ComAp
The heart of smart control

InteliBifuel Solutions

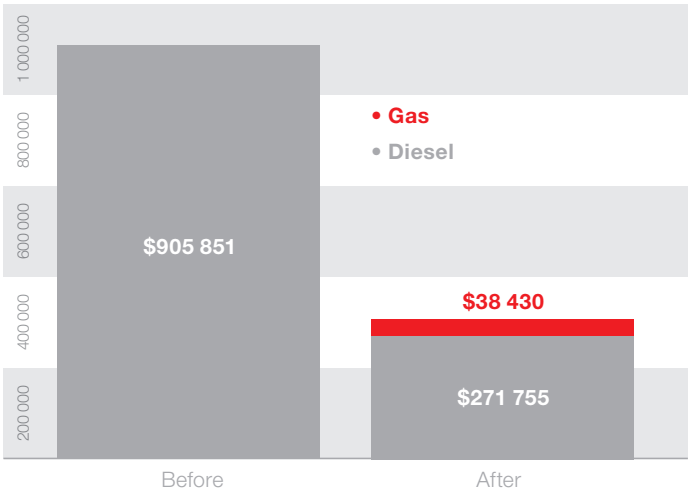
Generate electricity using gas that is usually flared That's smart control

InteliBifuel solutions

ComAp's simple bi-fuel conversion modifies your original diesel power generation engine so that it uses natural gas as the main fuel - substantially reducing operating costs. It works by introducing gas into the engine and then electronically controlling gas flow dependent on engine speed and output.

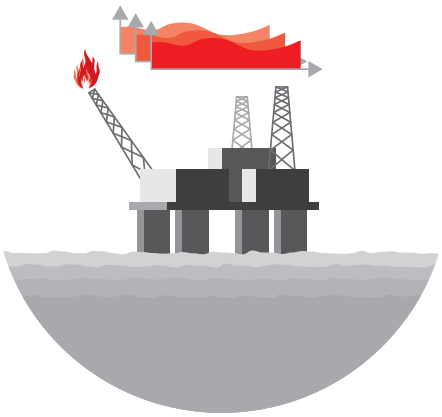
What ComAp offers

1 Lower fuel costs



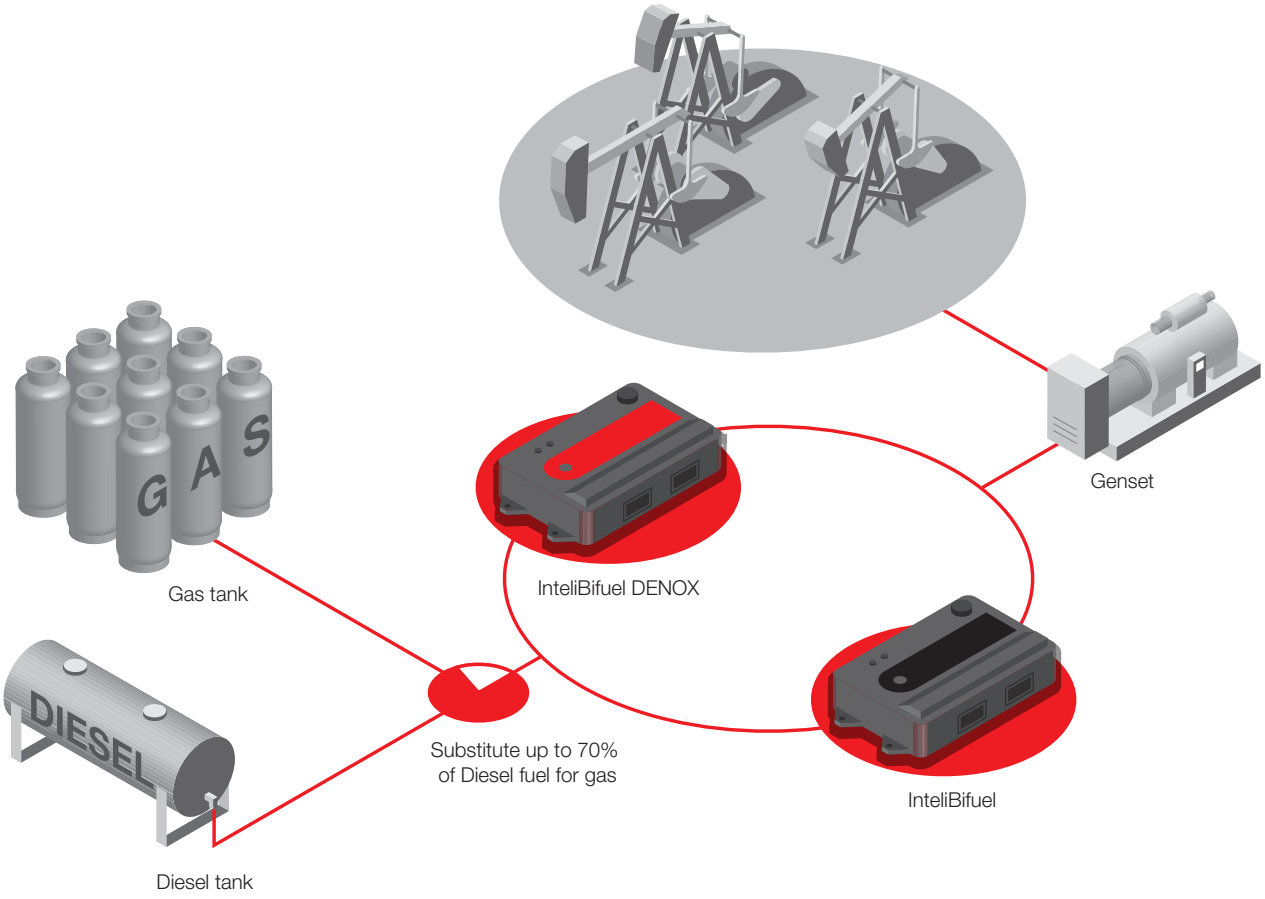
- > Up to 70% diesel consumption replaced by gas
- > Dramatically reduced operational costs
- > Enables the ongoing use of existing assets
- > Reduced maintenance costs – no ignition system
- > Seamless and automatic changeover to 100% diesel operation

