ComAp
The heart of smart control
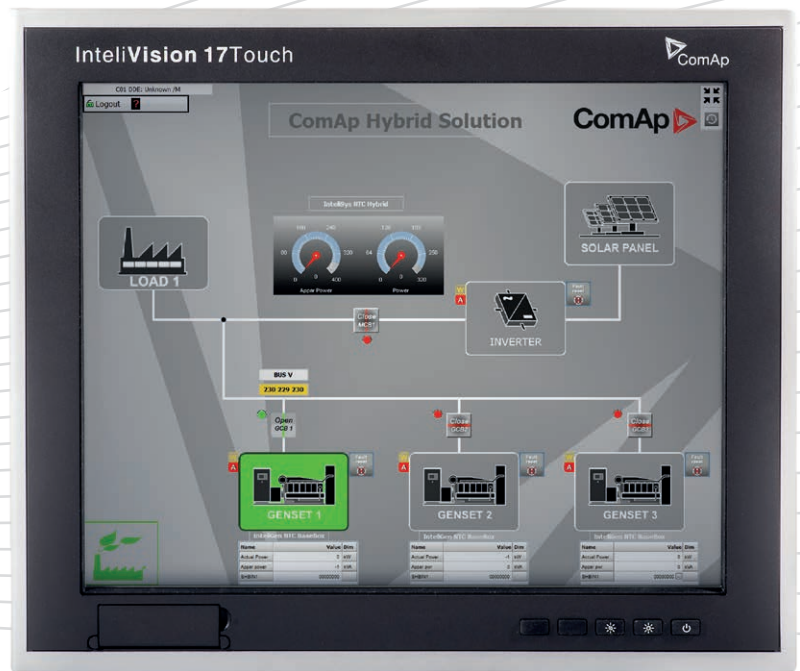
Save fuel and maximize power system reliability
That's smart control

Hybrid power plant solutions

Hybrid solutions

InteliVision 17Touch — ComAp Hybrid Solution

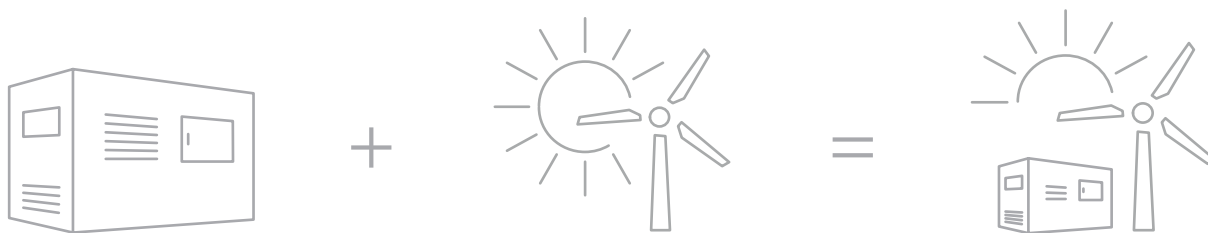## Hybrid power plant solutions

The hybrid system uses a combination of renewables and reciprocating generators to generate electricity. The usage of renewables can significantly reduce the consumption of fuel and the amount of CO_2 emissions released into the atmosphere.

ComAp's control system for hybrid applications enables you to use the best combination of renewables and diesel to save fuel and maximize your power system reliability.

How does it work?

