



framatome

Small & Multi Diesel Generators

Small & multi diesel generators offer a safe and reliable solution helping utilities to prevent shut-down on their Nuclear Power Plants.

Your performance
is **our** everyday **commitment**

Small & Multi Emergency Diesel Generator – EDG

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Challenge

- A safe and reliable emergency power supply is required to operate a nuclear power plant or nuclear facility
- Large diesel generator sets are highly complex and require high efforts for integration engineering and erection
- Replacement of obsolete large diesel generator sets with other brands is highly difficult due to different footprints
- If one large diesel generator set is damaged, repairs are time consuming and extended outages are required
- Many manufacturers have low interest in nuclear qualification issues and applications

All those challenges lead to high prices and long lead times for the nuclear power plant operators.

Value Drivers

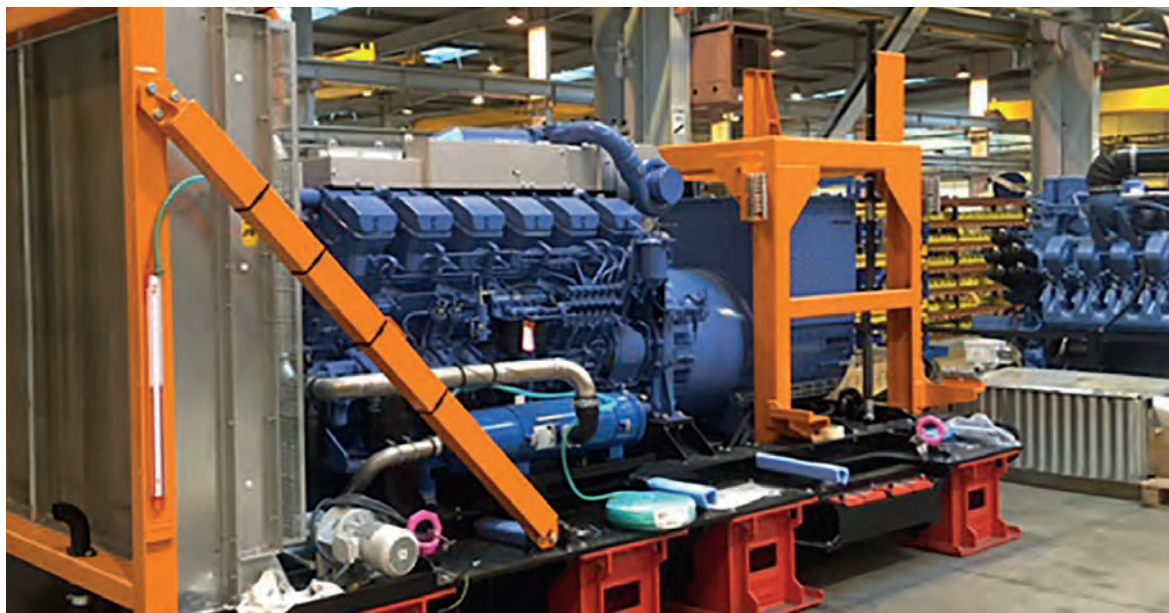
- With reliable emergency power supply:
- Increase plant availability due to highly reliable emergency power system
 - Reduce maintenance & overall operating costs
 - Save time and costs through qualified spare parts

Value Proposition

Framatome small & multi EDG offer
a safe and reliable solution
to help utilities to prevent shutdown
on their NPPs. Using several EDGs
allow to reduce maintenance cost
and save time during outages.

Small Diesel Generators

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Solution

- Framatome is engaged to offer qualified small diesel generators as stand-alone generating sets or completely functional container packages
- Wide range of power output and flexibility in customizing for specific needs
- Reliable solution with many references over the recent years

For Higher Power Ranges?

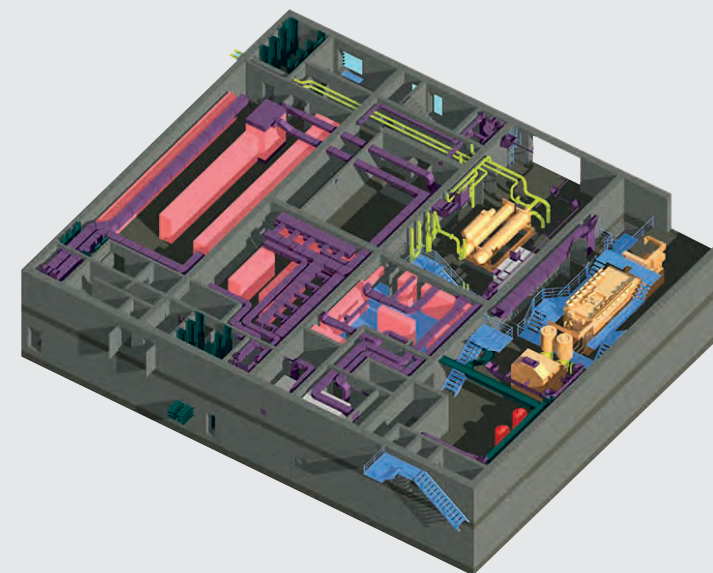
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Several small diesel generators replace one large diesel set

Challenge

- Large diesel generator sets are highly complex and require high efforts for integration engineering and erection
- High space requirements for the diesel buildings
- Form-Fit-Function (FFF) Replacement of obsolete large diesel generator sets in existing plants with other brands is highly difficult due to different footprints
- If one large diesel generator set is damaged, repairs are time consuming and extended outages are required
- “Clogging” due to oversized gensets
- Obsolescence and unavailability of spare parts lead to difficulties within the refurbishments of the genset and its auxiliaries



