



Bureau of Energy Efficiency



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Government of India  
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# ANGAN

## Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency

An International Conference on Building Energy Efficiency

9<sup>th</sup>-11<sup>th</sup> September, 2019 | Hotel The LaLiT, New Delhi





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THIS PRESENTATION WAS SHARED BY

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FOR THE SESSION:

*“State-of-the-art Cooling Systems, including  
District Cooling System”*

DURING ANGAN 2019

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# **Augmenting Nature by Green Affordable New-habitat (ĀNGAN)**

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## **Track 10-State-of-the-art Cooling Systems, including District Cooling System**

*By Bali Singh*

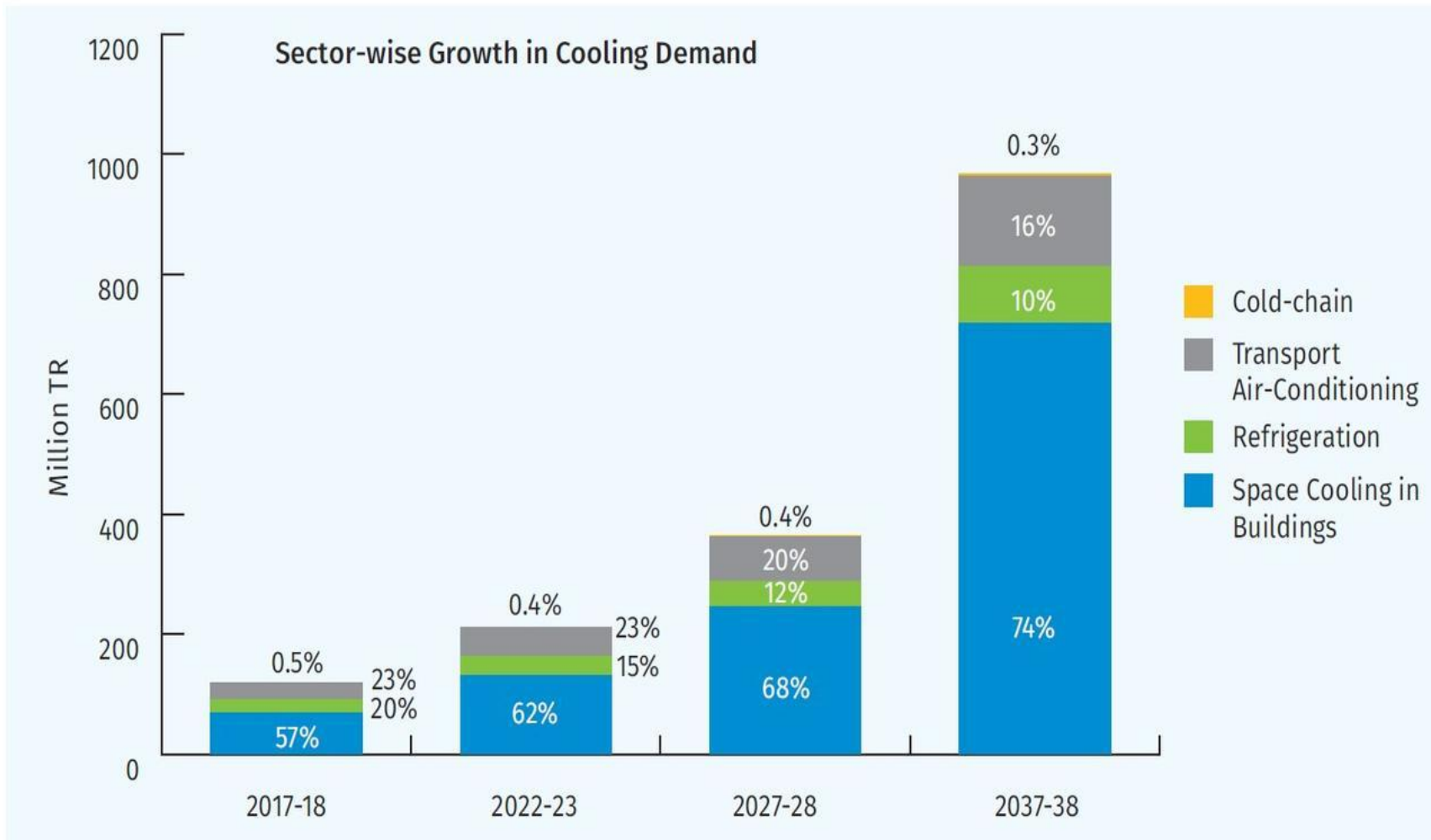
*CEO – Namdhari Eco Energies Pvt Ltd*

*([www.ecoenergies.co.in](http://www.ecoenergies.co.in))*

*BEE- Accredited Energy Auditor*

*Product Founder – Chiller Optimizer*

## Colling Demand of India

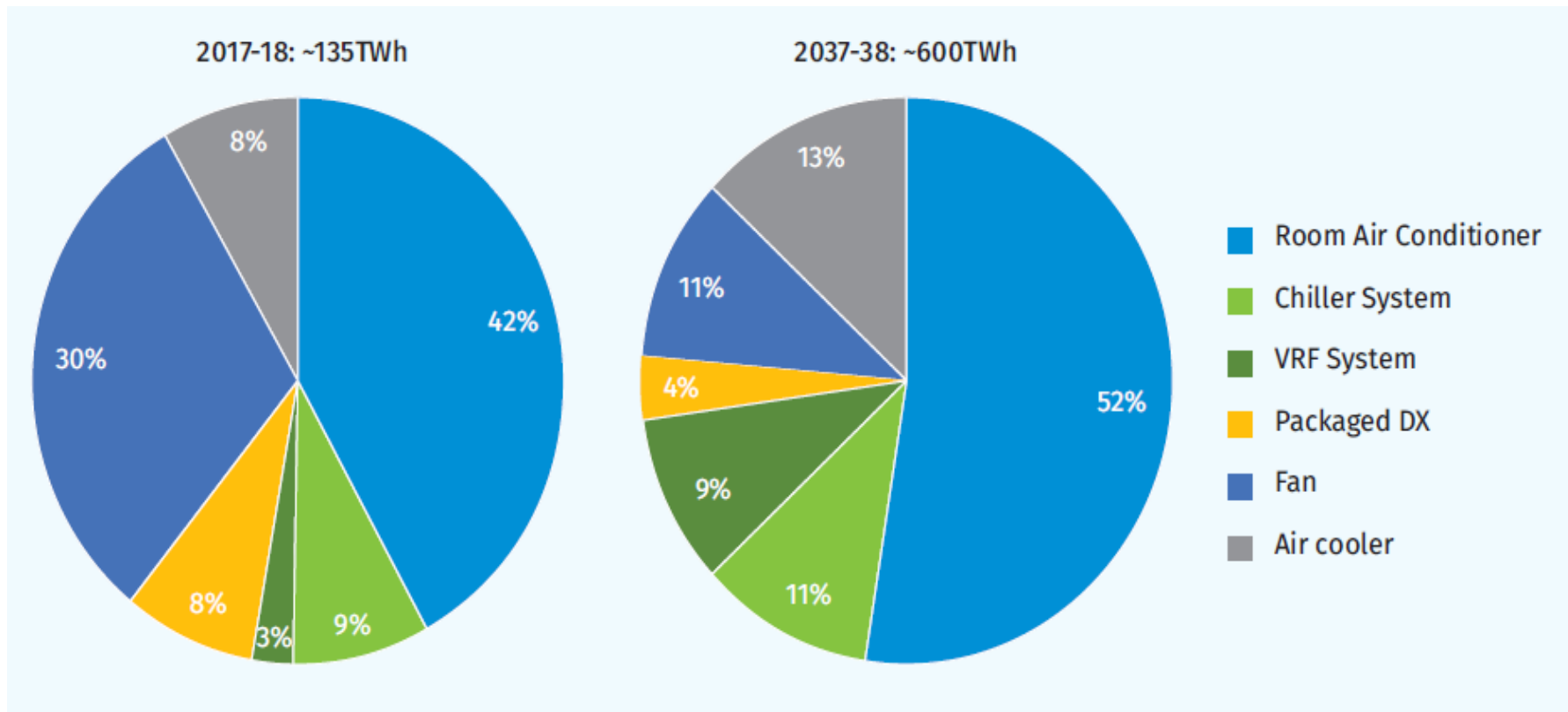




## Types of Colling System

1. Unitary (35 % more power than DCS)
2. Centralized Cooling System (Approx. 20 % more power than DCS)
3. District Cooling System (DCS)

