

Comparison of UPS Technologies

| | <u>Static UPS + Standby Diesel</u> | <u>Conventional Direct - Coupled Diesel UPS</u> | <u>Hitzinger Direct - Coupled Diesel UPS</u> |
|---|--|---|--|
| Reliability MTBF hours | 250,000 (Complex design) | 800,000 + (Slip rings) | 1,000,000+ (Brushless) |
| Backup Source | Batteries | KE store | KE store |
| Maintenance Visits | 2 x per year | 2 x per year | 2 x per year |
| Time per visit | 24 hours | 8 hours | 8 hours |
| Major Overhaul period | 5-7 Years | 7 Years | 10 Years |
| Overhaul Downtime | < 1day | up to 1week | < 1day |
| Operating Life | 10-12 Years | 20-25 Years | 20-25 Years |
| Battery Service life | 5-7 Years | N/A | N/A |
| UPS / Battery | Yes | No | No |
| Air Conditioning | | | |
| UPS Installation | Yes | Yes | Yes |
| Diesel Installation | Yes | Yes | Yes |
| Standby Diesel Genset matching | ~ 1.6 x UPS rating | N/A | N/A |
| Engine Pre-heating & Pre-lube for assured reliable "first crank" starting | No | Yes | Yes |
| Diesel Starters | single starter | redundant starters | redundant starters |
| Emergency Diesel Start facility | No | No | Yes |
| Plant room Space Saving | No | Yes | Yes |



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20 Yr Running Cost Comparison of UPS Technologies

| | <u>Static UPS + Standby Diesel</u> | <u>Conventional Direct - Coupled Diesel UPS</u> | <u>Hitzinger Direct - Coupled Diesel UPS</u> |
|---|--|---|--|
| Maximum UPS Rating | 800kVA | 1700kVA | 1800kVA |
| Efficiency | 92.5% | 94% | 96% |
| N+1 Configuration | 6 x 800kVA in // | 4 x 1500kVA in // | 4 x 1500kVA in // |
| 20 Year Efficiency cost based on 5p/kWh | ~ £ 2,250,000 | ~ £ 1,790,000 | ~ £ 1,170,000 |
| 20 Year maintenance cost | £600,000 | £ 800,000 | £ 800,000 |
| 20 Year UPS Overhaul costs | £600,000 | £ 400,000 | £ 100,000 |
| 20-Year Battery Replacement costs | £ 1,080,000 | N/A | N/A |
| 20 Year Air-con Capital & Replacement Cost | £ 150,000 | N/A | N/A |
| Air-con running cost | £ 90,000 | N/A | N/A |
| Total Operating Cost* | £4,770,000 | £2,990,000 | £2,070,000 |

*Based on a 4 MVA Load with N+1 redundancy