

aggreko

PIEA/WLPGA LPG SUMMIT

Beyond the Kitchen – LPG to Power



KEY FACTS

10 GW

Power in our fleet

£1,760 million

2018 revenue

6,000 employees

Permanent

80 countries

Where we operate

195 locations

Sales and service centres
across the world

aggreko

We provide power globally where there is a gap in supply



Global knowledge, local expertise

A global FTSE250 company, listed in London

LPG CAN BE USED IN POWER, HEATING AND COOLING APPLICATIONS, ALONGSIDE OTHER FORMS OF ENERGY



NATURAL GAS AND LPG

Considerably lower fuel cost compared to diesel



DIESEL

Capable of dealing with large step loads



SOLAR-DIESEL HYBRID

~12% cost savings



BATTERY STORAGE

When rapid response and



LOAD BANK

Used in testing turbines and other power generating equipment



HEAVY FUEL OIL (HFO)

Used for generating base load and where diesel is too expensive



COOLING

Used for mine-cooling, Petchem and refining processes, events



GAS-FIRED WATER HEATER

LPG, Biogas, NG

SERVING MULTIPLE SECTORS – BEYOND THE KITCHEN



We engineer tailor made power solutions to meet your exact **utility** needs

- Supplementing the grid
- Overcoming transmission and distribution limitations
- Seasonal peak shaving
- Power for planned maintenance / unplanned outages
- Bridging power.



We design, manufacture and assemble our own rental equipment, so we understand the challenges and pressures of **manufacturing**. We're skilled at finding creative ways to enhance your processes and overcome power, heating, cooling and dehumidification challenges.

- Industrials looking for on-site modular power generation and fast installation
- Beat the grid
- Support increase production of expansion plans



Power, cooling and heating at every stage of a **mine's** life-cycle

- Off-grid power plants for remote mines
- Power for mine site operations
- Power for new projects / Expansion
- Power for smelters / refineries.



Helping optimise operating costs for **the oil and gas** upstream, midstream and downstream operations

- Flare gas application for cost reduction
- Offshore operations power
- Onshore drilling rigs, and artificial lift systems
- Pipeline construction and operation.



Keeping your **petrochemical and refining** plant safe, online, productive and cost-effective when facing turnarounds and ageing equipment. Our technical expertise and engineers are on hand to assess and advise on how best to remedy your challenges.



Testing your **data centre** power and cooling systems is crucial to ensuring the resilience of your site. Our engineers can design a power solution or put your equipment through its paces with load banks to stress-test your power, heating and cooling kit.



We know the **building services and construction** industry inside and out – which means we can recommend the best generators, heating and drying equipment for the job. Our expert construction team and technical engineers offer hassle-free support to help keep projects on-schedule and within budget.

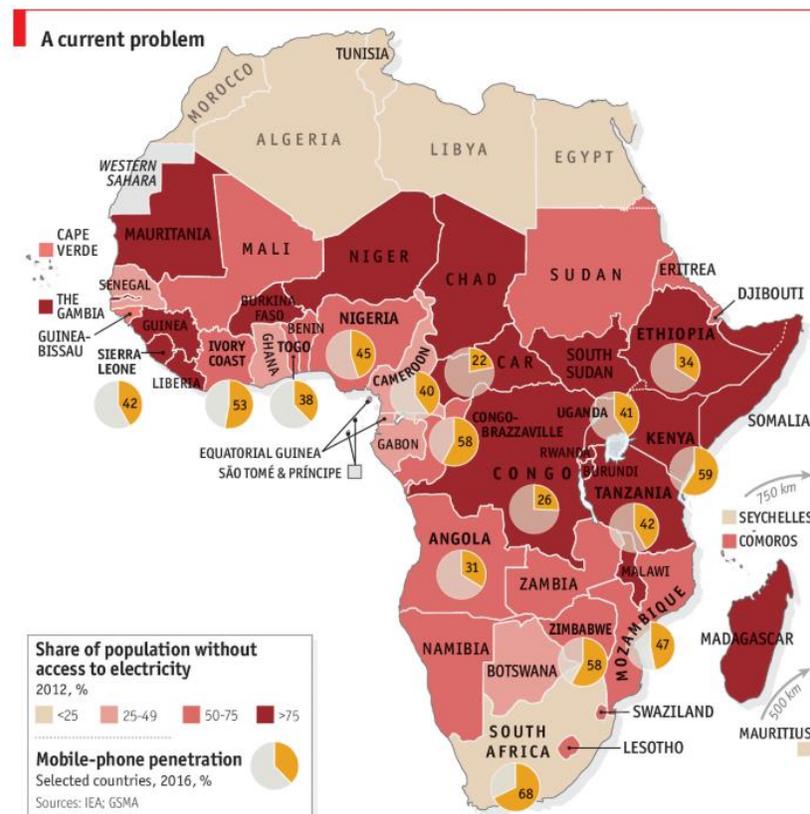
DEVELOPMENT OF INDUSTRIES BEING HINDERED BY LACK OF COST-EFFECTIVE, RELIABLE POWER SUPPLY

