

A large industrial mobile power unit, the Siemens SGT-A45 TR, is shown in a desert landscape. The unit is a long, white, rectangular structure with multiple large cooling fans and exhaust stacks. It is mounted on a trailer and is being towed by a blue semi-truck. The background features a vast, flat desert plain with distant mountains under a blue sky with scattered clouds. A power line tower is visible in the distance.

SIEMENS
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SGT-A45 TR Mobile Unit

Fast Power. Superior value. Trusted technology.

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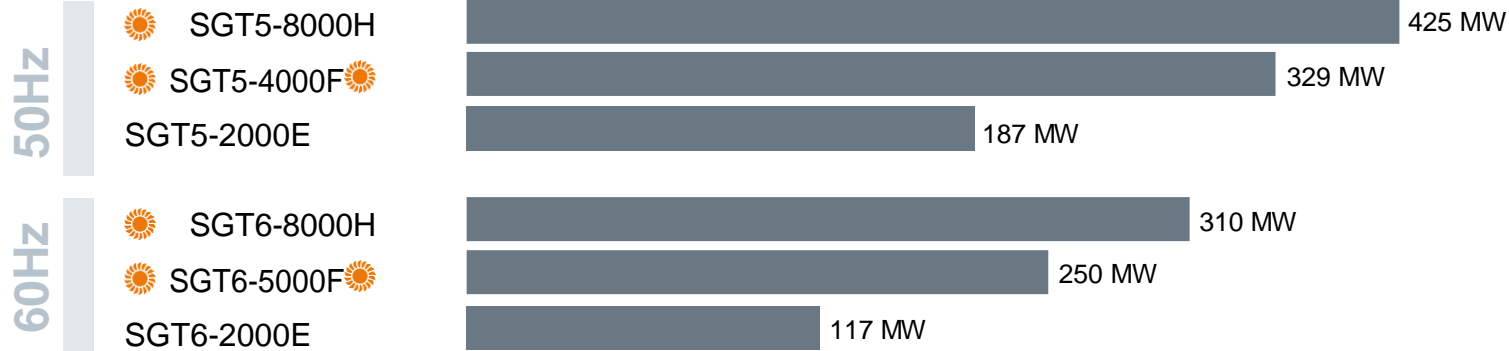
Siemens Distributed Generation

Siemens Gas Turbine portfolio

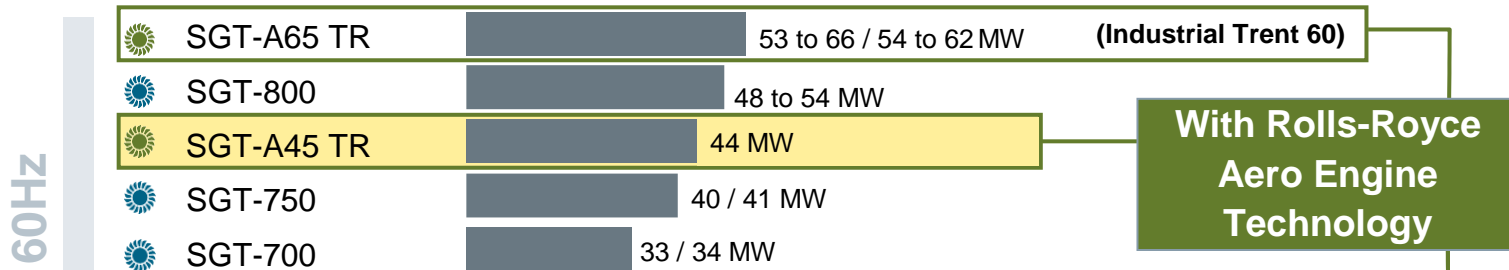
Now even stronger with Aero-Derivative products

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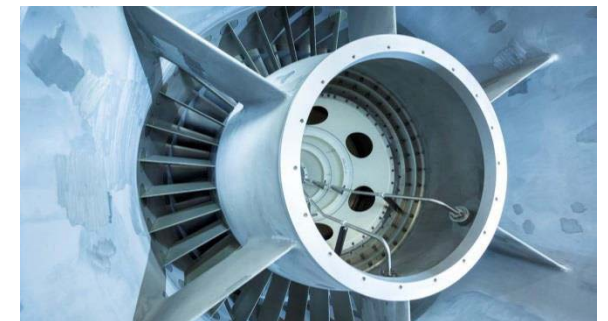
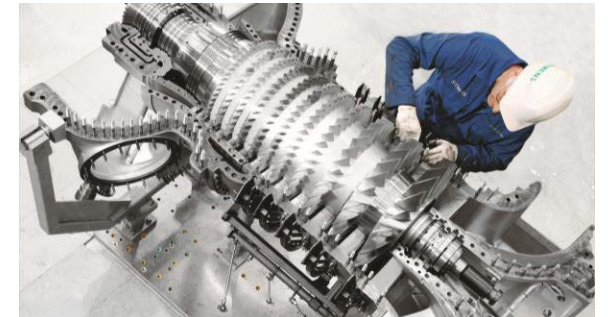
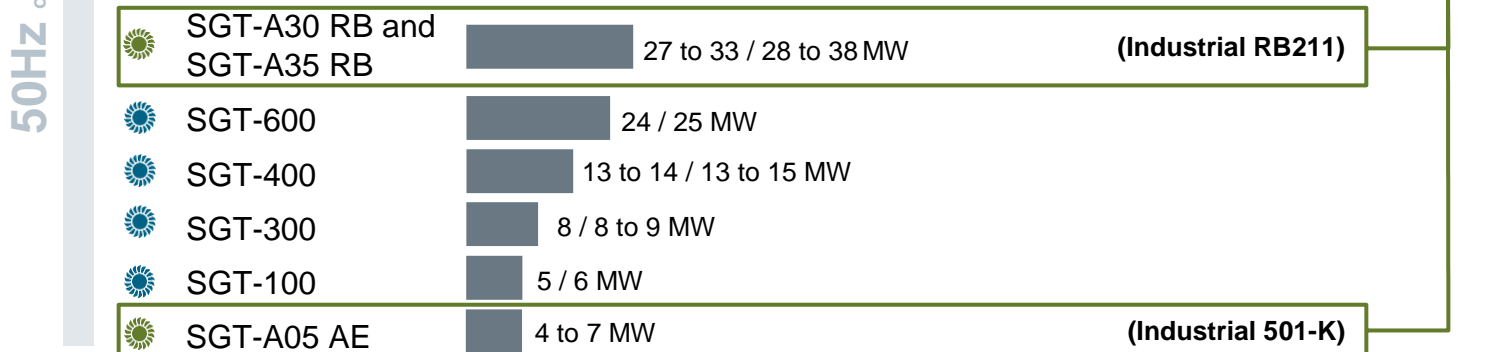
Heavy-duty gas turbines



Industrial gas turbines



Aeroderivative gas turbines



Power Generation / Mechanical Drive, Performance at ISO conditions

Siemens Aeroderivative Gas Turbines With Rolls-Royce Aero Engine Technology

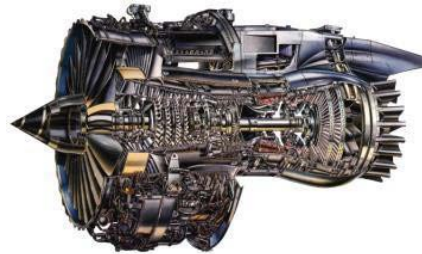
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Boeing 747



Rolls-Royce RB211

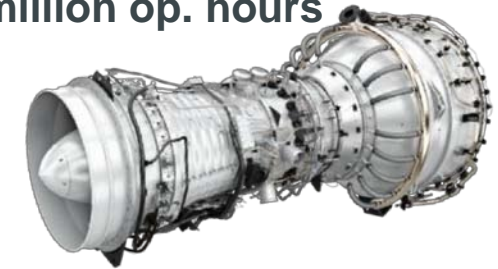
>48 million operating hours



SGT-A30/A35 RB

(Industrial RB211)

>36 million op. hours

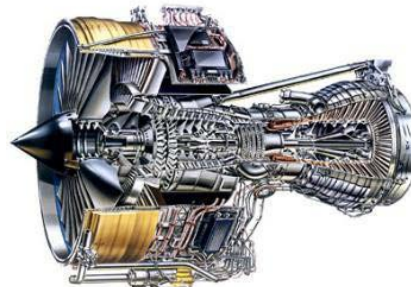


Boeing 777



Rolls-Royce Trent 800

>26 million operating hours



SGT-A65 TR

(Industrial Trent 60)

>1 million operating hours



Siemens Aero-Derivative Gas Turbines

Proven in mission-critical services

Industrial Power Generation (IPG)

- ▣ Simple Cycle
- ▣ Combined Cycle
- ▣ Co-generation



Oil & Gas Off-shore

- ▣ Fixed-leg platform
- ▣ Floating Production, Storage & Offloading (FPSO)



- ▣ Upstream production
- ▣ Midstream transmission (e.g. pipeline compression)
- ▣ Downstream processing (e.g. refinery)

