



**ENERGIE**  
THERMODYNAMIC SOLAR ENERGY

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# RADISSON BLU DEIRA CREEK, DUBAI

CASE STUDY





## OBJECTIVE

The project aim was to retrofit the first five-star hotel in Dubai – Radisson Blu Deira Creek – by implementing an energy saving measure – a thermodynamic solar system for hot water generation.



# OVERALL SCENARIO

The hotel was producing its domestic hot water (DHW) using a diesel boiler which was both expensive on the operational cost and highly pollutant in terms of environment. The project's aim was to replace that diesel boiler by a thermodynamic solar system for the full hot water demand of the hotel. For this purpose, 80 thermodynamic solar panels were installed, occupying only 20m<sup>2</sup> by using a tailor-made structure and placing them in front of the existing cooling towers. That location allowed the thermodynamic solar system to create a symbiose with the cooling system, which is unique in the world. So, the thermodynamic solar system is now producing all the DHW needed for the building and assisting the chiller by reducing the temperature and the humidity level of the inlet air being pulled by the cooling tower. This is possible because the byproduct of the thermodynamic solar panels heat exchange is cooling, which is then transferred to the surrounding air, which in turn is the inlet air for the cooling towers, resulting in a significant delta T decrease for this inlet air when compared to the original condition of the ambient air temperature. As a result, this hotel switched off their boiler and is the first hotel in Dubai to produce all its hot water by renewable sources. It allowed them to reduce 82% on the operation costs and 83% on carbon footprint. The payback based on the savings obtained so far indicate a ROI of 1.54 years.

# INSTALLATION PHOTOS





# INITIAL PROPOSITION

- Producing an average of 23.8M<sup>3</sup>/day and a target of 30M<sup>3</sup>/day (DHW)
- Achieving 77% savings
- Estimated yearly savings of 132,256 AED
- Disconnecting the diesel boiler
- Giving collateral cooling to the cooling towers



