

# MINUTES OF TECHNICAL MEETING ON HYBRID ENGINES

## TECHNICAL SERVICES - PRODUCT DEVELOPMENT WORK

Date : 11.08.2019  
Place : Workshop- Bureau de SudBiogaz/Le Monde de l'Energie  
Start of the sessions : .....

### **I. Participants**

#### **a. The Togolese Delegation** -(SUDBIOGAZ / MONDE DE L'ENERGIE JV - Product Owners/Manufacturers Representatives)

- Mr Felix ETOH (Directeur Général – Le Monde de l'Energie, Lomé – Togo)
- Mr. Cephas BEDI ((Directeur Général – SudBiogaz, Kpalimé – Togo)
- Mr Amétépé KENGBO (Employé – SudBiogaz/Monde de l'Energie)
- Mr Agbéssi Kodzo ETSOH (Employé – SudBiogaz/Monde de l'Energie)
- Mr Boris APETOGBO (Employé – SudBiogaz/Monde de l'Energie)
- Mr Kossi Sitsofe AGLE (Employé – SudBiogaz/Monde de l'Energie)
- Mr. Amidou OUSSINA (Employé – SudBiogaz/Monde de l'Energie)
- Mr. Koffi ADJOH (Employé – SudBiogaz/Monde de l'Energie)
- Mr. Mensah ASOGBAGUE (Employé – SudBiogaz/Monde de l'Energie)
- Mr Koffi Mawussinou ESSE (Employé – SudBiogaz/Monde de l'Energie)
- Mr. Tao BENTHO (Employé – SudBiogaz/Monde de l'Energie)
- Mr KomlaTAMEKLOE (Employé – SudBiogaz/Monde de l'Energie)
- Mr Adjoh Koffi (Employé – SudBiogaz/Monde de l'Energie)

#### **b. The Ghanaian Delegation** – (Green Development Limited - Ghana Country Representatives/ International Relations and Marketing Unit of the Group)

- Mr. Courage DEI-ZANGA (Managing Director – Link Technology)
- **Mr. Prosper BURNSON (Executive Director – Green Development Limited )**
- Mr. Edem ASSISI (Member of delegation)
- Mr. Jacob TETTEH (Member of delegation)

#### **c. The Burkina Faso Delegation**

- Mr. Karim SAWADOGO (Member of the delegation)

**d. The Senegalese Delegation**

- Mr. Christian SHALLEY (Member of the delegation)

**e. The Nigerian Delegation**

- Mr. Onwuka Anthony ANYALE (General Manager, The Graceland Tonymex Limited)

- Mr. Babin BUTU (Member of the delegation)

**f. The Chinese Delegation**

The Chinese delegation (Wallong, The manufacturers)

- Ms Xia JUAN

- VicIMING Wong

## **II. Objective**

The reason for the meeting was to make corrections on the current prototype, and to create marketing strategy to maximize market penetration and define responsibility among the partnering organizations. The market penetration is targeting 16 West African countries but with an initial campaign through nine (9) countries.

The strategy is to be achieved through thinking ahead, proper planning, and appropriate product design to create difference in the local market, in order to have advantage over other competitors. The Chairman emphasized the need to bring together all different and specific interests of partners to one coherent and mutual interest; to make a cocktail of all aspects that gives a plus to the collaboration.

The modification plan is not to change current manufacturers but to adapt the present vehicle prototypes to local environment and market design. The Chairman presented a summary statistics on the current market on other products as follows:

- Nigeria, with 80,000 to 150,000 per year, but other statistics are showing 500,000.
- Ghana is shown to have not less than 5,000 per year,

- Cote D, Ivoire not less than 20,000 – 30,000, with trans-country supplies to Ghana, Guinea, Mali, etc.
- Burkina Faso, known as the home-of-bikes, have larger market statistics than Cote D`voire though exact figures are not available.

### **III. Technical and Engineering Assessment of the Vehicles**

The subject of the technical assessment is to examine and identify deficiencies, and propose appropriate corrections to improve the operation of the various components of the machines. The following remarks, solutions and resolutions have been proposed:

#### **1. Tricycle Hybrid Passenger Carrier.**

##### **Engines (Thermal and Electric)**

##### **Remarks:**

- Engine capacity too low
- Excessive and unwanted noise in the thermal engine (when running) while driving.
- Abnormal heating of the electric motor

##### **Proposed solutions:**

- Increased Engine capacity
- Reducing noise level to acceptable standards
- Installing automatic cooling device for the electric motor

##### **Resolutions:**

The Chinese delegation agreed on the following:

- Increase Engine capacity.
- Reduce noise level.
- Renovate the electric motor's automatic cooling system

## **Batteries**

Remarks:

- a. Low energy supply and low storage capacity
- b. Battery space too large.

