## Cost breakup of new emerging decentralised wastewater treatment technologies

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| Green bridge          | Filtration, sedimentation, biodigestion and biosorption by microbes and plants  | 50 – 200 KLD/sq m  | In situ treatment of water bodies       | 200-500              | 20-50                 | • Suitable for in-situ treatment in rivers, flowing streams  
  • No skilled labour is required for its operation and maintenance  
  • It improves the overall aesthetics, aquatic life of the water body  
  • Pollution load reduction is up to 80 per cent in general  
  • Increase in dissolved oxygen (DO) from 150-200 per cent |
| Biosanitiser/ Eco chip| Bio catalyst- breaking the toxic/ organic contents  | 100 mg/ KLD        | In situ treatment of water bodies       | Chip costs 10,000 excluding civil / construction cost | NA                    | —                                                                                                                                                                                                     |
| Nualgi                | Phycoremediation (use of micro/ macro algae- fix CO₂ , remove nutrients and increase DO in water) | 1Kg treats upto 4ML | In situ treatment of lakes/ ponds, increase in fish yield. | ₹350 / MLD           | 9000 -10,000/ML         | • The growth of diatoms is very fast-starting within 5 minutes and continues as long as the nutrients last, about 1 week to 10 days  
  • 1 kg of Nualgi results in the release of approximately 100gps of oxygen  
  • 100kg of Nualgi can treat 4 million litres of water |
| Bioremediation        | Decomposition of organic matter using biological products  | 1 billion CFU/ml    | In situ treatment of lakes/ ponds       | Rs. 20,000-30,000/ML for flowing water and Rs. 4000-5000/ML for still water | 1.9 lakhs/ MLD for flowing water and Rs. 2.8 L/Acre for still water (for eg. Lakes) | • Pollution load reduction is up to 80 per cent in general  
  • Increase in dissolved oxygen (DO) from 150-200 per cent  
  • It is cost effective. No construction or additional infrastructure is required  
  • Effective in removing highly toxic and health hazardous gas H₂S from the environment completely  
  • These strains exhibit growth even at low temperature as low as 4 degree celsius and in the optimum pH range of 6-9  
  • The strain of bacteria maintains a satisfactory level of DO and therefore aerators, which consume high power, can be avoided or its use can be reduced  
  • Controls the nutrient level in water thus helps in controlling “Eutrophication” process |
| Soil Bio technology   | Sedimentation, filtration, biochemical process  | 5KLD – tens of MLD  | Horticulture Cooling systems            | 10,000-15,000         | 1000-1500              | • The process can be run on batch or continuous mode  
  • No sludge production  
  • Mechanical aeration is not required  
  • The hydraulic retention time range from 30 mins to 1 hour without any pre-treatment  
  • The overall time of operation is 6-7 hours. The bed is dried prior to next cycle of use. |
| Soil scape filter     | Filtration through biologically activated medium  | 1-250 KLD          | Horticulture                            | 20000-30000           | 1800 - 2000            | COD reduction in the range of 70-98%  
  Area requirement is 1 sq m |
| DEVATS                | Sedimentation, anaerobic treatment, plant rootzone treatment, oxidation process  | Should be more than 1 KLD, but plants bigger than 1 MLD are also not feasible as would need extensive land. | Horticulture, mopping floors, cooling towers and flushing | 35,000-70,000          | 1,000-2,000             | • Consist of several modules like settler, anaerobic baffle reactor, planted filter bed and a pond.  
  • There’s no need to have all the modules at each site, selection of modules depend on the quality of the water required after treatment  
  • Settler helps in trapping the settleable solids whereas ABR helps in reducing BOD by 80-90%, while PFB helps in trapping the nutrients. Pond takes care of the odour  
  • Minimal running cost, as no electro-mechanical equipment used |
| Ecosanitation Zero discharge toilets | Separation of faecal matter and urine  | Flushing Horticulture Composting | 30000 – 35000 (includes civil work) | 35000 – 40000 (includes salary of the caretaker) | —                     | • Easy to install with no sewerage system requirement  
  • No electrical power supply or motor driven devices required  
  • Hygienic conditions are maintained at the same level as in conventional water borne systems.  
  • Can easily be operated and maintained by the community. |

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| Fixed Film Biofilter Technology (FFBT) | Settling and flow equalisation followed by enhanced natural degradation (biochemical process) | 0.5 KLD to tens of MLD | Horticulture, Car Washing | 25,000-35,000 | 1000-2000 | • Biofilter used may be stones, gravels, sand or PVC filter material whichever provides maximum surface area and is easily available.  
• Enhanced degradation of contaminants takes place in minimum area, since suitable micro-culture is added to the Biofilter cell. |
| Phytorid | Settling followed by plant root zone treatment in specially engineered baffled treatment cells which provides both aerobic and anaerobic treatment | 5 KLD – tens of MLD | Horticulture | 14,000-35,000 | 1,000-2,000 | • Use of chosen wetland plants that are locally available  
• Retention time is between 5-7 days  
• BOD and TSS removal average between 70-90% while faecal coliform is about 85-97% in treatment cells  
• Average nitrogen and phosphorus removal are in the range of 69-90% |