2 Simply adaptive

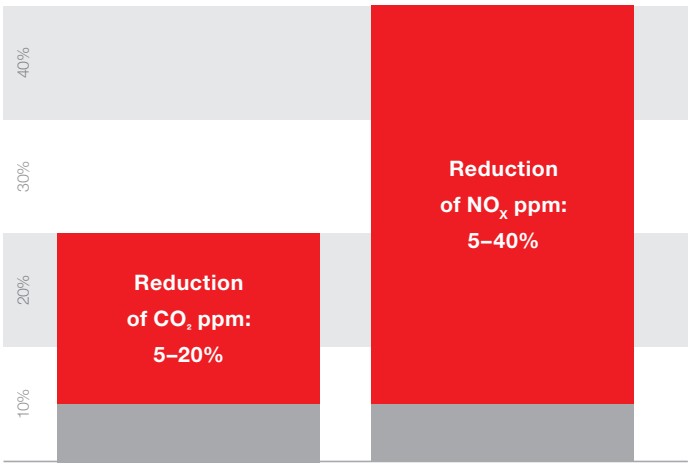


- > Fully automatic compensation for changes in:
  - gas quality (typically Oil&Gas applications)
  - gas pressure
  - temperatures
- > Ensure best performance in every situation

How does it work?



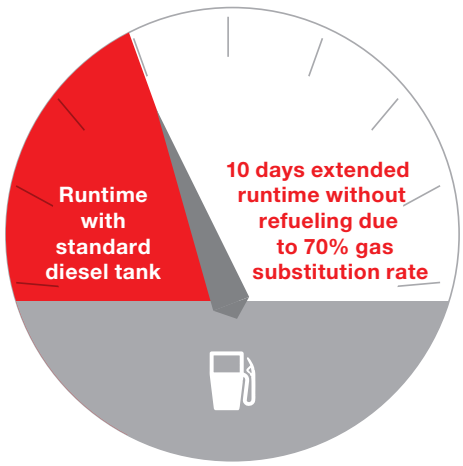
3 Environmentally friendly



Typical emission reductions with ComAp InteliBifuel conversion

- Significant reduction in engine emissions
  - NO_x, PM
  - SO_x, CO_2
- Increases CO
- With the use of a catalytic converter, can reduce CO

4 Fuel flexibility



- Extended run times without refueling
- Smooth transition between diesel and Bi-fuel mode at any time
- Maintains the output of the diesel engine
- Maintains the transient performance of the diesel engine

Solutions

Small Single Speed Engines (up to 500 kW)

InteliBifuel LITE packages are cost effective, compact solutions designed for single speed Bi-Fuel applications at nominal output power of up to 500 kW. They are available in two variants: InteliBifuel LITE 100 and InteliBifuel LITE 500, for engines up to 100 kW and up to 500 kW respectively. These solutions are perfect for the Rental market or any other Power Generation applications using any type of gas.

