

Q4 2020

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By: Abel Botello, Mechanical Industrial Engineer, PLANELEC (Plantas Electricas Mexico, S.A. de C.V.)

When the time came for IZZI Telecom, the primary cable provider in Mexico, to upgrade their backup power to support their newest triple play (TV, Internet and Telephone) installations they chose to enlist PLANELEC, an exclusive Cummins OEM and Member of EGSA since 1987.

### The Challenge

IZZI's rapid growth, the result of increasing subscribers, intensified the need for reliable backup power. Since most of IZZI's facilities are located in populated residential areas, the need for sound attenuation was a primary concern. Manufacturing, supply, installation and commissioning of the 2.5 MW genset included the required space for a second unit and switchgear ready for plug and play for the second unit. Their HUB is state-of-the-art and easy to expand for national support. This HUB represents redundant reliability to their service.

### The Project

Development and construction included assembly, engineering, concrete foundation for a 55,000-pound total weight, acoustic room, air intake and exhaust sound traps and exhaust engine gas piping, etc.

In the event of utility power loss, this genset will supply all critical equipment, servers and precision A/C with reliable electricity. The genset, comprised of a Cummins engine, Stamford

Generator and Bearward Cooling System, will comply with the highest quality standards demanded by the customer. All radiator piping; high pressure diesel hoses; Aeroquip high performance fittings; control wiring to EMC and communication; operation logic; exhaust piping with thermal insulation; as well as customer switchgear automation were carefully designed to accomplish a sound level below 68 dBA @ 23 feet. Site aesthetics were also an important consideration with the installation.



### The Details

The acoustic room was made with Black Acoustic 3M®, the highest quality of material available for this purpose.

All walls use 4" thick panels protecting the acoustic material with perforated metal sheet. The intake

and exhaust traps were designed to take the outside air using fifty 6" thick acoustic panels and were sealed with Sikaflex®. For the exhaust sound trap thirty 13' long and 6" thick acoustic panels were placed to let the hot radiator air out while avoiding sound outside. Four additional 6'x6' louvers containing 68 linear elements were the final touch to get this critical attenuation.

The manufacture of a marine container type door also lined with Black Acoustic 3M® guarantees a perfect seal, while a rubberized canvas was used to seal the space between the radiator and the exhaust panel to avoid the introduction of hot air due to back pressure.

To mitigate sound a 30 to 35 dBA attenuation super critical NELSON silencer was used.

Two diesel containers (21,000 total gallons) were also provided to guarantee a 14-hour run time at full capacity.

The engine exhaust system is 65 feet long in 18" piping with a soot recuperation with two sampling ports. This system is assembled with flanges for future easy maintenance and with a suspension system to avoid vibration transmission.

Preheaters were installed with a 120' long wiring calculated for zero loss tension. This was interconnected with the switch-gear system for easy maintenance and fault finding.

950 wire connections were made with zero fault during commissioning.

Second genset same size preparations were developed for easy plug-and-play installation in the near future.

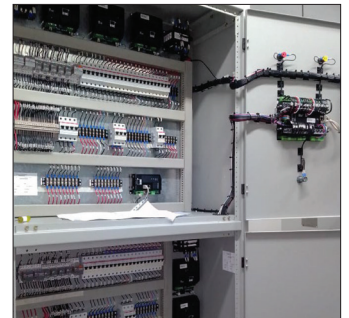
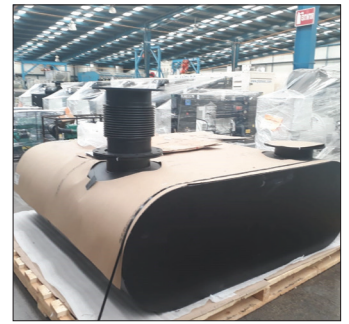
This project represented a big challenge due to the COVID-19 pandemic and presented transportation and security issues that, with coordinated logistics, ended in a successful, on-time commissioning of the operation.

Commissioning included 10 simulated utility faults using load banks to simulate different demand conditions from low demand to high demand. Sudden drop and 100% demand were each tested for 3 hours. 100% compliance results were obtained.

This project was completed in 7 months sharp, as promised to IZZI from day one.

#### Relevant information

- More than 900 design and engineering hours.
- QSK78G8 CUMMINS engine.
- LV804S STAMFORD generator.
- Heavy Duty air filtration.
- 50°C Bearward radiator.
- Super Critical silencer (3,300-pound weight).
- Cummins assisted FAT and SAT test.
- Sound pressure measurement at 23 feet 68 dBA.
- 3M® Black Acoustic panels.
- 1.9" Hg back pressure in exhaust (maximum permitted 2" Hg).
- All flanged exhaust system.
- 100% customer satisfaction.
- 0 changes on engineering during the construction process.
- Deadline compliance was achieved. ■



#### About The Author

Abel Botello has 22-year experience as an Industrial Mechanic Engineer specializing in project development. For the past 15 years he has worked for PLANELEC (Plantas Electricas Mexico, S.A. de C.V.)

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