Desired solution:

- a. Increased energy supply and storage capacity.
- b. Reduced space for battery and battery size

Resolutions:

The Chinese delegation agreed on the following:

- a. To increase the power supply and storage capacity.
- b. To reduce the size of the batteries

## **Tire**

Remarks

- a. Lack of uniformity.
- b. Insufficient number of bolts and knots
- c. Lack of Spare Tire
- d. Undefined space for spare tire

Desired Solutions

- a. Uniformity of Tires
- b. 5 holes on the rim instead of 4
- c. Spare tyre required
- d. Space for spare tyre

Resolutions:

The Chinese delegation agreed on the following:

- a. To standardize tires
- b. Increase the number of holes from 4 to 5 on the rim

- c. To give a spare tire



- d. Confirms the spare tire location at the rear

### **Pedals: Brake and Accelerator**

Remarks:

- a. Lack of space between the two pedals
- b. Insufficient space between the pedals and the driver's seat



Desired solution

- a. Creation of space between the pedals
- b. Creation of space between the driver's seat and the pedals



Resolution:

The Chinese delegation agreed to create the desired spacing

## Vehicle body

### Remarks

- a. Excessive fragility of the steel plate.
- b. Unsuitable knots and bolts.
- c. Bad welding
- d. Lack of ceiling lining against heat in the passenger cabin
- e. Lack of protection from rain
- f. Lack of safety structure against shaking.
- g. Unfavourable space between the two cabins

### Desired Solutions

- a. Thicker metal sheet



- b. The knots and bolts are better suited.
- c. Rigid and well-made welding is required



- d. Heat resistant material lining is required



- e. Installing tarpaulin roller set to protect against rain
- f. Installing safety chains on both sides against shaking
- g. Closing the space between the two cabins



Resolution:

The Chinese delegation agreed to make all identified improvements to ensure safety, passenger comfort and body durability

### **Dashboard**

Remarks:

- a. Lack of fuel gauge.
- b. Chinese-language indication on dashboard
- c. Speed crank (back/front) too fragile



Desired Solutions:

- a. Gasoline gauge installation
- b. English-language indication on dashboard
- c. Change from cranking system to press button (on/off)



Resolutions:

Chinese delegation agrees to give satisfaction in accordance with desired solutions

### **Electricals**

Remarks:

- a. Components are easily and often damaged due to short circuit
- b. Lack of inside light

Desired solution:

- Installing suitable and lasting fuses
- Installing lamps in cabins

Resolutions:

Chinese delegation agreed to effect all electrical installations for safety to prevent damages

### **Accessories**

Remarks

- a. Lack of toolbox.
- b. Lack of safe for documents

Desired solution:

- a. Providing toolboxes with necessary standard tools.
- b. Create a safe for documents

Resolutions:

Chinese delegation agreed to provide appropriate tools

### **Shock absorbers**

Remarks:

Weak absorber system

Desired solution:

Install effective shock absorbers and strengthen support blades especially at the back

Resolutions:

The Chinese delegation agreed:

- a. To provide shock absorbers
- b. Strengthen support blades.

## **2. For the Hybrid Baggage Carrier Tricycle**

### **Engines (Thermal and Electric)**

Remarks

- c. Low energy supply and low storage capacity
- d. Battery space too large.
- a. Excessive noise in the thermal engine (when running) while driving.

Desired solution:

- a. Increased energy supply and storage capacity.
- b. Reduced space for battery and battery size

Resolutions:

The Chinese delegation agreed:

- a. To increase the power supply and storage capacity.

- b. To reduce the size of the batteries

### **Batteries**

- e. Low energy supply and low storage capacity
- f. Battery space too large.

Desired solution:

- c. Increased energy supply and storage capacity.
- d. Reduced space for battery and battery size

Resolutions:

The Chinese delegation agreed on the following:

- c. To increase the power supply and storage capacity.
- d. To reduce the size of the batteries

### **Tire**

Remarks

- e. Lack of uniformity.
- f. Insufficient number of bolts and knots
- g. Lack of Spare Tire
- h. Undefined space for spare tire

Desired Solutions

- e. Uniformity of Tires
- f. 5 holes on the rim instead of 4
- g. Spare tyre required
- h. Space for spare tyre

Resolutions:

The Chinese delegation agreed on the following:

- e. To standardize tires
- f. Increase the number of holes from 4 to 5 on the rim

- g. To give a spare tire

### **Crank at speed**

Remarks

- The speed crank is not solid. It can break while manipulating it.

