

CAT Natural Gas Power Solutions for the Israeli Market

CAT TEAM

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The Caterpillar logo, featuring the word "CATERPILLAR" in a bold, sans-serif font. A yellow triangle is positioned below the letter "A".

CATERPILLAR®

Be Safe

Every Employee ... Safely Home ... Every Day

be•present

SEEK + SHARE + LISTEN + CHAMPION

Win the Right Way

VALUES + ETHICS + COMPLIANCE

— Our reputation is built not only on what we achieve, but how we achieve it

Caterpillar Inc.: Proudly Serving Customers Since 1925



Construction Industries

Caterpillar Inc. Overview:

- Fortune 100 Company
- Dow Jones 30 Company
- Top 100 Global Brands
- 3 Million+ Cat Products Working Worldwide



Energy & Transportation

World's Leading Manufacturer:

- Construction and mining equipment
- Diesel and natural gas engines
- Industrial gas turbines
- Diesel-electric locomotives



Resource Industries



Caterpillar Electric Power Division



CULTURE

Passion

.....

Simplicity & Agility

.....

Win-Win Relationships

.....

Operational Excellence

.....

Safety



VALUED PRODUCTS & SERVICES

Power Up / Cost Down

.....

Customer Value Focused

.....

Parts & Services

.....

Application Specific
Solution



CUSTOMER FOCUS

Ease of Doing Business

.....

Deep Expertise

.....

Meet Commitments

.....

Make Customers
Successful



GROWTH

Aftermarket

.....

Critical Power

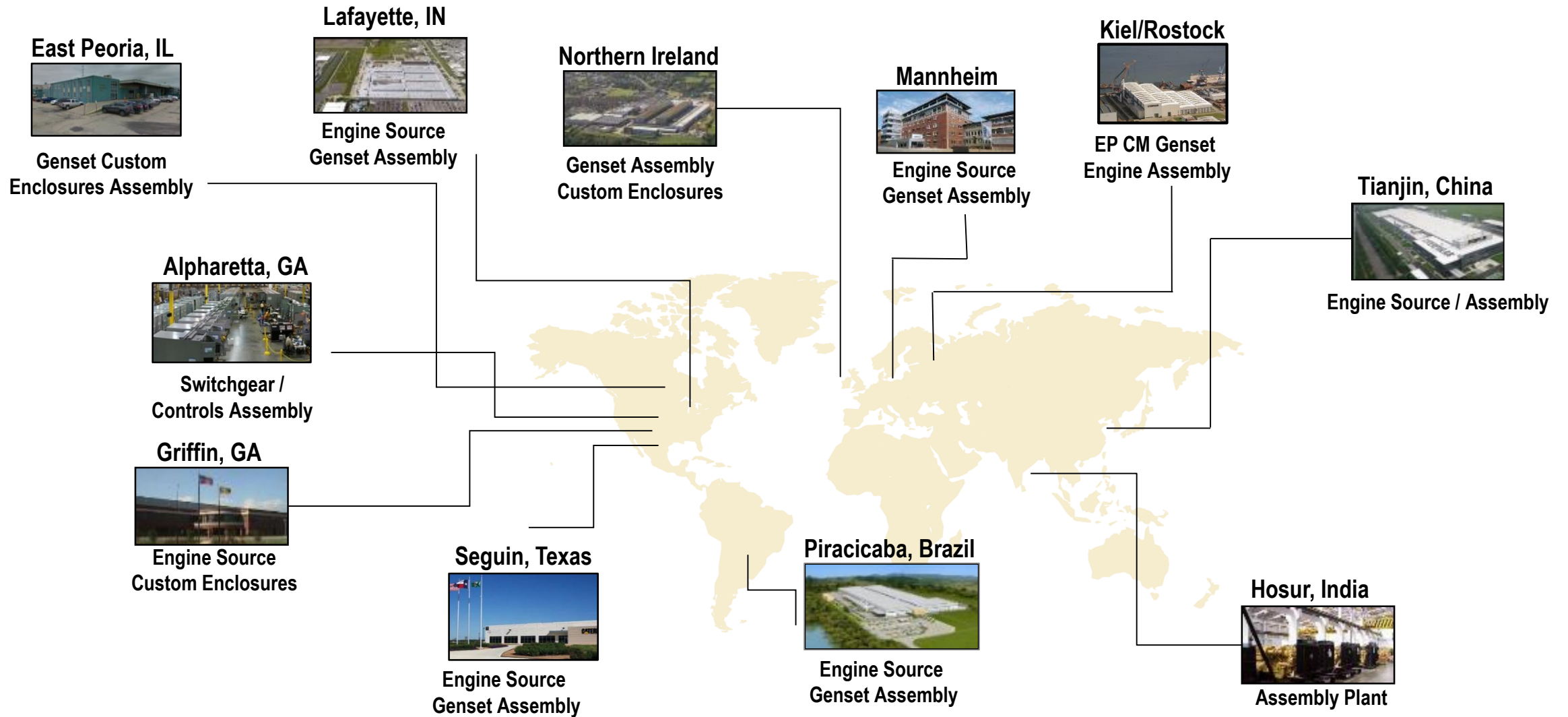
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Essential Power on Demand