Load

Genset

Batteries

InteliSys[NTC] Hybrid
+
InteliVision 17Touch

Wind farm

Solar panels
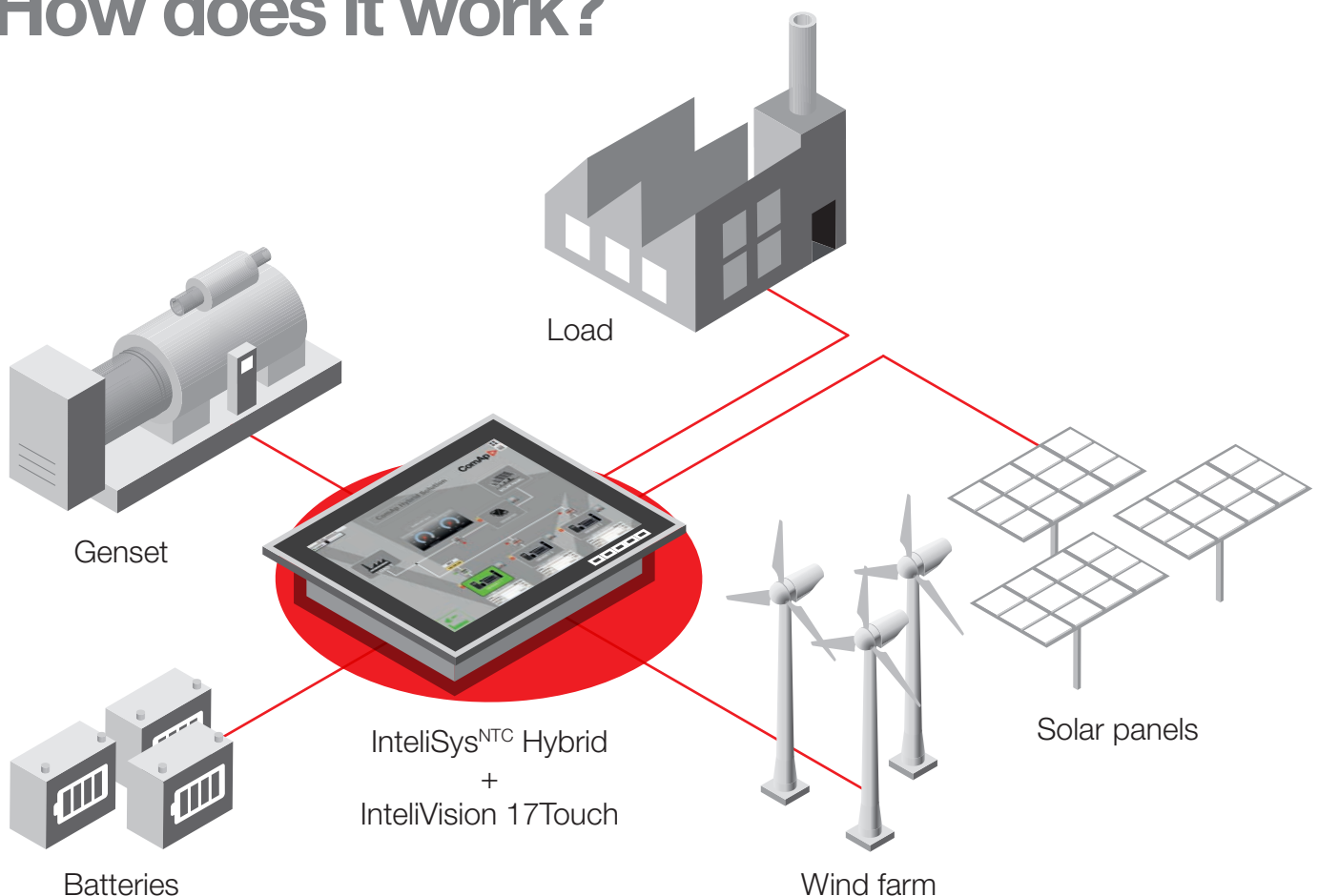
The advantage of hybrid applications

Diesel generator system

+ Reliable source of power
+ Variable load coverage
+ Quick availability and reaction

− Cost of fuel and maintenance
− Pollution and emissions

Photovoltaic or wind turbine system

+ No fuel is burned
+ Environmentally friendly technology
+ Less maintenance

− Intermittency of production
− Unable to react on changing load
− Expensive energy storage required

Hybrid power system

+ Lowering electricity costs and pollution, while keeping reliability
+ Less dependency on fuel shipments
+ Lower maintenance costs
+ Save fuel
+ Economical, even without subsidies
+ Lower requirement for power storage