- High or low pressure single point gas injection technology, gas injected before or after the turbocharger
- NEW algorithm with automatic compensation for gas quality changes
- Easy installation and commissioning
- Harsh environmental design
- IP-69 enclosure fits to any application
- Compatible with InteliVision displays

Single speed engines

InteliBifuel package is a fully programmable solution designed for any single speed Bi-fuel application, with its features perfectly suitable for Oil & Gas, Mining and Rental applications.

- NEW algorithm with automatic compensation for gas quality changes
- Enable factory setting of Bi-fuel system
- Simplified installation and commissioning
- Extended PLC logic and history
- GPRS/GSM remote monitoring
- IP-69 enclosure fits to any application
- Optional high pressure single point gas injection after turbocharger
- Compatible with InteliVision displays

Variable speed engines

InteliBifuel MOBILE package is a fully programmable solution designed for any mobile variable speed applications as Mine haul trucks, Frack trucks, Locomotives or Marine propulsion engines.

- Fully configurable 3D maps
- IP-69 Harsh environmental design allows full integration in applications with limited space
- Remote monitoring
- GPRS/GSM remote monitoring
- GPS Location
- Extended PLC logic
- Extensive history records
- Optional high or low pressure single point gas injection technology; gas injected before or after the turbocharger
- Compatible with InteliVision displays

Integrated solution for Power generation

Fully integrated solution combining features of the InteliBifuel LITE or InteliBifuel controller with Antiknocking protection system InteliBifuel DENOX and the power generation controller InteliGen^{NT} BaseBox with InteliVision 5. It offers our customers a single interface for both applications. This integrated solution is suitable for applications with limited space (such as Rental) or any other Power generation application, from stand-by power, right up to multiple engine parallel operations.

- Integrated system allowing up to 64 generators paralleled on a single bus
- Isochronous load sharing, DROOP or Emergency DROOP and Power management
- Single and Multiple genset operation
- Automatic priority swap and Redundant communication
- Automatic system addressing for ease of installation and adding removing gensets from site
- InteliVision family displays bring the controls to one HMI (InteliVision 5 – standard; InteliVision 8 – optional)
- InteliGen and InteliBifuel share system and critical information for integrated power generation and Bi-fuel control in one package
- Display of critical power, engine, alternator and Bi-fuel data, with customizable screens
- Remote monitoring from WebSupervisor and remote access via AirGate
- Ready to incorporate renewable energy sources

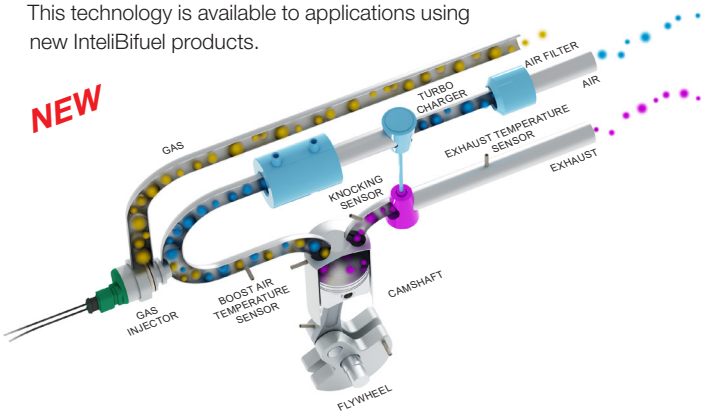
Technology principle

ComAp Bi-fuel high pressure single point injection system

Together with ComAp's new generation of InteliBifuel controllers we have developed technology capable of delivering gas into the engine via high pressure injectors.

Single point injectors are placed after the turbocharger enabling the ComAp controller precise gas portion control with higher efficiency and increased safety. Simplified gas delivery into the engine air manifold offers ideal cost effective solution.