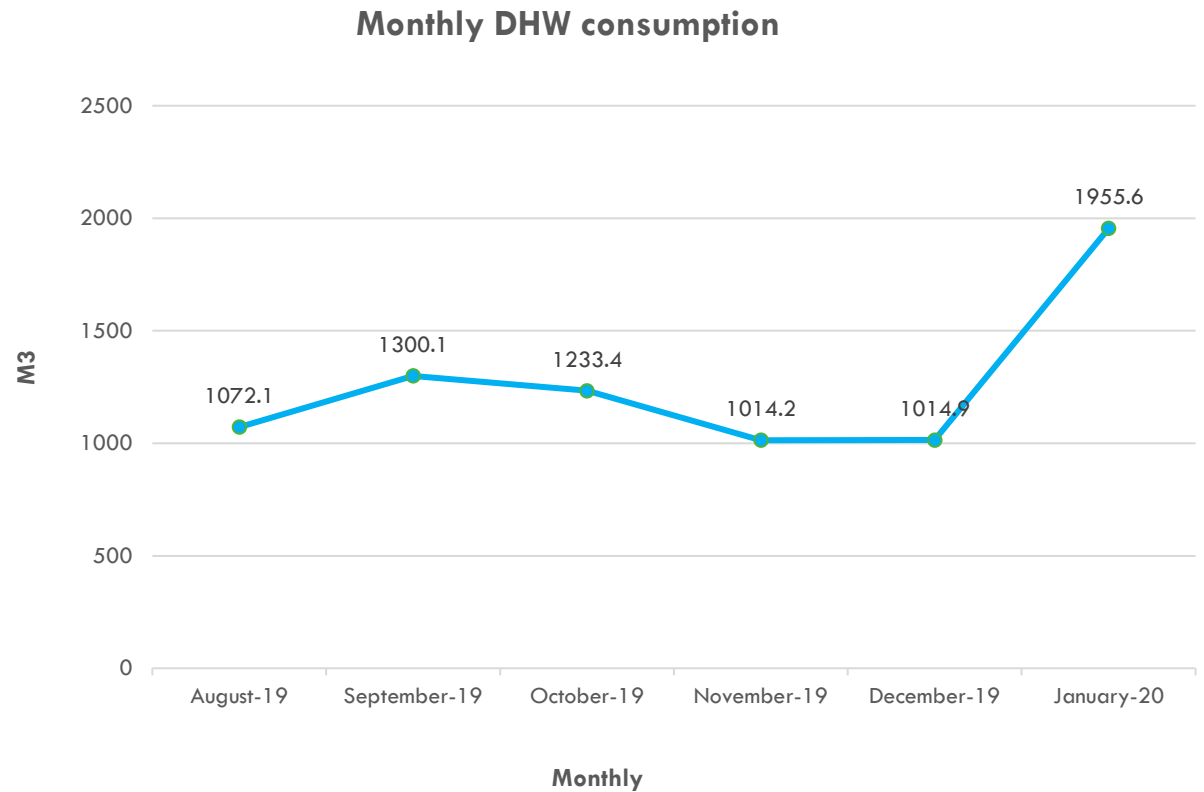
## HOW WE MONITOR

To measure the results/performance, monitor the operation and enhance the system, a smart system was installed comprised of the following elements:

- Energy meters – to measure KWh consumption for the thermodynamic solar system
- Water meters – to measure DHW production and HWR (hot water return) flow
- Temperature sensors – to measure temperatures and calculate delta Ts
- Gateway – to transmit the data in real time to a cloud-based system

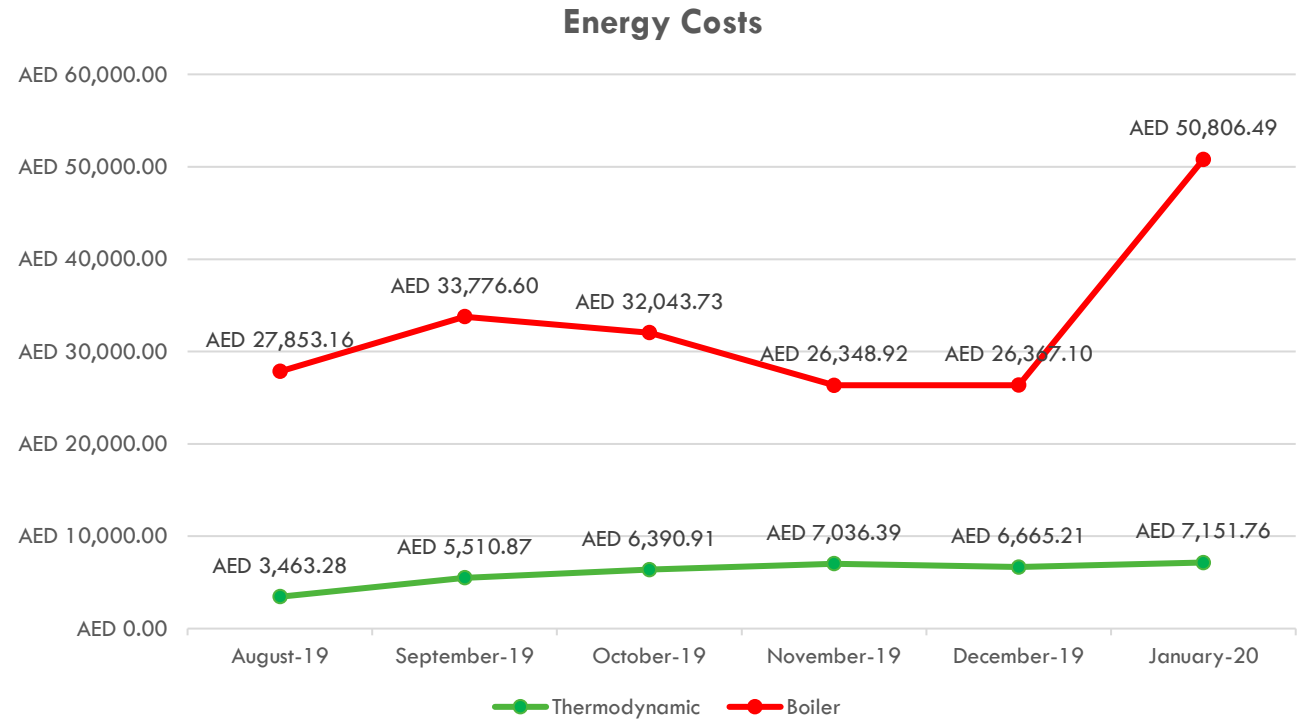
# ACHIEVED IN THE FIRST 6 MONTHS' OPERATION

