**Clean Utilities:**

* Water for Injection
* Purified Water
* Clean Steam
* Clean Compressed Air
* Process Air
* Process Gases
* Liquid Nitrogen

**Technical Utilities:**

* Water
  + Fresh Water
  + Cooling Water
  + Hot Water
  + Fire Water???
* Steam
* Cold Steam
* Electrical Power
* Gasoline
* Bio Waste Water
* Non Bio Waste Water
* Waste
  + Paper
  + Plastics
  + Other

|  |  |
| --- | --- |
| **Clean Utilities** | **Technical Utilities (Black Utilities)** |
| Water for Injection (WFI) | Wastewater Collection/ Inactivation (Bio / non-Bio) |
| Purified Water (PW) | Water (Portable, Cooling, Heating and Fire Water) |
| Clean Steam | Compressed Air |
| Clean Compressed air | HVAC |
| Process Air | Electrical Power |
| Process Gases (N2, O2, CO2) | Technical Steam (Black Steam – Fresh / Used) |
|  | Waste (Plastics / Paper / Other) |
|  | Gasoline |
|  | Nitrogen Liquid |

Clean Utilities:

Clean utilities are high-risk systems due to the fact that they come into direct contact with the final product thus they have direct impact on the quality and purity of the product. PW and WFI are used for buffer and media preparation. They are also utilized for CIP operations (Clean in place). Clean steam is used for SIP operations (Sterilization in place). Clean compressed air is utilized for drying of product contacting surfaces, for blow out of product transfer pipes and also used in pneumatic valves within the transfer pipe network.

Technical Utilities:

Technical utilities (also known as black utilities) are needed as support for process operations, but unlike the clean utilities they don’t have direct contact to the product. They are either used as input for clean utility generation like for example potable water or as supporting agents like for example cooling / heating water.