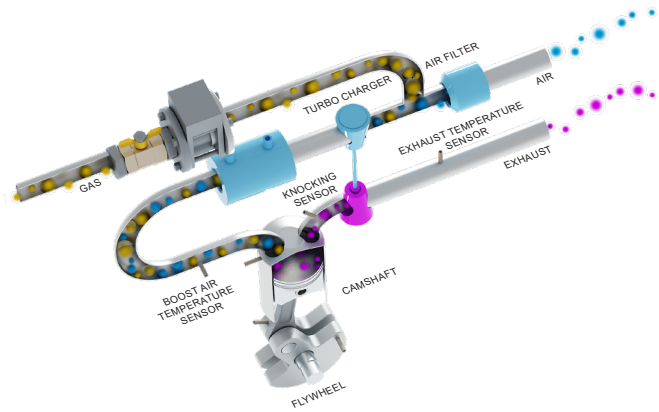
This technology is available to applications using new InteliBifuel products.



ComAp Bi-fuel low pressure fumigation system

This system has been in use for many years and is widely used for high-speed engines. Gas is introduced into the engine before the turbocharger and controlled by a gas throttle valve.

This system is suitable for applications where the high-pressure single point injection system is not suitable.



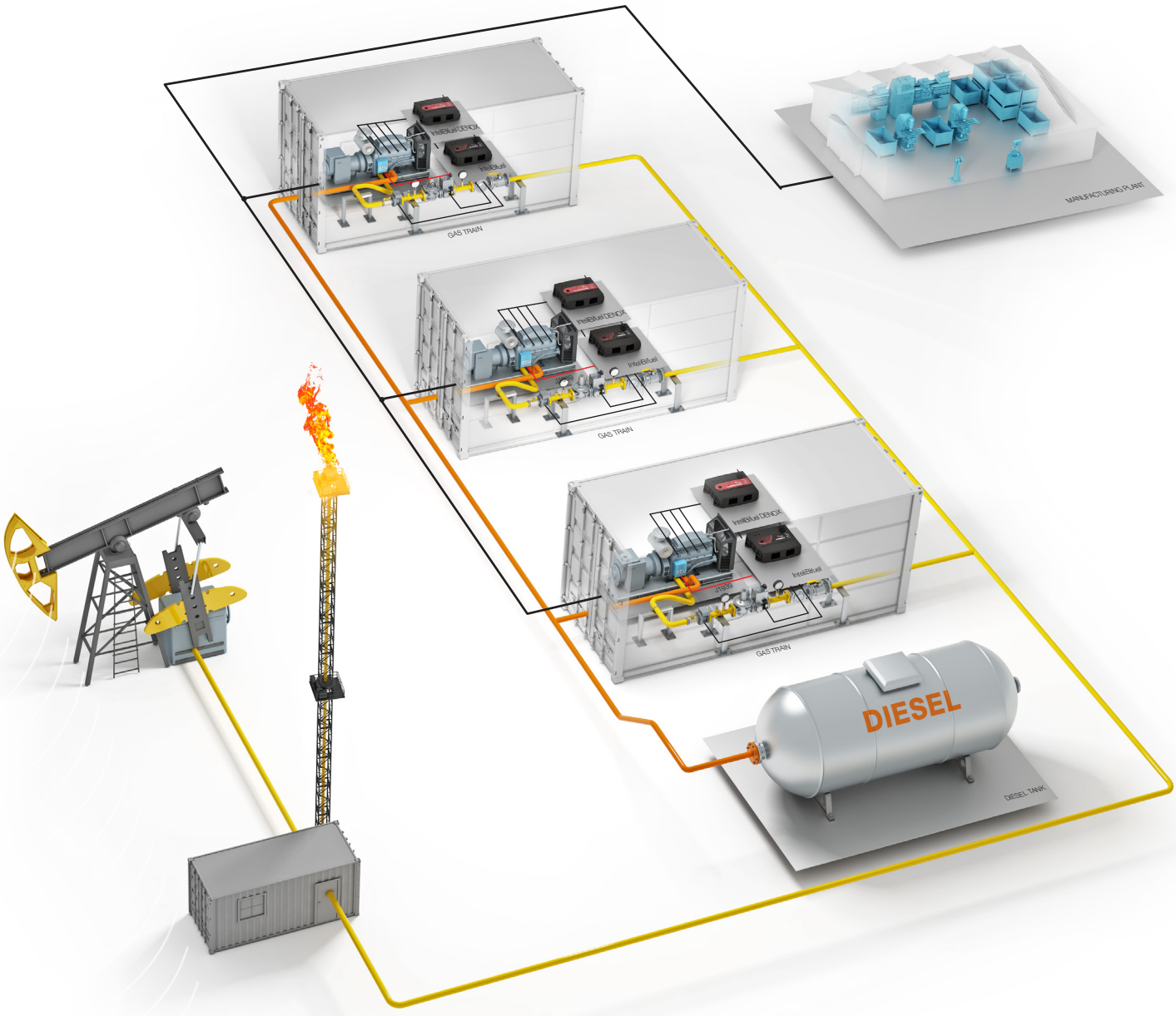

We can replace
up to 70% of diesel
consumption with gas.