- Very low electrification rates in East Africa, and where there are grids, these are often very weak and unreliable – preventing new generation capacity coming online
- Overdependence on hydro-power in drought prone areas
- East African gas boom – Tanzania & Mozambique to become major gas producers; Kenya and Uganda also have large oil & gas resources.
- Natural gas power generation planned but still some years off. Opportunity for LPG to power to bridge the gap until that gas becomes available
- Particularly as LPG infrastructure is developed

....Meanwhile

- Renewable energy, a means to end fuel poverty, remains underutilised due to cost and reliability constraints but it has large potential
- For example, Kenya is establishing itself as a regional hub to attract large infrastructure projects and diversify from its traditional industries of tea and tourism, into data centers, ports, rail, roads and finance
- A rapidly growing technology sector supports an internationally-competitive services sector.
- Being a relatively advanced economy, Kenya could serve as a springboard for international firms looking to enter Sub-Saharan Africa, **but not without a cost-effective, flexible and reliable power supply**

Mobile phone penetration often higher than access to the grid



Benefits

LPG for power, heating and cooling



Availability

LPG is available in over 140 countries compared to significantly fewer with Natural Gas and logistics costs are typically lower keeping delivered costs lower



Rapid response

Fuel is available at short notice and can be delivered and installed rapidly to meet customer needs



Lower emissions

LPG has significantly lower emissions than liquid fuels



Pricing

The growth in shale activity has led to an abundance of LPG with positive impact on price for LPG to power and heat



Guaranteed reliability

Gas engines and storage will provide the needed flexibility to integrate renewables and guarantee reliability, running our heating and cooling systems



Bridging solution

While waiting for LNG and/or permanent infrastructure to become available

Ideal for smaller, decentralised, lower emission generation, heating and cooling

PROJECTS



Case studies

ST CROIX – 20 MW OF LPG POWER



THE CHALLENGE

St Croix has a long-term plan to revamp current ageing inefficient power infrastructure. In 2017 one of their power generators suffered mechanical failure and a new power plant was required to avoid power shortfalls.

They also needed cleaner energy, to cut costs and to comply with Environmental Protection Agency regulations.

THE SOLUTION

We delivered 20 MW of power to replace the defective plant using Liquefied Petroleum Gas (LPG) to power our efficient gas generators.

THE IMPACT

The solution doesn't just bring reliable power, it also lowers emissions providing cleaner power for the island and most importantly – at a lower total cost of energy to both our customer and their end users.

The island will benefit from savings of around 6 million USD in first two years.

DATA CENTRE – IRELAND



THE CHALLENGE

When the customer began development of a new data centre in Dublin, it found that it could not be connected to the power grid. Instead of putting off construction until the grid had caught up with demand, they decided to find a bridging supply that could support the site until grid connection was complete. The supply needed to be reliable enough to hit data centre tier requirements, use green technology and efficient fuel could meet stringent EU standards on both emissions and noise and able to ramp up its power load as the data centre became fully active.

