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Sustainability Meets *Reliability*

Our climate crisis has resulted in urgent demand for more sustainable mission-critical power technologies.

To balance environmental impact against the need for mission-critical power, the doughnut economics model is useful – the concept shows that we need to use enough resources to provide the basics for all people, without causing damage to nature and our planet.

For mission-critical power, diesel generators are a proven solution, and the most popular option. They offer flexible outputs across a broad range of power nodes and can be accurately sized within a small footprint. Diesel provides an efficient and readily available fuel that can be stored safely on-site and works well in most climates. Additionally, most generator suppliers offer well-established maintenance and spares support, giving end-users long-term peace of mind.

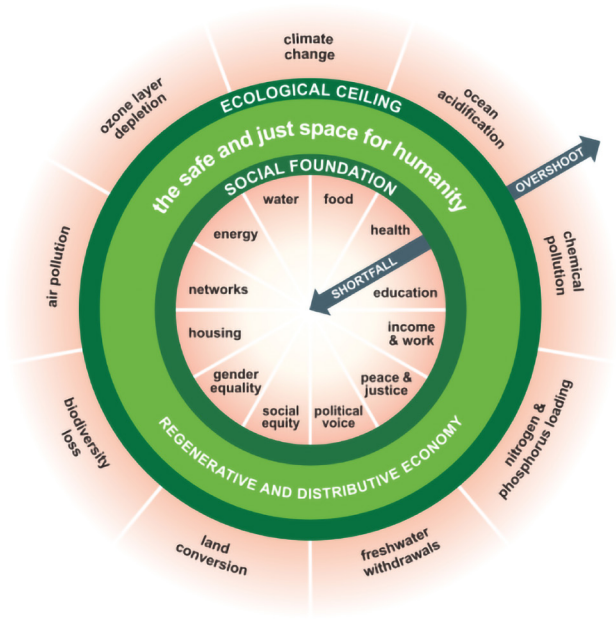


Figure 1: The Doughnut of social and planetary boundaries.

Credit: Kate Raworth and Christian Guthier. CC-BY-SA 4.0.
Citation: Raworth, K. (2017), Doughnut Economics: seven ways to think like a 21st century economist. (London: Penguin Random House)

But diesel generators do emit greenhouse gases and other pollutants. Switching entirely to another backup power source is unrealistic in the short term, and for some applications, diesel gensets are the only practical option.

Therefore, generator manufacturers have invested heavily in reducing emissions. The focus has been on the engine, with environmental standards such as EPA Tier 4 in the US and Stage V in Europe pushing engineers to reduce nitrogen oxides (NOx) and particulate matter levels.

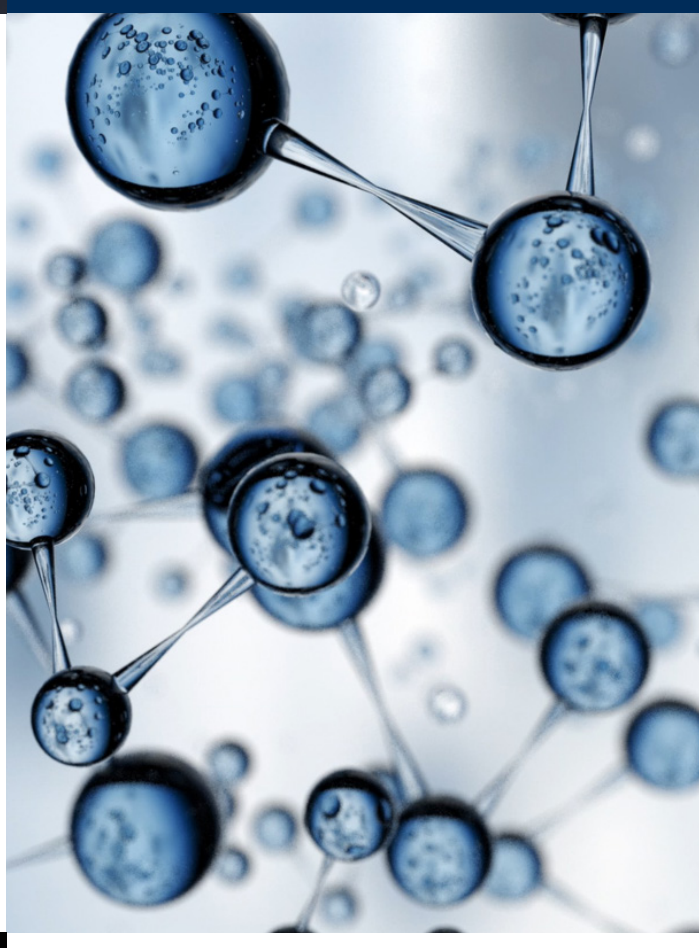
Emissions reduction technologies have cut the amount of pollution created, via in-cylinder reductions, and after-treatment technologies. Engineers have also used advanced computer-aided tools and computational fluid dynamics to optimize designs.

For example, high-pressure common rail fuel injection systems improve combustion efficiency, while exhaust gas recirculation (EGR) is commonly deployed to reduce NOx, by recycling exhaust gases back into the combustion chamber.

Significant advances have been made in after-treatment. For example, diesel oxidation catalysts break down pollutants in exhaust gases into less harmful components. Other technologies such as diesel particulate filters and selective catalytic reduction can also cut contaminants.

Another advance is the development of renewable fuels. HVO, for example, is a liquid fuel that is synthesized from waste vegetable oils or animal fats. Unlike first-generation biodiesels, HVO does not impact crop resources, and it can translate into up to 90% fewer greenhouse gas emissions than diesel.

HVO is similar in grade and quality to traditional diesel, and so can be used as a drop-in replacement, or as a blend with diesel. It is resilient in cold weather, safe in hot climates, and can be stored for several years.



The pursuit of sustainable solutions for mission-critical power is driving the exploration of emerging technologies, such as batteries and fuel cells. Energy is everything. It's the lifeblood of life support machines and the most valuable currency in any bank. Without energy, everything stops. Batteries have seen significant advancements in recent years, achieving efficiencies nearing 90%. These improvements position them as a viable option for certain applications, and ongoing collaborations between industry leaders and technology developers continue to refine their potential.

However, mission-critical applications would require many large battery packs – presenting cost, complexity, and footprint challenges. And batteries contain high levels of rare metals, which are becoming difficult and expensive to acquire.

Fuel cells have a lower footprint compared to batteries, and the possibility of quick refuelling with pressurized or liquid hydrogen. But they can only really be considered 'green' if the hydrogen used to power them comes from renewables, nuclear, or biomass. Achieving this fully is many years away from being available at scale, and the hydrogen produced is more challenging to store in bulk.

Rehlko is investing heavily in mission-critical power, helping end-users to reduce their emissions.

Cleaner power will be achieved via a transition period – it will not happen immediately. There is no 'one size fits all' solution, with multiple options enabling each customer to choose what's exactly right for them. Throughout this transition, Rehlko remains committed to providing reliable solutions that not only reduce emissions but also keep your business running – ensuring uninterrupted operations no matter the challenges.

For more information on the transition to more sustainable backup power, please visit: www.powersystems.rehlko.com/sustainable-future.