Desired solution:

- Turn the crank system to press button ( ON/OFF button)



Resolutions:

The Chinese delegation agreed:

- a. Turn the crank system into press (ON/OFF) button.

### **Speed and brake pedals**

Remarks:

- c. Lack of space between the two pedals
- d. Insufficient space between the pedals and the driver's seat



Desired solution

- a. Creation of space between the pedals
- b. Creation of space between the driver's seat and the pedals

Resolutions:

The Chinese delegation agreed:

- a. Move a little forward, separate and put enough space between the pedals at speed and brake
- b. Increase the distance between the handlebars and the driver's seat.

### **Short-circuit problem**

Remarks:

- Components are easily and often damaged due to short circuit

Desired solution:

- Installing suitable and lasting fuses

Resolutions:

Chinese delegation agreed to effect all electrical installations for safety to prevent damages



### **Warming up the electric motor**

Remarks

- The electric motor heats up when you travel a given distance.

Desired solution:

- Provide a cooling device for the electric motor.

Resolutions:

The Chinese delegation agreed:

- To equip the tricycle with a cooling device for the electric motor.

### **Back Damper and Support Blades**

Remarks

- a. When enough luggage is loaded into the luggage tricycle, the tires touch the bottom of the tricycle and the blades are flat.

Desired solution:

- a. Provide shock absorbers and supporting blade on both tire racks.



Resolutions:

The Chinese delegation agreed:

- a. To provide shock absorbers and supporting blade

**No toolbox containing accessories**

Remarks

- a. In the event of a breakdown, the driver lacks tools or keys to repair the failure.

Desired solution:

- a. Provide a toolbox containing the keys of wheels, triangle, fire extinguisher, other keys).

Resolutions:

The Chinese delegation agreed:

- a. Provide a toolbox containing the keys of wheels, triangle, fire extinguisher, other keys.

**3. Small White Hybrid Car**

**Spare tire**

Remarks

- a. No spare tire in the small white hybrid car
- b. The car practically touches the ground.



Desired solution:

- a. Provide a spare tire for the small car
- b. Increase tire size

- c. Increase the dimensions of rims
- d. Make the rims of the tires with 5 holes instead of 4.

Resolutions:

The Chinese delegation agreed:

- a. To provide a spare tire
- b. To increase the size of the tire
- c. To make the bolts & knots 5 holes instead of 4
- d. To increase the dimensions of the rim

### **Fuel gauge on the dashboard**

Remarks

- a. Difficulties in reading the fuel level on the dashboard.



- b. No Fuel Gauge on dashboard

Wanted solution:

- Provide a gauge on the dashboard to read the fuel level.

Resolutions:

The Chinese delegation agreed:

- Provide a gauge on the dashboard to read the fuel level.

### **The door handles**

Remarks

- Door handles break quickly.



Wanted solution:

- Review the design of door handle by making them harder and more efficient.

Resolutions:

The Chinese delegation agreed:

- To review the design of door handle by making them harder and more efficient.

## **4. Truck**

## **Spare tire**

Remarks

- No spare tire in the truck

Desired solution:

- Provide a spare tire for the truck

Resolutions:

The Chinese delegation agreed:

- To provide a spare tire

## **Seatbelt**

Remarks

- No seat belt in the truck



Wanted solution:

- Provide seat belts in the truck

Resolutions:

The Chinese delegation agreed:

- To provide seat belts in the truck

## **Shock and support blade**

Remarks

- Low shock absorber and low support blade performance



Desired solution:

- Strengthen shock absorbers and support blades

Resolutions:

The Chinese delegation agreed:

- Strengthen shock absorbers and support blades.

### **Engines (Thermal and Electric):**

#### **Remarks:**

- a. Engine capacity too low
- b. Excessive and unwanted noise in the thermal engine (when running) while driving.
- c. Abnormal heating of the electric motor

#### **Proposed solutions:**

- d. Increased Engine capacity
- e. Reducing noise level to acceptable standards
- f. Installing automatic cooling device for the electric motor

#### **Resolutions:**

The Chinese delegation agreed on the following:

- d. Increase Engine capacity.
- e. Reduce noise level.
- f. Renovate the electric motor's automatic cooling system

### **Batteries**

#### **Remarks:**

- a. Low energy supply and low storage capacity
- b. Battery space too large.

#### **Desired solution:**

- e. Increased energy supply and storage capacity.
- f. Reduced space for battery and battery size

#### **Resolutions:**

The Chinese delegation agreed on the following:

- e. To increase the power supply and storage capacity.
- f. To reduce the size of the batteries

### **No toolbox containing accessories**

#### **Remarks**

- a. In the event of a breakdown, the driver lacks tools or keys to repair the failure.