That’s smart
control

Applications

Power generation using flare gas

In this application the Bi-fuel system uses flare-gas to substitute the diesel portion of the fuel. This application is particularly efficient as it uses gas that would normally be burned as a waste product during oil production.

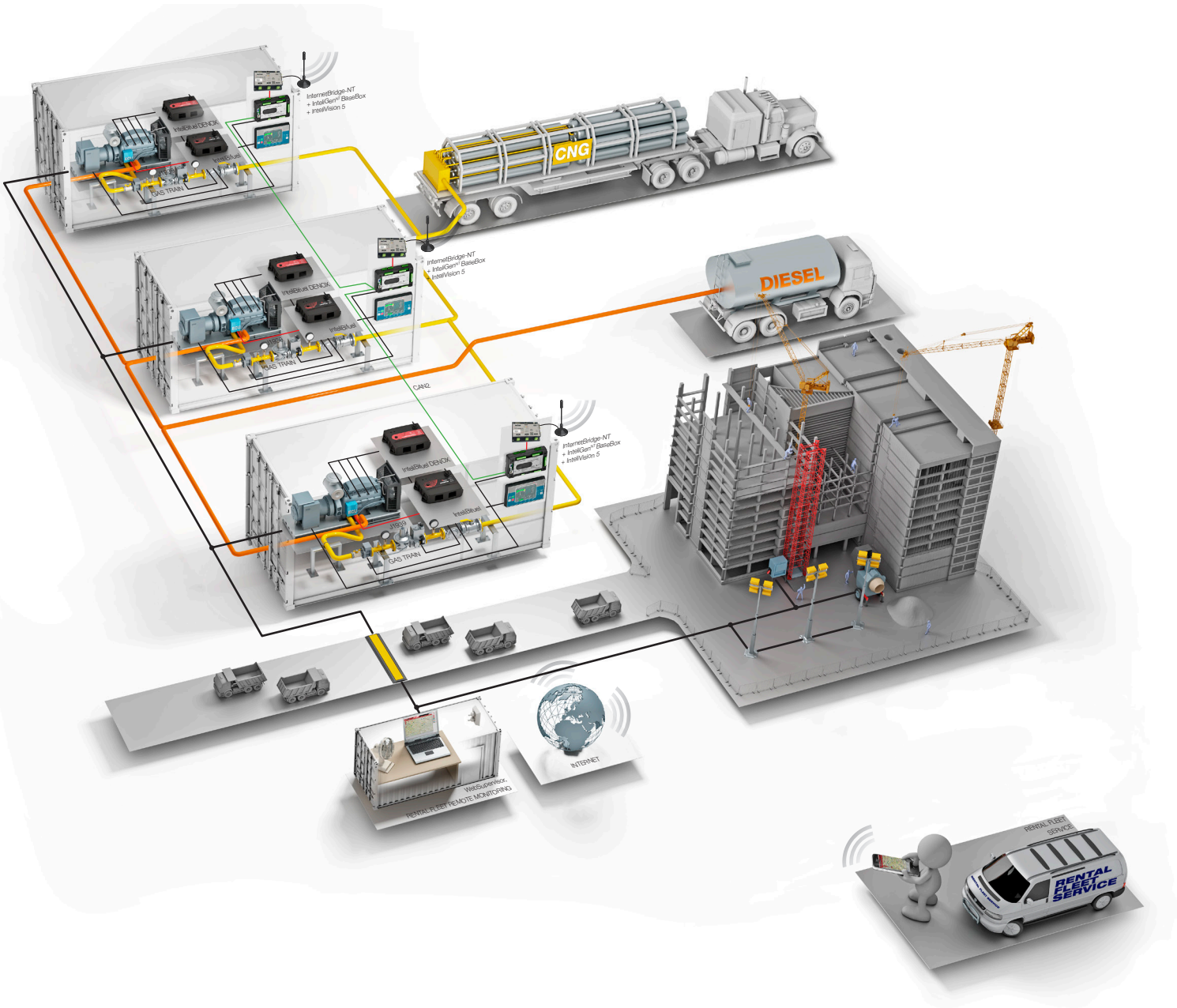
ComAp InteliBifuel solution with new algorithm is able to react on various gas quality to set up the optimal diesel/gas ratio to provide the best possible performance and safety during Bi-fuel operation.