.....

Rental

CAT Electric Power Global Operations



Caterpillar Electric Power Product Portfolio

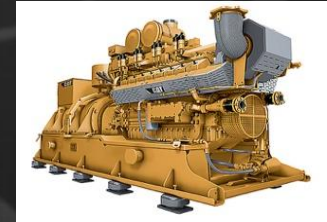
DIESEL GENSETS

20kW – 14.7MW



GAS GENSETS

25kW – 14MW



RENTAL GENSETS

20kW – 2MW



Caterpillar Reciprocating Engines

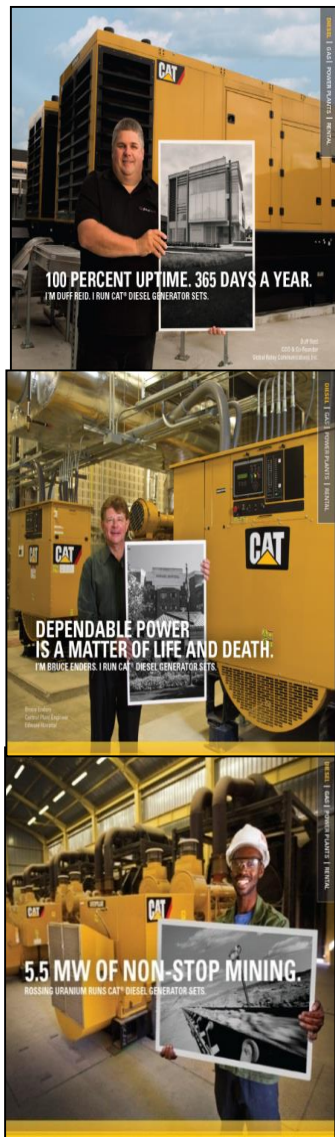
80+ years serving customers

500,000+ installations > 300 kW

1 million+ installations < 300 kW

Over 1,300GW installed worldwide

Applications & Clients



CLIENTS

- Data Centers
- Utilities
- Municipalities
- Telecommunications
- Hospitals
- Agriculture, greenhouses
- Commercial
- Industry
- Mining
- Construction
- Landfills
- Biofuel - Hybrid

