

Presentation to:



Operating and First Costs with Primary, Primary/Secondary
(Buildings or Plants), Primary/Secondary/Tertiary and Primary with
Booster System

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Chilled Water Distribution System

- Over the years engineers have designed many different ways to distribute the chilled water system
 - Primary Pumping
 - Primary Secondary Pumping
 - Primary Secondary Tertiary Pumping
 - Primary pumping with booster system
 - Push Pull pumping

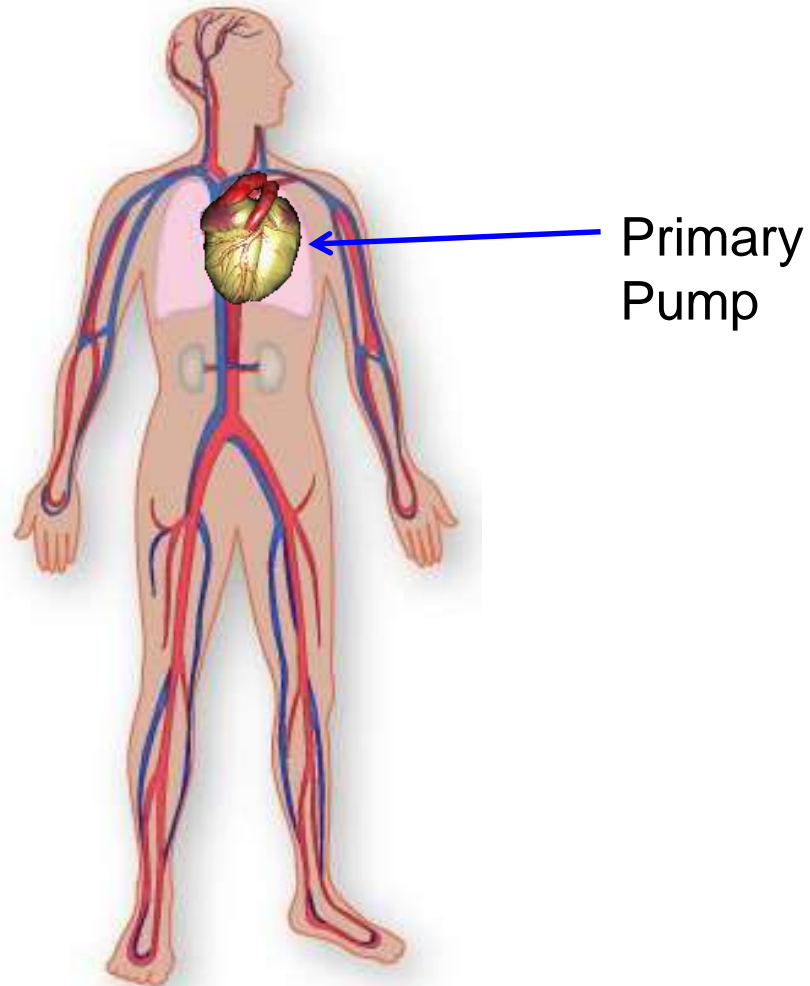
Chilled Water Distribution System

- Many of the distribution system are copied from Hot water Distribution system.
 - What is the optimum design that meets our mission of
 - ✓ Safe
 - ✓ Reliable
 - ✓ Sustainable
 - ✓ And Cost effective infrastructure
 - Let's review it together

