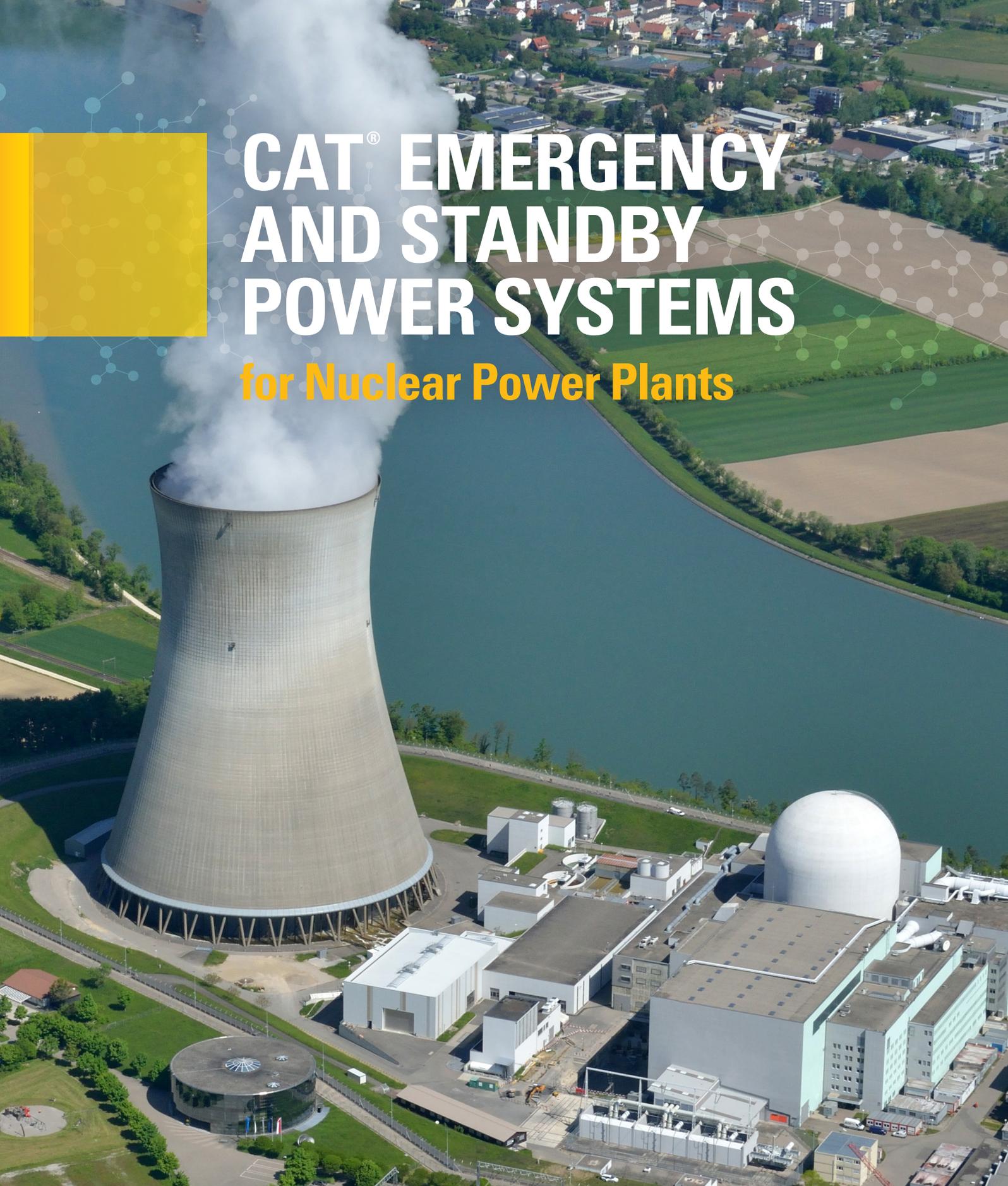


# CAT<sup>®</sup> EMERGENCY AND STANDBY POWER SYSTEMS

for Nuclear Power Plants





**A LEGACY  
TO LEAD YOU.**

**Whether you seek to upgrade from an aging generator set, install an entirely new fleet, build backup power, or maintain an existing system, Caterpillar Electric Power has the power range and nuclear knowledge to match your power needs.**

For nearly a century, we've been powering the world's largest cities and their leading industries, and for more than 40 years we've been supporting nuclear power. Cat<sup>®</sup> emergency standby power generator sets are designed to last, made with high-efficiency parts and designed to your specific plant needs. Our generator sets are built not only to meet nuclear standards, but to exceed them. In an industry where regulations are continually changing, we're engineering one step ahead with quality in mind. The Cat quality promise is in every power product we provide to nuclear applications and in the support provided by our expert Cat team.



