

Optimizing Diesel Generators to Reduce Emissions

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The climate crisis means that all organizations are under significant pressure to comply with environmental regulations and achieve corporate sustainability goals.

Anything that uses fossil fuels will, rightly, be subject to increased scrutiny to see how its emissions can be reduced.

The diesel generator is in this category, as it emits carbon dioxide (CO₂) and other gases. But it's proven technology that delivers reliable, high-performance emergency backup power. A generator starts up quickly, in 10 seconds or less, and has a well-established fuel supply infrastructure.



Energy is everything. It's the lifeblood of critical systems, from life support machines to financial institutions. Without energy, everything stops. That's why having a robust and reliable backup power solution is crucial to keeping your business running.

Diesel generators are the backbone of resilient energy solutions. So how can their emissions be minimized to reduce their environmental impact?

Key Considerations When Selecting a Generator

Once the application for the generator has been understood and the requirements for how much power is needed, a good next step is to review regional regulations.

For North America, installations are regulated by the US EPA. The EPA Tier 4 requirements have made good progress in reducing emissions, and pockets of specific air quality management districts (AQMD) with stricter regulations are also emerging. This includes California, Virginia, and other areas of the East Coast. **Understanding these local regulations is key to ensuring your energy solution is not only compliant but resilient.**

In the EU, similar emissions requirements, including Stage V, apply. The Medium Combustion Plant Directive (MCPD) aims to reduce harmful emissions like NOx from generators and other mid-size equipment (rated between 1 MWth and 50 MWth). Individual countries adapt this directive to their local needs.

Customers increasingly seek not just compliance but excellence, choosing the best available technologies to go beyond what legislation demands. For example, some add after-treatment systems to further reduce generator emissions. These efforts align with a commitment to sustainable operations while ensuring critical systems remain powered.



HVO: A Renewable Fuel

One of the biggest opportunities to reduce generator emissions is by switching from fossil diesel to renewable fuel. In particular, hydrotreated vegetable oil (HVO), also known as renewable diesel, provides an effective alternative to diesel and can help reduce overall greenhouse gas emissions.

HVO, often made from waste products like used cooking oils and animal fats, can reduce the lifecycle carbon emissions of the fuel used by up to 90%. It requires no modifications to existing infrastructure or engines, offering a seamless transition to greener operations.

For example, a 1000-kilowatt generator running 100 hours annually on fossil diesel emits CO₂ equivalent to 16 cars per year. Switching to HVO brings that down to the equivalent of fewer than two cars. This alternative fuel option doesn't compromise generator performance, ensuring that **your power stays reliable and your business keeps running.**

Companies like Rehlko are at the forefront of integrating renewable fuels into their power systems, helping clients achieve both sustainability and reliability in their operations.

Other Technologies

During generator development, manufacturers balance emission reductions with performance. In-cylinder technologies such as EGR (exhaust gas recirculation) and combustion optimization improve efficiency while maintaining output.

When emissions standards are more stringent, additional systems like Selective Catalytic Reduction (SCR) and Diesel Exhaust Fluid (DEF) may be required to reduce NOx emissions to negligible levels. Although these systems involve additional costs, they ensure compliance and sustainability without sacrificing reliability.

Optimizing Maintenance Schedules

Generators for emergency standby power spend most of their life idle, ready to spring into action during an outage. Maintenance is critical to ensure reliability, traditionally requiring periodic test runs at load to prevent issues like wet stacking.

Recent advancements in maintenance protocols now allow generators to operate with no-load testing, significantly reducing annual emissions. These sustainable maintenance practices can lower operational testing lifecycle emissions by up to 70% annually while preserving readiness. **It's another step toward making power solutions more sustainable while keeping businesses running.**



Conclusions

Reliable backup power is more than a utility; it's peace of mind. It's the confidence that, no matter what happens to the mains supply, your systems will stay operational, and your business will keep running.

By leveraging renewable fuels like HVO, adopting advanced technologies, and implementing sustainable maintenance protocols, diesel generators can achieve significant emission reductions without compromising performance or reliability.

Energy resilience means being prepared for anything, ensuring your operations never skip a beat.