Economic viability
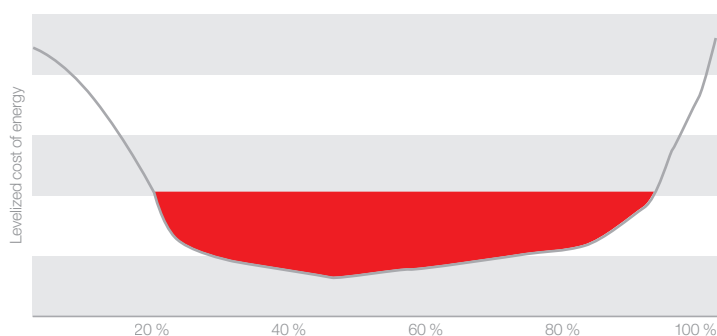
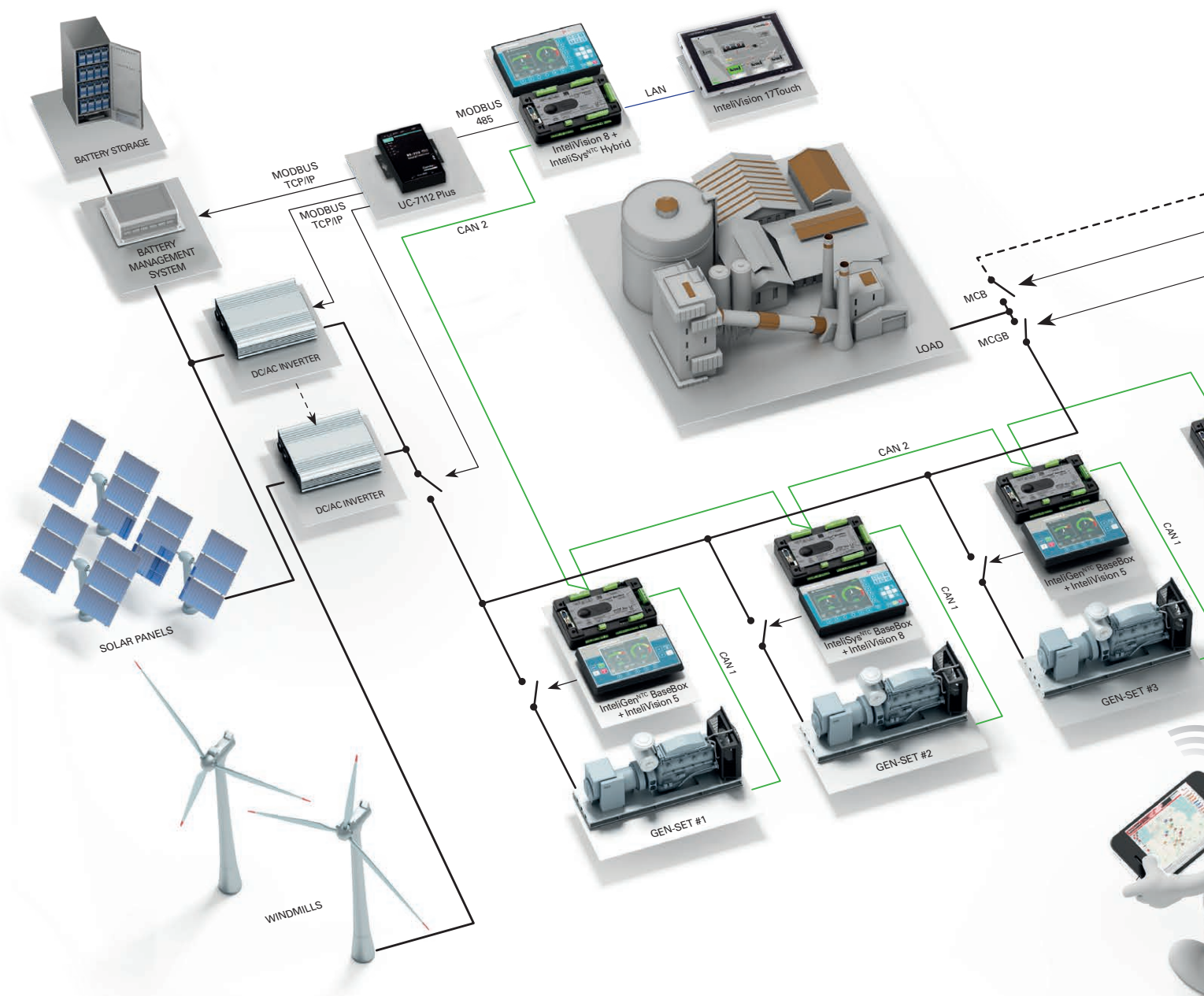## Influence of Renewable Energy Penetration on Electricity Costs

The ideal penetration is between 40–60 %. Lower penetration means more fuel is burned and higher penetration means that expensive battery storage is needed.
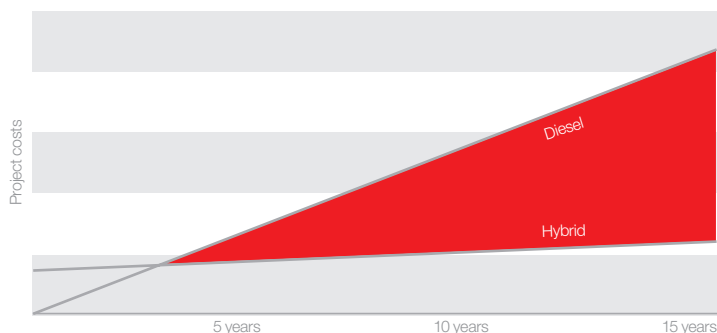
Return on Investment Period

The return on investment period for a hybrid system is much shorter when compared to a purely renewable generation setup. The hybrid system begins to pay for itself faster, due to the lower cost of generating electricity with a renewable system.

