



# REFRIGERATION 2019 DUBAI

FUTURE TECHNOLOGIES THAT WILL IMPROVE THE EFFICIENCY , AND REDUCE THE ENERGY

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# TOPIC:

- FUTURE ( EXISTING) TECHNOLOGIES TO REDUCE ENERGY CONSUMPTION OF GHG EMISSIONS FROM REFRIGERATION AND HVAC INSTALLATIONS.



# CLIMATE CHANGE

We are triggering an event of problems that we will not be able to control.

IT WILL BE HOTTER BEFORE IT GET COLDER:

- DO YOU KNOW THAT GLOBAL WARMING CAN ...OR WILL TRIGGER A NEW ICE AGE ???
- Ice on the north pole and Greenland is melting, causing the Gulf Stream to become unbalanced. This will cool Europe and America instead of warming it?
- This is triggered also by the fact that the freezing point in salt water will increase from existing  $-2,3\text{degC}$  .
- We remember the movie “ DAY AFTER TOMORROW” perhaps it was a true documentary of the future and not fiction at all. .



# SAVE OUR NATURE

- ▶ What most people fail to realize is that we will never truly destroy the Earth. The planet will always remain & its nature will change and adapt to new conditions.
- ▶ We can only destroy humanity.....and other living things.
- ▶ AND WE DON'T WANT THAT !

# WE NEED TO CHANGE THE WE LIVE, AND IMPROVE OR CHANGE EXISTING PRACTISES..... **AND IT IS URGENT**

- The following are meant as mind openers, and will be a great help to reduce emissions into our atmosphere and reverse the trends we see today.
- **THERMAL STORAGE should be used more** in commercial refrigeration for Walk in chillers and freezers, display units, preparation rooms, as well as fish markets, fruit and vegetable markets, production units etc.
- **HYDROLOOP** used in display units in supermarkets.
- **WATER COOLED CONDENSORS** instead of air cooled where ever practical
- **IMPORTANCY OF PREVENTIVE MAINTENANCE**
- **USE** NEW DEVELOPED REFRIGERANTS SUCH **AS CO2 and PROPANE..**
- **MAKE USE OF THE HEAT** FROM THE CONDENSORS
- **ITS HIGH TIME THAT HVAC & REFRIGERATION INDUSTRY SIT DOWN....**



# THERMAL ENERGY STORAGE

T E S



# THERMAL STORAGE

WHAT IS IT? CAN YOU SEE IT HERE ?





NO YOU CANT, BECAUSE ITS  
UNDER GROUND. CALLED  
**PERMAFROST**

THIS ICE IS ALMOST 20 000  
YEARS OLD, CREATED DURING  
LAST ICE AGE

THE ICE HAVE BEEN  
STORED IN THE NATURE FOR  
20 000 YEARS OR MORE.

INCREDIBLE...

WHAT CAN WE LEARN  
FROM THIS?



# THERMAL ENERGY STORAGE TES

- ▶ TES or Thermal Energy can be compared with Electric Energy stored in a battery...and can be released when we need it.
- ▶ In construction we can cool concrete when the cost of energy is low, or efficiency of AC plants are at peak. ( Night time)..Electricity are cheaper, and condensing temperature is much lower than during daytime  
Dr.Ghassan Al Nimri will tell us more about this a little later.
- ▶ Ice bank as precooling the return water in HVAC installations. We can produce ice during night time, and use to cut the peak next day.  
Enormous saving of energy.
- ▶ In refrigeration we cool a brine , usually ( Ethylene Glycol) which can be released whenever required, and used directly in refrigerated display units and Walk In Chillers & Freezers .
- ▶ 60% Ethylene Glycol mixed with 40 % Water freeze at - 45 deg C, so it will cover mostly of requirements.

# BRINE CHILLER (ETHYLENE GLYCOL)

- It works as any water chiller, but with lower temperature. For refrigeration we cool the glycol to -5 -8 Deg C . The condenser heat glycol, which can be used for defrost. Since the defrost happens from inside out, it works very fast compared with traditional evaporator defrost systems
- This will maintain a more constant temperature during the defrost.
- Use special evaporators with a little larger surface in the display units.
- The chilled glycol are distributed to multi evaporators through Polypropylene pipes by a circulation pump.
- We can energize a compressor unit by Solar Energy, and store the Glycol in tanks for use next day.
- **ABSORPTION AND ADSORPTION** CHILLERS ARE PERFECT FOR THIS....

THIS INTRODUCTION OF THERMAL STORAGE IS BRIEF, AND COMPANIES IN THE BUSINESS SHOULD WORK MORE ACTIVELY TO PROMOTE THESE TECHNOLOGIES



