

# PUMPING SYSTEMS

- **Avoid cooling water re-circulation in DG sets, air compressors, refrigeration systems, cooling towers feed water pumps, condenser pumps and process pumps.**

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- **In multiple pump operations, carefully combine the operation of pumps to avoid throttling**

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**Provide booster pump for  
few areas of higher head**

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- **Replace old pumps by energy efficient pumps**

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- **In the case of over designed pump, provide variable speed drive, or downsize / replace impeller or replace with correct sized pump for efficient operation.**

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- **Optimise number of stages in multi-stage pump in case of head margins**

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- **Reduce system resistance by pressure drop assessment and pipe size optimisation**

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- **VFDs may offer operating cost reductions by allowing higher pump operating efficiency, but the principal savings derive from the reduction in frictional or bypass flow losses**

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- **Using a system perspective to identify areas in which fluid energy is dissipated in non-useful work often reveals opportunities for operating cost reductions.**

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- **For example, in many systems, increasing flow through bypass lines does not noticeably impact the backpressure on a pump.**