Providing

# POWER OPTIONS.

## Emergency and Standby Diesel Generator Sets.

With the industry's broadest product range we can customize emergency and standby power to fit your nuclear power plant needs.



Find on-site diesel generator sets tailored and tested to meet the most demanding industry standards or install your additional line of defense, off-site, with our mobile generator sets. In addition, we offer quick response modules, built to the same standards as our mobile generator sets but designed for rapid deployment during disaster situations.

All Cat nuclear power systems support Severe Accident Mitigation and FLEX strategies – including cooling capabilities and backup electrical power capabilities.

# Whatever the application demands – Demand Cat Electric Power

## Emergency Diesel Generators (EDGs)

The risk of loss of off-site power requires solid mitigation. Within the Cat generator set range is the 3600 tailored solutions for this application. Their output range, proven reliability, and simple design make them the ideal choice as EDGs. With large populations in the field, these solid performers are proven in many applications including cruise liners, fast ferries, cargo ships, and power plants. These engines are equipped with mechanical injection systems and electronic governors with mechanical backup, enhancing reliability and avoiding qualification issues related to electronics.

	Electric Output (kW)	Speed (rpm) @ 60/50 Hz	Dimensions L x W x H (m)	Weight (t)
<b>3612</b>	3880	900/1000	10.3 x 2.5 x 4	52
<b>3616</b>	5200	900/1000	10.3 x 2.5 x 4	65
<b>3616N</b>	6500	900/1000	10.8 x 2.5 x 4	70

*Weights and dimensions may vary due to project-specific options and features.*

## Station Black-Out Units (SBOs)

Loss of all external and internal sources of power is an extremely unlikely scenario at a nuclear power plant, yet station black out is one of the most critical conditions preceding core damage as laid down by the Nuclear Regulatory Commission (NRC), USA. This risk is best managed with generator sets from the Cat 3500 series, C175, or 3600 ranges. In addition to installing these sets in conventional buildings, Caterpillar can provide modular solutions, easy and quick to install, yet meeting all nuclear industry-specific standards.

	Electric Output (kW)	Speed (rpm) @ 60/50 Hz	Dimensions L x W x H (m)	Weight (t)
<b>3512</b>	1700	1800/1500	5.9 x 2.0 x 2.4	12
<b>3516</b>	2400	1800/1500	7.1 x 2.8 x 3.0	18
<b>C175-16</b>	2560	1800/1500	7.8 x 3.0 x 3.2	29
<b>C175-20</b>	3200	1800/1500	8.4 x 3.3 x 4.3	33

## Mobile Diesel Generator Sets

Foresee the unforeseeable – in a beyond-design situation, any operator wants to rely on the best equipment in class. While non-classified, Cat mobile generator sets offer the highest quality and reliability standards. With power outputs ranging from 20 kW to 2000 kW the choice we offer is the widest in the industry, available in portable sound-attenuated enclosures up to 40" ISO standard container size, optionally truck- or trailer-mounted.