#### **Wanted solution:**

- a. Provide a toolbox containing the keys of wheels, triangle, fire extinguisher, other keys.

#### **Resolutions:**

The Chinese delegation agreed:

- a. Provide a toolbox containing the keys of wheels, triangle, fire extinguisher, other keys.

### **Fuel gauge on the dashboard**

Remarks

- Difficulties in reading the fuel level on the dashboard.



### **Lack of Fuel Gauge**

Wanted solution:

- a. Provide a gauge on the dashboard to read the fuel level.

Resolutions:

The Chinese delegation agreed:

- a. Provide a gauge on the dashboard to read the fuel level.

### **Shock absorber**

Remarks

- Low shock absorber and low support blade performance

Desired solution:

- Strengthen shock absorbers and support blades

Resolutions:

The Chinese delegation agreed:

- Strengthen shock absorbers and support blades.

### **Handbrake**

Remarks

- a. Low handbrake stability when the car stops at a slope.

Desired solution:

- Re-enforce handbrake system

Resolutions:

The Chinese delegation agreed:

- Re-enforce the brake system



### **Engine Seat**

#### Remarks

- The engine seat is not durable.

#### Desired solution

- Strengthen engine support

#### Resolutions

The Chinese delegation agreed:

- To strengthen the engine seat

### **The charger**

#### Remarks

- The charger burns quickly.

#### Desired solution

- Review its manufacturing

#### Resolutions

The Chinese delegation agreed:

- To review the engineering of the charging system

### **Summary**

After the practical and technical working session at CITO 2, all delegations returned to SudBioGaz headquarters in Totsoayni for a small closing ceremony for the day's work. At the end of the meeting, all delegations from Senegal, Burkina-Faso, Nigeria, Ghana, China and Togo agreed to the following:

#### **For the Hybrid Passenger Carrier Tricycle**

- Make uniform and identical tires (4 in total (front and rear), including the spare tire) of the same size (section or width, series or percentage ratio between tire height and section)
- Provide a spare tire to attach to the rear of the tricycle.
- The tires should contain 5 holes (bolts & nuts).
- Increase the power and performance of the electric motor.
- Increase the power and performance of the thermal or gasoline engine.
- Increase battery power and performance.
- Increase the thickness of the sheet metal (thick and hard) with which the roof of the tricycle was made.

- Close the small space at the top between the front and rear cabins to prevent water from pouring over passengers.
- Close the width (front and rear) sides of the passenger cabin with tarpaulin or aircloth
- Fix the roof with bolts and nuts and protect it with a plastic blanket
- Putting heat resistant lining under the roof of the rear cabin (passenger's)
- Fix the handbrake well
- Provide side blanket coverings (rain shields) for front and rear cabins to protect passengers and drivers in case of rain.
- Provide toolboxes (wheel keys, triangle, fire extinguisher, other keys)
- Provide a place for the converter
- Provide a place for the money box.
- Provide a gauge on the dashboard to indicate the fuel level in the tank
- Review the controller
- Turn the crank system into an OFF/ON press button system
- Provide a silencer if possible to reduce or stifle the noise of the gasoline engine
- Push the pedal a little at speed and the brake a little forward.
- Provide a safe (fuse) device to cushion possible short-circuiting
- Provide a cooling device for the electric motor
- Provide light inside the tricycle
- Review the dashboard
- Bring the exhaust back to the tire.
- Change space at the tank. Now place it right behind the driver's backrest.
- Provide a seat belt, with lock for the driver and passengers
- Provide shock absorbers on the rear wheels

#### **For the Hybrid Baggage Carrier Tricycle**

- Make uniform and identical tires (4 in total front and rear) of the same size (section or width, series or percentage ratio between tire height and section)
- Provide a spare tire for the tricycle
- The tires should contain 5 holes.
- Turn the crank or case at speed into an OFF/ON button
- Increase the power and performance of the electric motor.
- Increase the power and performance of the thermal or gasoline engine.
- Increase battery power and performance.
- Set the gasoline engine to reduce or stifle noise.
- Push the pedal a little at speed and the brake a little forward
- Provide a safe (fuse) device to cushion possible short-circuiting

- Provide a cooling device for the electric motor
- Strengthen tricycle shock absorbers
- Strengthen the blades
- Increase the dimensions (length, width, height) of the tricycle's cargo carry luggage
- Provide toolboxes (wheel keys, Crick, triangle, fire extinguisher, other keys)
- Increase the distance between the driver's seat and the Handleon

#### **For the small White Hybrid Car**

- Provide a spare tire to put in the rear trunk of the car.
- Provide toolboxes (wheel keys, Crick, triangle, fire extinguisher, other keys)
- Provide a gauge on the dashboard to indicate the fuel level in the tank
- Increase the size of tires (section, and height) and the size of the tires. This will lift the car a little relative to ground level.
- Review door handles (they break or break quickly).