- Producing an average of 41.25M3/day (DHW)



# ACHIEVED IN THE FIRST 6 MONTHS' OPERATION

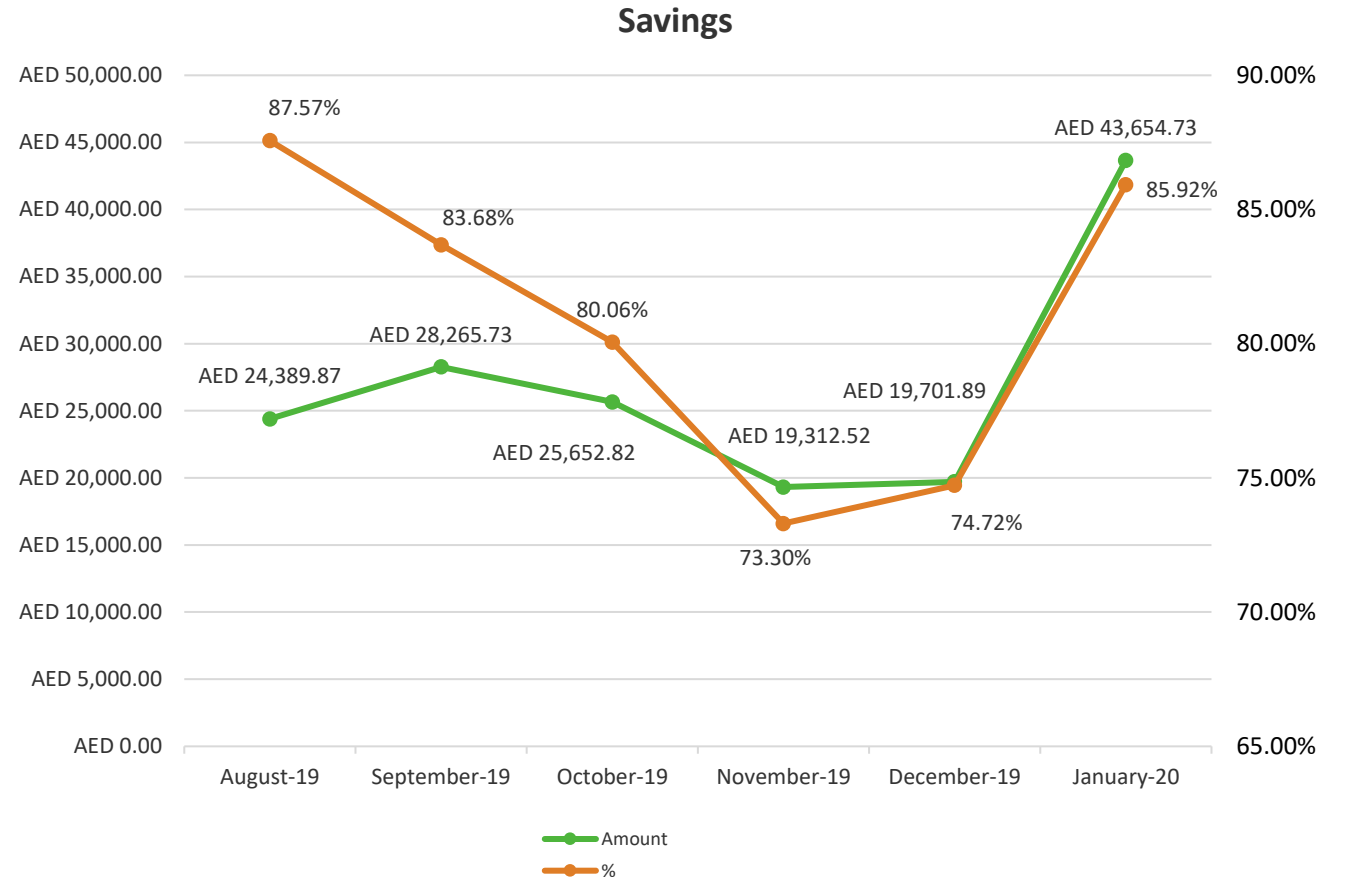
- **Achieving 82% savings** (Boiler consumption calculated based on the actual M3 of DHW consumed during this period at an average cost per M3 for the previous 12 months of boiler usage)





