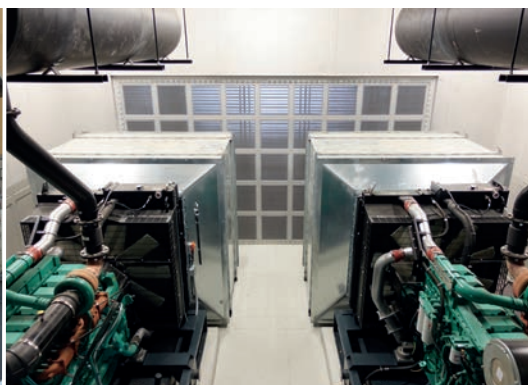


Telecom Solutions

Our energy, your power.
Always on.



THE PERFECT SYNERGY BETWEEN TECHNICAL INNOVATION CAPABILITIES AND ENERGY SUPPLY EXPERIENCES

Established in 1932, Ausonia represents the company with the highest know-how in the Italian market of gensets, both as productive potential and technological skills.

Focusing on specific strategies for different industries, it is today recognized as the main Italian player in terms of customized products and services.

Ausonia R&D Department has always driven market reference standards and new technology development.

The company has successfully used this expertise and experience to develop **a wide range of different solutions specifically designed for the Telecom market.**

In order to meet the specific needs of the Telecommunication industry, Ausonia R&D's activity has been successfully oriented **to reduce OPEX and CAPEX, to extend the Product's Life Cycle, to increase its reliability and to achieve significant environmental benefits.**





Willing to move ahead from product manufacturer to solution maker, in 2003 Ausonia created **MediPower** with specific skills and a dedicated structure, in order to manage all service activities related to the gensets' world with a customer focused **“energy supply approach”**.

Thanks to the dynamic and flexible nature of its young and innovative organization, MediPower became in a short time undisputed leader for the Italian off-grid BTS energy supply, servicing a market share of more than 85%. For such service, MediPower is able to provide a turn-key approach for a **“Full OPEX”** solution, based on a daily fee.

Ausonia's product design and production capabilities, joined with MediPower's full service skills, provide to the worldwide market a unique combination, able to identify and manage all typical operational and cost drivers of BTS power supply, in order to **increase energy efficiency** and **reduce the Total Cost of Ownership (TCO)** of the power solutions.



A COMPLETE PORTFOLIO OF DEDICATED SOLUTIONS TO SATISFY YOUR ENERGY NEEDS

Thanks to more than 85 years dedicated to the design, production and service of power generators, Ausonia represents a strategic partner for the leading companies operating on highly critical sectors.

Main key factors are:

- High vertical integration / strong capabilities in design and engineering
- Products design based on customers' specific needs
- Complete energy solutions and system integrator capabilities
- Products and service integration and full life cycle management
- Newest technologies and highest reliability / efficiency solutions

Among all sectors, Ausonia has always focused a particular attention to the Telecom market, for which it has developed a complete portfolio of power solutions which meet and satisfy the different exigencies coming from worldwide Mobile Network Operators, Tower Companies and Energy Service Companies, being able to establish **strong relationships on a global scale**.

Worldwide References







Solutions for Data Center / MSC

Ausonia has designed, produced and installed worldwide a wide range of power solutions, specifically developed for Data Centers (HLR) and Mobile Switching Center (MSC), going from 150 kVA up to 3000 kVA for each unit.

Typically requested configuration is in containers with extremely high soundproofing levels up to 55 dB(A) at 7 m.

To get the highest level of reliability and to get always powered the priority loads, TelCos often choose the configuration with gensets running in parallel mode, managed by a synch panel.

Some TelCo also adopts CHP solutions (Combined Heat and Power), in order to achieve the best trade-off in terms of efficiency, environment and costs, and therefore optimizing the overall return.

DATA CENTER AND DISASTER RECOVERY

Solutions for Disaster Recovery

TelCos always ask for energy recovering solutions to be quickly and easily installed on site in case of black-out.

In order to satisfy such specific need, Ausonia offers a wide range of Mobile Power units, easy to place and relocate.

Covering a range from 20 kVA to 400 kVA, also in parallel configuration installed on the same vehicle, these units offer an effective, reliable and energy efficient platform to power mission critical applications, anywhere in the world.

Additionally, Ausonia offers solutions with generators installed on board of light motor-vehicles, internationally drivable with a “B” category license, or on certified road trailers. Both the configurations could be designed in order to guarantee excellent noise attenuation performances.





In the definition of the roll out/swap plans for their Base Transceiver Station (BTS) and Base Station Controller (BSC) sites network, TelCos must always look at the overall economy of the power solutions to be adopted.

In order to avoid power interruption at their sites, it's extremely important for them to rely on serious and trustable partners, as any unexpected event caused by the adopted power solution, could lead to very bad impact on their expected returns. If this occurs, TelCos are often forced to rapidly perform corrective actions, in order to quickly restore the power supply and guarantee the stable continuation of the services offered to their subscribers.

Being Ausonia well aware of this, it always offers TelCos high reliability power solutions, which are deeply tailored on Operators' different exigencies and requirements.

AC SOLUTIONS FOR BSC/BTS

Single AC Genset (1+0)

This configuration allows easy installation on Telecom sites thanks to its embedded ATS and the mono-block structure of its sound/weather proof canopy or shelter, which are able to achieve noise level up to 50 dB(A) at 7 m. This solution allows to work in very harsh climate conditions and guarantees long autonomy for maintenance and refueling. Remote Control & Management System included.



Dual AC Gensets (1+1)

In off-grid sites, and in the most critical ones, the Operators need high reliability and constant power supply. To meet these needs, Ausonia has developed a configuration of gensets working in dual mode (12+12 hrs) or in "Master & Slave" operation, easily selectable also through the Remote Management and Control System. Long maintenance and refueling intervals are additional benefits given by this configuration, in which the reliability is the utmost priority.



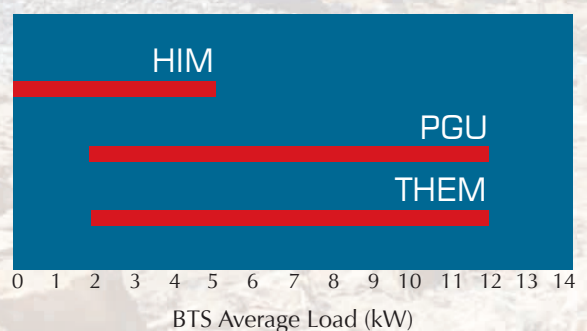


- “Plug & Play” connection with poor grid and PV panels
- Fuel quality sensors and fuel leaking / stealing alarms
- Remote Monitoring System, integrated into a dedicated Network Management System
- Separated outputs and energy meters for multitenant sites
- Simultaneous output voltages (DC and AC) with scalable output capacity

For the BTS power supply applications, Ausonia has developed a complete family of **HIGH EFFICIENCY DC SOLUTIONS**, representing the latest variable speed power generation technology now available in the market and offering the right balance among lowering CO₂ emissions, reducing operational costs and enhancing the overall fleet efficiency, with a specific fuel consumption rate of only **0,4 l/kWh**.

The family includes three main products ranges (**HIM, PGU, THEM**) suitable to cover all typical BTS configurations and able to satisfy Customers' different power needs, along with their requirements for high efficiency equipment.

Typical Applications of Ausonia DC Solutions



HIGH EFFICIENCY DC SOLUTIONS FOR BTS

Hybrid Integrated Module



The **Hybrid Integrated Module (HIM)** represents the hybrid solution offered by Ausonia, as it integrates in one single module the efficiency of its variable

speed DC generator and the capability of working in parallel mode with external energy sources to charge the integrated battery bank, installed within the HIM canopy. On the efficiency side, the module provides by itself a specific fuel consumption rate of only **0,4 l/kWh**, even in case of very low power demand. Such efficiency could be further improved if the module is connected with Poor Grid and/or PV panels, as the battery pack is automatically charged by the cheapest energy source available on site.



Main Performances HIM Range		
Average BTS load (kW)	Fuel consumption (l/day)	Engine running hours (per day)
1,0	9,9	4,1
2,0	21,1	7,5
3,0	30,1	9,5

Main Performances HIM Range with 3 kWp Solar		
Average BTS load (kW)	Fuel consumption (l/day)	Engine running hours (per day)
1,0	4,6	2,7
2,0	15,8	6,0
3,0	25,1	7,9



Power Generation Unit



The **Power Generation Unit (PGU)**, belonging to the High Efficiency Products family developed by Ausonia, consists of a variable speed DC generator with output Voltage @-48V, designed to run in continuous mode on off-grid BTS power supply applications, or to provide back up power to grid connected sites, in order to charge the batteries and power the load during Power Grid shortage.

Additionally, being equipped with a smart hybrid controller, the PGU can be also deployed to hybridize existing sites with an external battery bank.

Main Performances PGU Range	
Average BTS load (kW)	Fuel consumption (l/day)
2,0	21,1
3,0	30,1
4,0	39,8

HIGH EFFICIENCY DC SOLUTIONS FOR BTS

Twin High Efficiency Module



The **Twin High Efficiency Module (THEM)** by Ausonia integrates, in one single product, two variable speed DC generators in a total

redundant configuration. The solution is designed to work in dual mode (1+1), focusing on off-grid remote BTS sites or rural and remote areas. The system allows to reach a specific fuel consumption of only **0,4 l/kWh**, offering the highest reliability and the longest maintenance intervals and back-up autonomy. When necessary, the dual generators can automatically switch their operation into parallel mode, in order to cover temporary high load demands. For this reason, the system is particularly appreciated by Tower Companies, in case of multitenants applications (site sharing).

The specific characteristics of this system, which is efficient without any need of cycling operation with batteries, allow THEM to achieve excellent performances, even under very hard climate conditions.



Main Performances THEM Range	
Average BTS load (kW)	Fuel consumption (l/day)
2,0	21,1
4,0	39,8
6,0	58,8

MEDIPOWER INTERNATIONAL STRUCTURE

Relying on the excellent results achieved in Italy and on the availability of the best-in-class technology offered by Ausonia, MediPower started duplicating its business model in foreign countries, directly or through local partners acting as ESCo companies.

Based on a flexible organizational structure focused on a customer oriented approach, MediPower represents the perfect business partner to identify and implement worldwide the most efficient and cost effective energy solutions for off-grid BTS power supply.

The OPEX model is now replicated by using Ausonia Power Solutions in Africa, Latam and South-East Asia.



Dedicated Network Management Tools

MediPower has developed specific network management tools, dedicated to off-grid BTS power supply service, in order to organize and control all operational activities in the most efficient and reliable way. The tools are used by local NOCs (one in each country) and can be worldwide accessed through a centralized web server.

Operational Planner

Automatic weekly scheduling of all operational activities, assets management and spare part re-provisioning.

Alarm management System

Gensets Status online monitoring and alarm follow-up procedures (detection, dispatching, identification and solving).

Remote Monitoring

Permanent web connection through dedicated server for remote monitoring and control (functional parameters, remote settings and commands).

Reporting

Automatic reports and statistic analysis of main operational and performance drivers. Service levels evaluation and impact analysis of corrective actions.



PROPOSED BUSINESS MODELS

Energy Supply

The service is based on a daily fee, plus an energy production quota. It includes:

- Rental of suitable product solutions
- Transportation and installation activities
- Fuel supply and refueling activities
- Remote Monitoring and Control System
- Ordinary and corrective maintenance
- Spare parts and consumables

Full Service

In case the Client purchases an high efficiency products (HIM – PGU – THEM), MediPower is available into providing the full service of all operational activities based on a daily fee plus an energy production quota. The service includes:

- Transportation and installation activities
- Fuel supply and refueling activities
- Remote Monitoring and Control System
- Ordinary and corrective maintenance activities
- Spare parts and consumables

Buy-Back Options

Within the service contract, MediPower is available into offering different buy-back options over the units purchased from Ausonia. The buy-back action will be executed by a company within the MediPower Group and the buy-back price will be calculated according to the product age and utilization.

Buy-back options can be also defined and agreed on a worldwide scale at Corporate level with main TelCos.





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