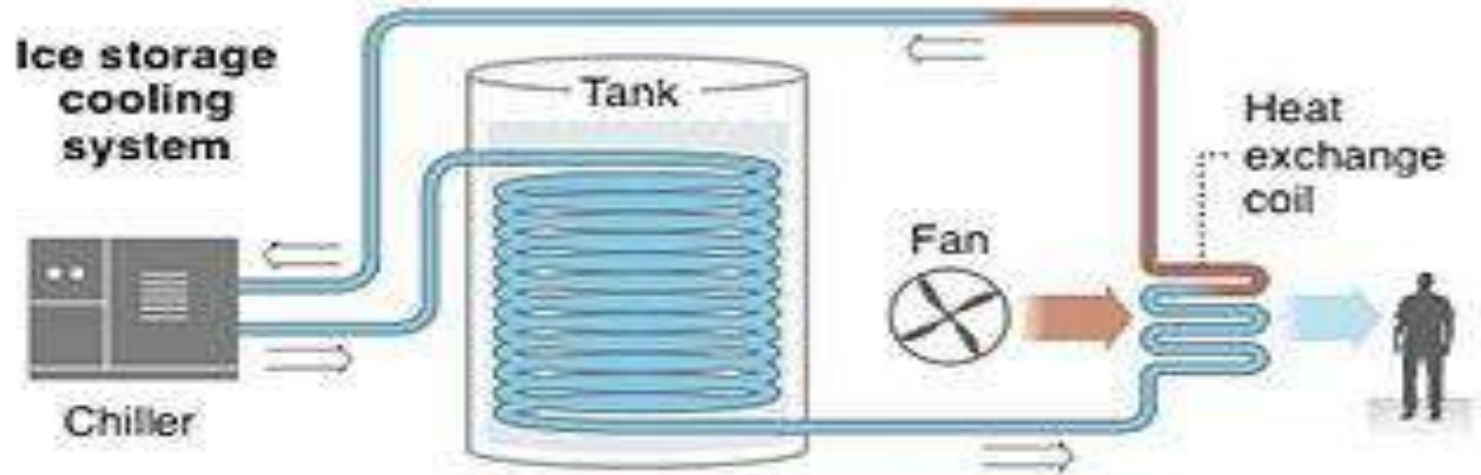
REFERENCE:

OUR INSTALLATION IN **THE MARKET** AT MUSHRIF MALL ,ABU DHABI, WHERE WE HAVE INSTALLED A GLYCOL CHILLER WORKING WITH 3-400 EVAPORATORS ( -6deg C)  
I WILL BE HAPPY TO ARRANGE YOU TO STUDY THIS INSTALLATION.

# ICE BANK ..... MANY DESIGN OPTIONS

## Ice used to ease cooling costs

Some office buildings are relying on blocks of ice created at night – when electricity is more plentiful and less expensive – to cool their interiors and help ease a burden on the environment.



At night, a chiller unit cools an ethylene glycol solution to below freezing temperatures.

The solution is circulated through tubes in a tank freezing the water held within.

During the day, the ice melts cooling the solution in the tubes.

The chilled solution is moved through a heat exchange coil where it cools the air.



**USE HEAT FROM CONDENSORS  
TO HEAT WATER FOR KITCHENS  
OR SWIMMING POOLS**





# ENERGY CONSUMPTION MONITORING

- ▶ THERE ARE SEVERAL COMPANIES PROVIDING SOLUTIONS FOR MAINTENANCE SCHEDULES, AS WELL AS MONITORING OF “ ALL WHAT WE NEED TO KNOW “
- ▶ TEMPERATURE MONITORING
- ▶ OPERATION OF COMPRESSORS, FANS, PUMPS.
- ▶ MONITORING OF FCU, AHU and FAHU s
- ▶ WHY OPERATE FRESH AHUs IN SUPERMARKETS AND RESTAURANTS WHEN THERE ARE NO KITCHEN EXTRACT AND NO CUSTOMER??

( MASSIVE SAVINGS OF ENERGY )



# PREVENTIVE MAINTENANCE ( VERY IMPORTANT )

- **ALWAYS CLEAN CONDENSORS** ( 1mm dust reduce efficiency by 10%)
- **ENSURE THAT EVAPORATORS ARE FREE FROM ICE** ( 1 mm ice reduce efficiency by 10%)
- USE **QUALIFIED** MAINTENANCE COMPANIES...  
( Perhaps Certification is required )
- **EDUCATE** INVESTORS
- ESTABLISHMENT OF **INDEPENDENT CONSULTANTS** IN REFRIGERATION INDUSTRY?
- ENSURE THAT REFRIGERATION PLANT IS WORKING WITH **MAXIMUM CAPACITY** BY SCHEDULING PREVENTIVE MAINTENANCE RECOMMENDED BY SUPPLIER.

# HYDRO LOOP

used in Supermarket refrigeration

We will get a detailed introduction by

**Mr. Matteo Zanesco**

Managing Director of Carel MIDDLE EAST..

WE WILL CHANGE THE USB



# THERMAL STORAGE IN CONCRETE

**PRESENTATION BY Dr. GHASSAN AL NIMRI  
MANAGING DIRECTOR OF ECO STRUCTURE, DUBAI**





# REFRIGERATION OF FOOD

## THE COLD CHAIN Challenges all the way:

AT THE FARM

PRODUCTION FACILITIES

TRANSPORTATION & DISTRIBUTIONS

STORAGE

DISPLAY UNITS

IN THE CAR TO HOME

IN THE FRIDGE AT HOME

THE ABOVE ARE CAUSING A BIG PART OF THE FOODWASTE AND WE NEED TO IMPROVE EXISTING, AND RETHINK FUTURE INSTALLATIONS AND PRACTISES



# THANK YOU

- ▶ HOPE THESE ISSUES CAN BE BETTER UNDERSTOOD, AND GAIN POPULARITY IN THE INDUSTRY....

TO HELP OUR WONDERFUL WORLD TO BE WONDERFUL TO OUR GRAND, GRAND CHILDREN ALSO.

HAVE A WONDERFUL DAY , AND ENJOY THE CLIMATE AS LONG AS WE HAVE IT...