Power Generation & Mechanical Drive

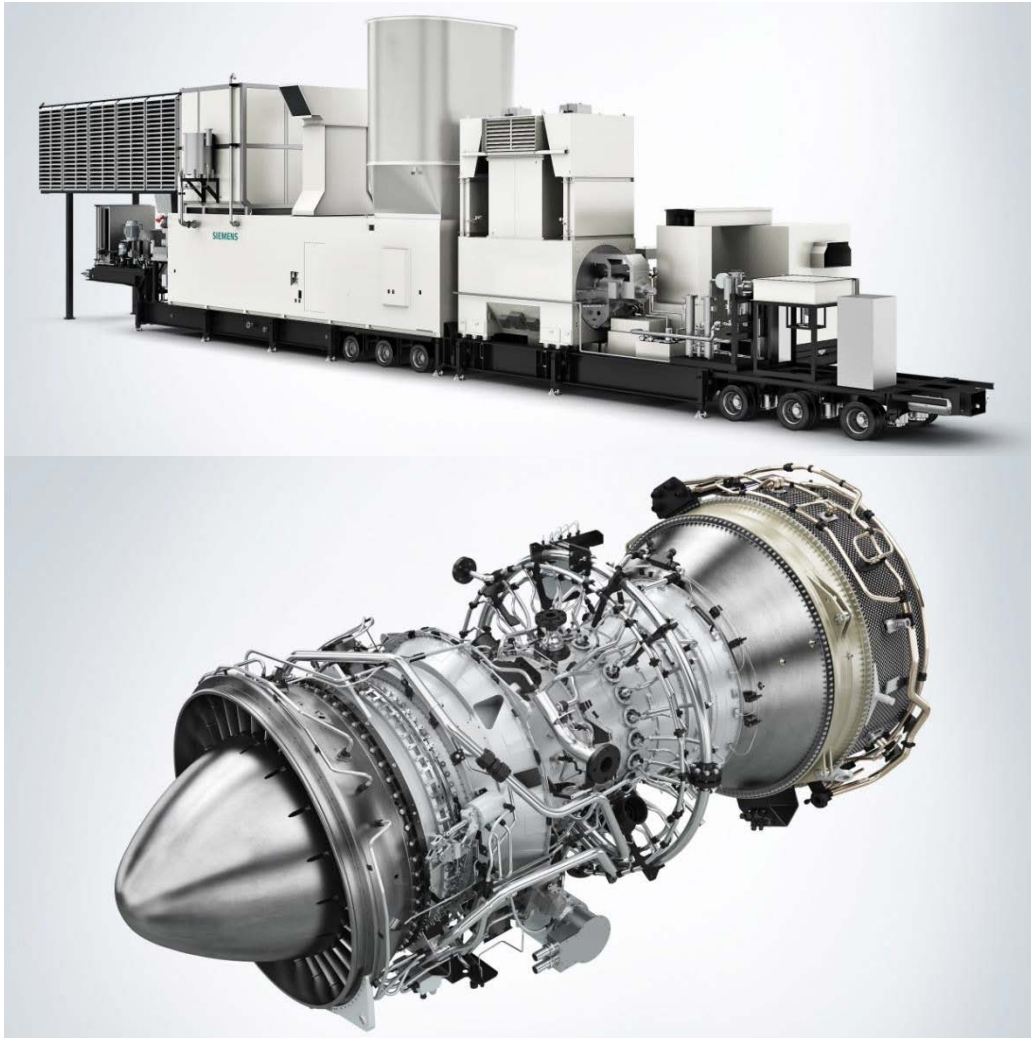
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SGT-A45 TR Mobile Unit

Fast Power. Superior Performance. Trusted technology.

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Fast Power

- ✓ 2-weeks installation
- ✓ Mobile by road, air or sea
- ✓ Minimal site interfaces and preparation

Cost-effective power solution

- ✓ 44 MW_e (ISO) with outstanding power density
- ✓ CAPEX savings with fewer units (\$/kW)
- ✓ Performance optimized for hot climates

Superior value in operation

- ✓ OPEX savings with high fuel efficiency
- ✓ Liquid and gas fuel with same service interval
- ✓ Proven turbomachinery in industrial package

Flexible, dependable technology

- ✓ 50 Hz or 60 Hz
- ✓ Emissions as low as 25 vppm NO_x
- ✓ Fast start (< 8 mins) and no “hot lock-out”

Ingenuity for life



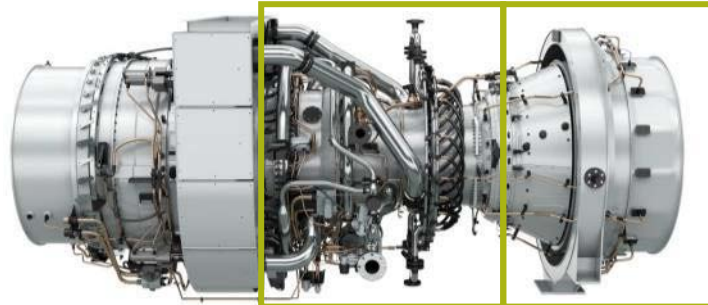
SGT-A45 TR Gas Turbine

First unit assembled
Montréal, Canada

SGT-A45 TR Core Built on Trusted Gas Turbine Pedigree

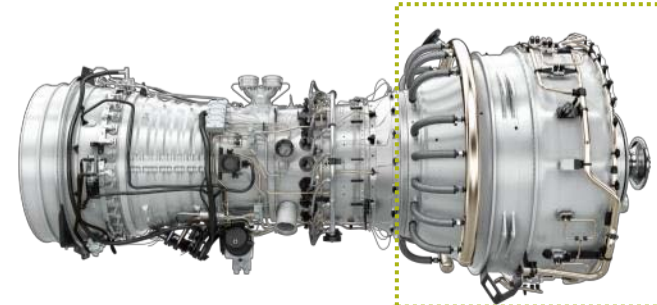
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SGT-A65 TR
(Industrial Trent 60)

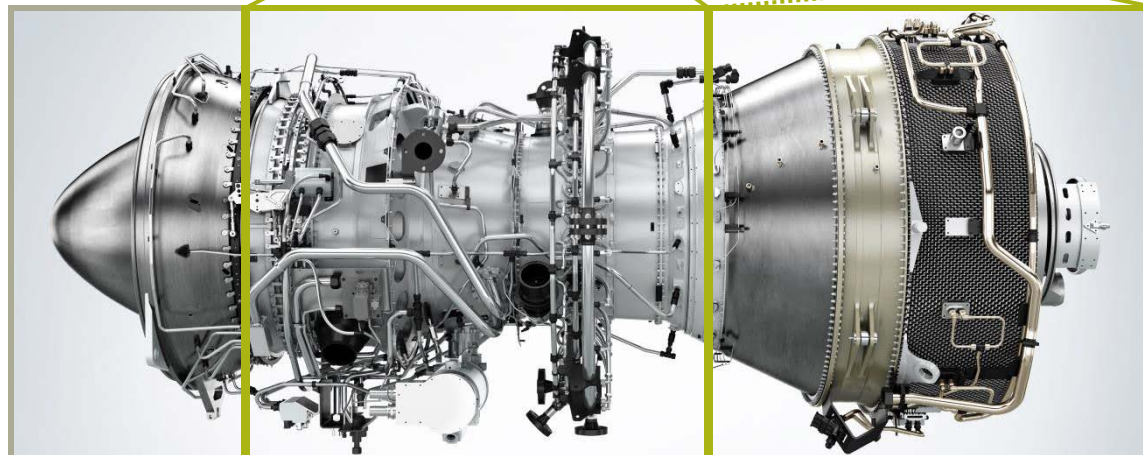


66 MW

SGT-A35 RB
(Industrial RB211-GT30)



34 MW / 38 MW



SGT-A45 TR

- ✓ Two-shaft architecture
- ✓ High power density
- ✓ Proven components

44 MW

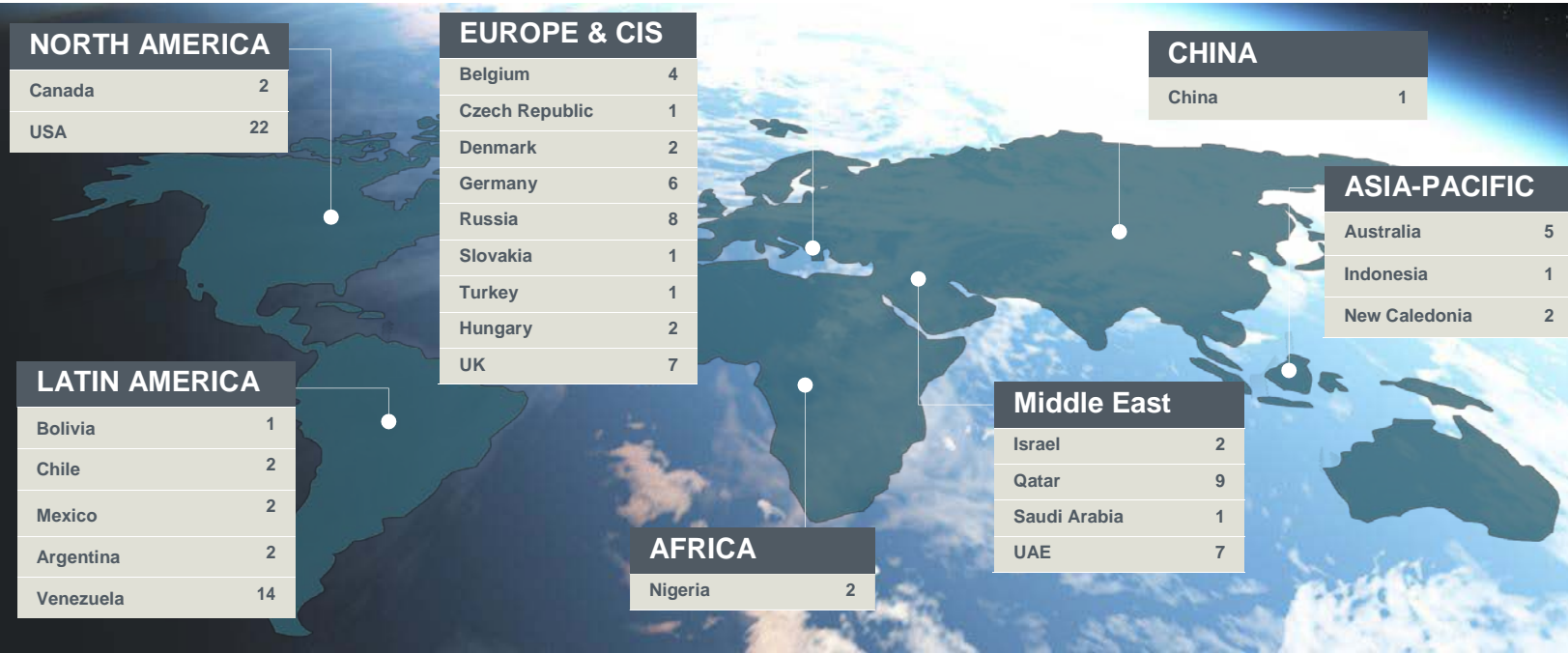
LP booster deleted
Industrial RB211 style air intake