Virtual pipeline gas distribution

In many places of the world gas infrastructure is not well established yet and gas distribution is available through CNG or LNG virtual pipeline by trucks. InteliBifuel is great option how to use gas from virtual pipelines and enable to any diesel generator to run back on 100 % diesel.

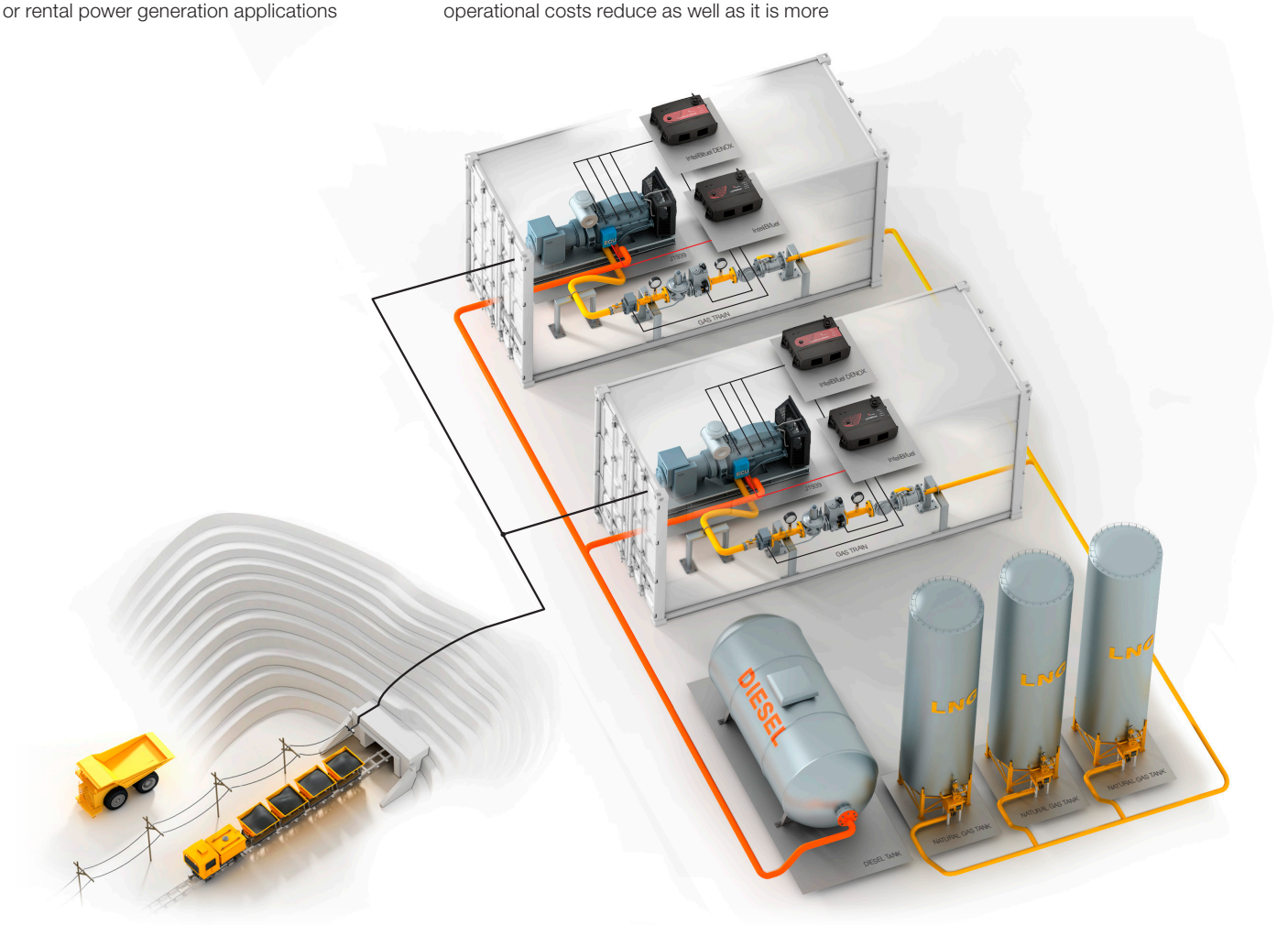
The ComAp unique integrated solution controls the diesel/gas ratio, as well as controlling the paralleling of the generators, which can all be monitored from a single control point.



