

Genset Economics

Fuel cost concerns

Liquid fuel/diesel gensets constitute a significant share of captive power generation or distributed generation in India, with users in almost all consumer segments – industrial, commercial, agricultural or domestic. A Power Line study indicates that almost 40 percent of captive power generation above 1 MW is liquid fuel based. If plants below 1 MW are considered, the percentage contribution of liquid fuel-based power generation units will be even higher.

The widespread use of gensets is owing to the ease in installation, affordable pricing, quick start-up and shutdown, and small space requirements. The less than 1 MW gensets are mainly used in standby mode for back-up during short or long grid outage periods. Genset users in this range are mostly in the agricultural, domestic and commercial categories.

Mid-range gensets of above 1 MW and up to 6 MW could be used either for back-up or as prime power solutions. Large commercial units and small industries are significant users in this range. The higher ranges are mostly used in the prime power mode and are prevalent with the large industrial consumer segments.

While high speed diesel (HSD) is the most commonly used liquid fuel, furnace oil (FO), light diesel oil (LDO), low sulphur heavy stock (LSHS), superior kerosene oil (SKO) and natural gas are also used. Now, use of biofuels and producer gases is also being explored for operation of gensets.

Unlike domestic category oils like automotive diesel or petrol, the prices of which are revised less frequently, the oils mentioned above fall in the industrial fuel oils category. Their prices are revised every fortnight according to the prevailing crude oil prices (see accompanying table on industrial fuel oil prices). These do not include excise duty and sales tax. For example, after adding excise duty, the ex-depot price of FO in Mumbai could be Rs 17,000-18,000 per mt.

In a liquid fuel-based power plant, commonly known as DG set, the typical life-cycle costs are: fuel constituting 75-80 per cent of the total cost, capital expenditure on equipment being 12-15 per cent, and spares and other costs the remaining.

Hence, fuel costs have assumed significance, especially in the past few years with crude prices more than doubling. HSD, the most commonly used fuel in gensets, has the highest unit cost of generation at Rs. 8.46 at Rs. 6.32 per unit; even a dual-fuel option is much higher than the average grid-supplied power at Rs. 4-6 per unit.

With the current trend of increasing state-supplied tariffs at least in the non-industrial segments, the higher limits of tariffs charged by Andhra Pradesh, Kerala and West Bengal have touched Rs 5 per unit. This makes the HFO-based generation cost of Rs 5.51 per unit competitive. While natural gas-, biofuels- and producer gas-based gensets have the potential to make conventional DG sets more economical, today, these fuels are not easily available. It will be some time before they are put to good use. In the meantime, only HSD and HFO are available for small and medium enterprises as well as domestic consumers to fulfill their standby requirements.

While questions on availability and storages are still valid, it is ironical that it is assumed that on the one hand, large tariff hikes would not be acceptable to the existing consumer groups, and on the other, that almost all consumer segments use costly power (produced from their DG sets) at least for some part of the day during peak shortage months. This leads to payment of higher average tariffs than state-supplied power.

Large industrial users not only need continuous supply but also stable supply. They have been using DG sets for their prime power requirements. A survey conducted by power line indicates that the rising cost of liquid fuels has prompted industrial users to look for alternatives. Natural gas- and coal-based plants are the obvious choices depending on the location of the manufacturing units. Manufacturers in the textile, cement and steel industries are keen to either acquire captive coal blocks or get firm linkages from coal India. However as of today, they have no option but costly liquid fuel, which has started affecting profit margins significantly.

The only alternative available currently is to cut costs through energy conservation measures, use of waste heat recovery / cogeneration wherever possible, undertake regular maintenance, and introduce energy-efficient machinery in power generation.

When open access becomes a reality, the cost efficiency of industrial power generation units could improve significantly because of higher availability. In Pune, the Confederation of Indian Industry has initiated pooling of power from all captive power generation units to overcome power shortages. This will not only help alleviate the problem of power cuts faced by the industrial town but also improve the running efficiency of gensets and reduce the payback period.

However, benefits from improved efficiency and cost-cutting can only bring marginal relief as liquid fuel prices continue to increase. Hence, the real alternative is to aggressively increase the overall generation capacity in the country, promote group captive power plants for bringing down tariffs and lay emphasis on developing alternative fuels. While the government has a significant role as an enabler, the private sector can organize itself better to take initiatives in these areas.

Not to forget the rural sector, which could be the main beneficiary of distributed generation with alternative fuels? Government and non-governmental organizations could play a significant role in promoting rural entrepreneurship in these areas through education and project support.

Generation costs of gensets, by fuel

| | HSD | Dual fuel (60% HSD; 40% gas) | HFO | Bio-oil | Gas | Producer gas |
|----------------------------|-------------------|---|------------------|------------------|-----------------|-------------------------|
| Capacity (MW) | 3 | 3 | 8 | 8 | 3 | 1 |
| PLF (%) | 83 | 75 | 81 | 81 | 90 | 87 |
| Generation (MkWh/annum) | 15.3 | 16.0 | 55.1 | 55.1 | 15.7 | 5.65 |
| Generation cost (Rs/kWh) | 7.79 | 5.60 | 4.13 | 3.76 | 3.16 | 3.27* |
| Fuel price | @ Rs 30 /litre | HSD @ Rs 30/litre; Gas @ Rs 12/cu. metres | @Rs 18,000/mt | @Rs 16,500/mt | @Rs 12/litre | - |
| Other costs (Rs/kWh) | 0.67 | 0.72 | 1.38 | 1.38 | 1.09 | - |
| Total cost (Rs/kWh) | 8.46 | 6.32 | 5.51 | 5.14 | 4.25 | 3.27 |

Note: *includes other costs

Source: Compiled from information available from leading manufacturers.

Industrial fuel oil market prices (As on September 30, 2006) (Rs per unit)

| Product | Mumbai | Delhi | Chennai | Kolkata |
|------------------|---------------|--------------|----------------|----------------|
| Furnace oil (mt) | 15,730 | 16,440 | 16,030 | 16,190 |
| LDO (kl) | 22,620 | - | - | - |
| LSHS (mt) | 15,730 | 16,440 | 16,030 | 16,190 |
| Naphtha (mt) | 26,390 | 27,100 | 26,680 | 26,830 |
| SKO (kl) | 33,300 | - | - | - |
| HSD (l) | 39.68 | 32.47 | 35.51 | 34.96 |

Note: Basic price before excise duty and sales tax; mt – metric tonne; - kl – kilolitre, l-litre.

Source: BPCL

Reference Book:

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