THE SOLUTION

The solution came in the form of our clean gas-to-power technology, which met all the site's environmental requirements, while also offering low capital costs and - due to favourable gas prices - an operating cost competitive with that of a conventional grid connection, making it highly cost effective, as well as reliable and scalable as the site's power needs grew. We supplied and installed 12 next generation gas (NGG) engine generators. There were able to supply 12 MW of load to the site, with spare capacity for redundancy as well as site services.

THE IMPACT

The site was able to operate completely independent of a grid connection. The sets were ready to run in 12 weeks, compared to facing a 2 year estimated delay for grid connection. The deal also covered remote control capability for the equipment and 24/7 on-site presence, ensuring that the data centre was always guaranteed the power it needed to operate.

AGGREKO

**Multi-gas fuelled
mobile power plants**

GAS GENERATORS

GE JE420C

Engine

42-43 %

Electrical efficiency (genset terminals) ISO3046

Variety of gas type

LNG, CNG, LPG, APG

1500 kW / 1360 kW

Engine output at @ 50 HZ
/ 60 Hz

0 %

Power derate at 35°C

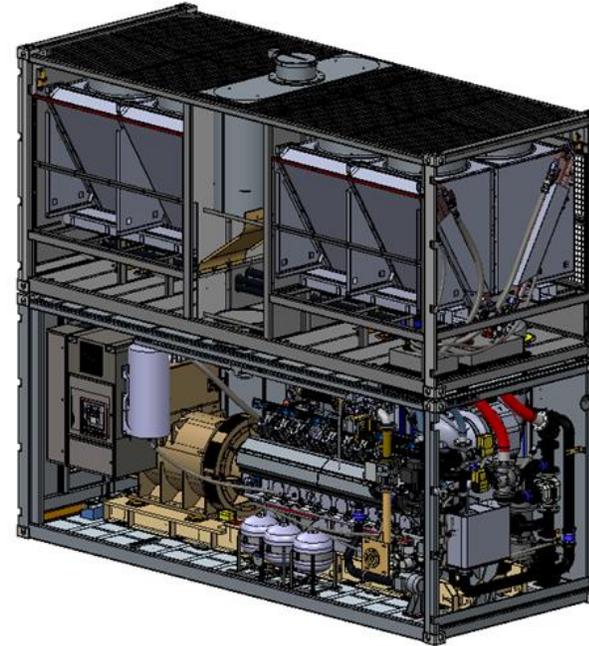
2 mins

Ramp up time to full power

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Aggreko Efficient Gas Generators

Our NGG Generator set consists of two 20ft ISO shipping containers

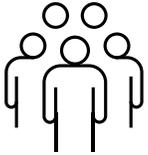


- Upper container houses the cooling system, maximises the cooling area, minimises parasitic load while minimising noise emissions
- Lower container houses engine and alternator, designed for easy servicing and air entry at both ends maximises cooling hence efficiency



Working with us

WORKING WITH AGGREKO

The Aggreko logo is displayed in a bold, orange, lowercase sans-serif font in the top right corner of the slide.

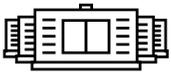
Local Expertise

Aggreko already has years of experience working over 80 countries across the world.



Flexibility

Our efficient gas generators have the flexibility to run on a range of different gases and has optimised engines to minimise derate using LPG.



