

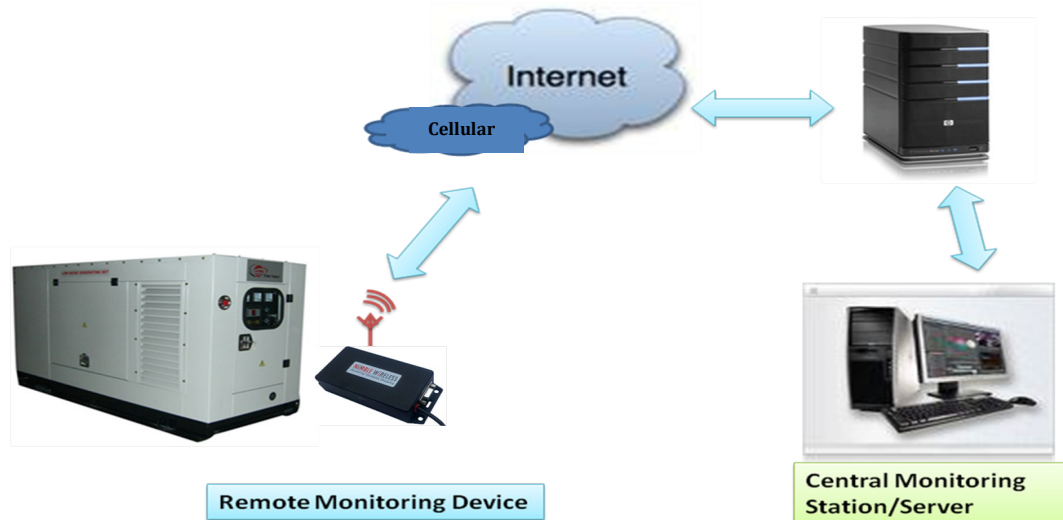
Remote Diesel Generator (DG) Monitoring Solution

Nimble Wireless Inc.

Overview

Nimble Wireless' Remote DG monitoring is an end-to-end solution including hardware, software and web based applications for complete and efficient monitoring and protection of DG sets. DG sets are used extensively in Telecom, commercial office buildings and various other industrial operations. Remote monitoring of DG sets is driven by various challenges in operation and maintenance, both on a day to day basis as well as over the life time of a DG.

Nimble Wireless' DG monitoring solution is designed to address these challenges and provide an efficient method to understand and operate the DGs in an optimal way.



Why DG monitoring?

Operators and owners of DG sets are under pressure to know every aspect of their DGs, which may or may not be under their direct control. The reasons for this vary. Following are some of the key reasons for remote DG monitoring:

- Efficient utilization and operation of DG
- Monitoring and auditing fuel consumption
- Timely maintenance to extend life of DG assets
- Protect from theft of fuel and DG
- Protection and monitoring of leased DG sets
- For purposes of insurance

Nimble Wireless' remote monitoring solution addresses these challenges and provides a comprehensive solution for DG monitoring.

Functionality: Nimble Wireless' solution is designed to be flexible to satisfy different needs of DG monitoring. Accordingly, every piece of the solution can be customized to monitor various DG parameters. The total solution is composed of two components:

(i) Remote Monitoring Device

This device interfaces to the DG and the various sensors as required to capture the desired data. It could interface to a fuel sensor or an onboard DG interface unit. This device transmits the captured data to backend server over wireless network. The device is also capable of send SMS alerts based on pre-defined conditions in the sensor readings. The support for wireless operation is critical, because of remote geographical locations of these towers and wired network is not an option.

(ii) Backend Server and Web application

The backend server, fully hosted and maintained by Nimble Wireless, captures all the required data and presents the information in a web application for further analysis and reporting.

These two components combine to provide all the functionalities of DG monitoring. The various sensor parameters provide feedback mechanism for maintenance, fault detection and in some cases theft detection. In addition to monitoring parameters, alerts are also sent, either over SMS or email, to technical support personnel to rectify problems quickly.

Flexibility built in to Nimble's solution can monitor virtually any parameter that is necessary to efficiently operate a DG. The following is a sample list of parameters that are usually monitored:

- DG On/Off status
- Fuel Level
- Run Time for current day or past days
- Coolant level/temperature
- Engine Related
- Voltage/Amps/KW Hrs
- Alarms: Failure, low coolant level, low DC voltage

Geo Location and Theft Detection

Nimble's monitoring solution is also capable of transmitting GPS location if required. This assists the customers in detecting any unauthorized movement of DG from a specified location. Geo-fencing can be set, such that if a DG is moved outside a specified geographical circle, alerts will be sent to key personnel for immediate action. These alerts can be in the form of web alerts, emails or text messages to key personnel.

Fuel Theft Detection

One of the key problems facing customers in developing countries is detection of fuel thefts in remote and unsupervised areas. Remote monitoring of fuel levels provides immediate alerts if there is a sudden fall in fuel level. These alerts can be in the form of web alerts, emails or text messages to key personnel.

Energy footprint and carbon credits

With the ability to capture and analyze all the information relating to power generation and consumption, Nimble's remote monitoring solution enables complete understanding of DG energy footprint and greatly helps with capture of carbon credits. This understanding in turn helps in optimizing future operations that directly lead to enhanced business value.

Web Application

Web based application provides rich set of interfaces for visualizing operational parameters to provide a comprehensive view of DG operation. It also provides report generation capabilities to study historical data and make further optimization to power infrastructure.

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Welcome To DG Monitoring [Logout](#)

Report History

Select DG to View History

DG Id: S00016 From Date: 12/08/2010 To Date: 15/08/2010 [Get Alerts](#)

[Export Data](#)

Fuel Level History

DGId	Report Date	Report Time	DGRunTime	DGStatus	Fuel Level(%)
S00016	2010-08-14	12:00:00	1h 0m	ON	60.0
S00016	2010-08-14	11:00:00	1h 0m	OFF	80.0
S00016	2010-08-14	10:30:00	0h 30m	ON	40.0
S00016	2010-08-14	10:00:00	0h 0m	ON	20.0
S00016	2010-08-13	19:30:00	5h 0m	OFF	95.0
S00016	2010-08-13	19:00:00	4h 30m	ON	40.0
S00016	2010-08-13	18:30:00	4h 0m	ON	45.0
S00016	2010-08-13	18:00:00	3h 30m	ON	45.0
S00016	2010-08-13	11:00:00	3h 30m	OFF	45.0
S00016	2010-08-13	10:30:00	3h 0m	ON	45.0
S00016	2010-08-13	10:00:00	2h 30m	ON	45.0
S00016	2010-08-13	09:30:00	2h 30m	OFF	45.0
S00016	2010-08-12	09:00:00	2h 0m	ON	60.0

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Real-time Monitoring Summary:

DG Name	Time	DG Status	DG Runtime	Fuel Level
SITE16	19:30:00	OFF	5h 0m	95.0%

Fuel in Percentage

Oil Pressure	-
Temperature	27C
Sensor 3	ON
Sensor 4	OFF

DG Run time & Fuel Level