

Asian Development Bank Webinar Series

Disease Resilient and Energy-Efficient Centralized Air-Conditioning Systems Session Coordinated by ADB TA 6563 Webinar 2 - Energy-Efficient Centralized Air-Conditioning Systems Date:8st September 2021 Time: 4.00– 5.30 PM (Manila Time – GMT +08.00 Hours)

Expert Address 3: Not-In-Kind cooling and heating technologies.

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Considerations for environmental standards: Safety vs. GWP





In-Kind versus Not-In-Kind District Energy Systems Introduction

- The UN reviewed and assessed all Air Conditioning and Refrigeration technologies.
- Must comply with Montreal Protocol; i.e. environmentally and thermally up to date with the latest technological advances.
- Committee of top experts formed and asked to produce an assessment report every 4 years.
- This is "THE REFRIGERATION, AIR CONDITIONING AND HEAT PUMPS TECHNICAL OPTIONS COMMITTEE" RTOC.
- The result is a report called the:
- REPORT OF THE REFRIGERATION, AIR CONDITIONING AND HEAT PUMPS TECHNICAL OPTIONS COMMITTEE.

The RTOC assessment report, published every 4 years.

Second ASHRAE Developing Economies

In-Kind versus Not-In-Kind District Energy System INTRODUCTION (cont.)

- The RTOC report lists the following chapters:
- 1-Intro.
- 2-Refrigerants
- 3- Domestic ref.
- 4- Commercial ref.
- 5- Industrial systems.
- 6-Transport ref.

7-Air to Air A.C. and H.P.
8-Water H.P.
9- Chillers.
10- Vehicle A.C.
11- Refrigeration conservation. and
12- Not-In-Kind Technologies.

I was given the responsibility of writing this new chapter as a Lead Author with a team of experts.

This became the corner stone for the "Not-In-Kind District Energy technologies Second ASHRAE Developing Economies

In-Kind versus Not-In-Kind District Energy Systems

1- Defining In-Kind and Not-In-Kind Technologies.

In-Kind Technologies in this context are these using primarily mechanical vapour compression to produce air conditioning or refrigeration.

Not-In-Kind Technologies used in this context are these *not* using primarily mechanical vapour compression to produce air conditioning or refrigeration.

Second ASHRAE Developing Economies

In-Kind versus Not-In-Kind District Energy Systems

- 2- Options of Not-In-Kind Technology for Developing Economies.
- A D.E systems operating by natural gas fired absorption chillers/heaters.
- **B** D.E. systems operating by indirect fired absorption systems, (steam or hot water).
- **C** D.E systems operating by direct use of reject heat sources, such as flue gases or exhaust streams or with Refuse Derived Fuel (RDF) or refuse incineration plants reject heat.

D D.E systems operating by deep sea cooling or cooling/heating.
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District Cooling, 12,000 TR/Km 2

Central Air Conditioning

Life Cycle Operating Cost – Unit Price/TR.hr



DISTRICT ENERGY KEY TO RENEWABLES & EFFICIENCY



Deep Sea Cooling (DSC) and DC in Alamein

1- WHAT IS DISTRICT COOLING by Deep Sea Cooling (DSC)

DC is becoming **essential** when building a new modern city, because of its economical and environmental benefits. DSC has one of the lowest operation costs of DC systems.





Surface waters (78°F) Return pipe: 120-150 ft depth

Example of Deep Sea Cooling in Hawaii

Deep waters (44°F)
 Intake pipe:
 1,600-1,800 ft depth

WHY DISTRICT COOLING FOR EL ALAMAEN EL GEDIDA



2 – شبكة المياه المثلجة Chilled Water Piping Network



Coordination with utilities should be established to construct a Chilled Water Network that cools the buildings, which are the same needs for conventional district cooling systems (using Chillers)

2- Direct/Indirect Evaporative Cooling (IEC)





Thank you

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