# Energy Consumption in different types of cooling system

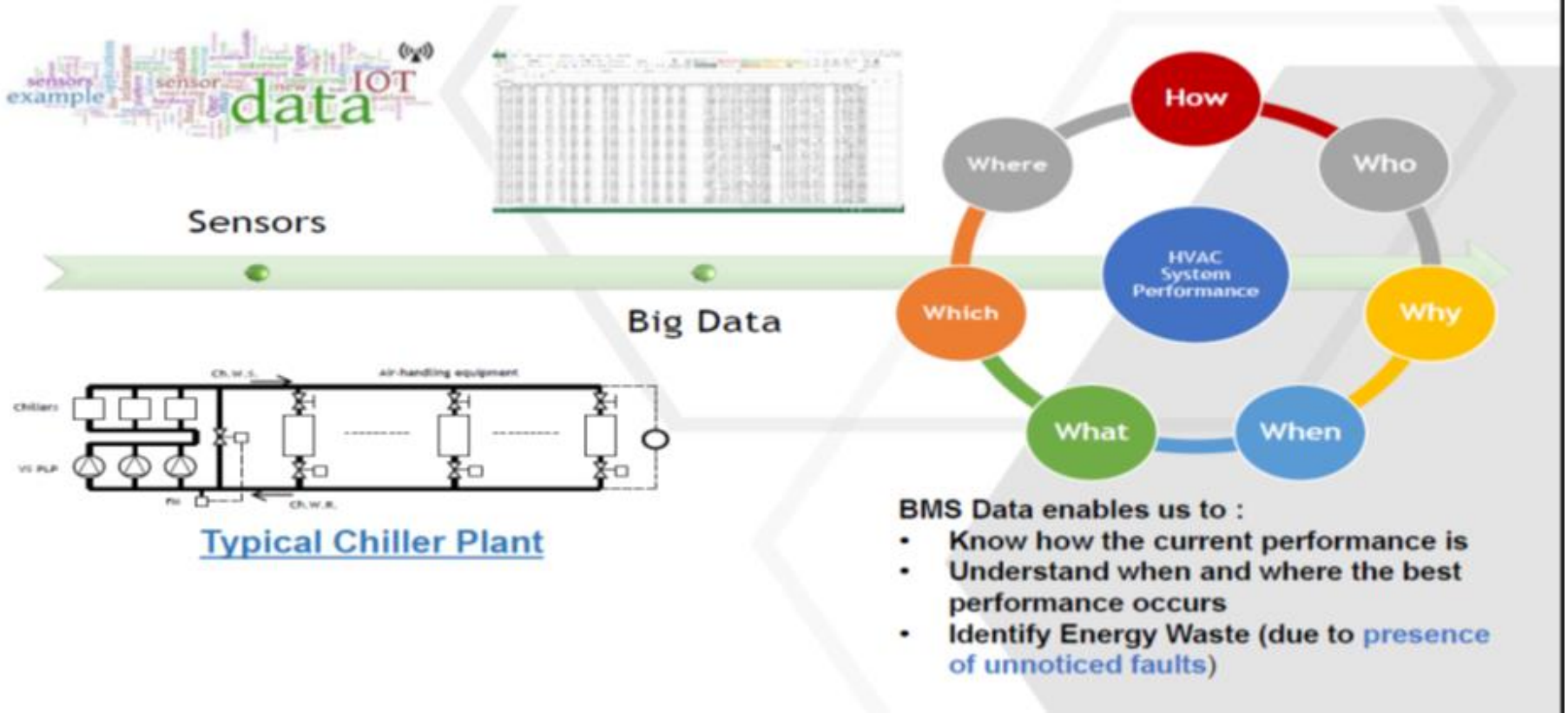




# Challenges with the Centralized Chiller System

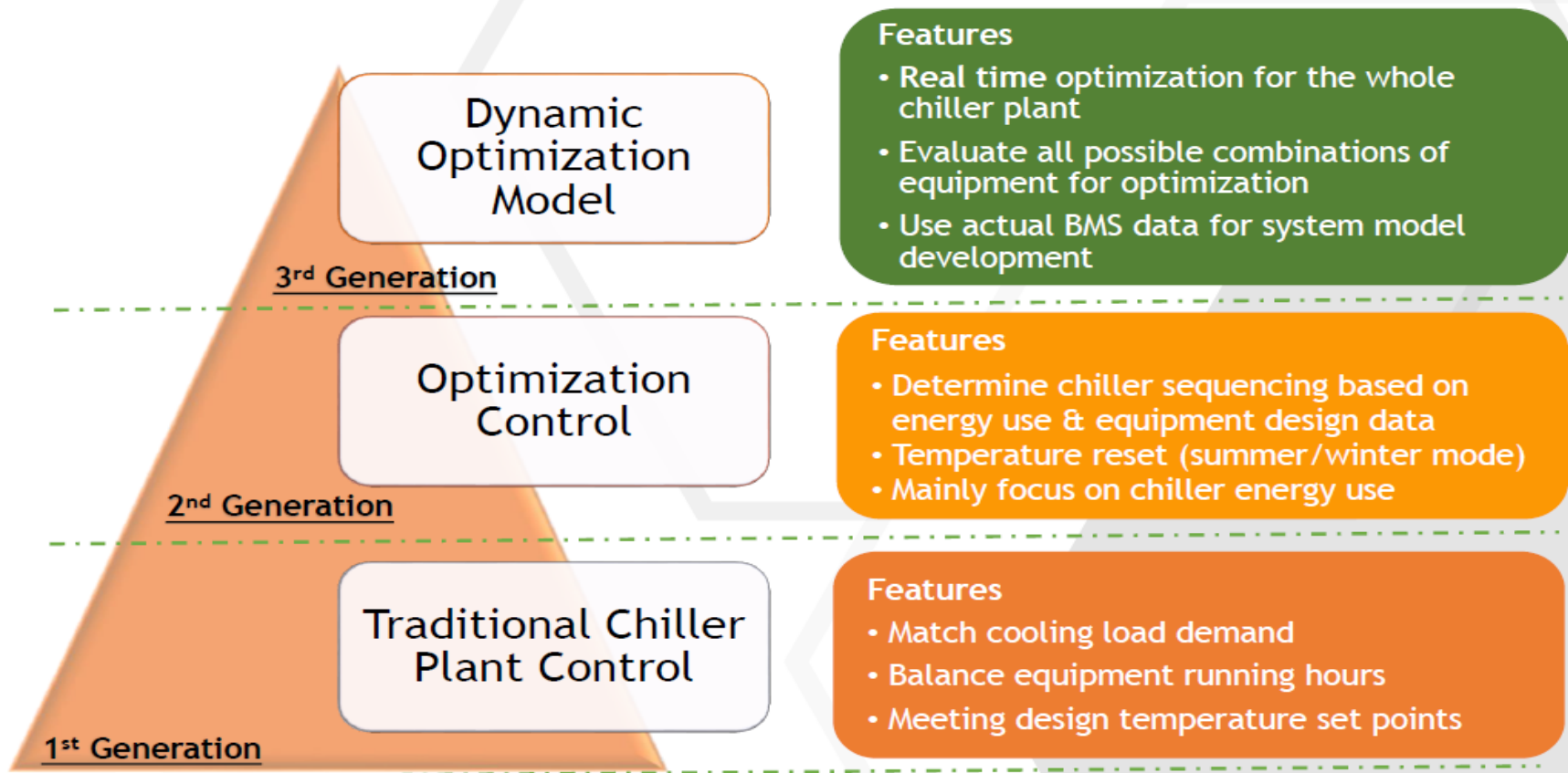
- Difference in design performance to actual performance
- Lack of Customized Control
- High and fixed Builder Billing

# Chiller Plant Optimization





## Overview of Chiller Plant Control





## Chiller Plant Optimization

- Monitor the Chiller efficiencies online. Even set alerts on the Chiller performance deviation.
- Sequencing ensures that the most efficient combination of chillers, pumps and cooling towers with optimum frequencies are operating and the system is operating near maximum efficiency. During part load conditions, it ensures that plant is operating on best System Part Load Value. Along with chiller sequencing, an EMS generates alarm for critical conditions.
- EMS takes accurate decisions on when the air conditioning system shall be on and off by using its algorithms to avoid unnecessary energy consumption. The control algorithm has a self-learning mode to learn the facility's air conditioning load pattern and modify the operations of the equipment.



# Chiller Plant Optimization

- It is a self-diagnosing technology which identifies areas of energy wastage in the system. It result in huge energy savings and reduce human errors in operation.
- It calculates real-time iKw/TR for the plant room and determines the deviation from design parameters.
- It records precise energy endues data and provides finer insight into energy consumption trends of plant. As per the industry claims, Integration of an EMS with above controls can produce energy savings varying from 10% to 60% on case to case basis