# ACHIEVED IN THE FIRST 6 MONTHS' OPERATION

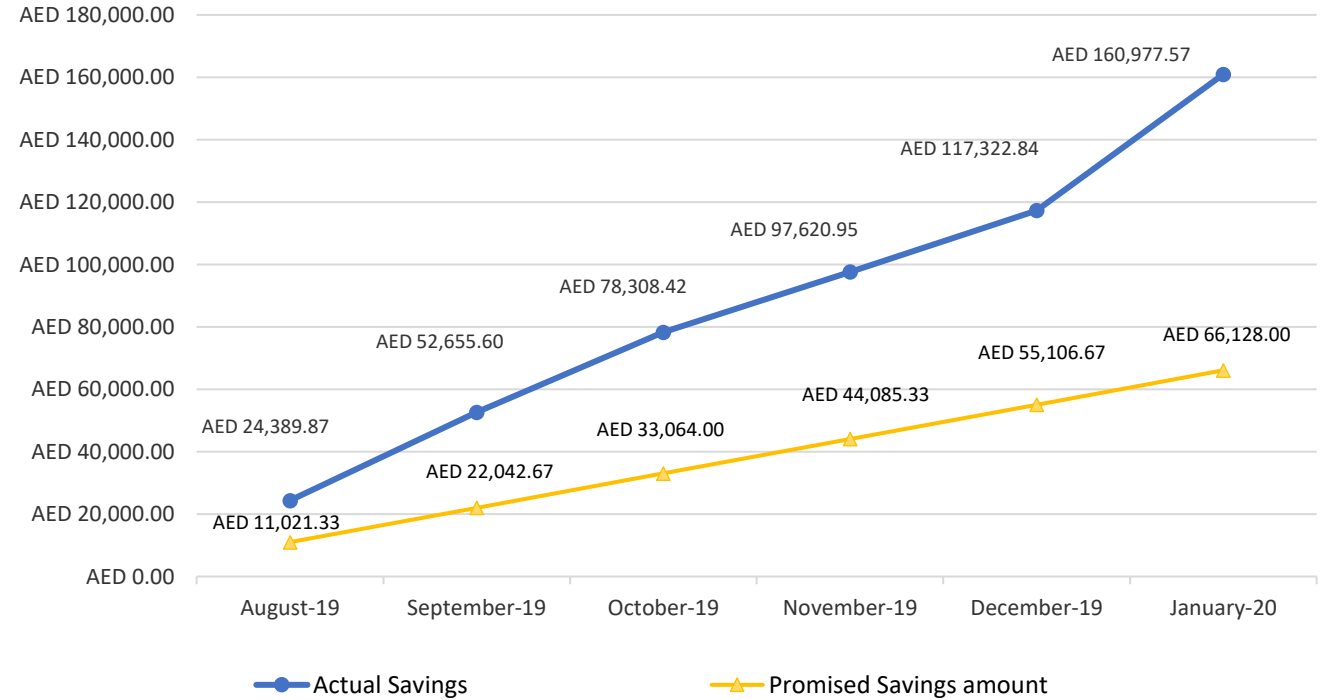
- Achieving average 82% savings
- More 5% savings than estimated



# ACHIEVED IN THE FIRST 6 MONTHS' OPERATION

- Proven savings of 160,977 AED in 6 months
- Estimated yearly savings of 281,710 AED  
(based on readings so far, but dependent on occupancy levels)
- More 94,850 AED than promised

Accumulate Savings





## ACHIEVED IN THE FIRST 6 MONTHS' OPERATION

### Additional Benefits:

- Diesel boiler disconnected
- Cooling system more efficient with collateral cooling from the thermodynamic panels



# CONCLUSION

As a conclusion, the thermodynamic solar system has proven to be extremely successful, exceeding the targets defined for the project and providing a renewable source for hot water generation capable of meeting all the hotel needs in a much more efficient and sustainable way with an expected payback period below 2 years.

As a side benefit, the hotel has also improved the efficiency of its cooling system, consuming less energy to generate the cooling required by the reduction of temperature of the air inlet in the cooling towers.



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