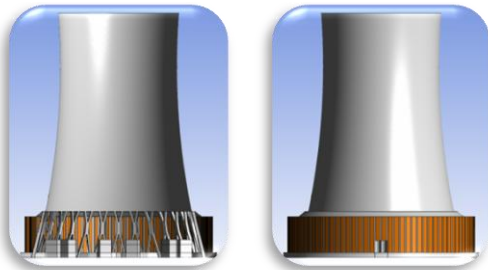


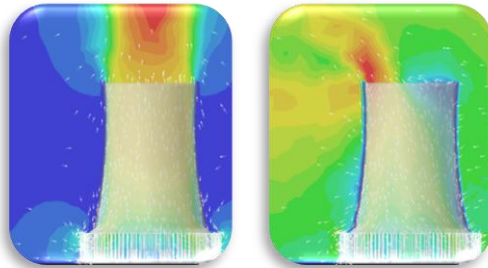
Natural Draft Cooling Tower Simulation

Cooling tower is a heat removal device used to transfer process waste heat to the atmosphere. The primary use of large industrial cooling towers is to remove the heat absorbed in the circulating cooling water systems used in power plants, petroleum refineries, petrochemical plants, natural gas processing plants, etc.



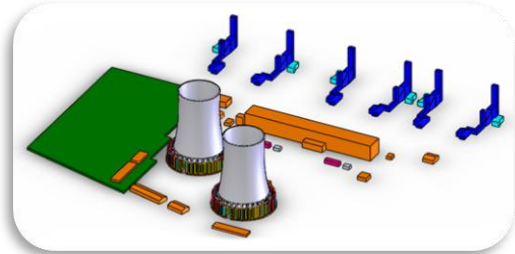
Natural draft cooling towers are particularly attractive as a cost-saving solution for larger power stations and industrial plants requiring greater quantities of cooling water.

As this type of cooling tower operates without fans, the substantial amount of electric power otherwise required for large cooling tower systems is not needed. The required cooling air is conveyed through the tower by natural draft thus neither fan nor fan power is required.

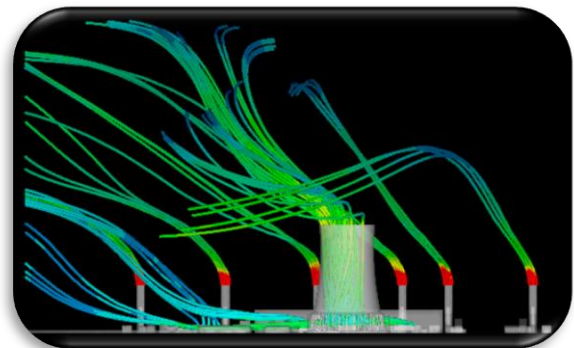
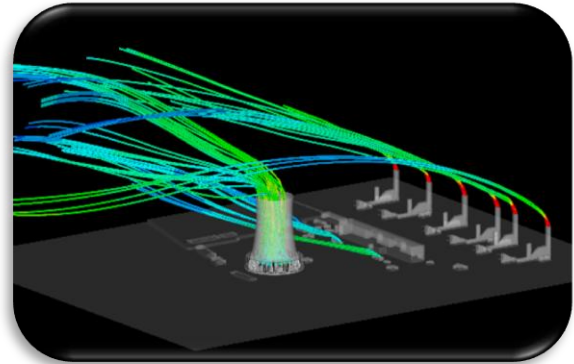


The Velocity profiles in the no-wind (left) and windy (right) conditions

Natural draft cooling towers are sensitive to the environment conditions, such as air temperature, humidity, and wind. The cooling capacity drops up to 40% during windy seasons and causes power shut down.



This study examined the effect of environment conditions and power plant's buildings and auxiliaries on the cooling tower performance by means of Computational Fluid Dynamics (CFD) calculations.



The calculated streamlines in the windy condition at the power plant