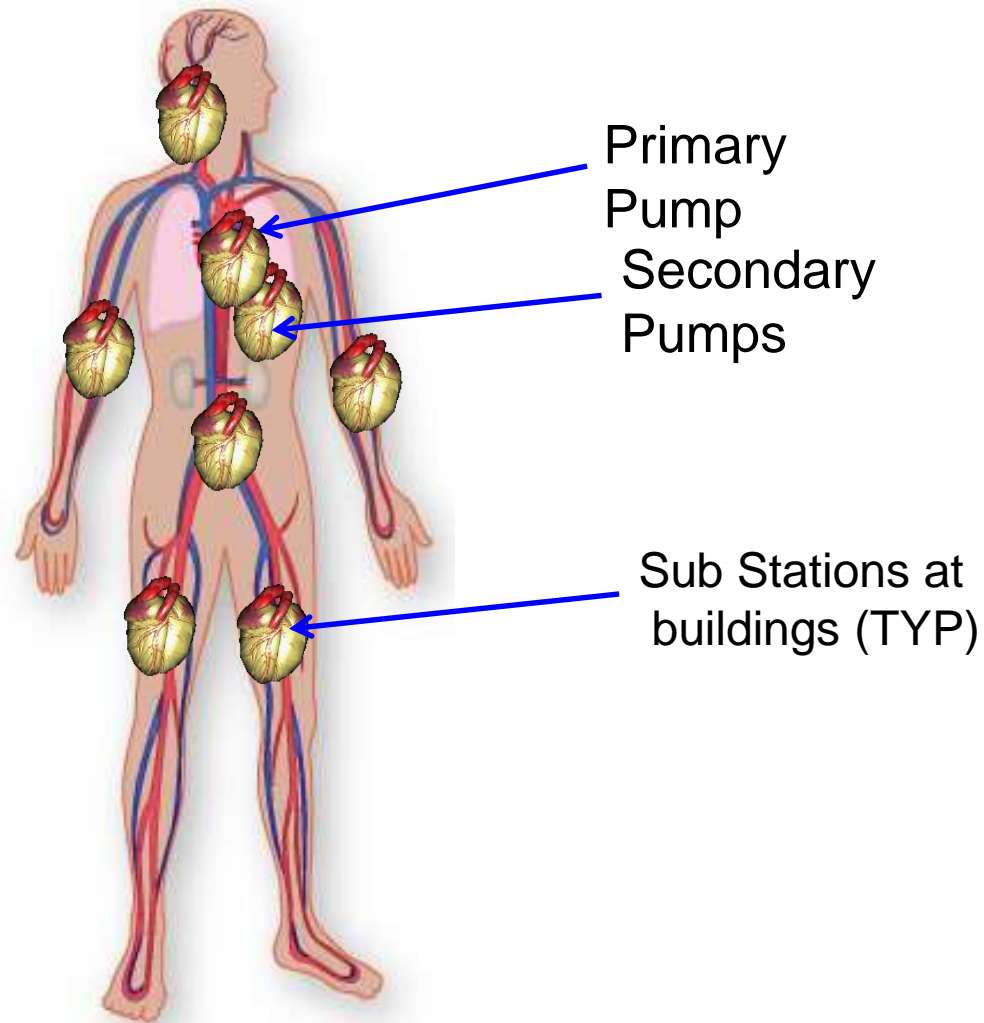
Chilled Water Distribution System

- What are the key issues in designing and operating chilled water distribution system
 - Remember..... The major difference between Air and Water that water can not be
???????????
 - Subsequently for all methods accept for primary pumping and primary with booster, supply and return chilled water mixes based on the pumping flow for each loop