Please note: information in these graphs is provided for information purposes only and actual costs and savings will vary depending on the specific application.

Hybrid power plant

BATTERY STORAGE

BATTERY MANAGEMENT SYSTEM

DC/AC INVERTER

DC/AC INVERTER

SOLAR PANELS

WINDMILLS

MODBUS 485

MODBUS TCP/IP

MODBUS TCP/IP

UC-7112 Plus

CAN 2

InteliVision 8 + InteliSys^NTC Hybrid

LAN

InteliVision 17Touch

LOAD

MCB

MCGB

CAN 2

CAN 1

CAN 1

CAN 1

InteliGen^NTC BaseBox + InteliVision 5

GEN-SET #1

InteliSys^NTC BaseBox + InteliVision 8

GEN-SET #2

InteliGen^NTC BaseBox + InteliVision 5

GEN-SET #3

Key features of ComAp's system

Power management

Starts and stops gen-sets based on the requested reserve remaining. Fully digital system with user-friendly setting.
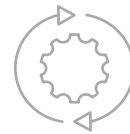
Efficiency mode

ComAp controllers automatically assign efficient combinations of gen-sets to run, saving you fuel and maintenance on your equipment.

Full generator control

ComAp controllers feature fully automatic gen-set control and protections. They also provide full ECU support. This allows user friendly communication with ECU-equipped engines.
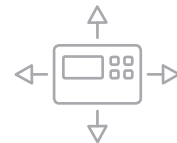
Dynamic spinning reserve

ComAp controllers feature spinning reserve that can be changed dynamically from analog value, Modbus reading or even ComAp's built in PLC.

Load sharing

ComAp load sharing, VAr sharing and all frequency and voltage regulations work seamlessly with your renewable energy sources.

Demand side management

In order to assure security of the power supply, ComAp controllers provide controlled disconnection of various load circuits based on their priority and pre-set demand-side logic.

Built-in PLC programming

Significantly saves time during commissioning – provides overview of all current PLC values.

Modbus support

ComAp controllers enable you to interface with virtually any renewable energy system that supports Modbus communication.

Control unit redundancy

ComAp controllers support redundant units to take the safety of any system to a higher level.

Remote communication

WebSupervisor is a cloud based system for remote monitoring and controlling of your ComAp controllers.

MAINS

InternetBridge-NT

InteliMains^NT BaseBox
+ InteliVision 8

Fuel tank

Typical hybrid usage

Mining

Mines are often located out of reach of the electricity grid. Up to 30% of operating costs are spent on power generation through diesel power.

Remote hotels and resorts

People like to get far from civilization but they don't want to give up the technology and comforts of home. Remote resorts can use hybrid systems to lower their bills for diesel.

Remote industrial

Industrial and manufacturing facilities in remote locations with weak or no grid rely heavily on diesel generators. A hybrid system can significantly cut electricity costs.

Off grid agriculture

Off grid agricultural sites can get most of renewable sources by combining biogas and other renewable sources of energy.
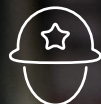
Island and village electrification

Islands pay amongst the highest prices for electricity in the world. Island nations are also concerned about global warming and rising sea levels. Adopting renewables is a must for them.

Defence

Temporary or permanent military bases in remote locations and war zones have to rely on diesel transports. They can lower this reliance by using renewables along side the diesel gen-sets.

Going beyond our leading reputation for controllers to deliver you full support for your projects

At ComAp, we collaborate closely with you to fulfil your existing requirements, that's a given. It's our knowledge of focused markets, which we gain through unrivalled local expertise that allows us to deliver intelligent electronic control solutions that anticipate your needs.

What's more, we are able to assist you at every stage of your project. We can help you design the system, with the wiring and installation, with the commissioning, and with the programming of the controller and other settings. We can deliver this through our specialist network of local experts operating in 100 countries around the globe. Please contact your local distributor for more information regarding this service.

