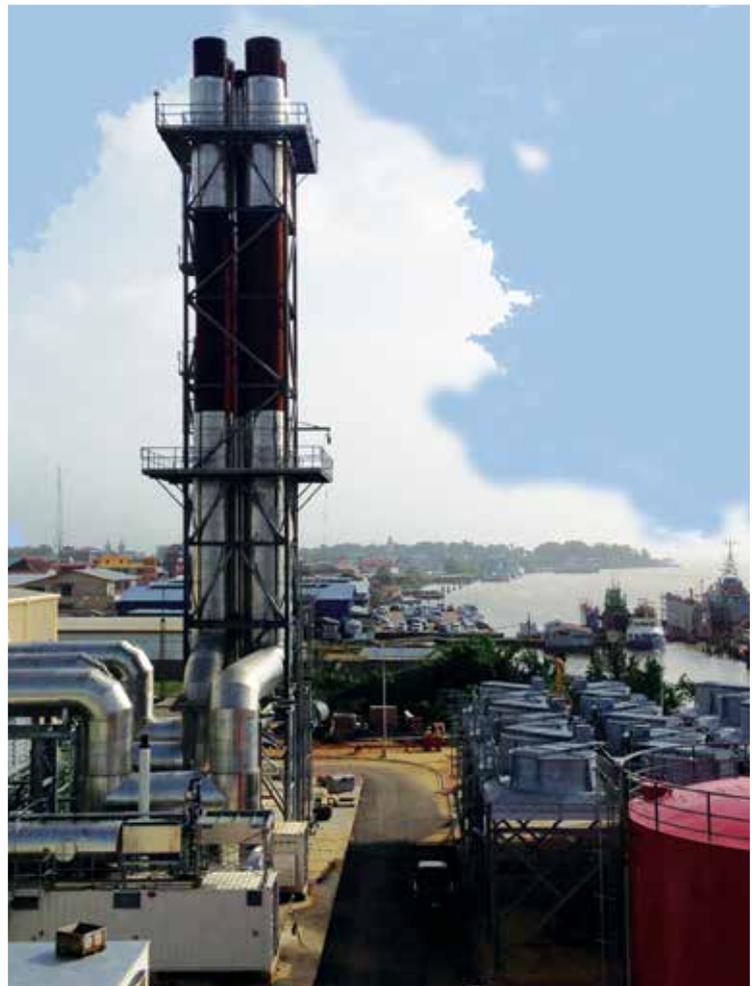




Commissioned 2014/2016

# 84 MW (63+21) EBS DDP2 POWER PLANT PARAMARIBO, SURINAME



# NEW GENERATION PLANT IN CAPITAL CITY PARAMARIBO

The Government-owned utility N.V. Energiebedrijven Suriname (EBS) needed to significantly increase its baseload power generation capacity to handle increasing demand in the Suriname capital, Paramaribo.

In 2012, Burmeister & Wain Scandinavian Contractor A/S (BWSC) won an international tender for a power plant in the Het Vertrouwen region on the outskirts of the city. Due to the time required to stabilise the ground conditions at the original site, the client, EBS, decided to build part of the tendered plant adjacent to its existing EPAR Plant in the centre of Paramaribo, to utilise existing infrastructure for fuel deliveries and electricity exports to the city grid, and to improve the efficiency of the existing generation plant by provision of steam for fuel treatment from the new plant to the older plant.

EBS required the new power plant to be capable of burning lowest-cost fuels, to utilise the most efficient technology currently available on the market, to be designed as an extremely low noise plant due to its city centre location,

and also that the plant should be in operation as quickly as possible. Three 21 MW diesel generator sets were installed in the power house that was designed to accommodate a total of four 21 MW units.

The fourth unit was added by BWSC in 2016.

## Parties involved

Four parties cooperated on the new plant: BWSC was the project leader responsible for the Balance of Plant and Turnkey Engineering, Procurement & Construction (EPC), MAN Diesel & Turbo S.E. (MDT) provided the 3 x 21 MW diesel engines and generators, local Suriname company, OLIBIS N.V., procured and financed the engine generator sets, which the client, EBS, provided free-issue to BWSC.

Local content was maximised through the use of local Surinamese companies, and BWSC was retained as operation and maintenance service provider for EBS during the initial operation of the facility.



# FAST TRACK EPC

On 30 November 2012, a fast track EPC contract between EBS and BWSC became effective, and immediately thereafter BWSC commenced civil work at the Bemland site with local civil works sub-contractor Haukes, while local supplier Kuldipsingh produced more than 300 steel reinforced concrete piles.