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# District Cooling System

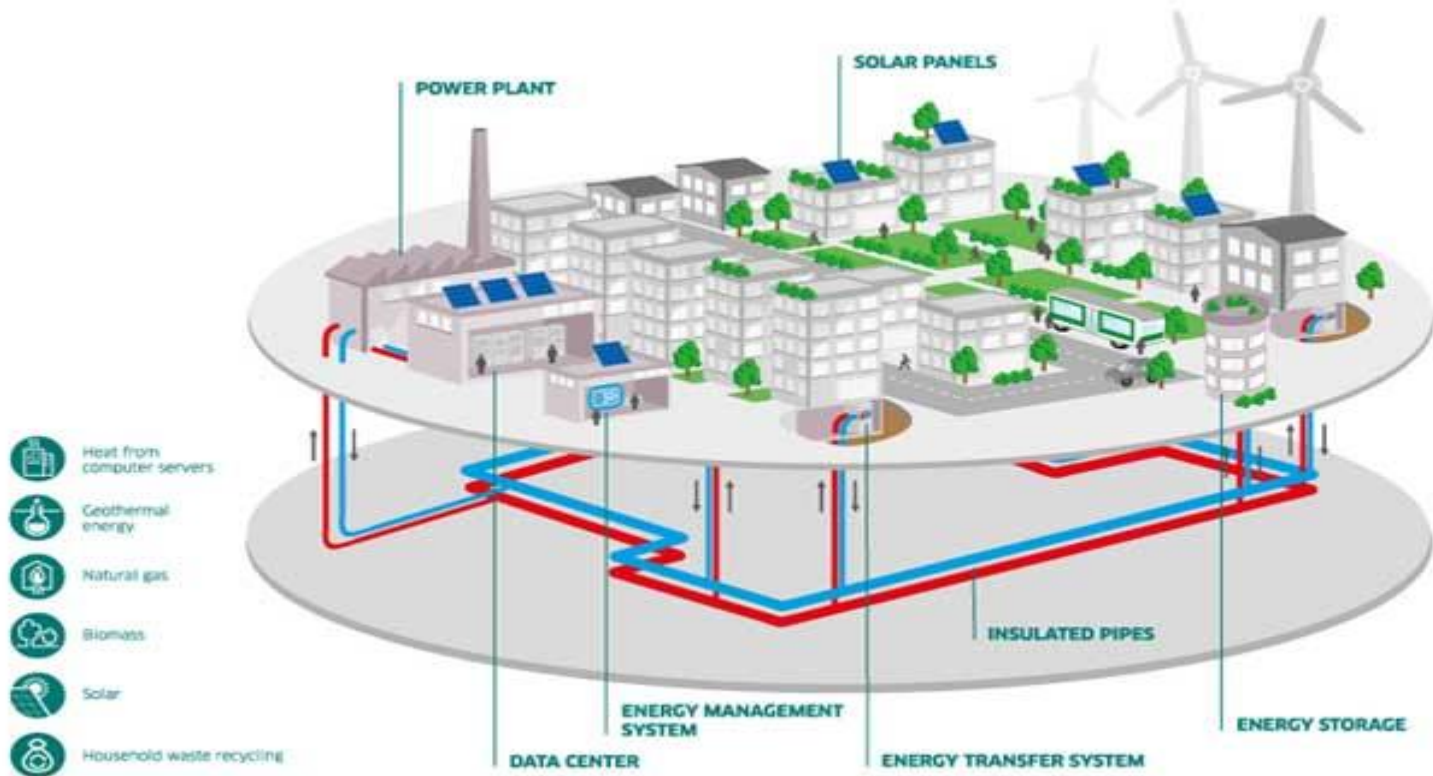




## District Cooling System

- District cooling indicates the central manufacturing and distribution of cooling energy.
- Chilled water is provided by means of an underground insulated pipeline to the building to cool down the interior air of the buildings within a district/zone.
- Specifically designed devices (HX & pumps, AHUs etc.) in each building after that utilize this water to decrease the temperature level of air going through the building's cooling system.

## District Cooling System





## Benefits

- More Efficient than individual Chiller plants
- Required Low Installation capacity as more Diversification available
- Save building space that could be used for better functions (such as rental revenue).
- Provide a higher level of reliability, Benefits as they are developed with enough capacity to guarantee power is always readily available at the main plant.



## Benefits

- Circulation systems are typically made with multiple loopholes or various other backup to give additional distribution reliability.
- Have less surprises-financial requirements are foreseeable, and you only spend for the energy you use.
- Enable a better level of flexibility, as building demands can rise or down without the need to change the main plant's capacity



# Conclusion

- District Cooling System are efficient but our country do not seem prepared for District cooling system
- We should transit from unitary system to centralize system and then from centralized system to District Cooling System
- The Govt policies like ECBC should mandate the installation of performance monitoring equipment's in Centralized chiller Plants so there actual performance should always be maintained



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**Thank  
you!**