Industrial Trent 60
Engine Core

Small, light-weight Free Power Turbine
Derived from Industrial/Aero/Marine Trent

The SGT-A45 TR builds on the trusted legacy of the Industrial Trent 60 (SGT-A65 TR)

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115 SGT-A65 TR units sold
 thereof **100** units for Industrial Power Generation
 and **15** units in Oil & Gas applications

1.5 Million SGT-A65 TR operating hours

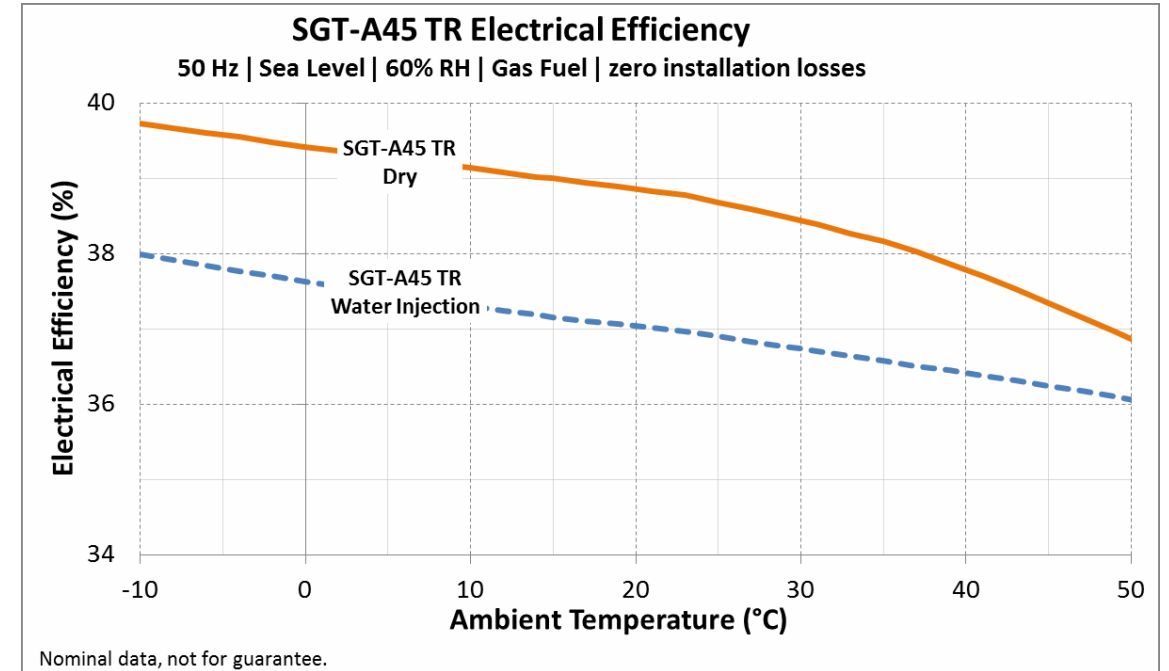
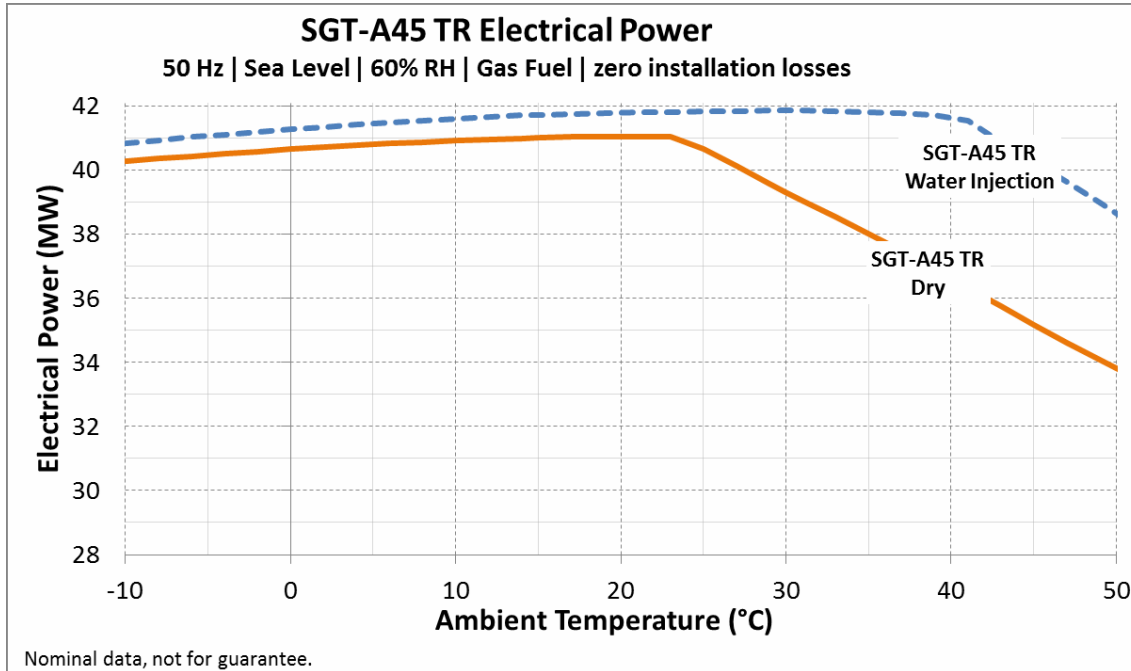
Project / Country	Bayonne Energy Center, New Jersey, USA
Application	> 500 MW peaking power for New York City.
Technology	8x Industrial Trent 60 WLE with ISI 2x additional units ordered in 2016
Operation	2012
Benefits	<ul style="list-style-type: none"> • 500 MW in 10 mins (non-spinning reserve) • Unlimited cycles per day, no lock-out • Compact footprint • Best in class efficiency • Very high availability and start reliability