Full support for your projects

References

Kiribati
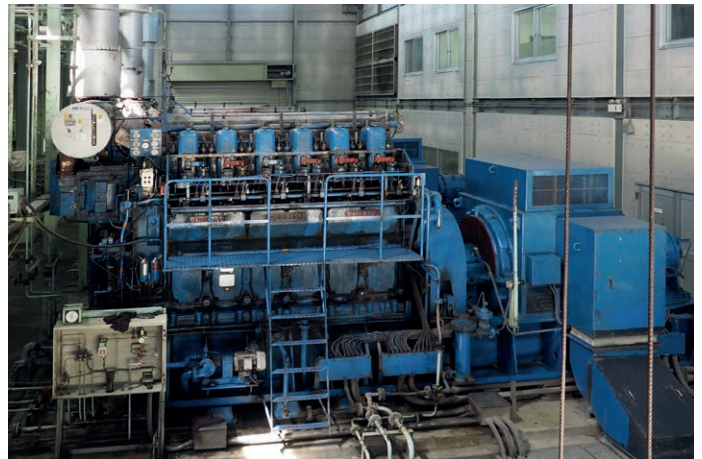### PV/Diesel power plant controls

The Republic of Kiribati is an island nation in the Pacific Ocean. Tarawa, one of Kiribati's 33 atolls is home to more than 50,000 inhabitants and, as with most of the islands in the Pacific, it originally used diesel generators to generate 100% of its electricity.

To reduce the dependency on diesel imports a 500 kWp photovoltaic power plant was built on the island, to be integrated into the Public Utilities Board's electrical grid.

This required full automation of the existing three 1400 kW low speed diesel generator systems. Originally the control system was predominately hardwired utilizing relay logic, timers and operator hand switches to manually operate the plant. This setup would not be able to react on constantly changing power output from the PV plant so ComAp has installed a fully automatic system using InteliSys[NT] BaseBox controllers with special hybrid firmware.

This solution has been integrated into Hybrid Wizard, a patented global hybrid control system – developed by French company Vergnet S.A, which improves the overall network stability and robustness and allowed smooth integration of the PV plant. Today the PV plant covers around 10% of Tarawa's electricity consumption but the plan is to increase this number by installing more PV in the future.

The hybrid system saves approximately 227,000 litres of diesel every year and prevents around 627 tons of CO_2 from being released into the atmosphere.

Vanuatu
Wind/Diesel power plant controls

Vanuatu is a small island located in the South Pacific Ocean. The Vanuatu's main industry is tourism, and it is noted as being one of the top holiday destinations in the world. Vanuatu used two 4 MW gensets to generate electricity. However they also have a 3 MW wind farm and the output of this obviously varies greatly from zero to 3 MW. An additional issue which needed to be countered is that if the wind gets too fast the wind farm automatically shuts down to protect itself, but this means that the output goes from 3 MW to zero in 30 seconds.

ComAp designed a system where four spare 800 kW Cummins sets were upgraded with InteliGen controllers and these run in a power management mode. Most of the time one set is running but as the wind drops off, other sets will start up through ComAp's standard power management. Normally it takes only 15 seconds to get the idle gen-set running and synchronized. All relevant data can be seen through our InteliMonitor SCADA system. The system had a tough test when there was a major earthquake and the wind farm shut down instantly. All the sets then immediately started to cover the load. This was the first time that they had lost power from the wind farm and not lost the whole system as well.

Product overview

InteliSys^NTC Hybrid

> A controller for applications that combine reciprocating gen-sets with renewable source of power
> It continuously monitors data from all sources of energy including solar, wind or hydro and gen-sets
> Automatically starts, synchronizes and loads the gen-sets to run smoothly alongside the renewable source

InteliGen^NTC BaseBox

> InteliGen^NTC BaseBox is a comprehensive gen-set controller for both single and multiple gen-sets operating in standby or paralleling modes
> The modular construction allows easy installation with the potential for many different extension modules designed to suit individual customer requirements

InteliMains^NTC BaseBox

> InteliMains^NTC BaseBox is a controller designed to connect a group of gen-sets to the mains
> On places where exporting to the mains is not allowed it can be used as a zero export protection through limiting the PV inverters output
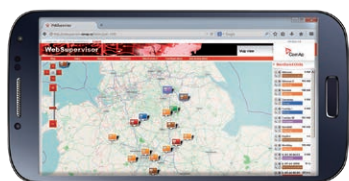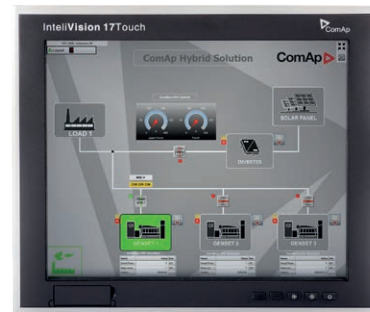
WebSupervisor

> Cloud based system for remote monitoring and controlling of ComAp controllers

InteliVision 8

> 8" easy to use, Plug & Play color display

InteliVision 17Touch

> 17" touchscreen display unit designed for complete monitoring and control of the installation

ComAp®
The heart of smart control

Manufacturer:

ComAp a.s.

Czech Republic
Internet: www.comap-control.com

Local distributor / partner:

p.u.r.e.