Design and Practice of District Cooling & Thermal Energy Storage Systems

18 & 19 August 2014

INTRODUCTION

District Cooling had been introduced and installed in Malaysia for the last 20 years and is being promoted as a way of addressing energy efficiency, energy demand and global warming. The shift in the electricity demand and supply balance, has paved the way for deployment of District Cooling incorporating Thermal Energy Storage which allows the Utilities & Developers to balance the power demand and effectively manage usage.

This course will bring to the understanding of the participants regarding the various aspects of District Cooling Plant design and implementation. Some of the key issues in the design and operation that can affect the efficiencies and viability of the District Cooling Plant will also be discussed.

The participants will have the opportunities to understand the various types of Thermal Energy Storage Systems and compare the merits and demerits of each system. He/she can also learn how to calculate, size up and optimize the Thermal Energy Storage system.

COURSE CONTENTS

1. 0.0 Introduction to District Cooling Systems

1.1.0 Different options for District Cooling Systems
1.2.0 Advantages of District Cooling Systems

2.0.0 Key factors for the successful implementation of District Cooling Plants

2.1.0 User Matrix: High Density, Diversity, Symmetry
2.2.0 System Factors: Simplicity, Efficiency, Distribution, Reliability, Flexibility, Modular implementation
2.3.0 Customer Factor: Dependency, Win-win with Customers, Customer Commitment
2.4.0 Risk Management: Load projection, manage variables, creative pricing, energy source volatility, system performance, distribution network venerability
2.5.0 To be in Control: Control system, system balancing, backup, breakdowns, operating team.

3.0.0 The Chiller Plant

3.1.0 The Chiller : types & performance
3.2.0 The Cooling Towers: types & performance; plume abatement
3.3.0 The Condenser Water System: optimization with chiller performance
3.4.0 Dedicated pump or common header systems

4.0.0 The Chilled Water Distribution System

4.1.0 Factors affecting the operational economics of chilled water distribution system: temperature range, variable flow system.
4.2.0 Configurations of chilled water distribution piping system: Primary-Secondary and Direct-Primary
4.3.0 Pipe sizing method
4.4.0 Leak detection and Catholic protection

5.0.0 The Energy Transfer Station

5.1.0 With or without Heat Exchanger
5.2.0 Heat Exchanger selection: approach temperature and pressure drop
5.3.0 Flow controls at the Heat Exchanger
5.4.0 Energy metering

6.0.0 Optimization of the design parameters to achieve high efficiencies for both the District Cooling Plant and End User's Air-side Systems

6.1.0 The inter-dependence between the Plant Operator and End Users
6.2.0 How Delta-T affects economics of the District Cooling Plant
6.3.0 The Performance of Cooling Coils and how they affect Delta-T
6.4.0 What are the common causes for low Delta-T
6.5.0 Optimizing Delta-T

7.0.0 Thermal Energy Storage Systems

7.1.0 Two sizing strategies for TES: Full Storage and Partial Storage
7.2.0 Benefits of Thermal Energy Storage
7.3.0 Comparison between available options for TES: Chilled Water Storage and Ice Storage.
7.4.0 Temperature separation methods for Chilled Water Storage Systems.
7.5.0 Different types of Ice Storage Systems.
7.6.0 Comparison between Ice Ball System and Ice-on-tube System
7.7.0 Different configurations for TES Plants
7.8.0 Performance of chillers in TES Plants
7.9.0 Building load profiling, Thermal Energy Storage System sizing and optimization

PROFILE OF FACILITATOR

Ir. Chua Keng Seng, B.E.(Hons), MIEM, P.Eng., MASHRAE, MIMM, CCP, graduated from the University of Malaya in 1974. Qualified as a Professional Engineer, he worked with Carrier Malaysia Sdn. Bhd., first as the Service Manager and then as Engineering Manager for about 10 years. During the next 25 years, he operated his own companies in contracting, maintenance and also in consultancy business. He has wide experience in the design, installation, trouble shooting on various types of systems and also in project management. He was in the design and project management team which implemented the Putrajaya Precinct 2 District Cooling Plant which has a capacity of 30,000 cooling tons.

Ir. Chua has also been involved in many training programmes. He lectured air conditioning design in the Mechanical Faculty of University Malaya between 1978 to 1984 and in Monash University for the last 3 years. Besides he had been invited to deliver lectures and presentations in the University Technology Malaysia, University Technology Petronas, The Institution of Engineers, Malaysia and conducted in-house training for some Corporate Companies.

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Registration fees

IEM Member: RM700.00
Non-Member: RM900.00

Venue:

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