SGT-A45 TR Performance Ratings – 50 Hz

Firm Guarantees provided in Individual Project Proposals



50 Hz generation – Power and Efficiency



SGT-A45 TR Performance Ratings – 50 Hz

Firm Guarantees provided in Individual Project Proposals

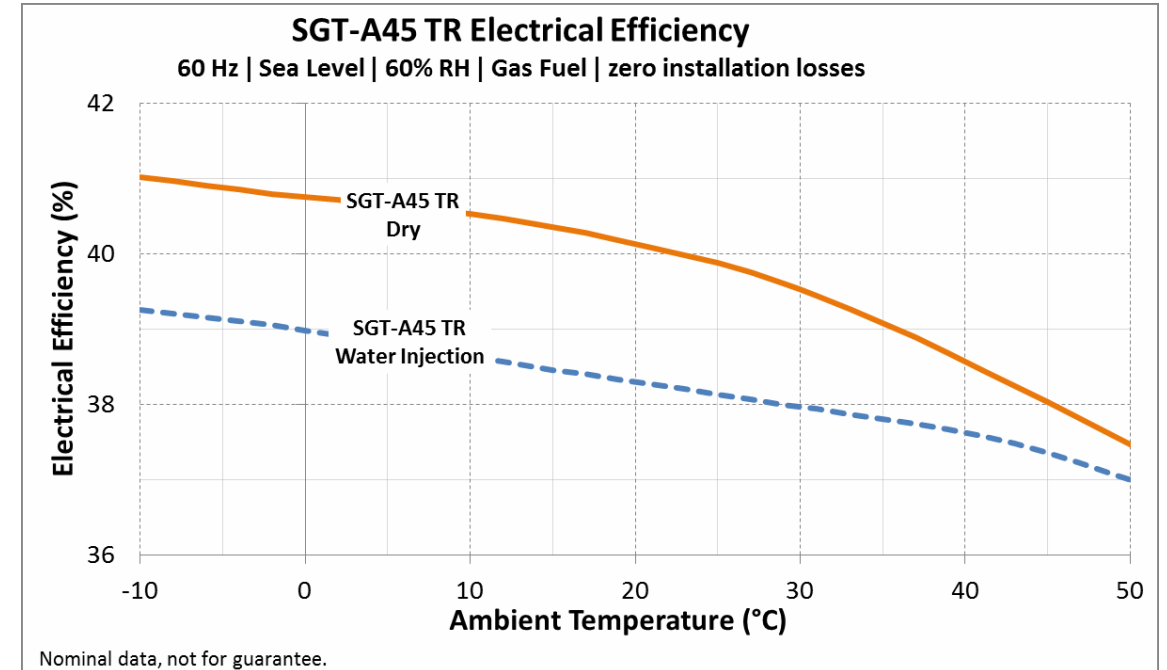
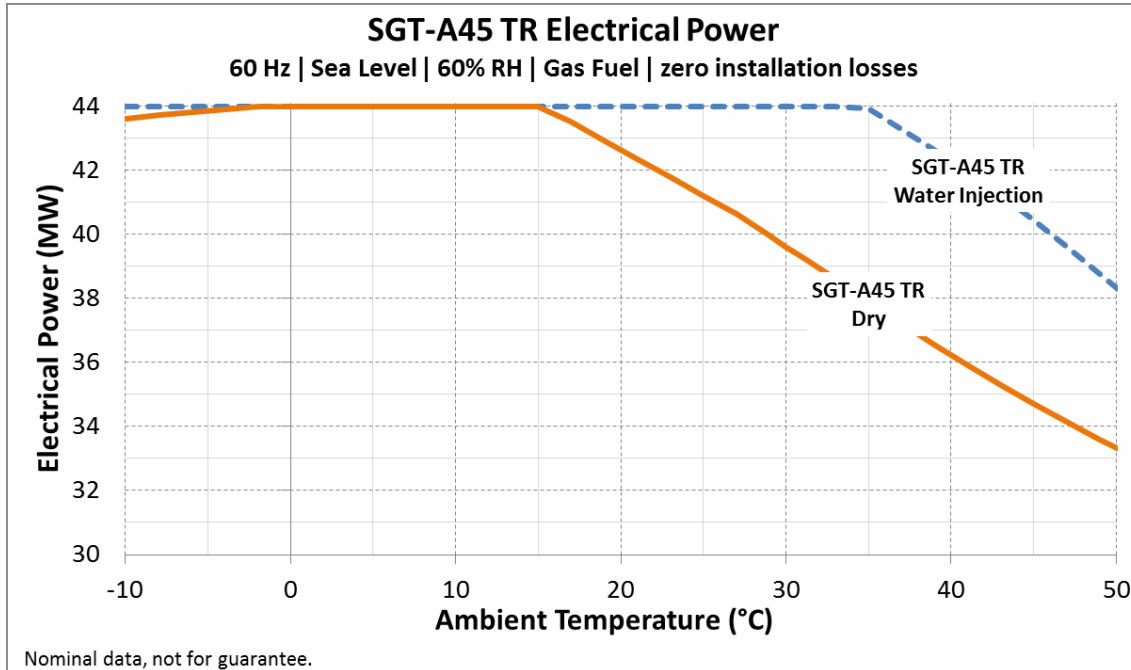
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- ✓ Outstanding hot climate performance – retention of 96% of ISO power output @ 30 °C
- ✓ Water injection (optional) allows constant output @ 42 MW_e to almost 40 °C
- ✓ High fuel efficiency minimizes life cycle cost
- ✓ Dual Frequency – can be switched between 50 Hz and 60 Hz

SGT-A45 TR Performance Ratings – 60 Hz

Firm Guarantees provided in Individual Project Proposals

60 Hz generation – Power and Efficiency



SGT-A45 TR Performance Ratings – 60 Hz

Firm Guarantees provided in Individual Project Proposals

- ✓ Water injection (optional) allows constant output @ 44 MW_e to almost 40 °C
- ✓ High fuel efficiency minimizes life cycle cost
- ✓ Dual Frequency – can be switched between 50 Hz and 60 Hz

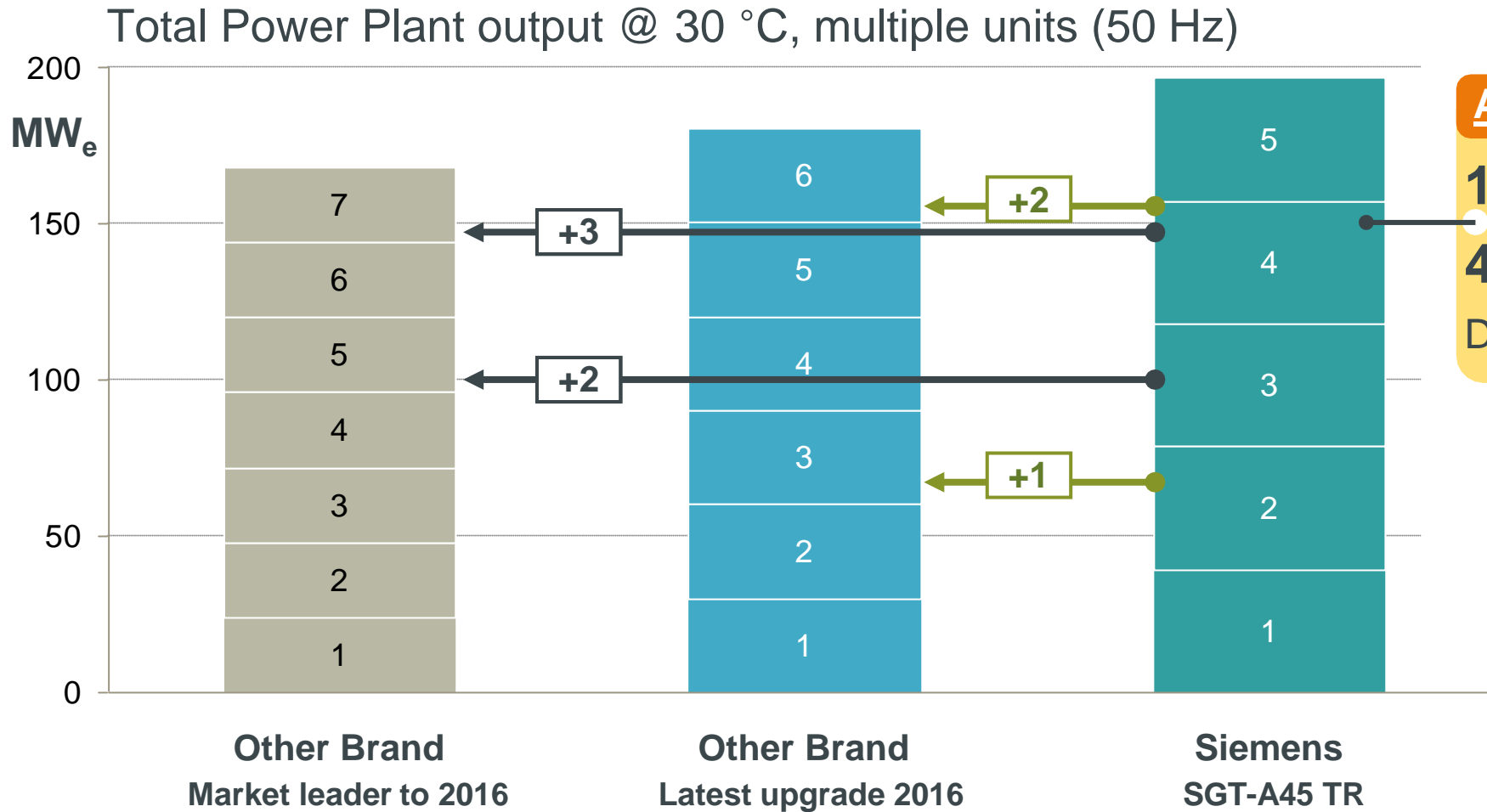
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SGT-A45 TR superior performance drives better economics

More power. Less units. Less fuel.



Annual fuel savings *

1,000,000 \$ gas fuel

4,500,000 litres Diesel

Due to higher efficiency

* Based on 150 MW plant output.
 Gas fuel price 6 \$/MMBTU
 8,000 hrs operation per year

