Organizations concerned with electric reliability and backup power want to better understand the tradeoffs between natural gas and diesel. The Department of Defense, in order to make military bases as reliable and resilient as possible, commissioned the Massachusetts Institute of Technology to do an in-depth study of natural gas versus diesel generation. The study concluded that natural gas is substantially more reliable than diesel across all dimensions from fuel delivery to generator uptime. These conclusions were reinforced by a California study looking into the aftermath of an earthquake.

The following quote is from a study performed by the National Renewable Energy Lab, part of the US Department of Energy. “*The reliability that’s inherently built into the natural gas pipeline is driving regional acceptance for businesses to choose natural gas backup generators. Because natural gas is delivered by underground pipelines, not by over-the-road diesel trucks to diesel storage tanks kept on-site, it’s less likely to be compromised during major disasters that result in power outages”*. Many major brands such as Perdue, now require their refrigerated warehouse suppliers to have natural gas backup generation and no longer accept diesel because of the increase in severe weather events significantly compromising the ability to deliver diesel fuel. Long outages often coincide with abnormal conditions such as extreme weather events, which can close roads and impede normal transportation. Long outages also often affect an entire region, which can lead to increased diesel demand and regional diesel shortages. During Hurricane Katrina, for example, fuel intended to resupply commercial generators was redirected to support rescue efforts. For diesel generators, fuel supply can pose a significant risk to generators with limited storage in the event of a long outage. 14% of hospitals that experienced power outages during Hurricane Sandy also experienced diesel generator fuel shortages.

Unlike diesel, natural gas is supplied through a network of pipelines. Natural gas benefits from not requiring resupply shipments. The pipeline is a widely interconnected network, basically a mesh very similar to the internet. If there is a problem with a feeder in one area, that feeder can immediately be replaced by another interconnected line. According to the MIT study, even a failure of half of the compressors, the distribution network could still run unattended. “*Natural gas has a history of reliability. Because gas lines run well underground, they are rarely interrupted by anything at all. Barring the very uncommon city or utility maintenance, gas lines remain unaffected by the majority of goings on. Its low maintenance needs and the strength of its delivery system plays an incredibly useful role in enabling its acceptance as a backup power fuel source. As diesel fuel goes, with the constant need to tend to the fuel and storage system, many engineers and contractors are starting to specify natural gas generators.”* Unlike other fuel sources, “*your gas service is in no way affected by outages that are common to storms and other natural or man-made incidents.”*

*“Natural gas has the most reliable, accessible and resilient supply network, around the clock and across the globe. Natural gas is available when and where other sources of energy are not.”*

Generator Reliability:

Diesel generators and their associated fuel require substantial and continuous monitoring and maintenance. Fuel cannot be stored for long periods of time and must be used or replaced frequently because it begins to oxidize, absorb water and form sludge. Similar fouling issues also occur inside the generator. Most backup generator manufacturers recommend that system be run several hours each week in order to keep the system available in case of need. This is expensive and dirty. The electricity generated by diesel cannot be used for demand response or other financial transactions (2009 EPA Regulation), so the only reason the generator is operating at very approximately 4 to 5 times the cost of grid supplied electricity is to maintain the generator and its fuel. Failure to abide by these recommendations can have serious implications. During Superstorm Sandy, 63% of the diesel back-up generator in NY failed to start and operate.

The MIT, National Renewable Energy Laboratory and all other studies have concluded that natural gas generation has the highest reliability both for fuel supply and the generator system. A natural gas generator is clearly a superior choice compared to diesel.