APPLICATIONS

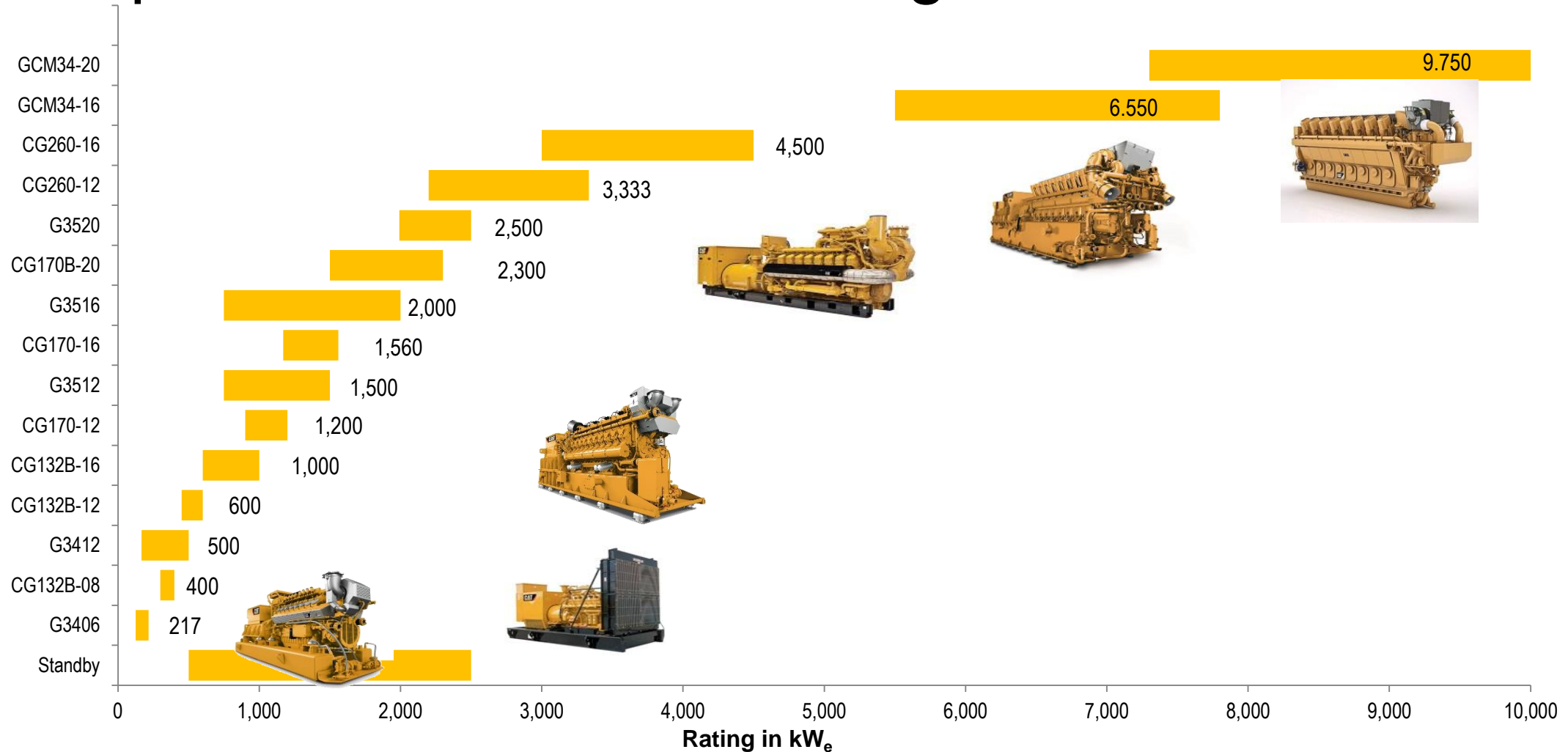
Emergency Standby
Prime / Continuous
Mission Critical
CHP

Fixed Installations
Temporary Power

Flexible Fuel

Caterpillar EP Gas Power Range & Solutions

Covering a range up to 10 MW
Available for various gas types



Generator Set output may vary based upon site conditions and fuel type.