SGT-A45 TR retains 96% of its ISO power output @ 30 °C

SGT-A45 TR Mobile Unit – Typical 3-trailers Layout

Trailer # 1

- A/C generator
- Generator lube oil
- Generator cooler

Trailer # 2

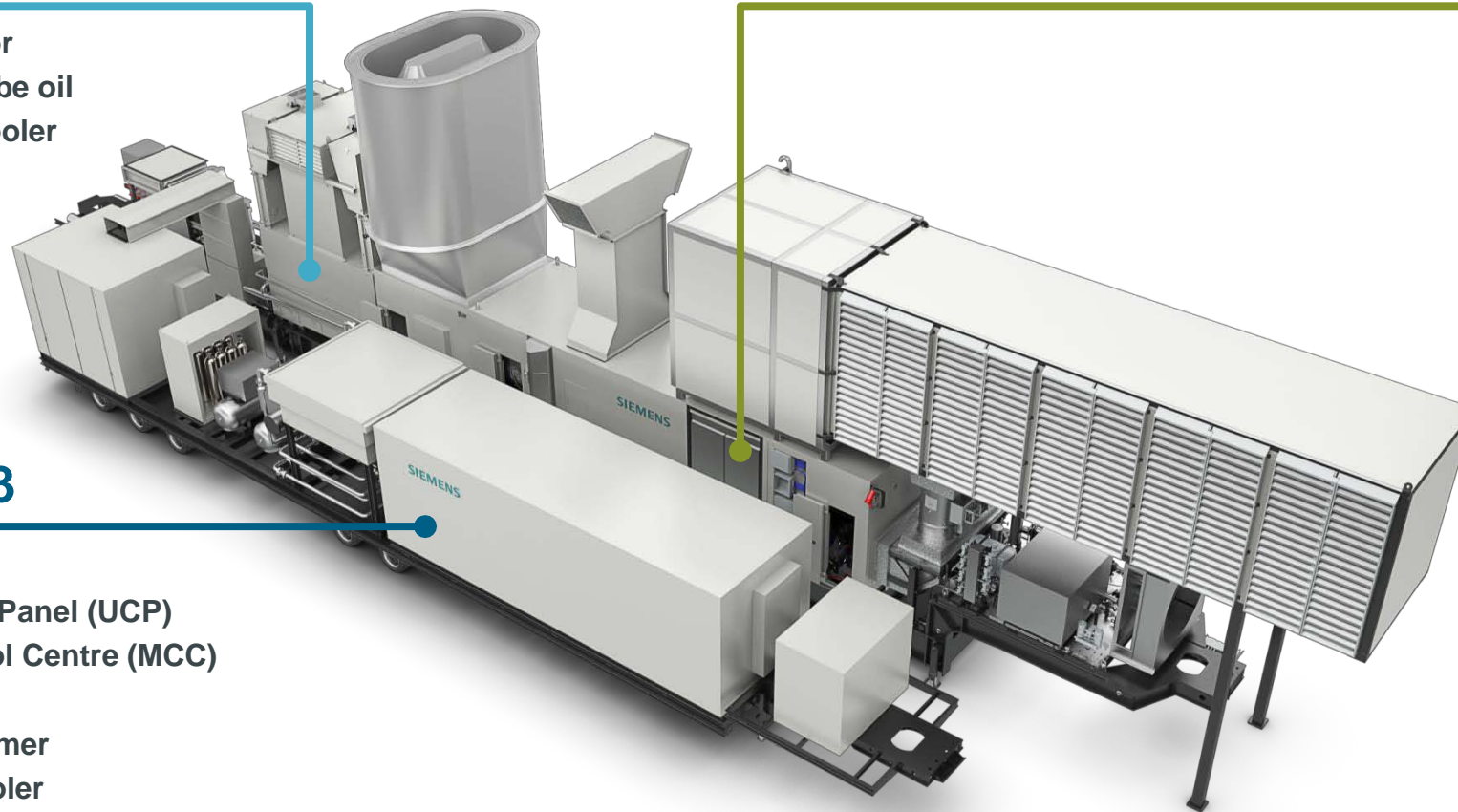
- Gas Turbine
- GT lube oil (synthetic)
- Air inlet silencer
- GT enclosure ventilation
- Fire protection
- Gas Fuel metering
- Liquid fuel/water metering
- Water wash
- Air-blast cooler (GT oil)

Trailer # 3

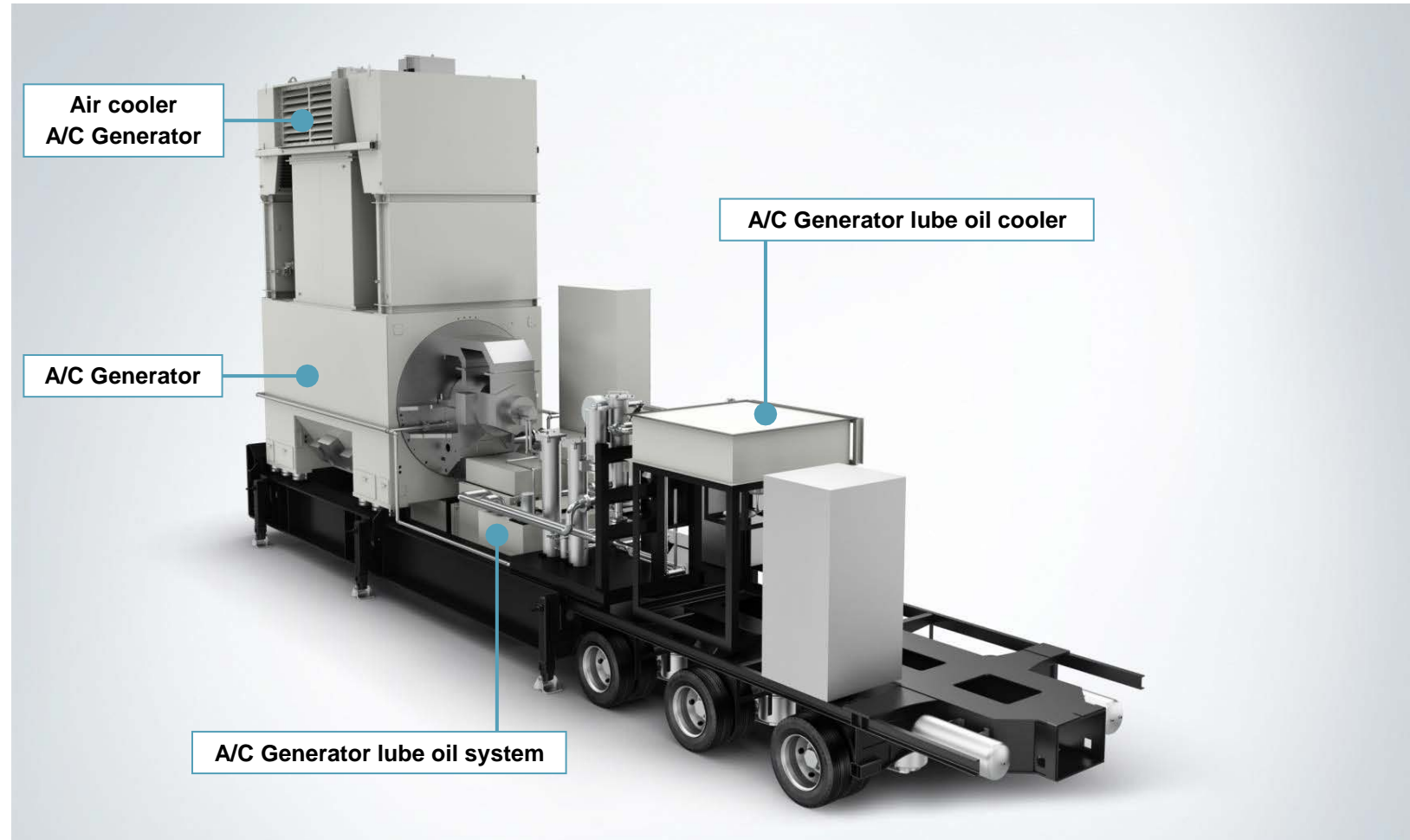
- Switchgear
- Unit Control Panel (UCP)
- Motor Control Centre (MCC)
- UPS
- Aux transformer
- Purge air cooler
- Instrument air compressor

Non-trailerized (ship loose)

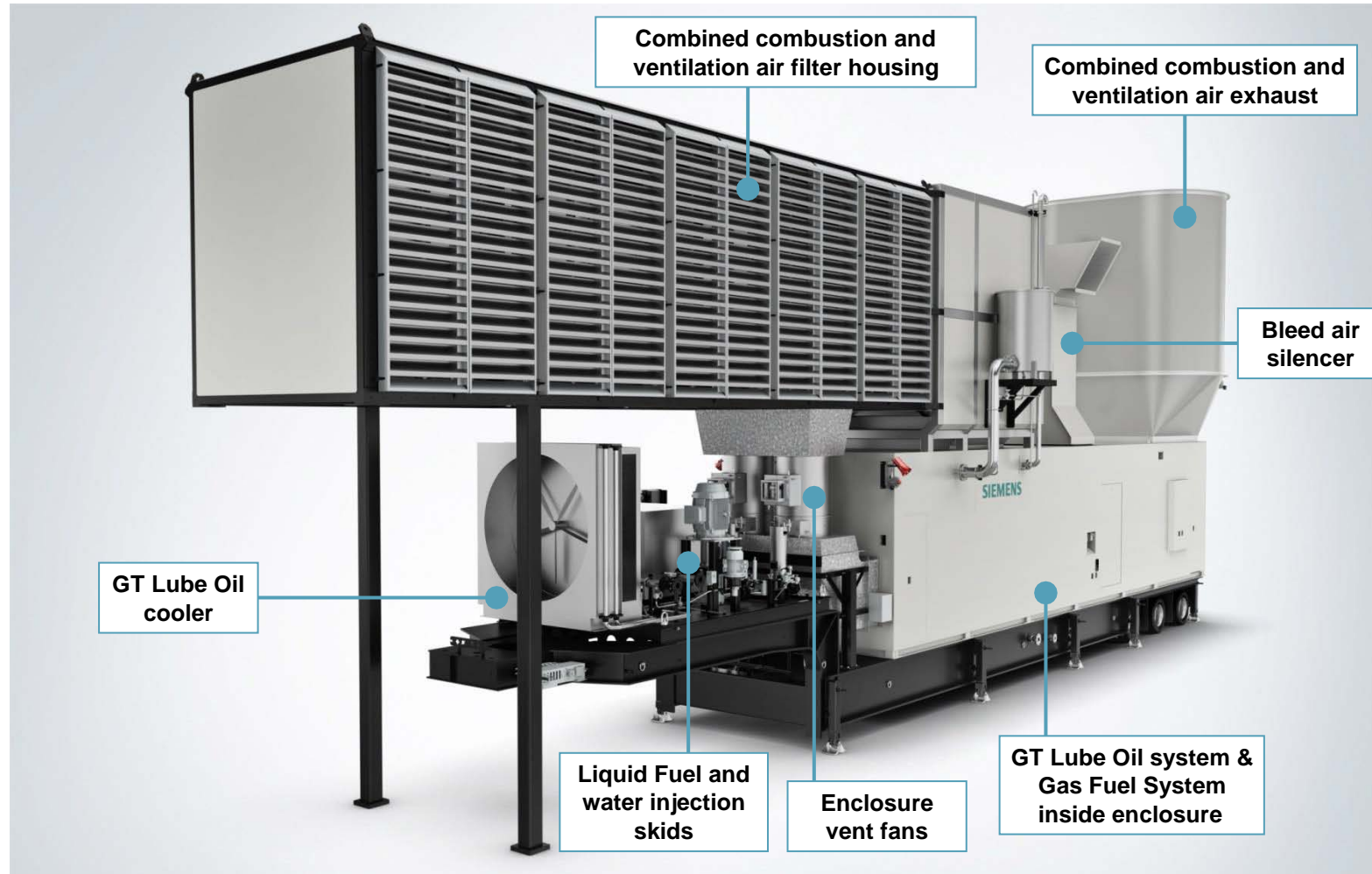
- Air filter
- Exhaust stack
- GT bleed air silencer