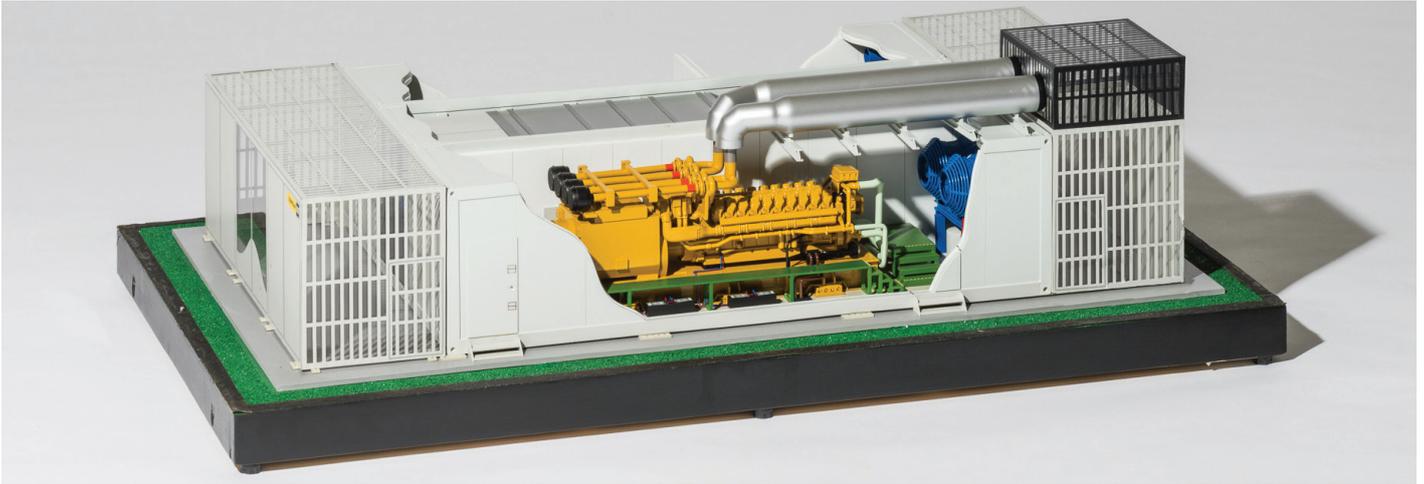
# MODULAR DESIGN.

## Factory-Made Quality And Precision Meets Easy Installation.

Reactor operation is at stake when backup power systems are not ready, never more so than during the modernization and upgrade of an existing nuclear plant. Our approach, providing factory-built modular power plant facilitates:

- Consistent factory quality control from design to installation and commissioning
- Minimized storage time and exposure to construction environment, as plant arrives to site for immediate installation and not before
- Reduced onsite construction time and minimal interruption to site operations as product arrives from the factory as a complete installation
- Reduced project duration from the date of order to commissioning





With short, well-controlled project schedules and proven designs tested and certified at our factories, Cat modular design solutions ensure swift installation.

Characteristics of Cat Modular Solutions:

- Designed for full seismic and external influence immunity
- Manufactured in our specialist factory
- Undergo factory inspection and certification before shipment
- Effect fast and efficient installation with limited site work
- Short delivery time
- Lower overall project cost

.....● **Your project on-budget and on-time.**



Keeping you within your

# NUCLEAR SAFETY MARGINS.



## Paralleling Switchgear

- Available 108V – 35kV
- Intuitive and easy-to-use graphical operator interface (Minimizing potential for operator errors and integrating other elements of your systems such as generator sets, ATS, and UPS)
- Redundant communications bus and distributed control processing ensure the utmost in reliability for nuclear applications
- Automated reporting capability, including generation of custom reports and real-time power usage effectiveness (PUE)
- Available in a broad array of configurations, including highly customized designs specifically developed to address specific power plant requirements



## Automatic Transfer Switches (ATS)

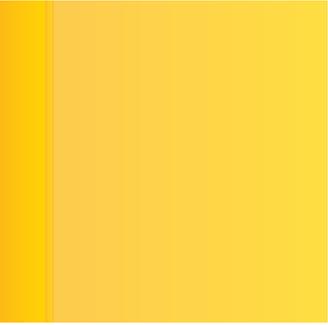
- Available in sizes from 30-5000 amps in 4-pole configurations
- Contractor and circuit breaker-based solutions for flexible coordination
- Open, closed, and delayed transition designs available to meet your specific nuclear power needs
- Bypass/Isolation type ATS (UL/IEC type)
  - ATS and bypass mechanisms rack in/out with door closed to maximize operator safety
  - Bypass operation accomplished with door closed, again maximizing operator safety
  - Load is not interrupted during bypass operation
  - Interchangeable ATS and bypass mechanisms provide the utmost in redundancy
  - Full automatic mode functionality is maintained with ATS in bypass



## EMCP 4 Controls

- Intuitive navigation and configuration
- Advanced telemetry capabilities for remote communications to ensure safety for operators
- Complete engine and generator protection, monitoring, and control
- Generator protective relays, including over/under voltage, over/under frequency, over current and reverse power
- Communication options over Modbus and Ethernet
- Expansion modules, including local annunciators, input/output and generator temperature monitoring





# WORLD-CLASS SERVICES

## + Great Equipment = Successful Projects

A dedicated project management and engineering team is assigned to each project. Supporting you in every aspect of your power design, from drawing board to commissioning, your project has their full attention.

