



Decarbonising the Grid – District Cooling

Antonio Di Cecca
Chief Operating Officer – Tabreed

Tabreed at a Glance



87
plants in **4 countries**



>1.38m RT
Delivered to clients



Equivalent to cooling
124
towers the size of Burj Khalifa

Environmentally responsible operations



2.31 billion kWh
annual reduction in energy consumption in the GCC through Tabreed's DC services (eq. to powering ~132,000 homes)

Reduction in CO₂ emissions

50%

more energy efficient

16%

Lifecycle Cost Savings

Top-tier and Diversified Customer Base



UAE Armed Forces



ارامكو السعودية
Saudi Aramco



ميرال
MIRAL

مبادلة
MUBADALA



ABU DHABI
GLOBAL MARKET
سوق أبوظبي العالمية

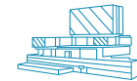
المنتجعات
AND RESORTS

ICT
International
Capital
Trading

Exclusive Provider of DC Services to Iconic Projects



Burj Khalifa



Cleveland Clinic
Abu Dhabi



Yas Mall



Dubai
Metro



Sheikh Zayed
Grand Mosque

THE
DUBAI MALL
Dubai Mall



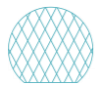
Etihad Towers



WTC



Ferrari World



Aldar HQ

Regional Presence

The only publicly listed and regional district cooling company in the world

4 GCC countries | 87 plants |
1.24m tons of cooling



Uniform utility infrastructure model implemented across GCC



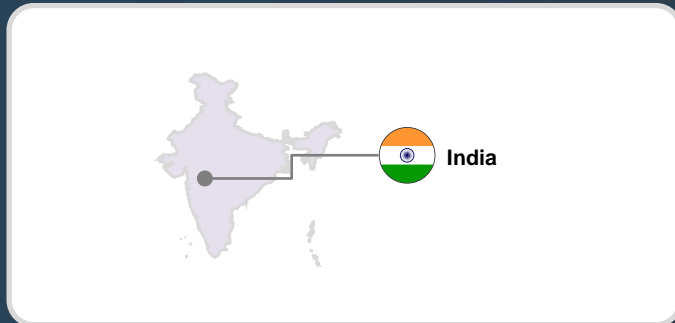
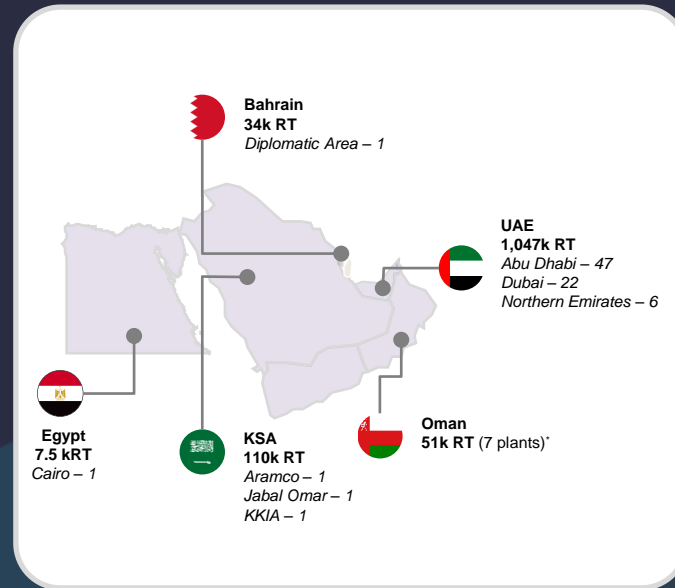
New market entries in Egypt and India



Long term contracts underpinning stability of earnings and returns for shareholders



Announced capacity guidance of 120,000 RT to be added during 2022



Bahrain District Cooling Company (Tabreed 99.8%)

- Owns and operates 1 DC plant (33k RT) Plant runs using sea water to provide cooling to the most prestigious developments in Bahrain
- Landmark Projects: Reef Island, Financial Harbour, World Trade Centre



Tabreed and its UAE investments

- Plants in 6 of 7 emirates of the UAE - Abu Dhabi, Dubai, Ajman, RAK, Sharjah and Fujairah
- Landmark Projects in Abu Dhabi: Louvre Museum, Guggenheim Museum, Sheikh Zayed Grand Mosque, Yas Island, Al Maryah Island and Masdar City
- Landmark Projects in Dubai: Dubai Metro, Burj Khalifa, The Dubai Mall, Address Hotel and Dubai Opera



Tabreed Oman (Tabreed 61%)

- Owns and operates 7 plants serving Knowledge Oasis Muscat, Oman Avenues Mall, Remal Castle, Al Araimi Mall, Mall of Muscat and AlMouj Development
- Landmark Projects: Oman Avenues Mall, Mall of Muscat and AlMouj Development



