

CAT[®] HYBRID MICROGRID SOLUTIONS

Integrating Renewable Energy



Together, let's power a better world.

For 90 years, remote industry sites, villages and islands have depended on the power of Caterpillar for reliable energy, grid backup and sustainable, continuous power.

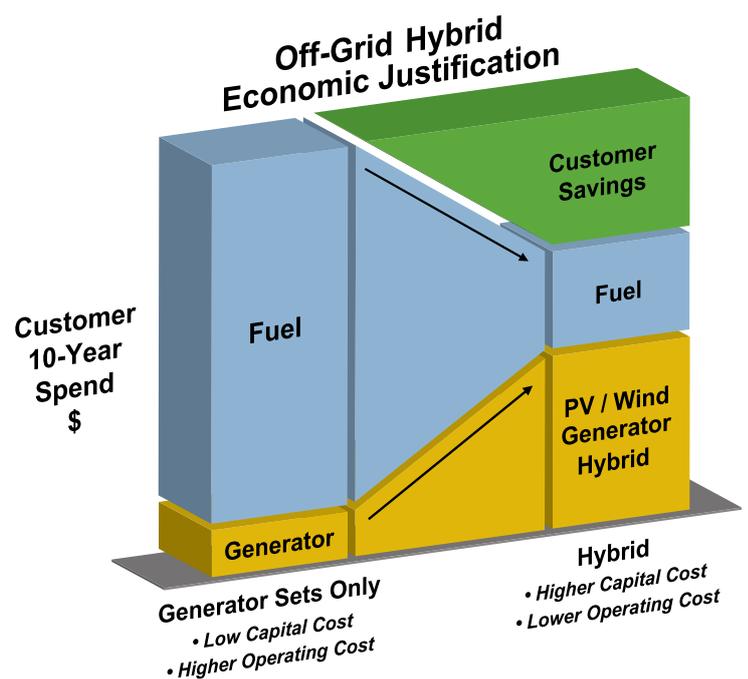
Today, Caterpillar is continuing to develop innovative energy solutions that offer significantly lower operating costs through the displacement of conventional fuels, resulting in lower electricity costs for industries, businesses and communities.

CAT® HYBRID MICROGRID SOLUTIONS

Caterpillar is at the forefront of the energy transition, integrating renewable power with smart energy storage and conventional diesel or gas fuelled power generation to keep your industries producing, communities developing and people connected.

As global fuel prices continue to fluctuate and renewable technologies become increasingly competitive and sophisticated, Cat Hybrid Microgrid Solutions are designed to significantly:

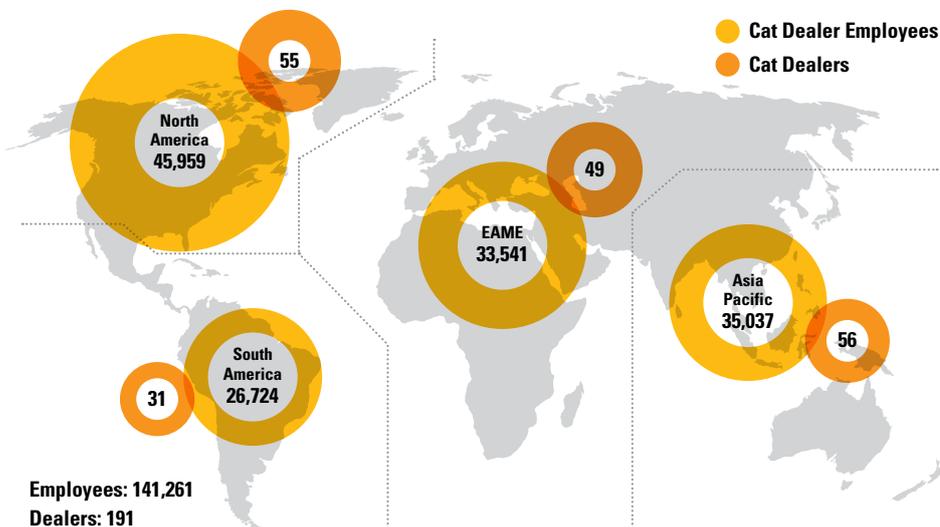
- Reduce your fuel expenses
- Decrease harmful emissions
- Lower your total cost of ownership (TCO)
- Achieve favourable payback periods.