Multi Group Diesel Sets

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Solution

- Several qualified small diesel sets act like one large diesel
- Transfer of a common and proven industry solution to nuclear
- Multiple sets in N+1 or N+2 safety concepts improve reliability and allow easier maintenance compared to one large diesel
- Replacement of a large diesel with multiple small sets is easier than by another large diesel
- Multi group diesel sets allow for innovative concepts (e.g. sound attenuation, container solutions and mobility)
- Use of central or de-central auxiliary systems (fuel supply, starting energy, cooling water and/or cooling air, controls)
- Flexible setups in frame of load steps and maintenance- and outages times



Reliability

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Single Large Diesel Generator



Emergency consumers

Safety concept:
N=1 per each safety train

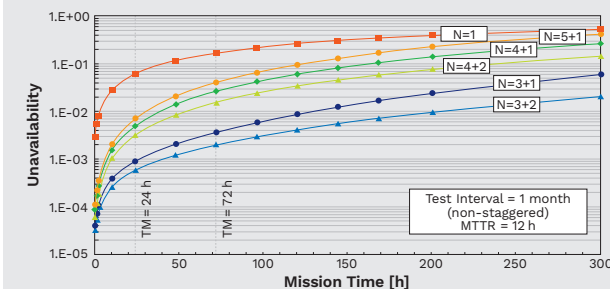
Replacement by Multi Group Diesel Set



Emergency consumers

Safety concept:
N, N+1, N+2 within each safety train

Example of unavailability vs mission time for different safety concepts:



- If a small diesel generator fails, the meantime to repair of most common issues ≤ 12 h
- Significant safety margin over extended mission times when compared to N=1!

Container Packages

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Container delivery



Installed container

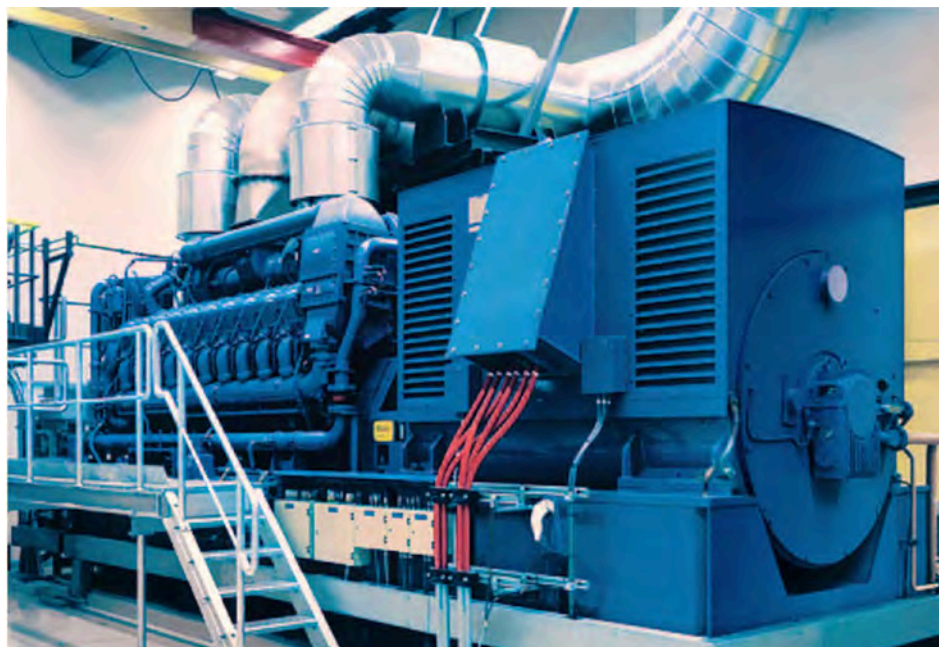


Solution

- Complete functional container packages, including
 - Gensets
 - Mechanical and electrical auxiliary systems
 - Control system
 - Thorough cooling concept
- Enforced and hardened containers, in ISO format, for seismic events and extreme ambient conditions
- Various options and site specific adaptations

Plant Replacement

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Solution

- Form-Fit-Function (FFF) replacement of the existing diesel generators in existing nuclear power plants
- In correlation to a FFF replacement of existing diesel units, the following main items are covered:
 - Dynamic behavior
 - Footprint
 - Auxiliaries
 - Operational conditions
 - Plant interfaces
 - Long-term availability
 - Nuclear qualification

Benefits of Small & Multi EDG

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Benefits

- Small- & multi-group diesel sets are an efficient and highly flexible alternative of large monolithic diesel generator sets
- Framatome's qualified small- & multi-group diesel save capital expenditures and come with long-term support
- Reduced operational expenditures by savings in maintenance time and costs are enabled with multiple small sets
- Multi-group diesel configurations achieve a significantly higher reliability than large-diesel sets
- With new flexible maintenance concepts the extended outages for large-diesel overhauls belong to the past
- Modular fuel storage solution introduces new economics in cost and space requirements
- Thorough fuel quality concept allows an improved fuel management concept and the use and storage of bio-diesel
- Wide range of power- and voltage-output is supported





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Click here to visit our
solutions-portfolio

For more info please contact:
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Your performance
is **our** everyday **commitment**

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