Microsoft

Fuel safety and sustainability are core to continuous delivery of the Microsoft cloud

Our customers use the cloud for mission-critical operations, such as operating transportation systems, connecting first responders, and supporting healthcare systems. To support continuous delivery of the Microsoft cloud, datacenters contain large banks of batteries that provide energy to the datacenter if there is a short-term disruption in the power grid. For an extended disruption, diesel-powered generators provide backup power.

Energy is vital to the operation of a datacenter, so planning for disruptions to the energy grid is an important focus for the design and operations of our facilities. Safe storage and handling of diesel are paramount, and Microsoft continues to explore innovative alternative fuel types.

Fuel handling

Fuel to operate the generators is stored on site, with enough fuel to run the generators for up to 48 hours. Multiple safety measures are taken to ensure the safe storage of diesel fuel, including compliance with all regulations for fuel storage and requirements for permits issued by local and regional authorities. The measures we use for fuel storage include:

- **Fuel storage is decentralized, with one fuel tank per generator.**
- **Fuel is stored in double-walled tanks**
- **Each tank contains leak detectors installed between the tank walls**

The fire risk from diesel fuel is low as it does not easily vaporize. Diesel is more dense, less volatile, and less flammable than gasoline in comparison. To ignite diesel, it has to be compressed in a cylinder to a very high pressure and temperature. Even with this low fire risk, we maintain a fire response plan with local fire departments and safety teams that includes all operations on our datacenter sites, including diesel fuel storage.

Generator operations

While Microsoft is prepared for extended grid disruptions and obtains permits for the worst-case scenario, extended disruptions are very rare. In reality, our generators operate minimally – less than three hours per year at full or partial load – only to ensure the generators proper function and availability.

Innovation

Microsoft is constantly innovating to reduce our reliance on diesel fuel. At our datacenters in Sweden, we are using Preem Evolution Diesel+ to power our generators. Preem Evolution Diesel+ is HVO50 fuel and contains at least 50 percent renewable raw material, which provides an almost equivalent reduction in net carbon dioxide emissions compared with standard fossil diesel. Microsoft is also experimenting with hydrogen-fueled backup generators and all-battery backup for extended grid disruptions.

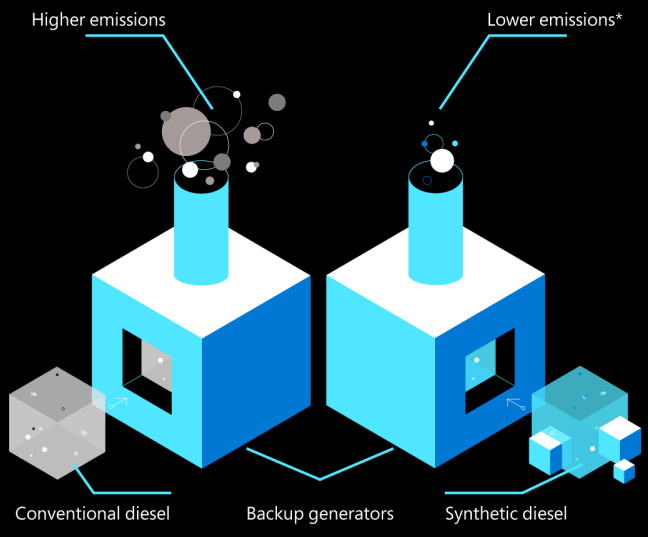
Synthetic diesel has lower lifetime carbon emissions

Approaching carbon neutral

Synthetic diesel is close to carbon neutral, emitting little more carbon than is already extracted in the production of the base material. Synthetic diesel is sourced from biomass, like paper and pulp residue, and has lower lifetime carbon emissions compared to current backup generators.

Same generator, cleaner fuel

As a drop-in replacement for diesel, synthetic diesel doesn't require any alterations or modifications in the design of the generators.



**As measured across entire lifecycle of fuel production*

Learn more about our sustainability programs and climate goals across the areas of water, waste, carbon and ecosystems.