Caterpillar offers a full range of Cat Hybrid Microgrid Solutions from 10 kW – 100 MW.

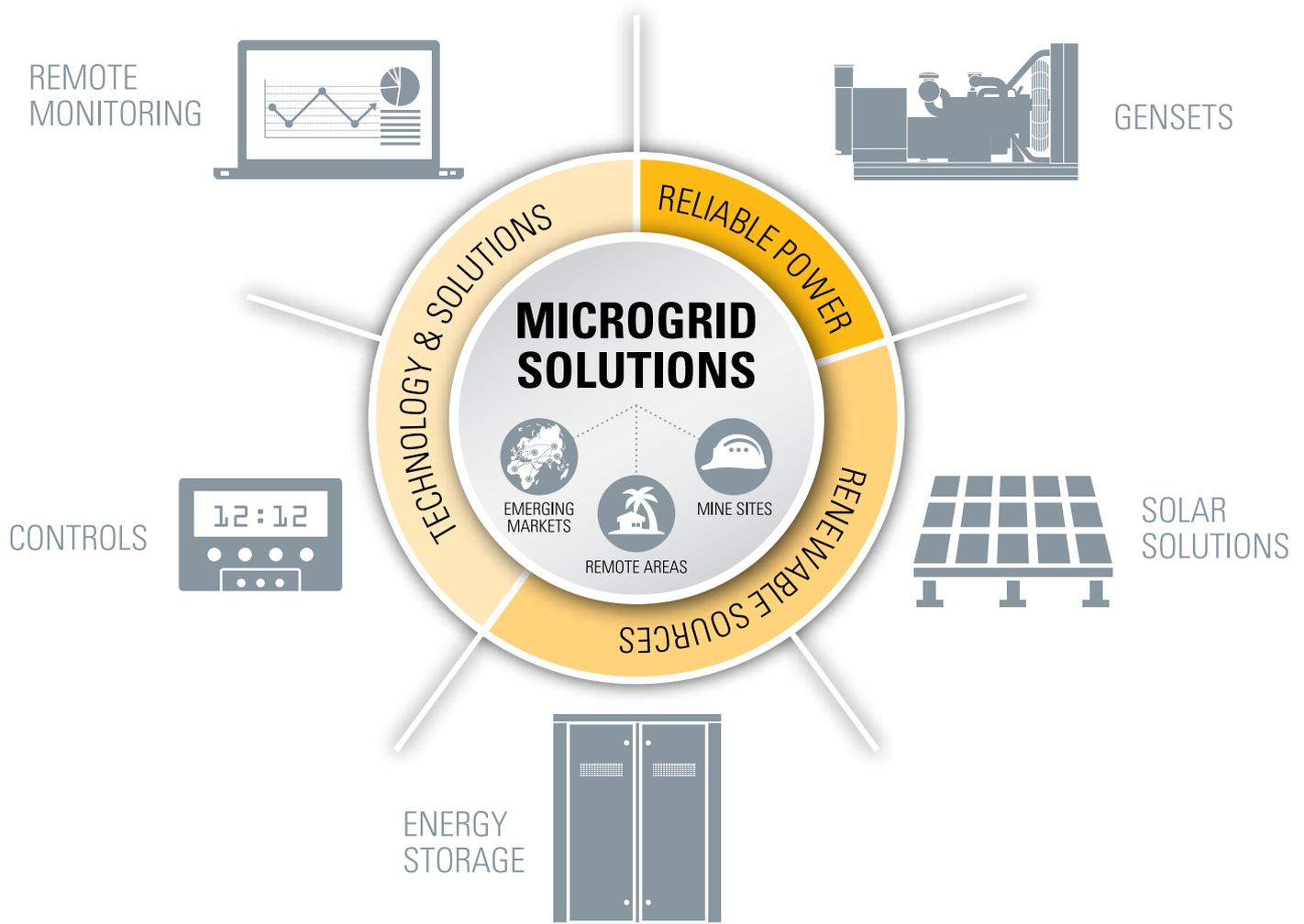
Fully supported by your local Cat dealer, we are with you at every phase of your project. From the delivery of your complete turnkey or design-to-order solution with maximised renewable penetration through to product upgrades, financing services, warranty, service agreements and parts availability.