Tabreed Egypt

- Owns 1 plant (contracted but not connected yet), in addition to a newly signed deal

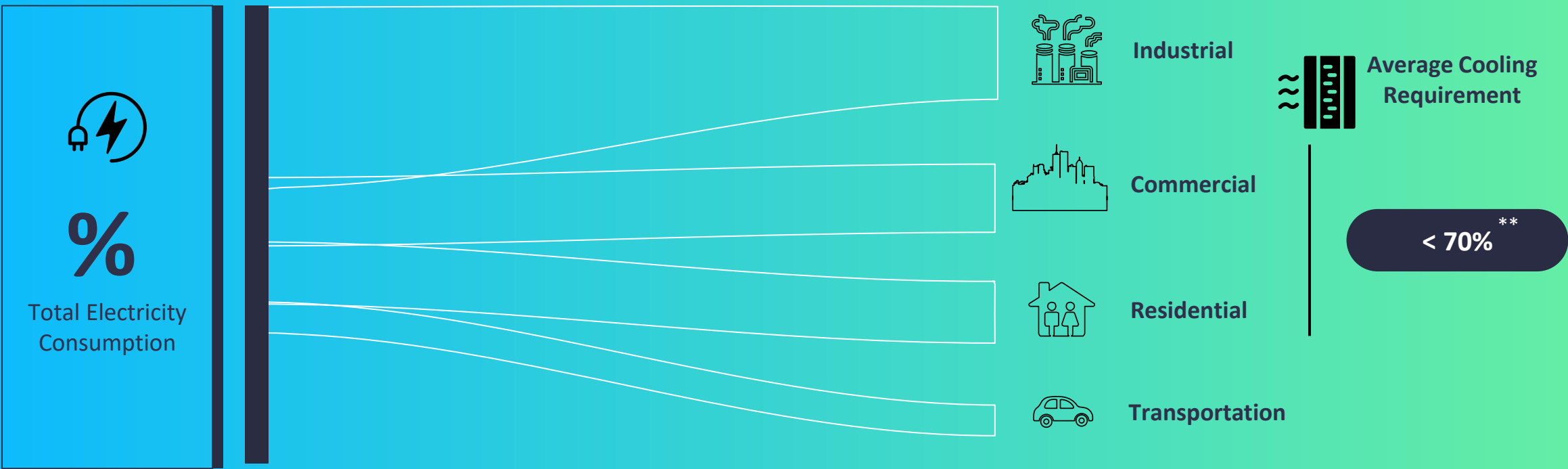


Tabreed India (Tabreed 75% and IFC 25%)

- JV with IFC formed, team in India is working on a pipeline of several opportunities

Cooling Requirements

Cooling is responsible for 70% of all electricity demand*



District Cooling is up to **50%** more efficient

Impact of Integrating DC to Decarbonise the Grid



DC - Business Model

Compared to conventional cooling solutions (e.g. air-cooled chillers, water-cooled chillers, DX) DC has a better carbon footprint.

In 2021, space cooling energy consumption increased globally by 6.5% and, in the Middle East, by 5% *

Focus Area – Abu Dhabi



The study includes residential and other (mixed-use, hotels, hospitals and schools) buildings in Abu Dhabi island (highlighted in red above). Cooling tonnage is based on 12-30 sqm/RT depending on the building function. **



Benefits



Approximate **40% reduction** in energy consumption versus air-cooled chillers**



Estimated **1.0 billion kWh reduction**** in energy consumption from Abu Dhabi's electric grid



■ Aircooled Chillers ■ Connecting to DC

Impact of Integrating DC to Decarbonise the Grid



Operating Efficiency

DC's operating efficiency usually ranges between 0.8-1.05 kW/RT. This is more efficient than alternative cooling solutions and, consequently, reduces the load on the grid



Implementation of VFD retrofit program and investment in more efficient equipment



Integrating OT with IT allowing for big data and AI driven operations



Digitising across the value chain, enabling us to optimise energy use



Unlocking value from big data and AI through live equipment condition monitoring



Benefits



More than **5%**** annual electrical efficiency improvement



More than **2.21 billion**** kWh reduction in energy consumed each year

Impact of Integrating DC to Decarbonise the Grid



Cooling Storage



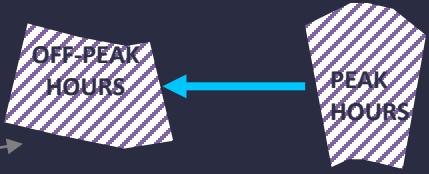
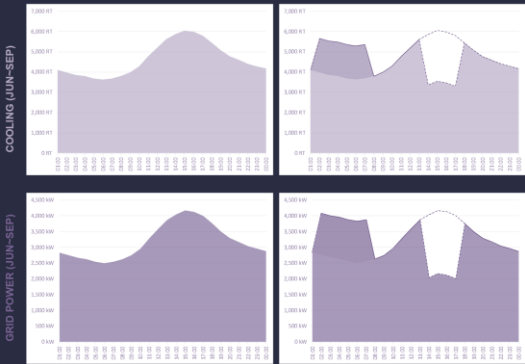
Benefits