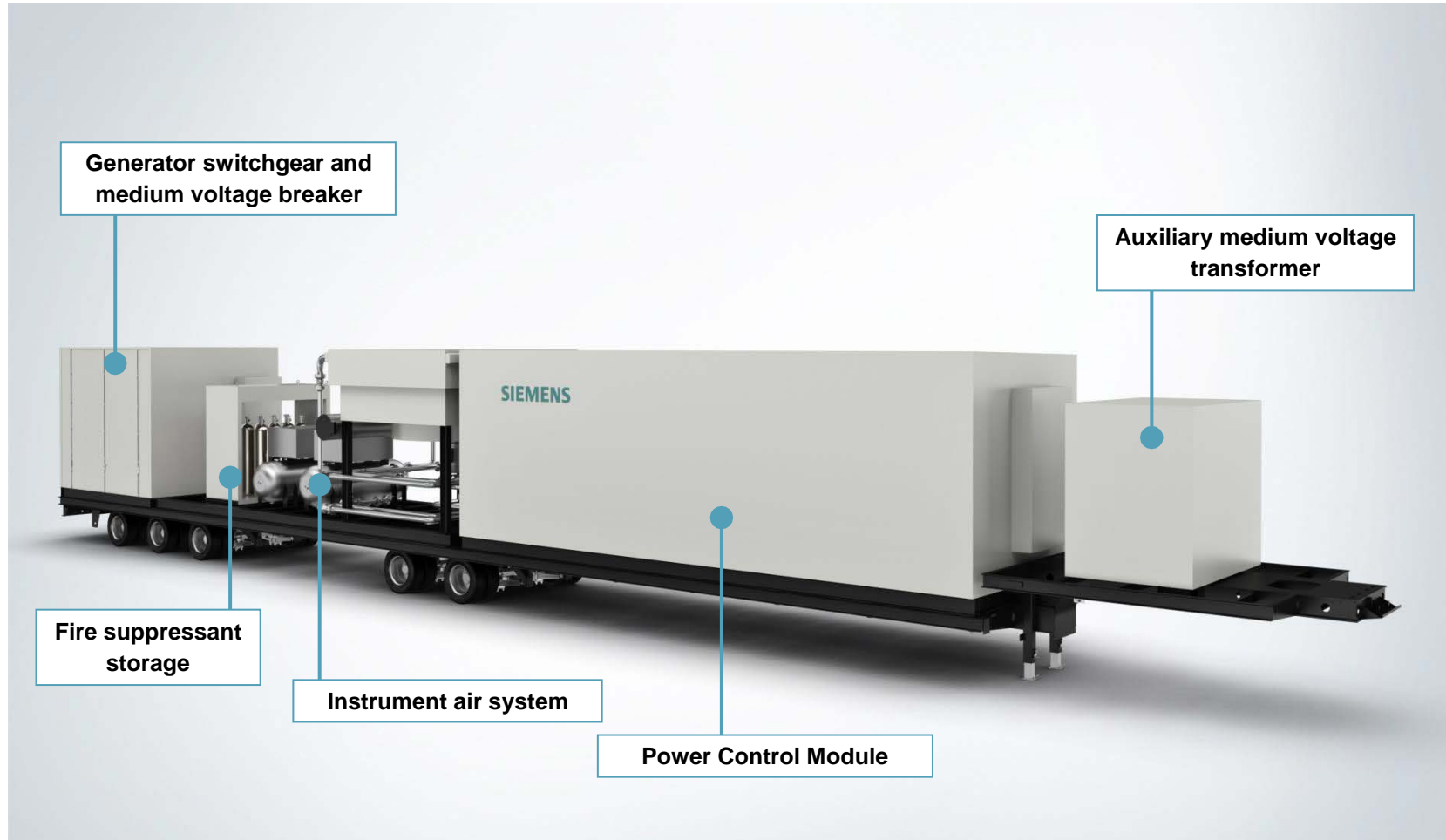
A/C generator systems – Trailer # 1



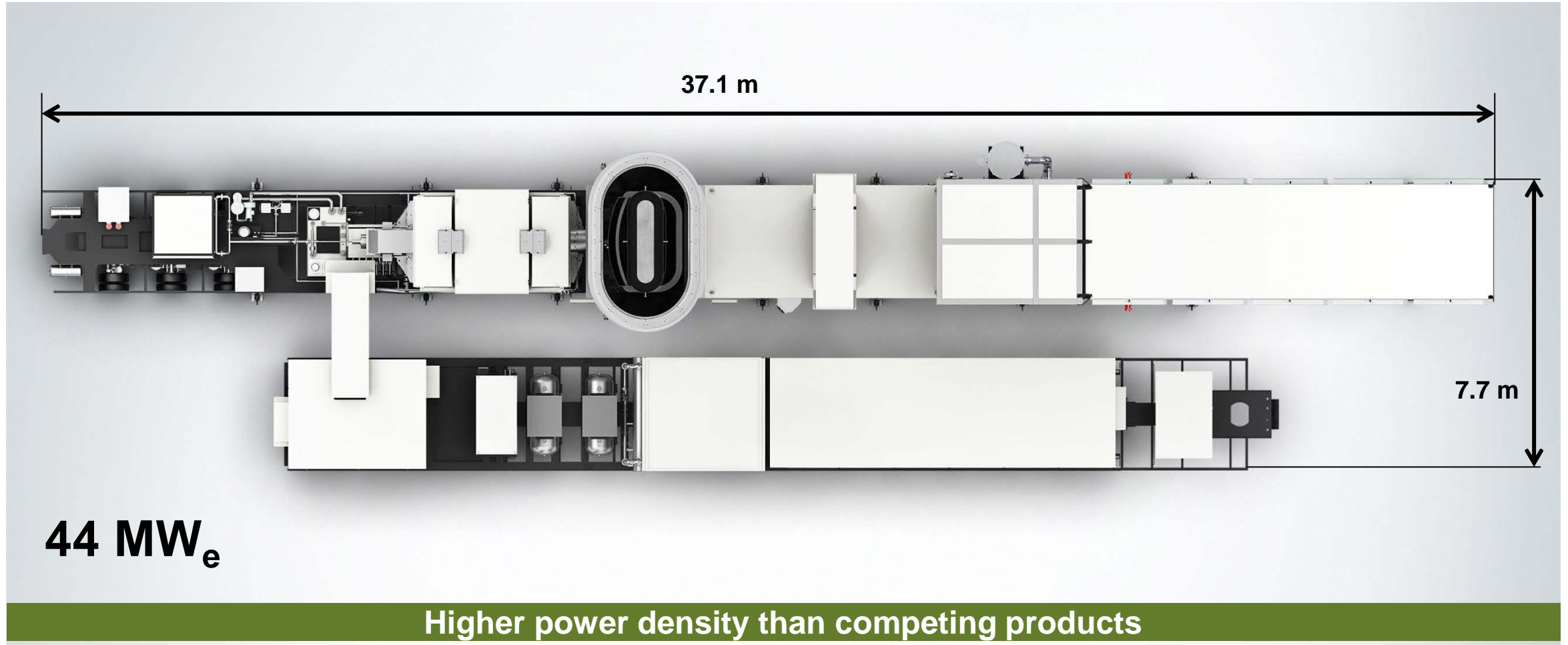
Gas Turbine systems – Trailer # 2



Power Control Module (PCM) systems – Trailer # 3



Package general arrangement



Scope of supply – Standard, options and balance of plant



SGT-A45 TR Mobile Unit

- 44 MW (ISO)
- 50 Hz or 60 Hz
- Liquid and gas fuel
- Emissions to < 25 vppm NOx
- Static air filter

Package options*

- Pulse clean filter
- Cold climate option
- Elevated platforms
- “Black start” kit