Remote mine power with stored gas

In this application natural gas is provided from on-site storage tanks, alongside the standard diesel tanks, which are refilled as normal. This is particularly useful for ‘semi-permanent’ or rental power generation applications such as mines, holiday resorts or long-term construction sites.

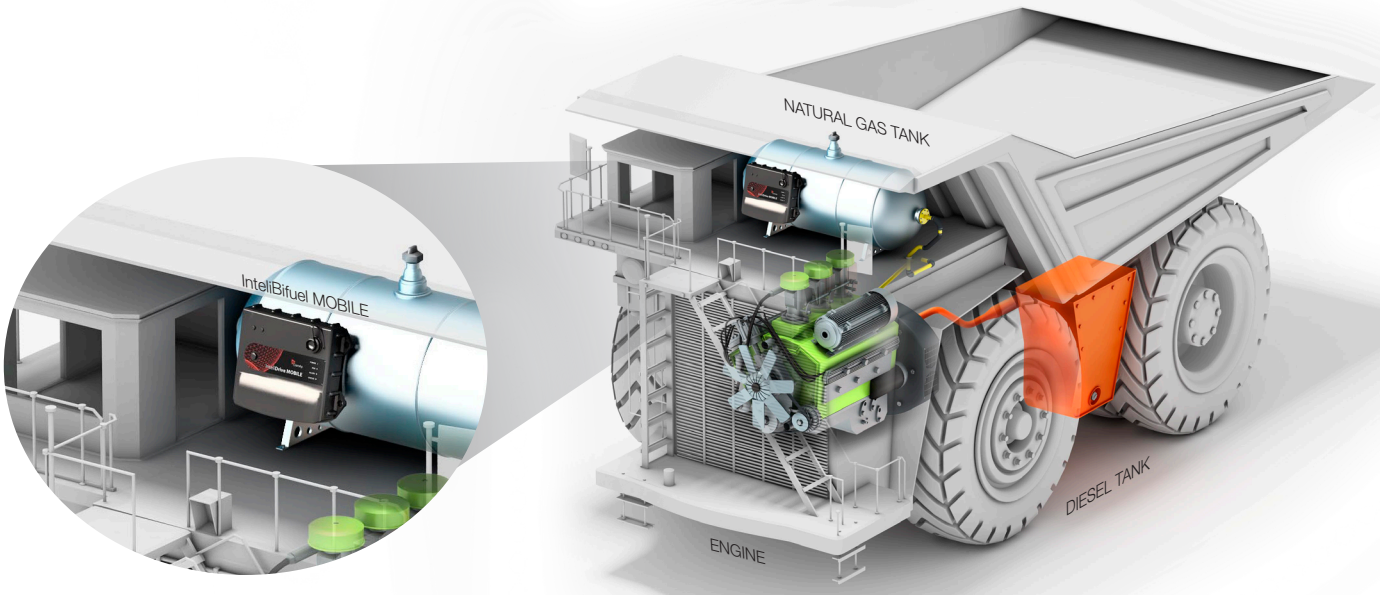
The ComAp Bi-fuel solution brings operational costs reduce as well as it is more environmentally friendly. Up to 70 % diesel fuel is replaced by LNG. There is significant reduce NO_x, PM, SO_x and CO_2 emissions compare to 100% diesel operation.



Bi-fuel conversion of a mine haul truck

As diesel is one of the major costs in any mine site, ComAp’s bi-fuel conversion has recently been adapted for use on mobile machinery such as haul trucks, which will provide operators with significant financial savings.

It works in much the same way as with other ComAp bi-fuel conversions, but specially designed 3D algorithm allows for the changing power demands from a vehicle engine. The solution is adapted in InteliBifuel MOBILE and is perfectly suitable for all variable speed applications as mine haul trucks, locomotives, pumps for fracking or marine propulsion engines.



References

Ghana

Trojan Power
25 megawatt Bi-fuel conversion

Trojan Power, a wholly owned, independent power generation company in Ghana, Africa have completed ComAp's largest Bi-fuel conversions to date.