Thermal Energy Storage (TES) avoids the need to ramp up production, thus having a favourable effect on power grids by lowering peak electricity demand



Approx. **3% to 10% **** electrical efficiency improvement, depending on cooling profile



*A plant was able to shed 2000 kW of power demand over four hours and shift 8000 kWh from peak hour to off-peak hours ***

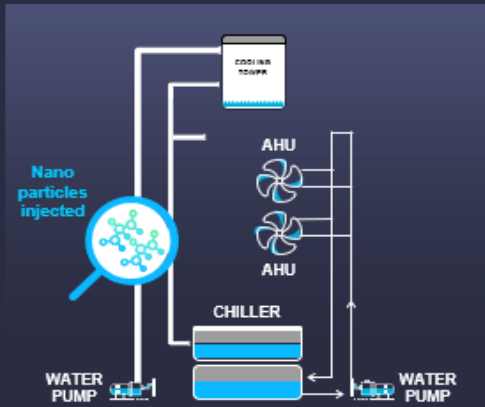
Impact of Integrating DC to Decarbonise the Grid



Innovation



Benefits



Use of **innovative Nano Particles technology** to improve the heat transfer of cooling systems



Demand Forecasting
Forecast of key operational parameters for energy-efficient operation



More than **5%** annual CO₂ reduction

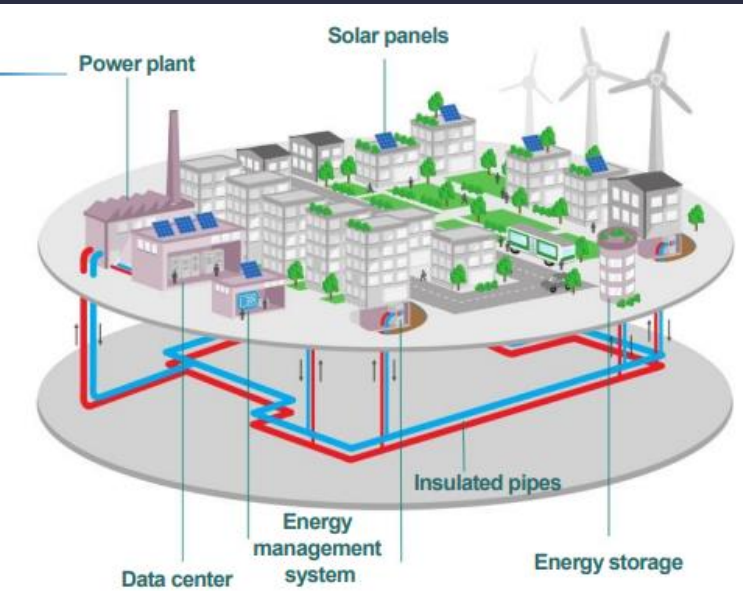
Impact of Integrating DC to Decarbonise the Grid



Renewable Energy



Benefits



Renewable energy can be utilised to reduce electricity consumption to achieve a fully sustainable DC plant.

Minimal electrical energy required to drive some pumps, which can be sourced through Solar Energy and Power Cells to achieve a fully sustainable plant.



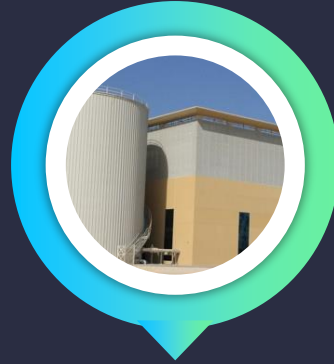
More than 10% annual CO₂ emissions prevention



Reduced
Carbon
Footprint



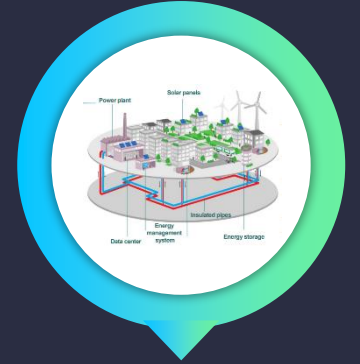
Operational
Efficiency



Thermal
Energy Storage



Essential
Innovation



Renewable
Energy

Adopting efficient and sustainable cooling solutions is crucial for achieving both development and environmental objectives, particularly in the Middle East region, where the need for cooling is high.
District cooling aligns with the UAE's Energy Strategy 2050 to attain Net-Zero

Thank you

tabreed.ae