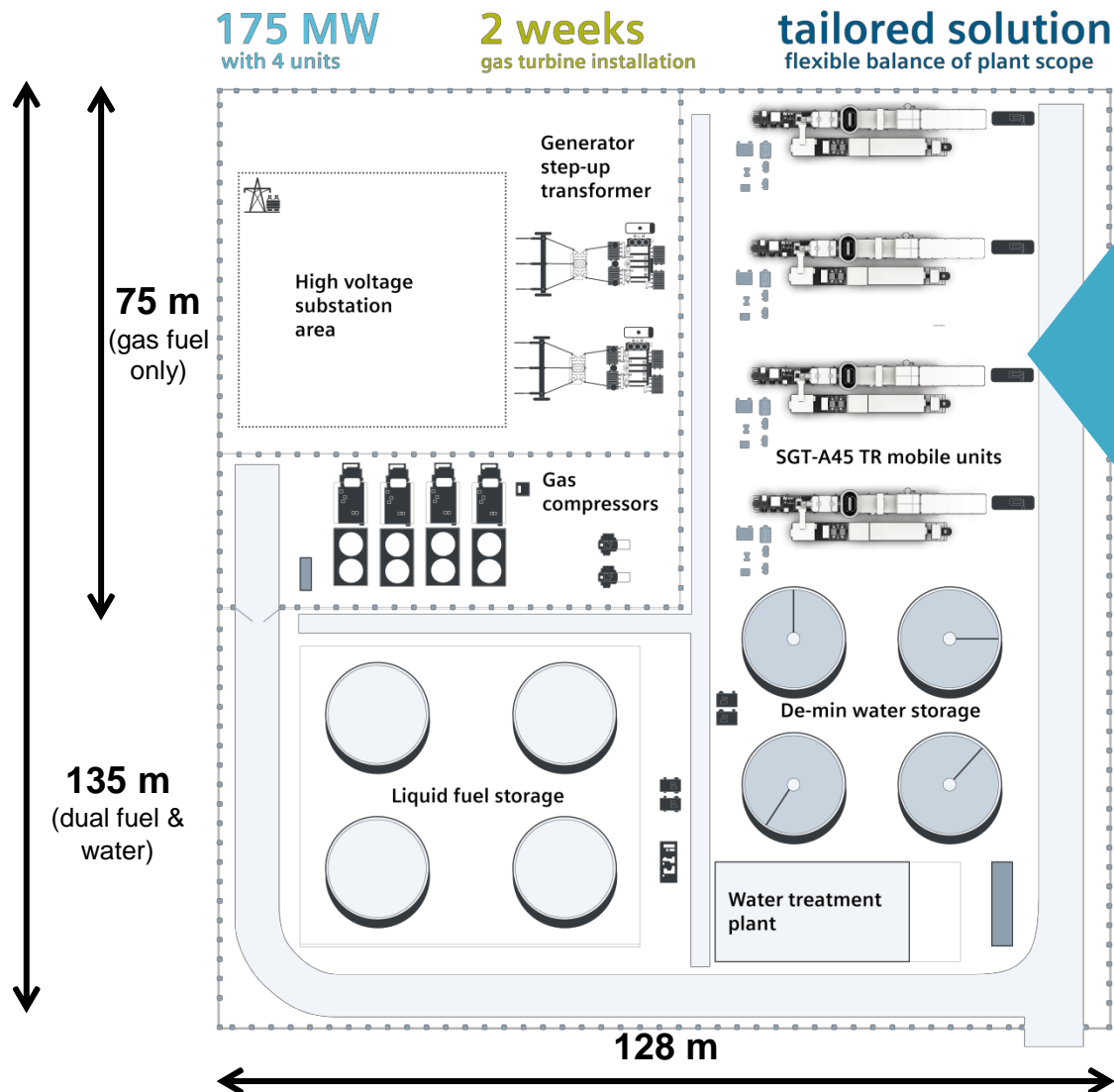
Optional Balance of Plant scope

- Generator Step up Transformers
- Liquid fuel storage and treatment
- De-min water treatment plant and storage
- Natural Gas Compressors and Filters
- ...and more (complete solution)

* Additional cost and lead time

Reference Plant 175 MW (ISO) – 4x SGT-A45 TR units

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Truck access for GT installation

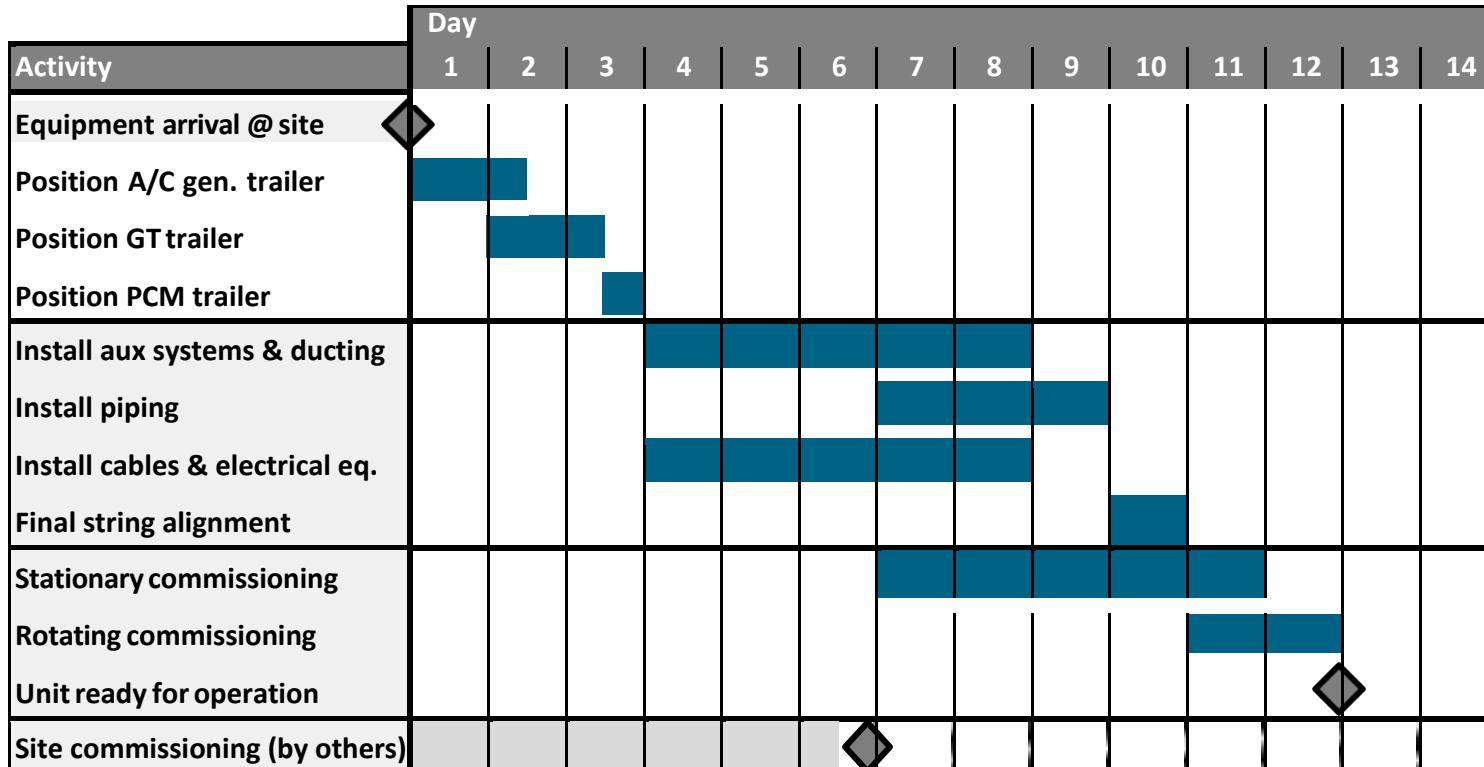
1. A/C generator trailer backed in
2. GT trailer backed in
3. PCM trailer backed in

GT installation only requires access from one side of plant

Site prep/utilities work can progress on the other side in advance or in parallel

Indicative Installation, Commissioning & Start-up schedule SGT-A45 TR Mobile Unit

Below schedule is indicative and not guaranteed. Actual duration depends on site conditions.



Estimated manpower requirements *

- Installation / Commissioning Site Leader
- Siemens Reps Mechanical (1), Electrical (1), Controls (1)
- Crane Operator
- Rigger

Preparation / tooling / facilities (by Customer) *

- Civil works
- Power, water, light, consumables
- Crane (20 t) and non-special lifting devices
- Mechanical working areas
- Office space
- Security, waste disposal, PPE etc.

* Typical requirements. Actual may vary by project

Siemens will typically provide labor required for the SGT-A45 TR package only. Site civil, Utility Grid connections, and miscellaneous site duties are the responsibility of the customer or contracted EPC.

Based on 10-Hr Days, 7 days a week work regime. No contingencies included.

Siemens Power Services (PS) Distributed Generation Portfolio



Comprehensive service for Siemens (OEM)¹⁾ industrial and aero-derivative gas turbines (< 90 MW), steam turbines (< 250 MW) and generators

Service Portfolio (PS DG)



Service Programs

- Long Term Program
- Operation & Maintenance frame- agreements
- Leasing Program



Maintenance

- Field Service
- Overhaul & Repair
- 24/7 Operational Service Desk



Performance Improvement

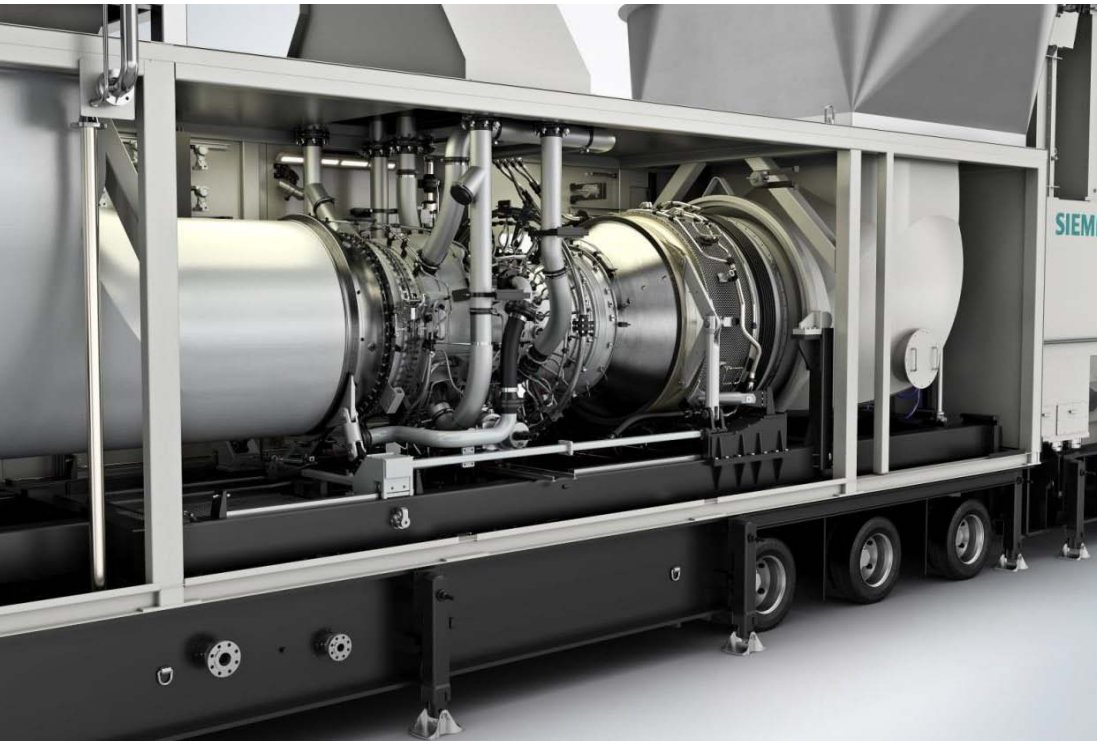
- Lifetime Extension
- Modernization & Upgrades