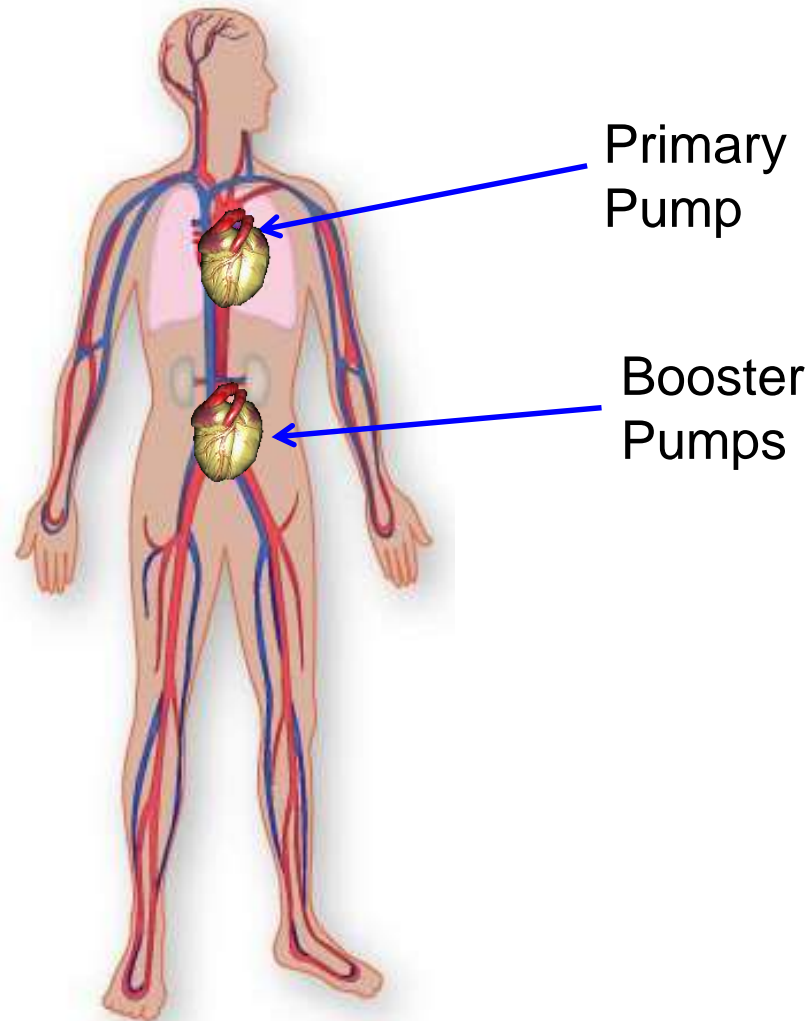
Primary only Pumping System



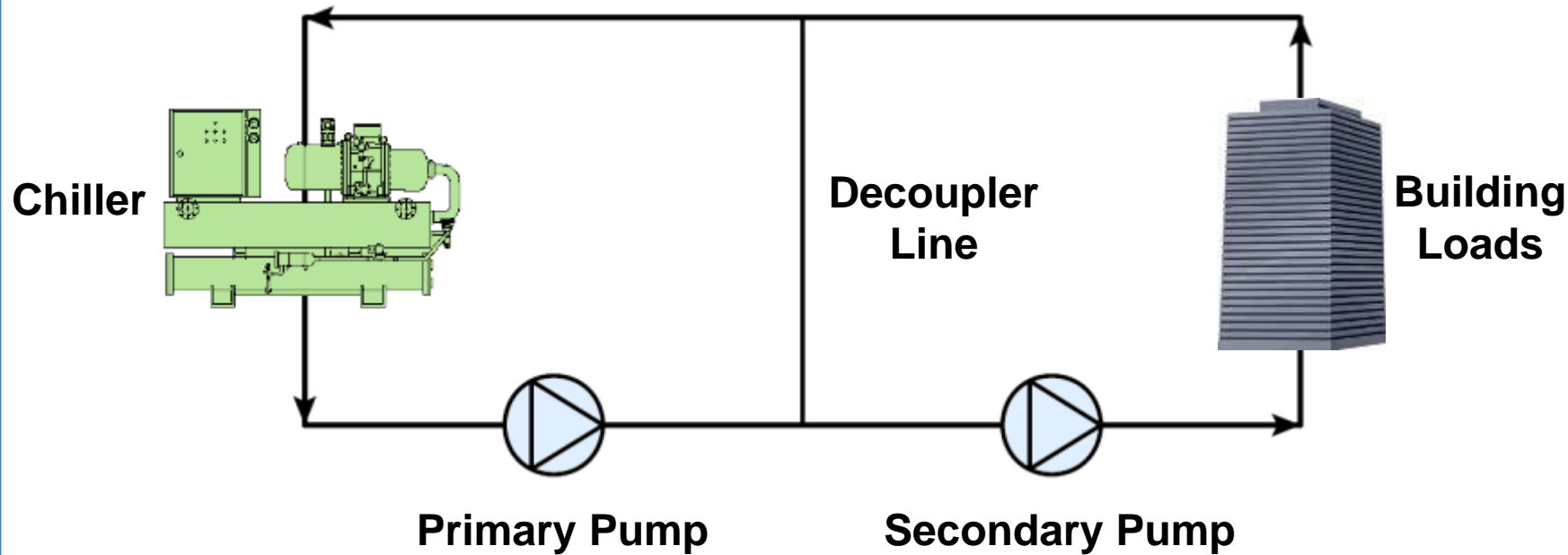
Primary / Secondary Pumping System



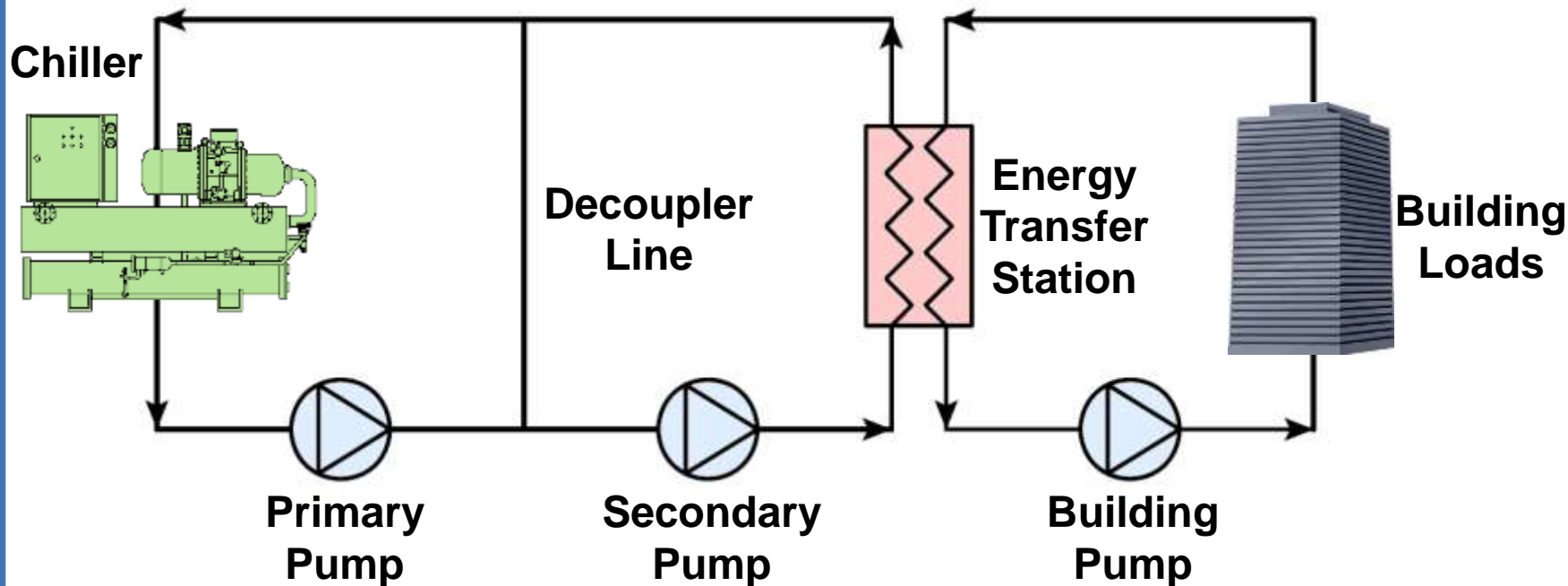
Primary with Booster Pumping System



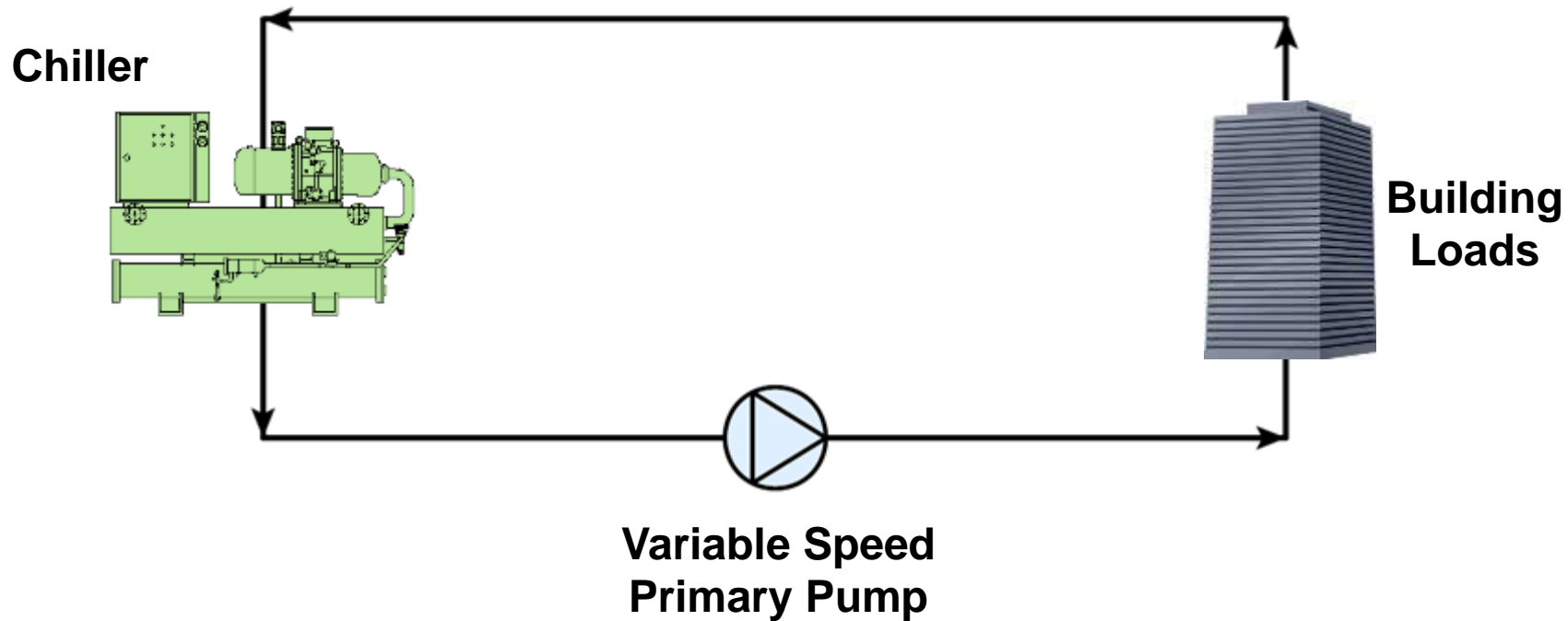