### **Seismic Qualification**

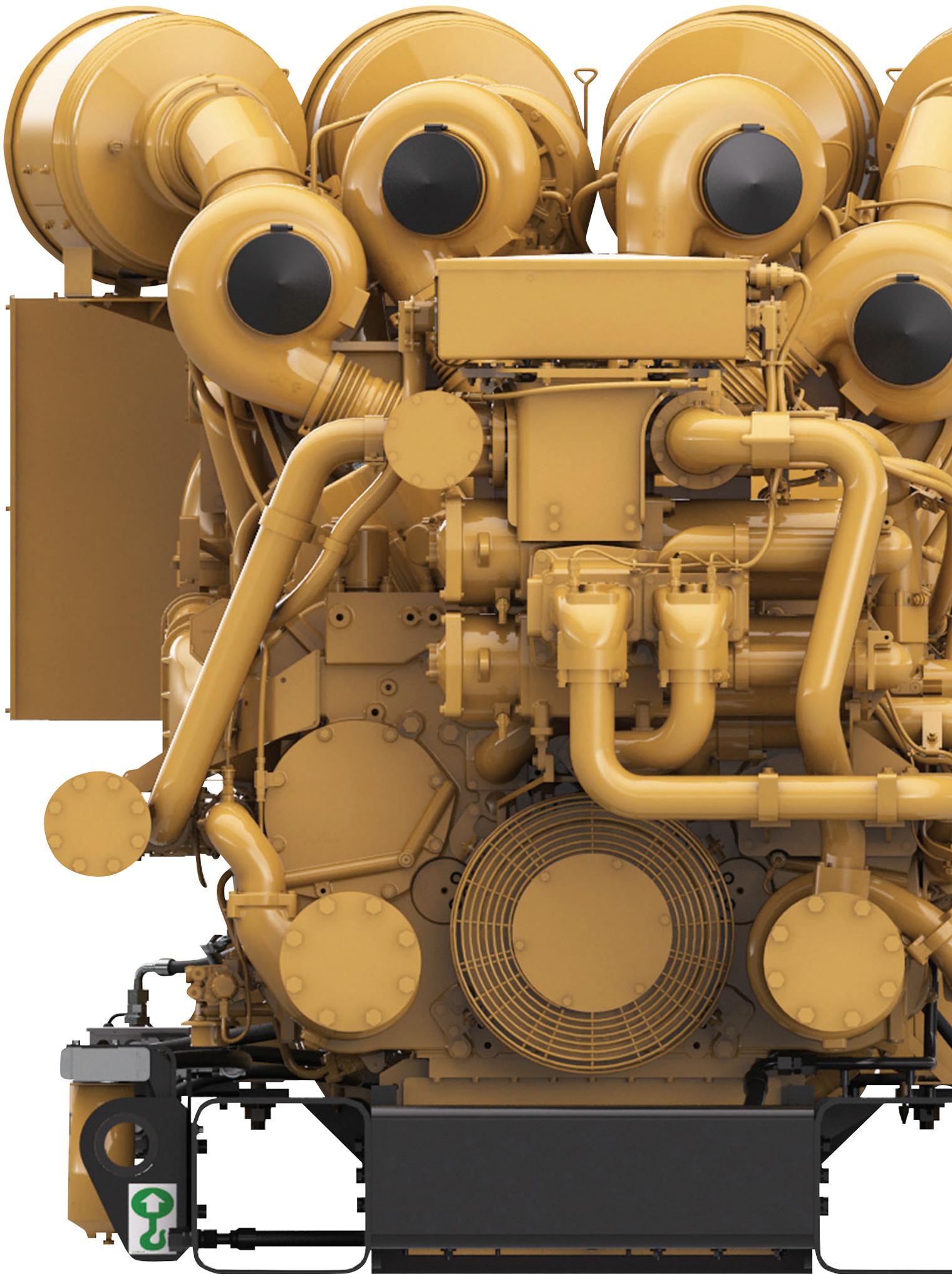
Cat generator sets are qualified by independent institutes to withstand significant seismic events as defined by the International Building Code (IBC). Our products and components are proven in the field, found in a multitude of different applications where they are exposed to extreme conditions every day.

