



**MAKENI ETHANOL  
PROJECT**  
SIERRA LEONE 2014



**FORGES TARDIEU**

*ENGINEERING*



# AERIAL VIEW OF SITE



**FORGES TARDIEU**  
ENGINEERING

CLIENT

**ADDAX  
BIOENERGY SL**

EPCM

**DE SMET  
ENGINEERS**

SITE

**MAKENI, SIERRA  
LEONE**

PROCESS

**CANE TO  
ETHANOL**

CRUSHING RATE

**225 TONS CANE /  
HOUR**

PRODUCTION RATE

**85,000 m<sup>3</sup> /  
YEAR**

POWER EXPORTED

**100,000 MWH /  
YEAR**



# SPLIT OF THE PROJECT



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## FRONT END

**Cane Preparation**



**Mill House**

**Milling**

## BACK END



**Juice Purification**



**Juice Concentration**

## STEAM & POWER GENERATION

## ETHANOL PLANT

## BALANCE OF PLANT



**Auxiliary Services**



**Cooling Tower**



**Pipe Racks**



**Piping**



## MILL HOUSE

24m Span x 90m Long  
x 22m High  
720 tons of steel

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# FRONT END

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## JUICE PURIFICATION

Juice Heaters  
Clarifier  
Mud Filters  
Liming  
Floculation

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# BACK END

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JUICE  
CONCENTRATION

Evaporators  
Condensers  
Syrup Cooler

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BACK  
END

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# AUXILIARY

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CHEMICAL STORAGE



WORKSHOP





FIRE FIGHTING



COOLING TOWERS



AUXILIARY



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Pipe Racks  
Piping



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# AUXILIARY

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# MOBILISATION



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## PLANT & MACHINERY

-  4 Cranes
-  13 Generators
-  100 Welding Machines

## MANPOWER

-  270 Expatriate Labour
-  180 Local Labour
-  45 Management Staff

## SITE AMENITIES

-  Site Camp  
6,000 m<sup>2</sup>
-  Site Office & Store  
400 m<sup>2</sup>
-  Laydown Area  
15,000 m<sup>2</sup>



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# WELFARE FACILITIES

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Site Camp  
Sanitary facilities  
Water treatment



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Pro cooks  
Industrial Kitchen  
Dining Hall  
Lounge

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# WELFARE FACILITIES

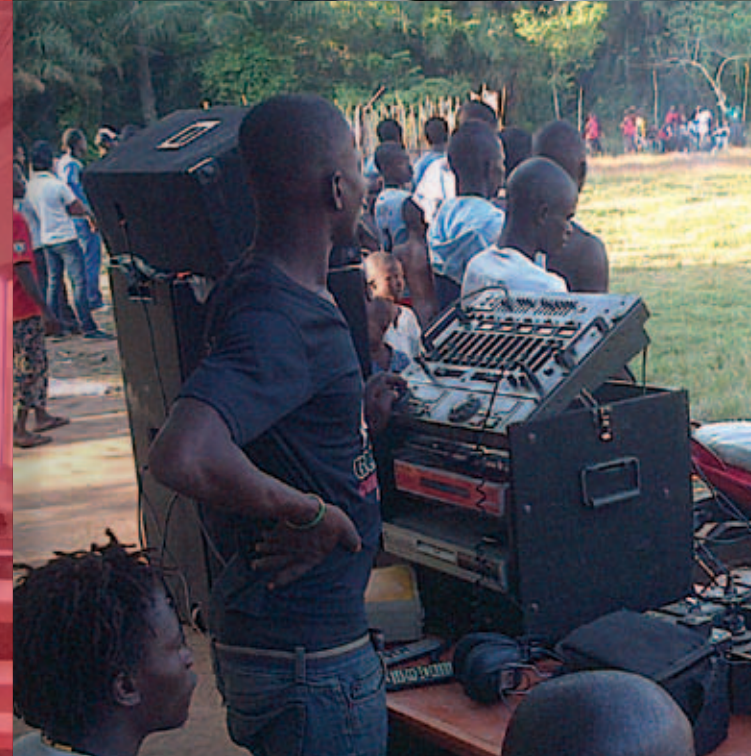
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# WELFARE FACILITIES



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Toolbox Talks  
PPE  
Medical facility  
Effective H&S  
Management

# CERTIFICATE OF ACHIEVEMENT

This certificate is awarded to

**FORGES TARDIEU LTD**

In recognition of working over one million man hours from September 2012 to May 2014  
without lost time injury on the

ADDAX BIOENERGY MAKENI ETHANOL AND POWER PROJECT, SIERRA LEONE



*[Handwritten Signature]*

Martin Laverick  
HSSE Manager  
De Smet Engineers & Contractors

28<sup>TH</sup> MAY 2014



# HEALTH & SAFETY



**FORGES TARDIEU**  
ENGINEERING





**FORGESTARDIEU**  
*INNOVATIVE ENGINEERING*

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