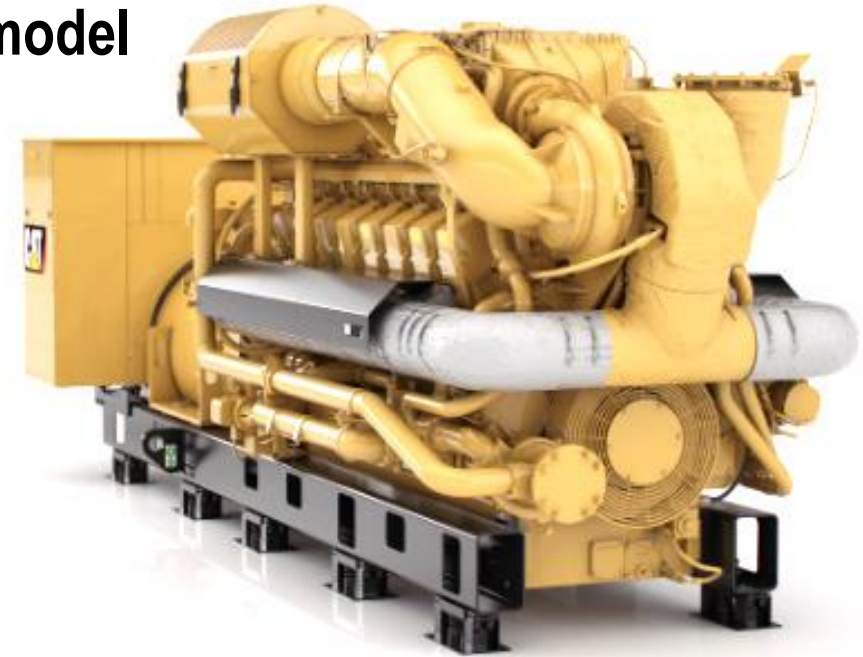
CATERPILLAR®

G3500H delivers Lowest Lifecycle Costs

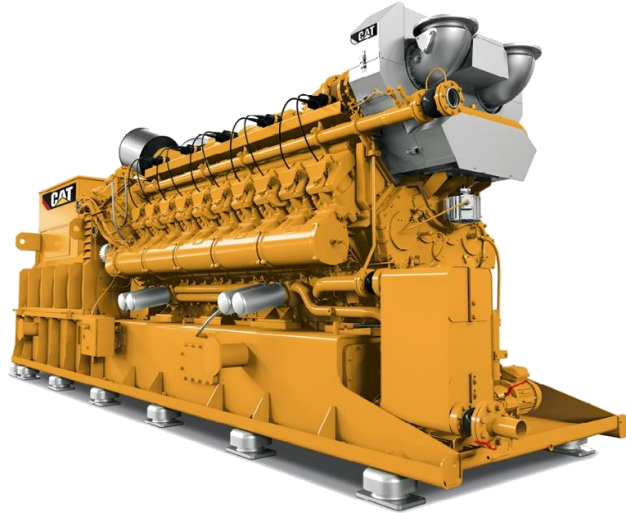
G3500H	V12, V16, V20
Power range	1,500 – 2,500 kWe
Electrical efficiency	44.5% (HR) – 45.3% (HE)
Thermal efficiency	43.1% (HR) – 41.0% (HE)
First service interval	2,000 Oh
Major overhaul	80,000 Oh
Useable gases	Natural Gas

- Top tier electrical efficiency
- Lowest maintenance and overhaul costs
- Low oil consumption
- Extended service intervals
- High Efficiency version optimized for fuel efficiency
- High Response version optimized for altitude and ambient capability and transient response

**20% Reduction of Maintenance
& Overhaul Costs Compared to
previous model**



CG170B Low Lifecycle Cost for variety of applications



CG 170B Data

Power	1.380 – 2.300 kW_{el}
Electr. Efficiency	45.0% (NG) / 43.6% (BG)
Overall Efficiency NG / BG	>87% / >86%
General Overhaul NG / BG	80,000 Oh / 64,000 Oh
Gases	Natural Gas and Biogas
Available Frequency	50Hz



High Efficiency



High Reliability



High Customer Profitability

✓ High efficiency, low oil consumption ~ 0,15g/kWh and up to 80,000 hours until major



Varieties of Gases and Applications

✓ Available for different applications like natural gas, biogas, wellhead- and propane gas operation



High Power Density

✓ More power in smaller footprint

CG260 - Highest Availability and Reliability

3,076 MW_e with 753 Gensets Worldwide



CG260-12, CG260-16

Power	2,530- 4,500 kW _{el}
Electr. Efficiency	42.2% - 44.6%
Therm. Efficiency	38.6% - 42.7%
Service	4,000 Oh (natural gas)
General Overhaul	80,000 Oh (natural gas)
Gases	Natural Gas, Biogas, Landfill, Coal Mine Gas, Sewage, Coke Oven, Syngas, Propane
Frequencies	50Hz, 60Hz



