GOVERNMENT OF DUBAI

DUBAI MUNICIPALITY

* Dubai Municipality
  * Energy Sustainability
    * Legislative Requirements
      * GHG Reduction
        * Green Building Code

* International District Cooling Conference. November 13 - 15

GOVERNMENT OF DUBAI

DUBAI MUNICIPALITY

* To reduce energy demand by 30%
* Local Order No.27
  * To Replace District Cooling Potable Water Supply with Sea Water or Treated Sewage Effluent

* Dubai Integrated Energy Strategy

DIES 2030

GOVERNMENT OF DUBAI

DUBAI MUNICIPALITY

*Sustainable Solution

* Reduction of > 1,000 gm/m^3 GHG emissions
* Cost reduction in potable water bill
* Legislative Compliance

*TSE Advantages

* TDS - < 1,500 mg/l
* Chlorides < 500 mg/l
* BOD - < 5 mg/l, COD - < 40 mg/l
* Requires Basic Pre Treatment
* Based on a 3,000 m^3/day makeup water requirement, the table below provides indicative costs (AED) and savings by switching to TSE.

Cost of Potable Water	Cost of TSE	Treatment Cost	Cost of Polished TSE	Net Saving	Annual CO_2 Reduction
34,145	3,900	11,100	15,000	44%	810 Tons

* Dubai TSE

GOVERNMENT OF DUBAI

DUBAI MUNICIPALITY

* Dis-infection by Ozone
* UF
* RO

* Pre-Treatment Schemes

* First step of pre-treatment to eliminate possibility of nutrients and COD ingress through TSE.
* To prevent build up of biofilm and reduce bacterial and legionella growth.
* Ozone has the highest efficiency in bacteria kill
* Removal of existing and prevent buildup of new bio film resulting in better heat transfer
* Average dose is 0.3 g/m^3
* Reduces blow down and increases number of cycles with improved quality of blow down to sewer network
* Reduces overall costs and avoids hazardous chemical handling
* Improves heat transfer coefficient due to improved heat exchange surface area

* Dis-infection

GOVERNMENT OF DUBAI

DUBAI MUNICIPALITY

* **HVAC system consumes 65-70% of total energy bill in a typical building.**
* The performance of air conditioning systems, including DC-chillers, is called COP – the higher the number is, the more efficient the system is.An air conditioning system uses power to move heat from a space being cooled to outside.

* District Cooling

GOVERNMENT OF DUBAI

DUBAI MUNICIPALITY

* Typical COP values for F-gas/FREON systems are in the range 2 to 2,5.
* Typical COP values for Ammonia systems are in the range 5 to 7
* Using Ammonia as a Refrigerant can save up to 2/3 of the old energy consumption compared to F-gas/FREON
* Most common refrigerant in use is hydro fluorocarbon HFC-134a
* **Its GWP is: 1360 whereas Ammonia is: 0**

* District Cooling

Substance	GWP value (100 year)
ODS	
CFC-12	10 300
HCFC-22	1780
HCFC-123	79
HCFC-124	527
HCFC-142b	2070
NON-ODS	
HFC-23	12 500
HFC-32	704
HFC-125	3450
HFC-134a	1360
HFC-143a	5080
HFC-152a	148
HFC-1234ze(E)	<1
HFC-1234yf	<1
R-744 (CO_2)	1
R-717 (Ammonia)	0
R-290 (Propane)	5

* HFCs are currently the world's fastest growing greenhouse gases, their emissions increasing by up to 10 per cent each year, trapping thousands of times more heat in the Earth's atmosphere than carbon dioxide (CO2).
* Reducing emissions of hydro-fluorocarbons (HFCs) under the Kigali Amendment can prevent up to 0.5°C of global warming, while continuing to protect the ozone layer.
* HFCs consumption to be reduced in 2019 in developed countries and frozen in 2024 and 2028 in developing countries

Mohammed Abdulaziz Najm Al Awadhi

*Director

Applied Sustainability & Renewable Energy Department

manajem@dm.gov.ae

*Thank You