Industry agnostic

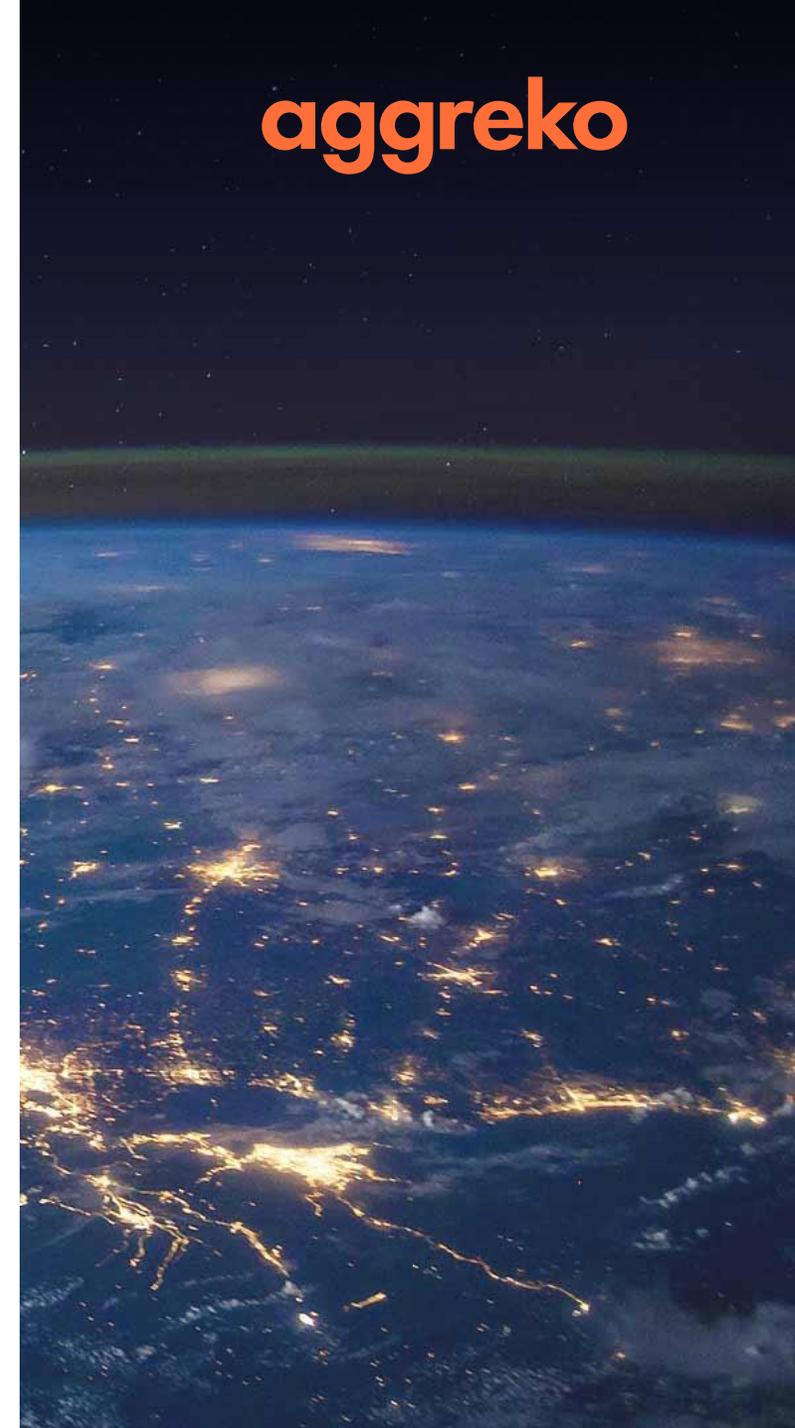
The application is suitable for – utilities, the entire range of manufacturing, mining, oil & gas, petrochemical and refining, building & construction, food and beverage, data centers.



Customer needs

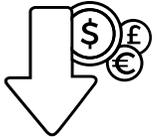
- Fast installation
- Beat grid prices or lower fuel costs and increase competitiveness
- A stable power supply or supplemental power during peak times
- Power in remote or off-grid regions
- Additional power for expansion
- Emergency power

(Cont.)



WORKING WITH AGGREKO (CONT.)

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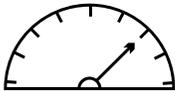
Potential savings

Based on current diesel and LPG prices in many regions, a 20MW power plant could save ~37% on the cost of electricity for one year. That's around \$11m*.



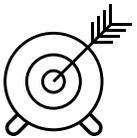
Turnkey solution

From engineering and design, system configuration, site preparation, commissioning and operation, to remote monitoring and maintenance.



No CAPEX

Working with Aggreko eliminates the need for capital expenditure when purchasing equipment. It incurs no large down payments or interest costs and preserves your borrowing capacity.



Commercial Flexibility

Need to increase or decrease how much equipment is required during the contract? Need flexible commercial terms? We can work with you to agree flexible terms.

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Thank you

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