High Availability

Long maintenance intervals and general overhaul only after 80,000 Oh allow an operation of 10 years without general overhaul



High Reliability

Anti-knock-control and cylinder balancing protect the engine from overload and ensure a reliable operation



Lowest Lube Oil Consumption

Improved components reduce lube oil consumption and save up to 4000 l compared to other engines



High Profitability

Miller valve timing and optimized compression ratios ensure high efficiency and low fuels costs – more profit for your plant



Varieties Of Gases And Gas Qualities

Highly efficient operation with every type of gas due to adapted pistons, gas-mixer and latest control systems



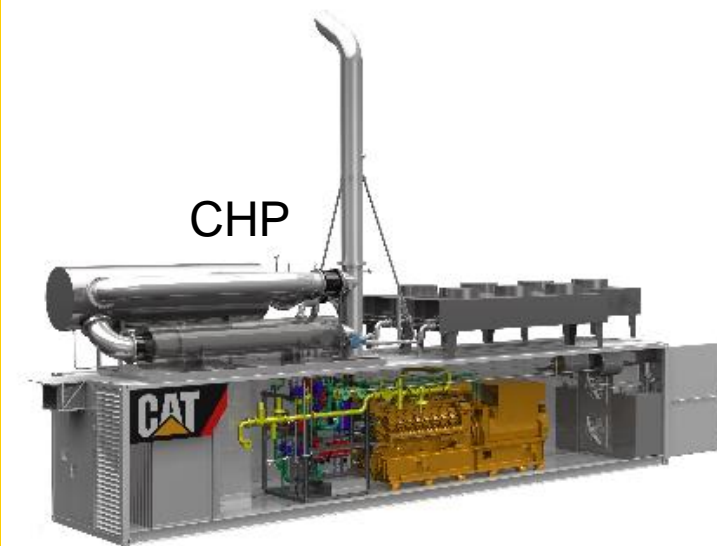
High Performance Under Every Condition

State-of-the-art turbocharger A140 with Wastegate ensures full performance even under high temperatures and higher altitudes

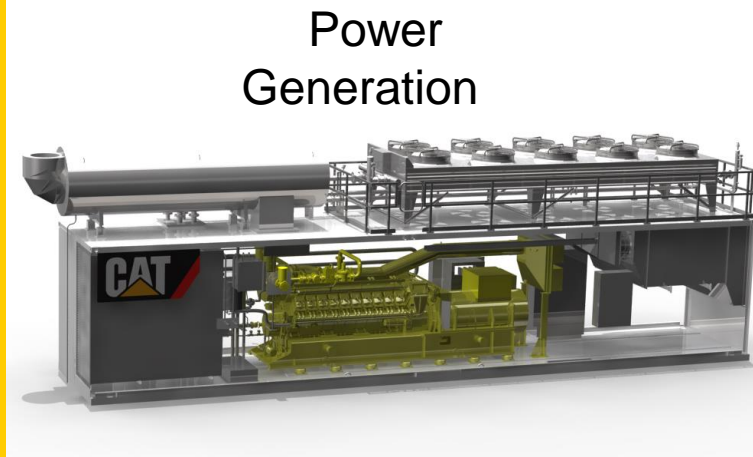


Caterpillar Solutions

- Decades of Experience
- One source for engine, generator and enclosure
- In house engineering
- Genset assembly
- Container / Enclosure packaging
- Fully tested solution before site testing
- Dedicated witness test facilities
- Quality certifications