Training & Consulting

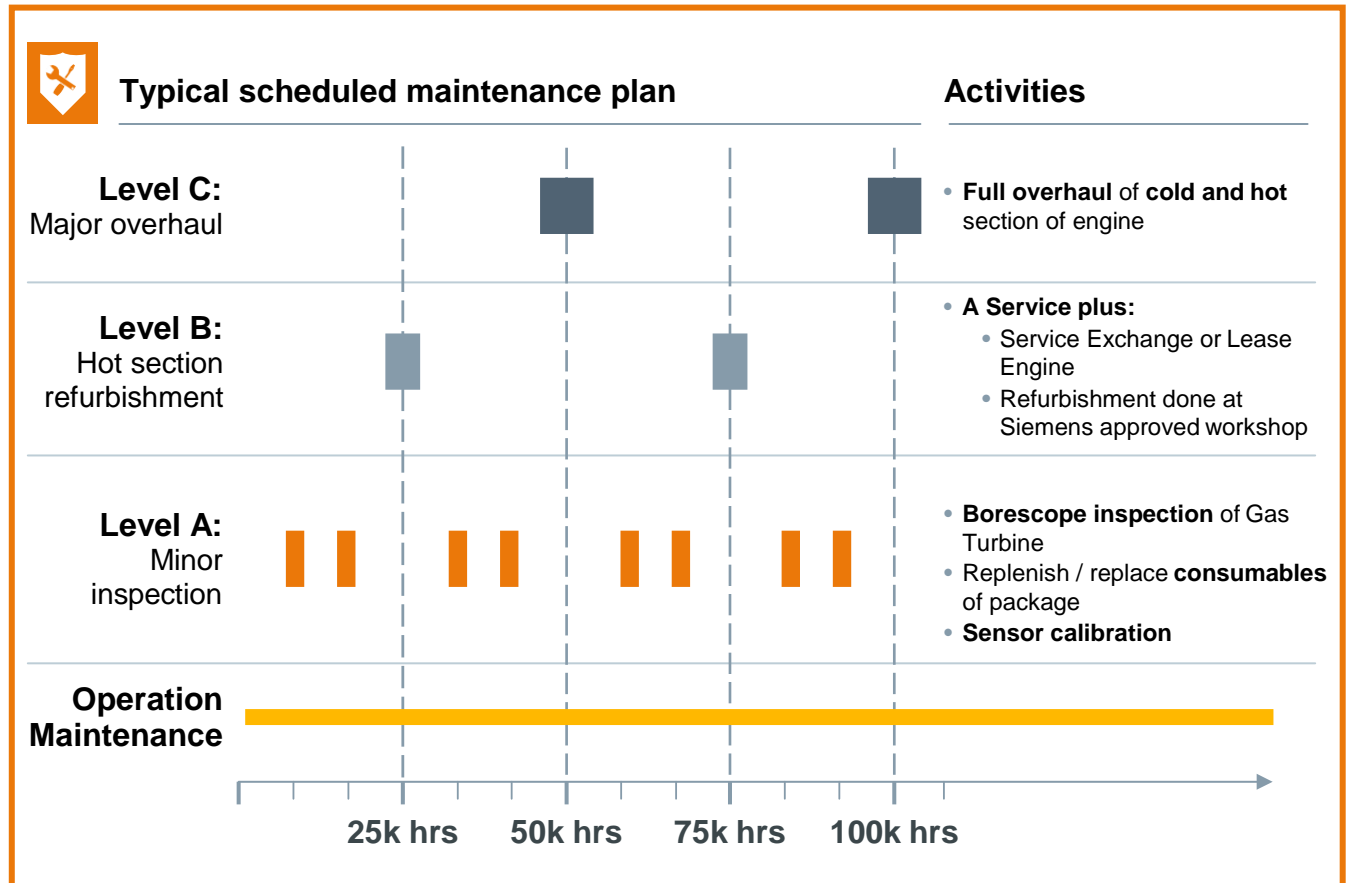
- Training for Customers and Partners on Equipment Operation & Maintenance

1) OEM= Original Equipment Manufacturer

Maintenance Plan SGT-A45 TR Mobile Unit



Lightweight aero-derivative core engine facilitates rapid exchange



SGT-A45 TR mobile unit

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SGT-A45 TR Mobile Unit

Fast Power

2-weeks installation

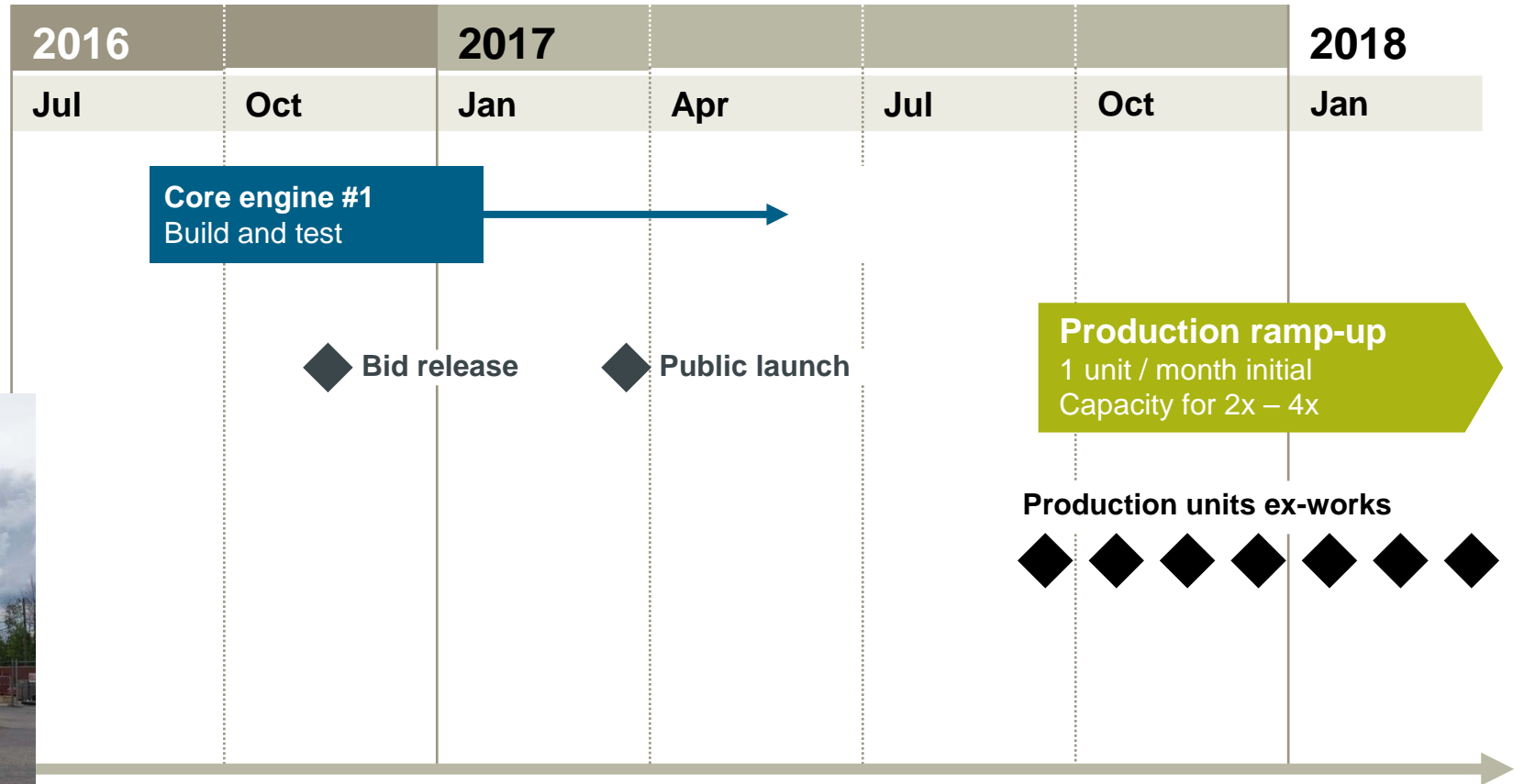
Superior value

More power. Less \$/kW. Less fuel.

Trusted technology

Proven, flexible turbomachinery.

Timeline – Product Introduction



Contact

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