### Calculating Generator Reliability

Generators can fail due to:

- Failure to Start (FTS)
- Failure to Run (FTR)
- Failure of Fuel Supply (FFS)

The likelihood of each failure type varies with outage length and fuel supply.

Many Power outages are short duration, but some can last for several days.

When calculating reliability, the distribution of outage durations, and the type of fuel used need to be considered.

### Additional Customer Services

In addition to reliability benefits, backup generators may:

- Allow a facility to switch to an interruptible rate tariff.
- Reduce energy and demand charges.
- In restructured markets generators can sell into wholesale markets.
- Reduce coincident peak charges.

More frequent operations also reduces failure likelihoods.

### Case Studies

- We gathered outage data, cost data, rate tariffs, generator reliability data, and reliability of fuel supply data from a variety of sources.
- We compare the reliability and economic benefits of a backup diesel system with 36 hours of on-site fuel and a natural gas system installed in Florida, Texas, and New Jersey, to provide backup power and grid services to a supermarket.

### Main Findings

- Due to lower rates of fuel supply failure during long duration outages, natural gas generators can provide higher reliability than diesel generators.
- Generators which provide grid services can significantly reduce net costs, or even provide net positive revenues.
- Due to lower capital costs, diesel generators tend to be cheaper than natural gas generators, even after accounting for the lower fuel costs of natural gas.
- Differences between fuel types are relatively modest. Additional considerations may determine investment choice.