportunities for further improvements.

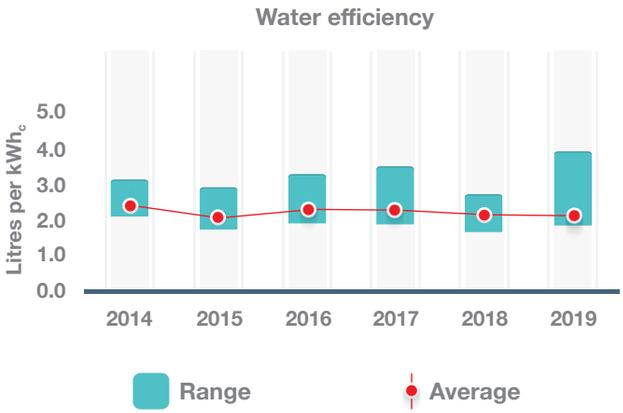


Figure 16

Total supply of recycled water remained constant at 5,000 megalitres but with the addition of new plant yet to be connected to the recycled water network, the proportion of water demand met by recycled water dropped by 2% to 24%. Only one company reported increased dependence on recycled water during the year, suggesting there may be a limit on its availability.

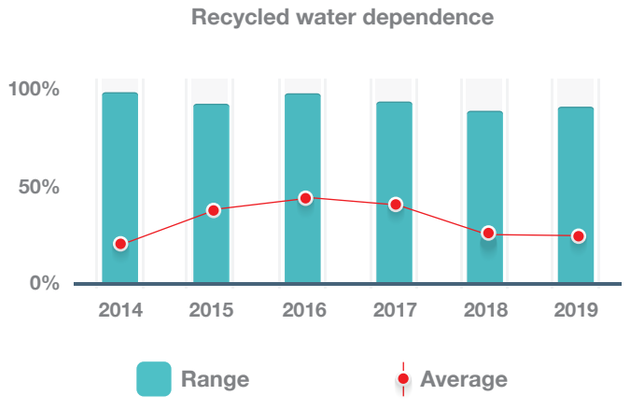


Figure 17

We monitor the percentage of customers that pay for cooling on the basis of meters and the average consumption of metered customers compared to their unmetered counterparts. Evidence shows that customers on a metered supply make lower demands for cooling but it should be noted that our data only covers those customers served directly by DC providers.

Sales of chilled water by DC providers are predominantly on a metered basis. Measuring supplies is important because it enables companies and customers to better manage demand and to quickly detect and effect repairs to pipe breakages.

Losses, measured as the difference between sales and production, were 9%, up from 6% in 2018. Increased losses occurred at just two of the DC providers.

Metering inaccuracies were blamed in cases where energy sold amounted to more than energy produced. Correctly installed and operated meters are accurate to within one percent and any small errors are unlikely to be systematic and will thus cancel each other out. Companies should ensure meters are installed according to the manufacture's guidance and they should address discrepancies arising from meter readings. These two actions should resolve cases where energy sold is reported as greater than energy produced.

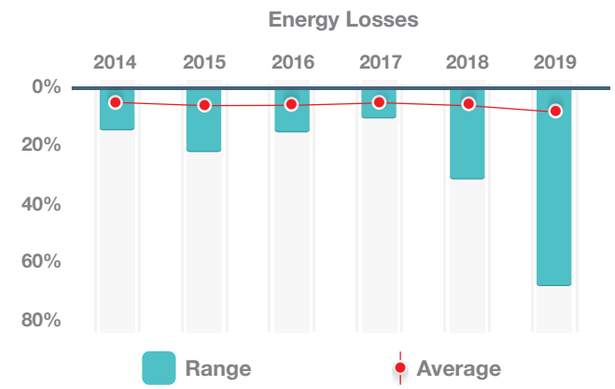


Figure 18

Out-turn unit prices rose to AED1.18/TRh (AED0.33/kWc) in 2019 driven by the lower demand per square meter of floor space – a likely combination of cooler weather, energy efficiency measures and lower average occupancy. New schemes which have fully contracted load but little corresponding consumption, and therefore a higher unit price, did not have a significant influence on the average sector price because of that low consumption. The unit prices of these new schemes are expected to reduce as occupancy increases, driving higher consumption.

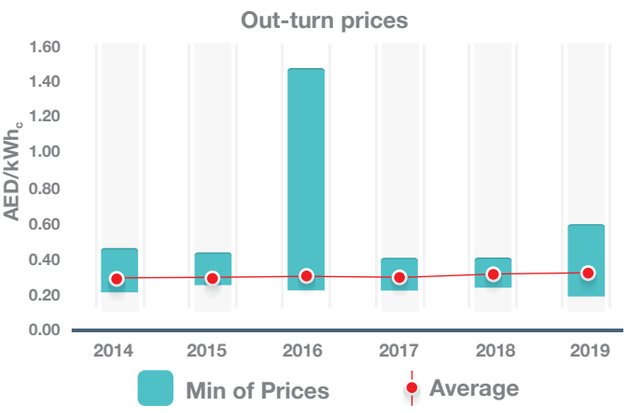


Figure 19

The typical DC bill is a new indicator that provides an estimate of what a typical customer with average demand, occupying a unit of 200m^2, would expect to pay. The weighted average charge of all reporting companies is used to develop this typical bill. In 2019 it fell by 8.1% to AED15,262, which reflects lower cooling load density in new DC schemes and lower consumption.