Powering sustainable progress. Everywhere. All the time.

THE CAT HYBRID MICROGRID SOLUTION PROVIDES:

- Increased energy efficiency with no reliance on the grid and optimal total cost of ownership.
- Efficient power that can be produced where and when it is needed without transmission lines and transformer losses.
- High performance, scalable system designed and built using standardised building blocks that are easy and quick to install even in challenging environments.





CAT HYBRID MICROGRID COMPONENTS



Cat Advanced Solar Solution

Powered by advanced thin-film solar modules that are setting the industry benchmark with an improved performance over conventional silicon solar panels, the Cat solar solution offers:

- *Superior Performance.* Reliable and predictable energy in all climates and applications particularly in high temperatures, high humidity, extreme desert and coastal environments where it generates more energy than multi-crystalline silicon solar modules.
- *Robust Modules.* Modules are independently tested to pass accelerated life and stress tests beyond industry standards (including Thresher, IEC, ISO, UL, CSI, MCS, CEC and other international standards) and come with warranty protection.
- *Scalable, Compatible and Easy to Install.* A fully scalable, pre-engineered solar solution that is compatible, quick and easy to install.



Controls: Cat Microgrid Master Controller (MMC)

The MMC manages every source in the entire Cat Hybrid Microgrid Solution, including main-grid when connected, keeping loads energized all the time, with high quality power at the lowest cost.



Energy Storage Paired with Cat Bi-directional Power (BDP) Module

The Cat BDP module offers state-of-the-art energy conversion and storage technologies. This includes the robust Cat power electronics system, renowned for its operational capabilities in harsh environments, as demonstrated by its utilisation in the Cat D7E Track-Type Tractor.

World class power electronic Insulated Gate Bipolar Transistors (IGBTs) seamlessly control the charge and discharge of the energy storage providing another tried and tested Caterpillar technology that is fully operational in the field with support ranging from Cat parts availability to service tools.

A range of energy storage technologies are available from traditional lead-acid or lithium ion, to revolutionary rechargeable metal-air (Zinc-air), which provides the most economical electricity storage and includes integrated controls and monitoring at the cell level. A fully flexible offering enables a combination of these technologies, depending on your application.



Flexible Fuel Options

Providing all the reliability and durability you need, Caterpillar offers the industry's widest range of diesel, gas and dual fuelled generator sets; automatic transfer switches, uninterruptible power systems and switchgear for seamless integration. From configuration to installation, operation and aftercare, your local Cat dealer is committed to your success, to ensure the Cat generator set you buy today is the one you trust years from now.

Where there's a
need for power,
there's Caterpillar.





Telecoms

In a world that demands increased connectivity, Caterpillar has created products and services that support the world's infrastructure from small telecommunication towers to exchange centres.

Offering affordable energy storage, Cat Hybrid Microgrid Solutions also come with remote 24/7 monitoring capability at cell level providing system optimization, early issue detection and diagnosis to ensure the continued smooth operation of your telecoms' site.

Site installations are modular and designed for scalability with solar and wind solutions that offer superior performance and cost effective energy storage units with significantly reduced theft value.



Villages, Islands and Rural Communities

Today, more than 1.3 billion people lack access to electricity and billions more need a reliable grid for basic human needs including access to clean water, health care, lighting and education.