BWSC's scope included site clearance, installation of piles and reinforced concrete foundations, the supply and erection of insulated steel buildings, internal roads, two x 2,000 m<sup>3</sup> heavy fuel oil storage tanks, service tanks, lub oil unloading station, mechanical and electrical auxiliary equipment, exhaust gas waste heat boilers, an auxiliary boiler, a 41 m lattice tower stack, two station auxiliary transformers, two 13.8/33 kV step-up transformers, a 33 kV gas insulated switchgear substation, an incinerator and the power plant control system.

The EPC contract also included four weeks of training for EBS operation and maintenance staff for the new plant.

## Genset delivery

OLIBIS/MDT delivered a total of four sequentially turbocharged MAN 18V48/60TS high-performance, medium-speed, 4-stroke diesel engines, each with a 21 MW Jeumont high-efficiency generator to the European port of export. BWSC was responsible for the shipment of the gensets from Europe to site, installation on the foundations, and connection of auxiliary systems. MDT handled the final genset commissioning and testing.

## Low noise design

The new power plant was designed as an ultra-low noise facility due to its location in the city centre, with noise level contribution from the new plant being less than 55 dB(A) at agreed points in the main street, in consideration of the comfort of downtown neighbours.

## Expansion from 63 to 84 MW

Three 21 MW generation units, 63 MW, were initially installed and put into operation. The plant was designed and prepared with all civil work and common mechanical and electrical systems required to support four generation units.

In 2015/2016 an additional 21 MW unit was added to the facility by OLIBIS and BWSC to provide a total plant capacity of 84 MW.

## Highly efficient design

All systems were designed to achieve the lowest auxiliary power consumption providing an impressive net plant heat rate after the exporting transformer, without tolerances, at 87.5 MCR of nominally 8153 kJ/kWhe / 7728 Btu/kWhe, making this plant one of the most efficient single cycle HFO diesel plants in the region.



# TAKEOVER

After completion of commissioning, EBS formally took over the initial three gensets from OLIBIS/MDT on 25 December 2013, and the balance of plant and EPC work from BWSC after completion of reliability testing on 3 January 2014, establishing a completion time for the initial EBS-BWSC engineering, procurement and construction contract of 13 months.

## Operation and maintenance services

Based on BWSC's extensive experience with generation support services on more than 3,000 MW of generation worldwide, BWSC, through OLIBIS, provided EBS with a mobilization package to support EBS operation and maintenance staff for the first few months of operation. Commencing in November 2013, the support package comprised initial operating and safety spare parts for the engine and auxiliary systems, additional operator training and resident BWSC technical staff to ensure safe and reliable operation of the new plant, and assistance to EBS in setting up long-term operational procedures.



# SUMMARY

## Contract:

Type:.....Balance of plant and turnkey EPC  
Effective contract:..... 30 November 2012  
Handing over: .....3 January 2014  
Plant capacity:.....63 MW

## 21 MW extension

Effective contract:.....April 2015  
Handing over: ..... March 2016  
Final plant capacity:.....84 MW

## Technical data:

### Diesel engines

Make:..... MAN, Germany  
Type:..... 4 x 18V 48/60TS  
Speed: .....514 rpm

### Alternators

Make:.....Jeumont, France  
Type:.....JEGSY 160/L/14  
Voltage / frequency: ..... 13.8 kV/60 Hz  
Rated output:..... 4 x 26.460 MVA  
Output at 100% load:..... 4 x 21.168 MWe at pf 0.8

### Exhaust gas boilers/auxiliary boiler

Make:.....Danstoker, Denmark  
Type:..... 3 x EEB-S shell & tube exhaust gas steam boiler  
1 x OPTI oil-fired containerized auxiliary boiler unit  
Steam capacity: ..... 4 x 3,000 kg/h, 8 barg  
1 x 1,500 kg/h, 8 barg

### Step-up transformers

Make:.....Koncar, Croatia  
Type:.....TRN 55000-36/A  
Ratio:..... 34/13.8 kV  
Rated output:.....2 x 55 MVA

### Control system

Make:.....ABB, Denmark  
Type:.....800xA

### Powerhouse building and chimney

Supplier: ..... Aquila A/S, Denmark  
Length:..... 40 m  
Width:..... 40 m  
Height:..... 16 m  
Overhead crane: ..... 5 tonnes  
Stack height:..... 41 m