#### **For the Hybrid Port**

- Provide seat belts
- Strengthen support blades
- Provide a gauge in the dashboard to detect the level of fuel in the tank
- Increase the power and performance of the electric motor.
- Increase battery power and performance
- Review the manufacture of the charger (It spoils quickly)
- Provide toolboxes (wheel keys, Crick, triangle, fire extinguisher, other keys)
- Provide a spare tire
- Provide a safe (fuse) device to cushion the short circuit.
- Review the manufacture of engine supports
- Provide a pot on the exhaust
- Strengthen the shock absorbers.

## COMMERCIAL RESOLUTION

All the delegations have reaffirmed their irrevocable commitments to order the following quantity should the manufacturer also honours its commitments to rectify the deficiencies found. The order is condition to the successful run both in Chinie and Ghana within 30 days after signing of the document.

The confirmed order of program conditioned upon the modification success and improvement as discussed and accepted by the Chinese delegation

<b>Clients</b>	<b>Passenger-carrying Tricycles</b>	<b>Cargo Tricycles</b>
<b>CI/ML</b>	1 000 units	1 000 units
<b>GHANA</b>	1 000 units	500 units
<b>NIGERIA</b>	1 000 units	500 units
<b>BENIN</b>	1 000 units	500 units
<b>SENEGAL</b>	1000 units	500 units
<b>BURKINA FASO</b>	1000 units	500 units
<b>TOTAL</b>	<b>6 000 units</b>	<b>3 500 units</b>

## SEQUENCES OF SUPPLY

<b>Clients</b>	<b>Supply of Passenger-carrying Tricycles</b>				<b>Supply of Cargo Tricycles</b>			
	<b>1st</b>	<b>2nd</b>	<b>3rd</b>	<b>4th</b>	<b>1st</b>	<b>2<sup>nd</sup></b>	<b>3rd</b>	<b>4th</b>
<b>CI/ML</b>	100	200	300	400	100	200	300	400
<b>GHANA</b>	100	200	300	400	50	100	150	200
<b>NIGERIA</b>	100	200	300	400	50	100	150	200
<b>BENIN</b>	100	200	300	400	50	100	150	200
<b>SENEGAL</b>	100	200	300	400	50	100	150	200
<b>BURKINA FASO</b>	100	200	300	400	50	100	150	200
<b>TOTAL BY SUPPLY</b>	<b>600</b>	<b>1 200</b>	<b>1 800</b>	<b>2 400</b>	<b>350</b>	<b>700</b>	<b>1 050</b>	<b>1 400</b>
<b>TOTAL</b>	<b>6 000 unit</b>				<b>3 500 units</b>			

The total of 9,500 units is to be delivered over 6 months at the rate of 6,000 units of passenger carriers and 3,500 units for cargo tricycles.

#### IV. Signatures and Endorsement

Delegates from the following countries have signed:

- **For the Togolese Delegation: Name.....Signature.....Date..**
- Mr. Felix ETO
- Mr. Cephas BEDI
- Mr Amétépé KENGBO
- Mr Agbéssi Kodzo ETSOH
- Boris APETOGBO
- Mr Kossi Sitsofe AGLE

- Mr. Amidou OUSSINA
  - Mr. Koffi ADJOH
  - Mr. Mensah ASOGBAGUE
  - Mr Koffi Mawussinou ESSE
  - Mr. Tao BENTHO
  - Mr. KomlaTAMEKLOE
- 1. For the Ghanaian Delegation: Name.....Signature.....Date.....**
- Mr. Courage DEI-ZANGA
  - **Mr. Prosper BURNSON**
  - Mr. Edem ASSISI
  - Mr. Jacob TETTEH
- 2. For the Burkinabe Delegation: Name.....Signature.....Date.....**
- Mr. Karim SAWADOGO
- 3. For the Senegalese Delegation: Name.....Signature.....Date.....**
- Mr. Christian SHALLEY
- 4. For the Nigerian Delegation: Name.....Signature.....Date.....**
- Mr. Onwuka Anthony ANYALE
  - Mr. Babin BUTU
- 5. For the Chinese Delegation: Name.....Signature.....Date.....**
- Ms Xia JUAN
  - Wong VICIMING

Made in Kpalimé, August 11, 2019.