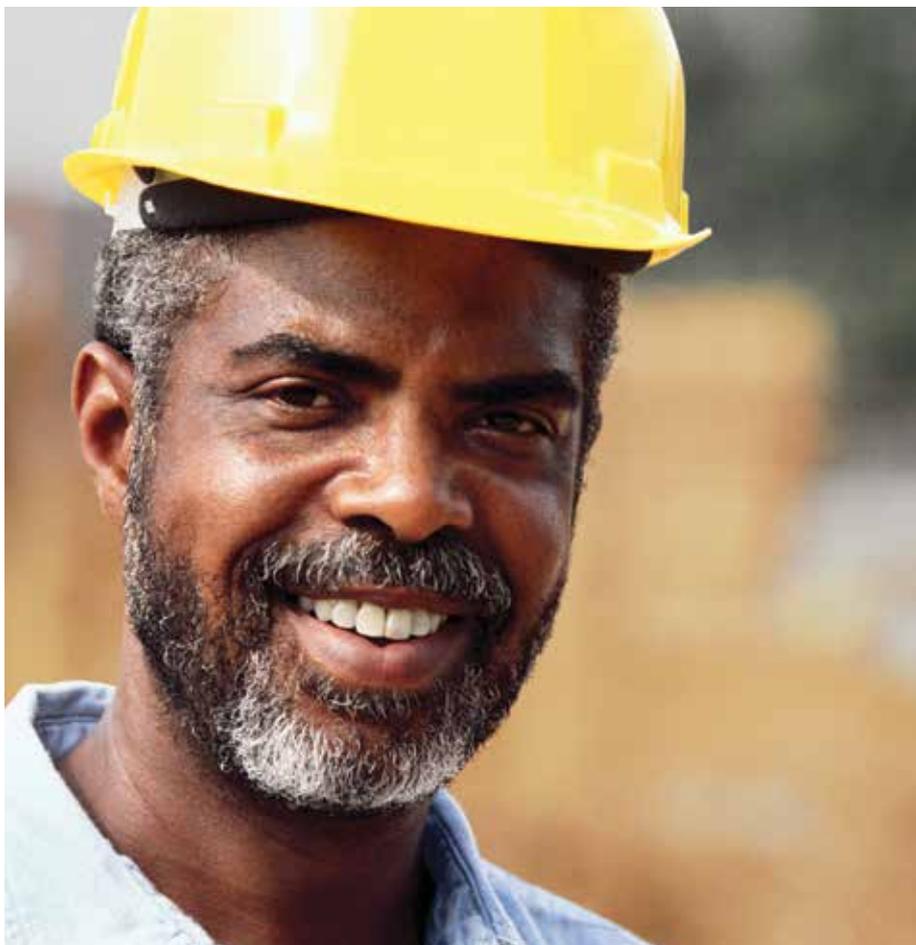
Cat Hybrid Microgrids are designed to power a better world. They provide reliable power where it is needed and maximize fuel savings through the highest possible renewable penetration with reduced impact to the environment.



Mining

From accessing a site, building it, mining it and growing it, the need for reliable onsite power is essential. Cat Hybrid Microgrid Solutions offer reliable off-grid power that is fully customised and scalable to meet your site requirements today and for future expansions.

With renewable technology and state-of-the-art energy storage displacing fuel and logistics costs, Cat Hybrid Microgrid Solutions offer affordable power designed to enable improved productivity across all site operations.



A REPUTATION OF TRUST

Caterpillar believes in the success of sustainable progress. We continue to develop solutions to power a better world, while minimising economic, social and environmental costs.

Your local Cat dealer is committed to your success, offering a suite of support services. From expert consultation and design, to ensuring optimised efficiency and ROI, to installation, commissioning, warranty, parts and Cat financing solutions – we're built to keep the power on.

Contact your local Cat dealer today.

LET'S DO THE WORK.™