Twenty four Caterpillar C32 and eight Caterpillar 3508 generators were converted to Bi-fuel for a total power output of 25 megawatts. The 32 bi-fuel generators are housed in two power houses with 16 generators in each and regularly function at a 70 % gas to 30 % diesel ratio, giving significant financial savings.

This huge power plant quickly provides reliable power for the surrounding area for customers who were previously relied on aging mains power electricity infrastructure.

Mexico

Ottomotores
Pre-installed Bi-fuel generators

Ottomotores, Mexico's largest genset packager offers ComAp's Bi-fuel solution as a standard package in new generators that they sell across Latin America. This allows their customers to begin saving on diesel immediately as there is no conversion payback period – they just start using the generator on gas and diesel.

Ottomotores regularly supplies generators from Cummins, Perkins and MTU, that are ready-converted to Bi-fuel and ready to provide their customers with significant financial savings.

Sudan

TPI Power Group
Flare gas used for Bi-fuel at a Sudanese power plant

TPI Power Group, based in the Netherlands, converted a power station in Sudan, Africa using ComAp's Bi-fuel controllers.

Six Caterpillar C32, 1000 kVA, 1500 RPM generators, were converted to Bi-fuel. The gas being used is associated gas from oil production and would normally be disposed of by flaring as waste product. Using this gas results in significant financial savings at this site.

The achievable gas rate with associated gas depends on the ambient conditions, engine load and raw gas composition. The ComAp controller allows for continuous optimization of the gas rate within set safe limits. In this case fuel cost savings between 35 % and 50 % have been proven possible.

Jobert Zijlstra, Technical Manager at TPI Power group says:
"The flexibility of the ComAp Bi-fuel controllers allow me to design and program conversion sets for a wide range of conditions".

Indonesia

United Tractors
Mobile Bi-fuel in mining

ComAp has been working with United Tractors in Indonesia on a project to install a new InteliBifuel MOBILE conversion system in mine haul trucks that are used in many mines throughout the country.

Due to the mining industry being heavily reliant on these trucks to move excavated materials around mine sites, any cost savings on fuel can provide a significant financial benefit. These trucks are one of the largest fuel cost contributors in any mine site, so utilizing ComAp's Bi-fuel conversion system brings huge cost savings based on the cheaper cost of natural gas.

This pilot project, with its 250 trucks in first phase, has the potential to expand across other types of trucks and industrial vehicles, providing significant cost savings for many different industries.

Products

InteliBifuel LITE

- Cost effective, compact controllers InteliBifuel LITE 100 and InteliBifuel LITE 500 are designed for single speed Bi-Fuel applications at nominal output power up to 100 kW and 500 kW respectively.
- USB and RS485 communication line with Modbus
- J1939 and Modbus ECU comm. support
- Running-hours meter, fuels consumption indication
- 9 Binary inputs for contacts switching to battery
- 8 Binary switches configurable as: Hi/Low-side or PWM
- 4 Analog inputs configurable for industry standard sensors
- 6 configurable analog inputs/outputs for standards industrial sensor, include thermocouples
- 4 Frequency inputs for RPM measurement (one is configured as impulse input)
- 2 Impulse inputs for rotary flow meters or other cumulative measuring

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- 6 configurable analog inputs/outputs for standards industrial sensor, include thermocouples
- 4 Frequency inputs for RPM measurement (one is configured as impulse input)
- 2 Impulse inputs for rotary flow meters or other cumulative measuring
- Operating temperature: -40°C to +80°C

InteliBifuel DENOX

- Unique anti knocking engine protection controller specifically designed for Bi-fuel applications, ensure proper detonation is always maintained during Bi-fuel operation.
- Suitable for engines up to 20 cylinders
- Suitable for variable speed engines
- Individual cylinder knocking detection
- Individual cylinder misfiring detection
- Integrated 2x Inteli AIN8TC up to 16 thermocouples
- Harsh environmental design IP69K
- Full communication and direct CAN interface to InteliBifuel LITE, InteliBifuel and InteliBifuel MOBILE
- Operating temperature: -40°C to +80°C
- CE, UL, CSA

ComAp
The heart of smart control

Manufacturer:

ComAp a.s.

Czech Republic
Phone: + 420 246 012 111
Fax: + 420 266 316 647
E-mail: info@comap-control.com
Internet: www.comap-control.com

Local distributor / partner: