



Bluenergy
Africa



Introduction

Bluenergy Africa Industrial (Pty) Ltd (Bluenergy) owns 100% of the equity of PLC Sub Sahara Limited and PLC South Africa Service (Pty) Ltd (PLC SA Service).

Bluenergy operates in the renewable energy and in the electrical infrastructure construction and maintenance sectors.

Bluenergy is an EPC and /or supplier of electrical plants/sub-stations, engineering and construction, operation and maintenance service, management of strategic spare parts, and round the clock electrical remote controls

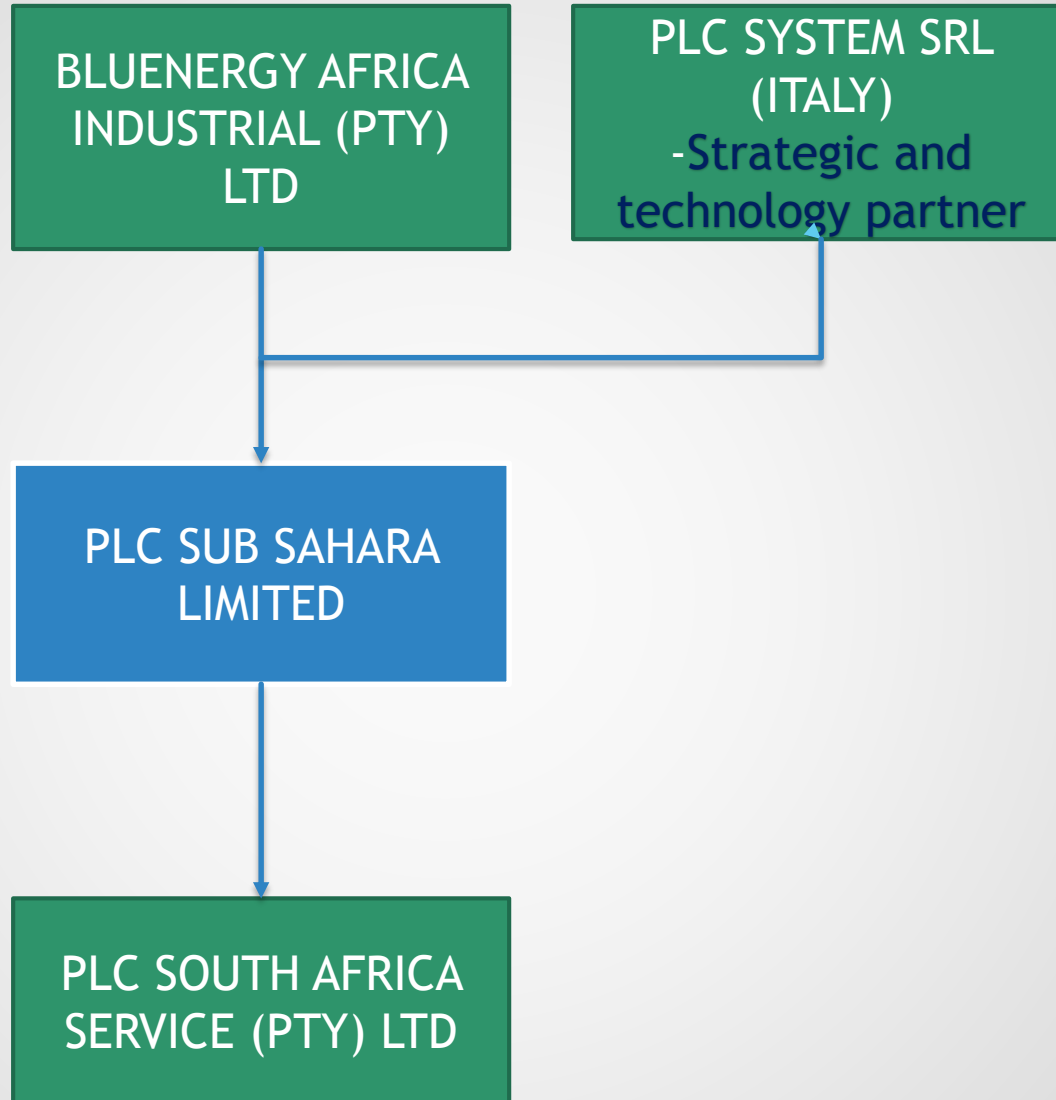
Bluenergy also acts as a distribution partner for technologies within the renewable energy segment. These include, Excool, Sun Cube, Unicomfort, Ondulit, PLC System, Ari-Metal and Building Energy.

Across the above mentioned companies/technologies these products cover the following segments within the renewable energy sector:

Co-generation (CHP), Tri-generation (CCHP), Biomass boilers, Solar Hybrid (Wind-Solar) Evaporative industrial Cooling for Data Centres, DC Cooling and Aluminium fabrication for Single Axis framework and fastenings



Organogram



Group overview

PLC System Srl (Italy)

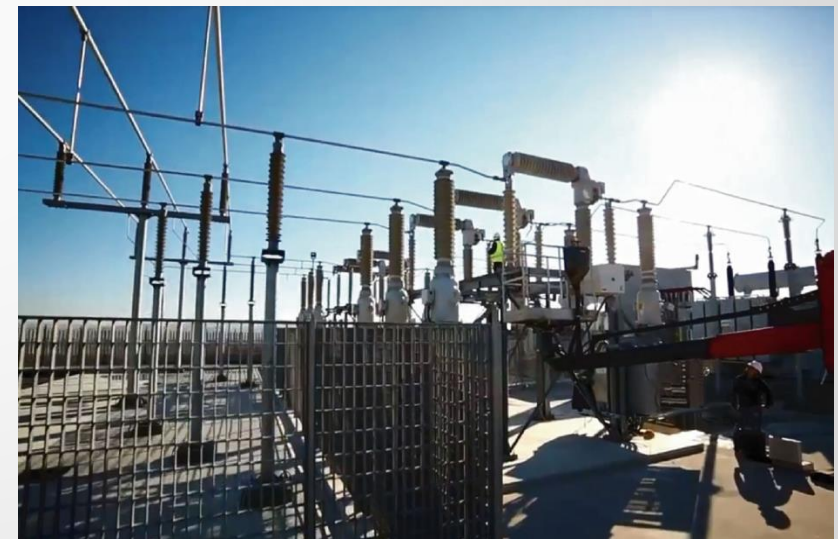
Founded in 1996, the PLC System was one of the first businesses in Italy established with the specific purpose of operating in the Renewable Energy Sector. Today, the PLC System is a **market leader in the design, installation and maintenance of Alternative Energy Power Stations.**

Bluenergy

Bluenergy works both in the Renewable Energy Sector and in more specialized Industrial Systems Sector using **state-of-the-art processing and verification systems**, and advanced tools and techniques for the **design, implementation and monitoring** of high, low and medium voltage power stations, alternative energy **distribution and production systems** (including cogeneration, wind turbine generators, photovoltaic power systems and biogas), transformation and interconnection stations.

PLC Service

PLC Service provides a number of specialized energy-related services in the sphere of **Operations and Maintenance** such as the testing of high voltage appliances, the commissioning and activation of energy systems (which includes the performance of a number of specialized tests to check the parameters and functions of a system before it is put into operation), preventive and predictive maintenance of systems, **round the clock remote control and monitoring of systems**, medium and low voltage cable troubleshooting and **infrared thermal explorations.**



Renewable Energy

- Engineering and turnkey solutions for: Balance of Plant, Integrated PV Plants, Wind Farms, Concentrating Solar
- Power, Cogeneration;
- Full/Partial O&M Management;
- Data Room & Integrated Monitoring;
- Electrical losses and imbalance assessment for high performing



Electrical Infrastructure

- Engineering and turnkey solutions for HV electrical infrastructures (Substations, temporary HV/MV substations)
- Transforming and interconnection substations;
- Switchboards and Shelters set-up;
- Cable/Overhead LV distribution networks, inclusive of any auxiliary equipment (MV/LV cabins, switching points, junction boxes, etc.
- Turnkey solutions for conventional/alternative power plants;
- Integrated management of substations, Electrical BoP, cable



Substations

A **substation** is a part of an electrical generation, transmission and distribution system, which performs a number of important functions, chief among which is transforming electricity generated from a high voltage to a low for use by consumers.

Bluenergy specializes in the construction of substations on photovoltaic, aeolic and other renewable energy plants.

Using the remotely controlled SCADA system, Bluenergy is able to offer not only the best quality service in respect of performance monitoring of the entire plant, but is also able to directly monitor and control the substations as well. This is all done through the Control Room.



Control Room System

- Full operation and maintenance of PV plants
- Operation and maintenance of MV/LV electrical substations and technological facilities
- Operation and maintenance of HV/LV electrical substations and technological facilities
- Integrated remote management systems for main and spare parts
- Corrective, Preventative, on-Conditions maintenance of PV plants
- Integrated management system for power plant performance control
- Remote digital modulation for power plants
- MV Cables fault tracking and analysis
- Plant performance ratio (PR) guarantee

The Control Room

PLC monitors the circa 100 plants under its management from the Control Room situated at its head office in Naples. The Control Room functions 24 hours a day, 7 days a week including public holidays.

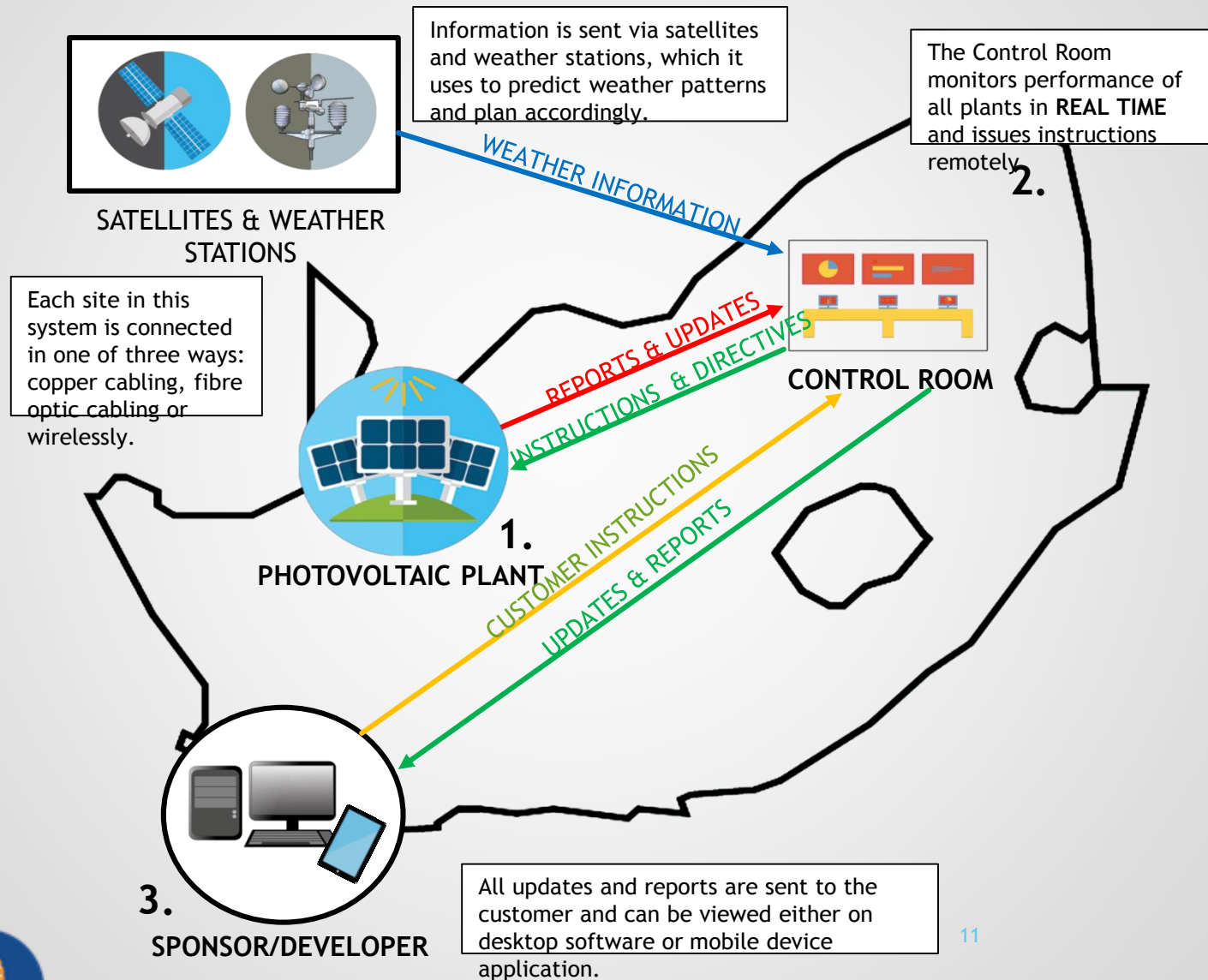
Through the use of a dedicated connection, the Control Room is connected with each individual plant directly. Specialized software developed in-house by PLC, which is present on all monitoring stations, enables operators to immediately identify, localize and address any technical or other issues that may arise at a particular plant quickly and easily, all the while keeping in contact with the personnel on site as well as customers themselves.



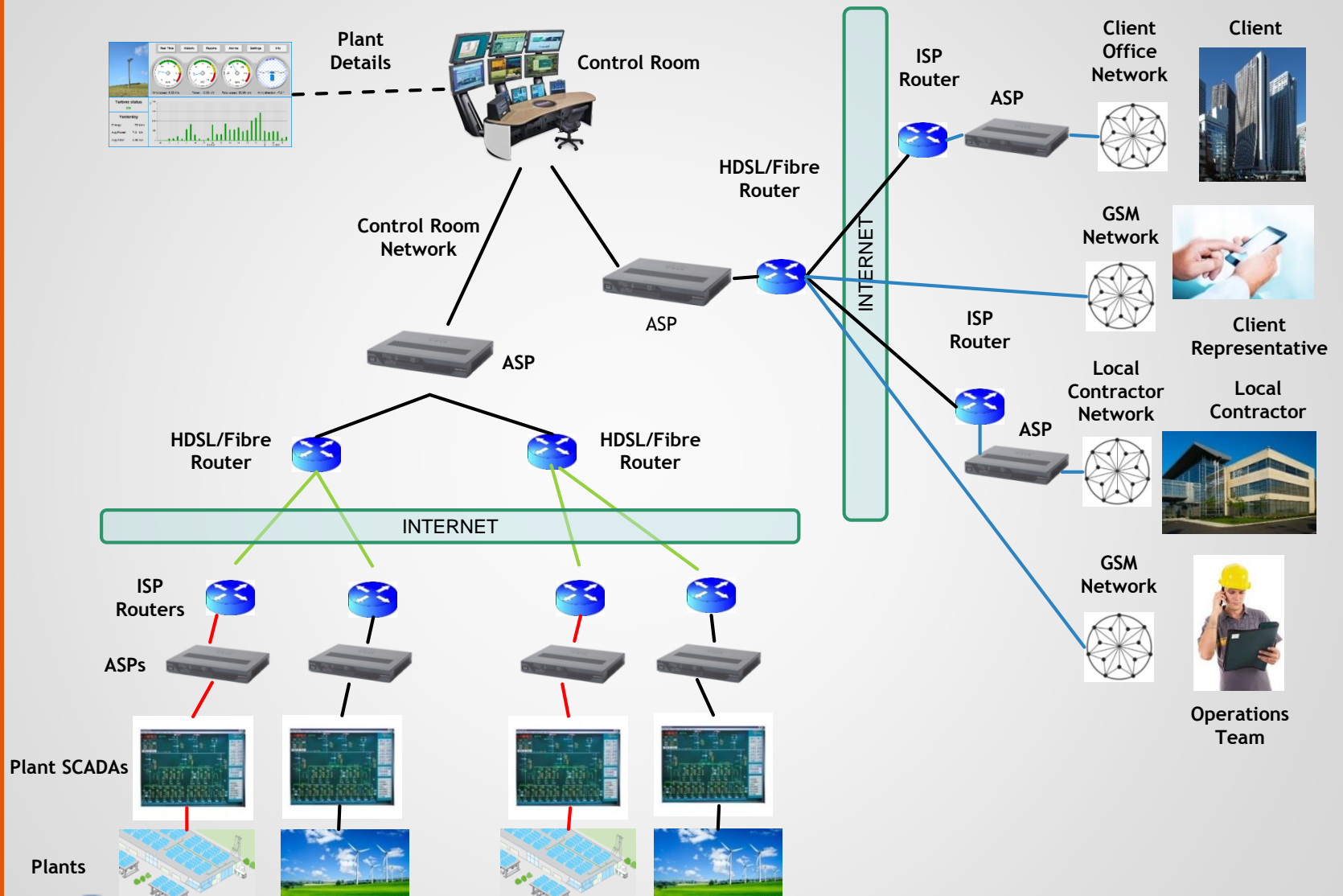
The Technical Advantages of the Control Room Technology

- The technology supporting the system has been operational for over 20 years and is already in use in Italy.
- The system uses various telecommunication systems (fibre, HDSL, GSM, Radio Link and satellite feed).
- This provides for redundancy telecommunication with on demand project data storage.
- The system is modular and scalable, and adapts to the needs of each customer's requirements.
- This means it can be applied to both integrated and stand-alone renewable energy equipment and electrical units.
- The system provides detailed and graphic analysis specific to the customers required information reporting which is channelled through terminals installed at the site.
- The reports are sent to the customer and can be directed to existing information systems including mobile phones through a dedicated app.

The SCADA System



SCADA Mirror Technology



PLC System Srl Track Record examples

Turnkey solutions for 150/220/380 kV electrical substations (engineering and building):

- Wind Power -> N. 77 - 2.500 MW
- Solar Power -> N. 13 - 234 MW
- Ordered by ENEL & ENEL Green Power -> N. 16



Eskom Related work performed

Customer (Contract number)	Project Name	Completion Date	Project Description
Eskom Benoni (4600049320)	Benoni Ds Substation	2015 March	<u>132/44KV substation refurbishment:</u> Civil works Electrical steel erection Procurement Equipment installation Stringing & cabling Project Management
Eskom Johannesburg (4600048884)	Astra Substation	2015 April	88/22KV substation extension (40 MW bay)
Eskom Bloemfontein (4600038936)	New Balfour Switching Station	2013 February	88KV switching station refurbishment
Eskom Benoni (4600049343)	Voslorus Women`s Hostel	2014 July	11KV switching station extension
Eskom Boksburg (4600062137)	Boksburg North Substation	September 2017	132KV ACSA Refurbishment



IPP Related work performed

Customer (Contract number)	Project Name	Completion Date	Project Description
Moncada Construzioni South Africa	Solar Capital	November 2013	<u>Switching Stations (87 Mwp):</u> Civil works Electrical steel erection Procurement Equipment installation Stringing & cabling Test & Commissioning SCADA System engineering & commissioning Project Management
Enertronica South Africa	Enel Green Power - Adams	August 2016	Switching Stations (82 Mwp)
Enertronica South Africa	Enel Green Power - Pulida	September 2016	Switching Stations (82 Mwp)

Experience and Track Record of PLC System Srl (Italy)

PLC System Italy

Over the past 16 years, PLC System has built and connected to the grid: 206 power stations, 49 wind farm and 56 photovoltaic plants, making up a total of 3 000 megawatts.



PLC Service

To date, PLC Service maintains a total of 60 substations, 30 wind farms and 25 photovoltaic plants, making up a total of 1 200 megawatts. The PLC Service control room is run 24 hours a day for 365 days of the year.



EPC for Smaller Projects (5 - 15MW)

All engineering in respect of projects is done in-house by Bluenergy staff who possess the necessary experience to ensure the highest quality of service.

Bluenergy provides procurement of equipment through competitive sourcing but also has a number of strong existing relationships with preferred suppliers such as Ondulit, founded in 1953, Ondulit provides insulated multilayer protected and integrated roof framings systems for solar panels - www.ondulit.com.

In terms of construction, Bluenergy has access to the leading contractors who are chosen on a competitive price basis and having due regard for the nature of the project itself.

Bluenergy has years of project management experience, which experience enables it to effectively compete in the South African Small Producer IPP Program.



PLC System Srl Track Record examples

Combined cycle-power/Biomass stations -> N. 20 - 2.700 MW

-Hydro-electric power stations -> N. 1 - 20 MW

- Ordered by TERN S.p.A. -> BOP for 22 Substations and electrical distribution plants



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