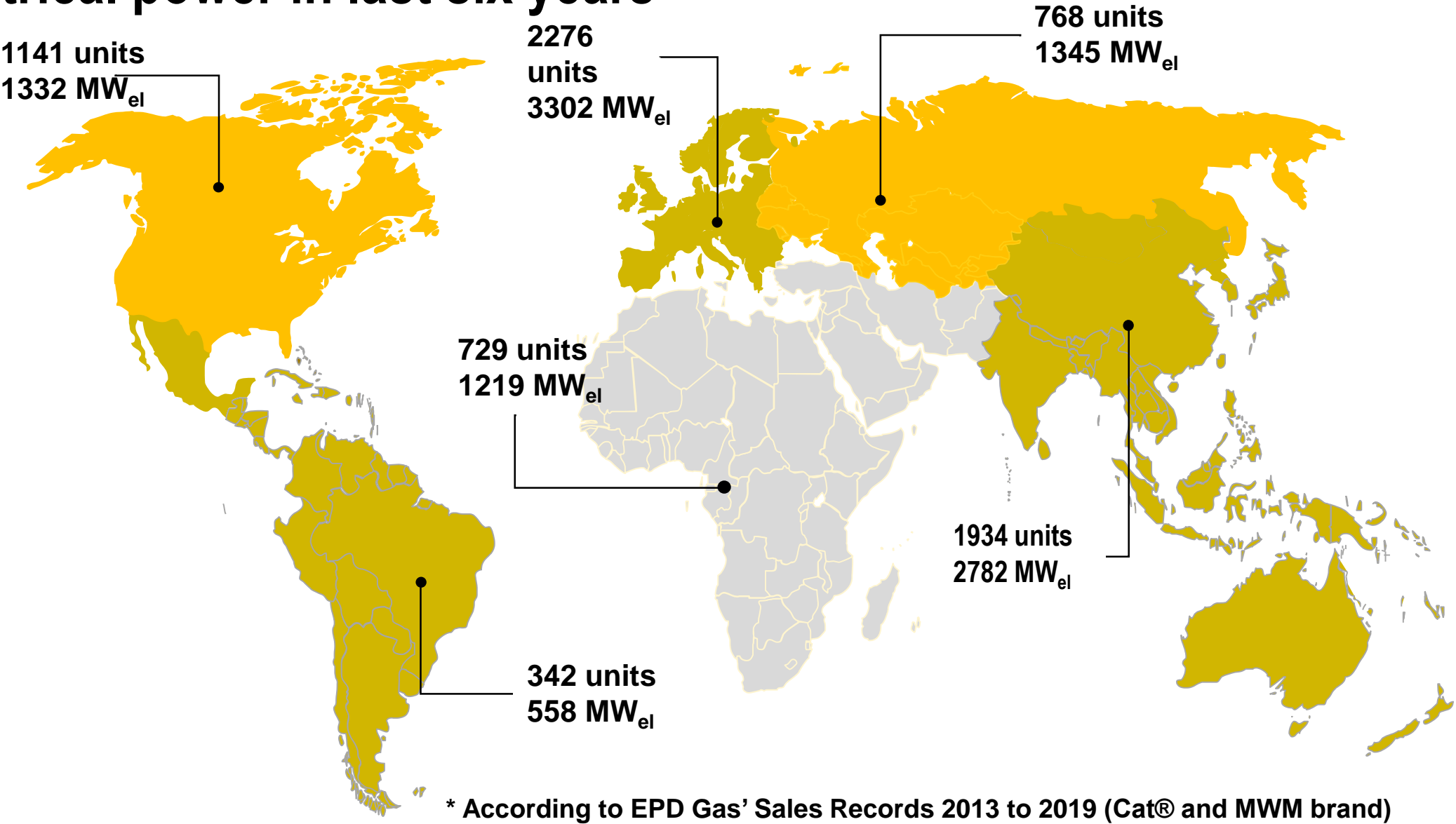


CHP



Power
Generation

Caterpillar delivered over 7,000 gas gensets with over 10,000MW of electrical power in last six years



* According to EPD Gas' Sales Records 2013 to 2019 (Cat® and MWM brand)

Gas Distributed Generation and CHP It is what we do

Distributed Generation - Examples

<u>Peoples Electric Coop</u>	30 x G3516H
<u>Provo Power UT</u>	5 x G3516H
<u>Lehi City Power UT</u>	3 x G3520C
<u>City of Santa Clara UT</u>	2 x G3520C
<u>Hurricane City UT</u>	6 x G3520C
<u>Orangeburg SC</u>	2 x G3520C
<u>Heber City UT</u>	9 x G3500's
<u>Tencent Data Center</u>	2 x G3520H
<u>Rubart Station KS</u>	12 x G20CM34