Basic 1970's Era Chiller Plant Design



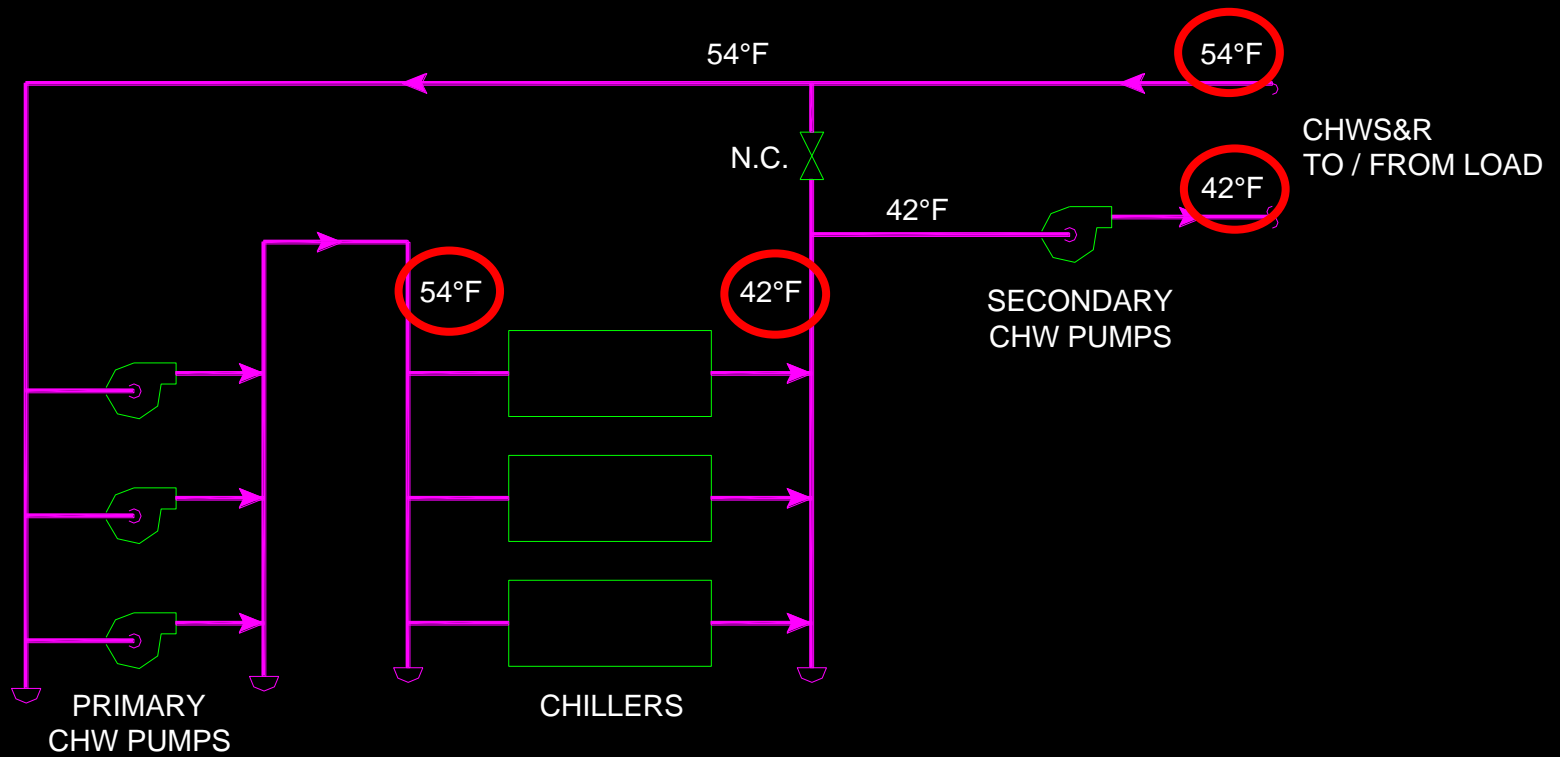
Current Design Used on Many Large District Chilled Water Systems



Modern Variable Volume Primary Chiller Plant Design



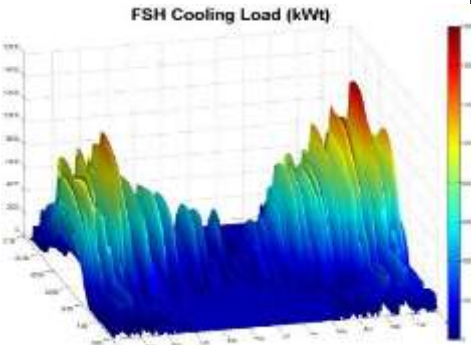
Improve Chilled Water ΔT



Distribution System Summary

- Only variable primary pumping system with or without booster pump is the optimum system
 - Does not allow mixing of water causing increase in chilled water supply temperature or reducing chiller
 - All the pumping controls remains with the Central plant
 - Simple controls
 - Ensures no loss of chiller operating capacity
 - Allows chillers to run at efficient operating point
 - No valuable space is required from buildings

Thank You



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