### **Test and Inspection**

Our factories provide type tests, manufacturing tests and inspection plans, material traceability and documentation, meeting regulator and nuclear power plant operator expectations.

### **Quality Management**

Audits by quality auditors from the nuclear industry have found the Caterpillar quality management system flawless. What is required by the nuclear power industry we do every day for all of our customers.



Supporting

# YOUR OPERATION

## **Dealer Network**

The global Cat dealer network supports your power product after installation from the provision of parts to regular service and maintenance throughout the life of the product. All along, dealer service specialists also have full access to design engineers, factory technicians, and engineering experts.

## **Parts Availability**

Having quick access to the right parts is crucial to keep your power systems maintained and ready. Your local Cat dealer is equipped with genuine parts inventory and with access to the global parts network, fulfilling 98% of part orders within 24 hours. Parts information is also available 24/7 at [parts.cat.com](http://parts.cat.com).

## **Rental Diesel Generator Sets**

A temporary power supply, whether your existing plant is undergoing retrofit work, installing new generator sets, or just performing scheduled maintenance, you can easily maintain power potential.

- 20 – 2000 kW
- Rapid response
- Easy transportation and fast installation
- Durable ISO container packaging



## **Customer Value Agreements**

Your customer value agreement (CVA) is a customized agreement between you and your Cat dealer. Regardless of the size or age of your product your CVA helps you maintain the reliability of your products. Agreements are tailored to fit your business needs and can range from simple preventive maintenance kits to sophisticated total cost performance guarantees. No matter which option you choose, you can be assured that your Cat dealer will provide you with the careful planning and ongoing attention that will help you succeed.

## **Financing Services**

Reliability, safety, and efficiency are the mainstays of your operation. That's why you count on Cat generator sets. Choose a financial partner with those same qualities. We'll support you during construction, installation, and ongoing expansion with complete project financing.

## **Financial Solutions**

- Construction plus term financing for projects that include Cat generator sets or related equipment.
- Standard loan terms of up to 10 years plus construction or installation period

### **Benefits:**

- Competitive floating or fixed-rate structures
- Flexible repayment options with no payments during construction
- Simple, straightforward documentation, funding, and closing processes that save you time and hassle



Bringing You

# RELIABLE POWER

Around the World

**Red Wing, Minnesota, U.S.A.**

Prairie Island-1  
Models: D399 x 2

**Ontario, New York, U.S.A.**

R E Ginna  
Models: C32 x 2

**Russellville, Arkansas, U.S.A.**

Arkansas Nuclear One-1  
Model: 3616

**Vernon, Vermont, U.S.A.**

Vermont Yankee  
Model: C175

**Surrey, Virginia, U.S.A.**

Surry-1  
Model: 3612

**North Anna, Virginia, U.S.A.**

North Anna-1  
Model: 3612

**Jenkinsville, South Carolina, U.S.A.**

Virgil C. Summer-2 & 3  
Models: C280-16 x 2 (each)

**Waynesborough, Georgia, U.S.A.**

Vogtle-3 & 4  
Models: C280-16 x 2 (each)

**Huntersville, North Carolina, U.S.A.**

McGuire Nuclear Stations 1 & 2  
Model: C175-16 (each)