Combined Heat & Power - Examples

<u>Red Stripe, Jamaica</u>	2 x CG170-16
<u>Brock University Canada</u>	4 x G3516H
<u>Univ Maryland Medical Center</u>	1 x G3516H
<u>Stornoway Diamond Mine Canada</u>	7 x G3520C
<u>Fort Knox KY</u>	6 x G3520C
<u>Polimeros & Derivados Mexico</u>	2 x G3520H
<u>Pactiv Jaguar Mexico</u>	4 x G3520H
<u>Flex TJ Mexico</u>	2 x G3520H
<u>Flex Sur Mexico</u>	3 x G3520H



Caterpillar Resources – Easy access to information

https://www.cat.com/en_US/articles/solutions/electric-power-generation/electric-power-app-center.html

GENERATOR SIZING TOOLS AND DATA AT YOUR FINGERTIPS.

Attention consultants, architects, engineers, and contractors! SpecSizer and the Technical Information Portal were designed to help you get the right-size generator set and all the information you need for every one of your projects.

ELECTRIC POWER SPECSIZER

SpecSizer uses factors such as site conditions, load characteristics, and required performance to give you accurate and timely technical data, load models, and optimized algorithms to specify the precise generator sets to best meet your power needs. SpecSizer evaluates load types such as air conditioners, elevators, ultraviolet lights, single-phase NEMA, and single-phase IEC motors. It collects data on your loads, then organizes them into steps, factoring in voltage dip and load demands, to help you select the best generator set size in both rating and footprint.

[REQUEST ACCESS TO SPECSIZER](#)

For SpecSizer Software Support Email: specsizersupport@cat.com

POWER SYSTEMS TECHNICAL INFORMATION PORTAL (TIP)

TIP is an engine/generator set selection tool designed to recommend Cat® products based on various operating criteria to meet your needs. After you log in and select the appropriate options, filter your results and view tabs containing detailed information such as benefits and features, technical and performance data, installation drawings and more.

[LOGIN TO THE TECHNICAL INFORMATION PORTAL](#)

WHITE PAPERS

Get first-hand information from Caterpillar engineers. Our white papers cover everything from application solutions and technologies to product support and maintenance.

[VIEW WHITE PAPERS](#)

TAP INTO INDUSTRY INFORMATION






We have an information library of product literature, white papers, customer stories, and more. Find what you're looking for.

[VIEW INFORMATION LIBRARY](#)

POWER SYSTEMS TRAINING

Take advantage of the many training opportunities available from Caterpillar. Whether onsite or online, build your business with seminars and webinars from the experts. With our free webinars, you can choose to attend live or watch at your convenience on demand. Get the most out of your equipment with training and support from Caterpillar.

[LEARN MORE](#)



Single source for Caterpillar Electric Power resources

- SpecSizer Access
- Technical Information Portal
- Product Information
- White Papers
- Customer Testimonials
- Training
- Cat EP News

CAT Global Dealer Network



Dealers Make the Difference

- 168 dealer locations globally
- Over 2,000 branches
- More than 160,000 dealer employees
- Typical dealer is a third or fourth generation family business; some are publicly traded companies



Service Technicians

- Most service technicians and dealer branches in the industry
- 7,500+ service technicians in North America; average 165 per dealer



Industry-Leading Parts Network

- 99.4% of parts orders filled within 48 hours
- Parts available up to 15 years beyond the life of the machine
- 12 months warranty standard, with option to extend



Electric Power Customer Value Agreement

VALUE

CUSTOMER VALUE AGREEMENT



EASY TO **BUY**



Hassle-Free
Ownership



Hassle-Free
Maintenance



Confidence of Expert
Repairs Included



Proactive
Care



EASY TO **OWN**

LEVEL

1



LEVEL

2



LEVEL

3



FROM **DO-IT-YOURSELF** TO **DO-IT-FOR-ME** SERVICES

* End customer pricing determined by independent dealers



"It's not good, better, best – it's what's the best solution for the customer"



THANK YOU