**York, South Carolina, U.S.A.**

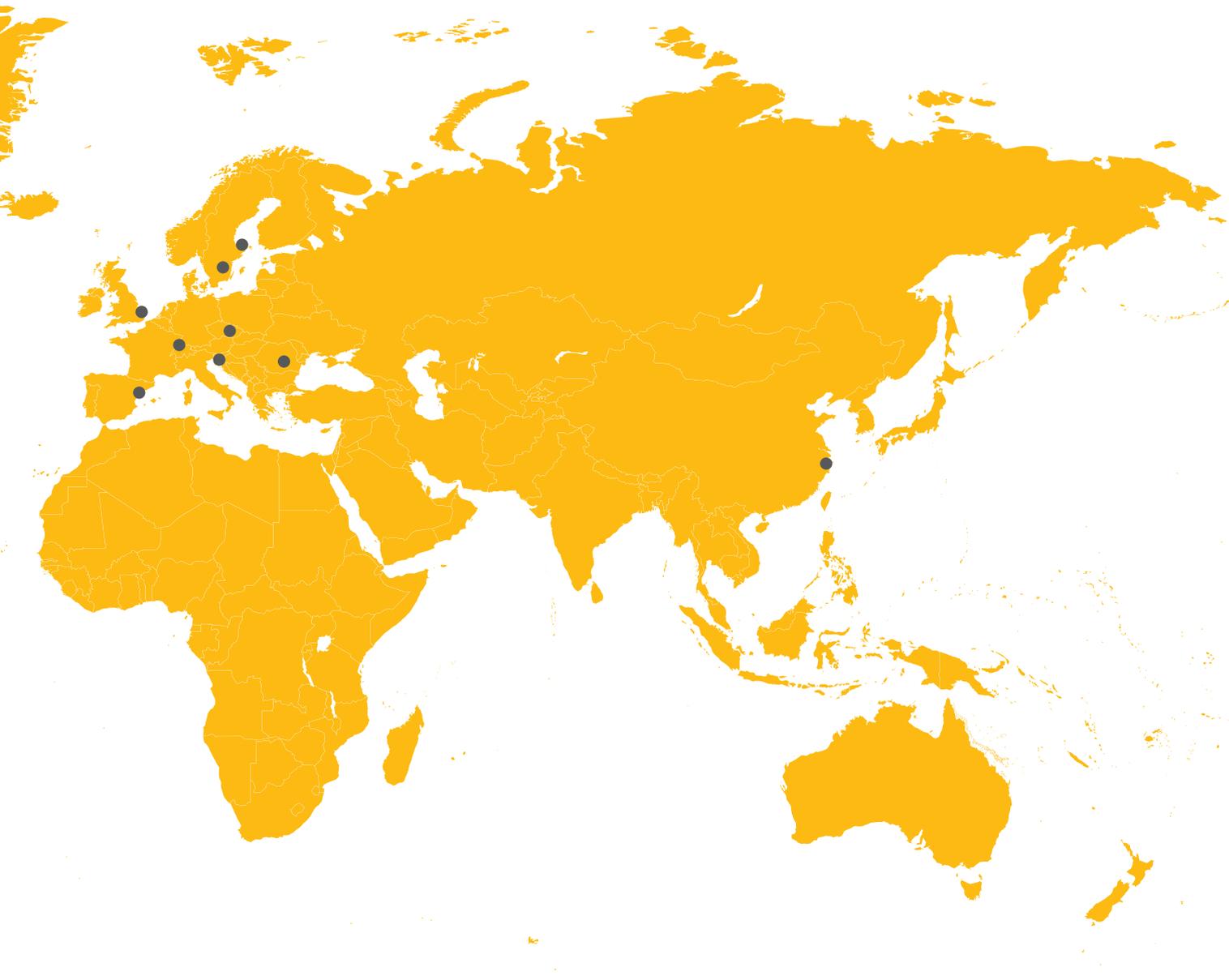
Catawba Nuclear Stations 1 & 2  
Model: C175-20 (each)

**Lima, Buenos Aires, Argentina**

Atucha-1  
Models: 3612 x 3

**Embalse, Córdoba, Argentina**

Embalse  
Models: 3616 x 4



**Clarington, Ontario, Canada**

Darlington  
Model: 3512

**Suffolk, United Kingdom**

Sizewell-B  
Models: 3512 x 2

**Ascó, Spain**

Ascó – Vandellos  
Models: C32 x 2

**Oskarshamn, Sweden**

Oskarshamn-1  
Models: 3608 x 2

**Forsmark, Sweden**

Forsmark 1, 2, & 3  
Models: 3508 IND x 2 (each)

**Mühleberg, Switzerland**

Mühleberg  
Model: C32

**Dukovany, Czech Republic**

Dukovany-1  
Models: C175-20 x 2

**Temelin, Czech Republic**

Temelin-1  
Models: C175-20 x 2

**Kozloduy, Bulgaria**

Kozloduy-5  
Models: 3616 x 2

**Krško, Slovenia**

Krško  
Model: C18

**Qinshan, Zhejiang, China**

Qinshan-1 (Phase I)  
Model: C175  
Qinshan-2 (Phase II, Units 1 & 2)  
Models: 3516B x 2 (each)



For more information on the Cat generator set range, visit [www.cat.com/nuclear](http://www.cat.com/nuclear).

**LET'S DO THE WORK.™**

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