

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

PRESENTATION

ON

“ECONOMIA” LITHIUM-ION BATTERY

PRESENTED BY

M. ASLAM AZAD (MEMBER OF ASHRAE & REAP) MD, AGEKO (Pvt) Ltd.

TOPIC

1. **Background of Manufacturing of Batteries.**
2. **EDB's Letter for Lithium-Ion Battery Manufacturing.**
3. **About the Lithium-Ion Battery.**
4. **Comparison of Lithium-Ion Battery VS. VRLA (AGM, Gel).**
5. **Specifications of "ECONOMIA" Lithium-Ion Battery Set.**
6. **Test Report of ECONOMIA Lithium-Ion Battery**
7. **Comparative Price ECONOMIA Lithium-Ion Battery VS Existing VRLA (AGM/GEL) Batteries**
8. **International Market Prices of Lithium-Ion Battery**
9. **Batteries Placed at Street Light in Pole & at Solar Panel.**
10. **New Factory & Academic Block Proposed Site.**
11. **Investment Manufacturing Proposal.**



BACKGROUND OF MANUFACTURING OF BATTERIES

1

Local:

- Volta: Dry/Flooded
- AGS: Flooded
- Phoenix: Flooded
- Exide: Flooded

Imported GEL/AGM

- Narada, China
- North Start Blue, USA
- Akhtar Solar, China
- BSB, china
- Ritar, China
- Catkin, China
- SEC, China
- Different varieties from M/s Icon Power

- No battery operated over 18 months from above mentioned brands. Most of the batteries got down in 12 months, except SEC operate 30 months.
- AGEKO suffered the loss over Rs.20 Million in two years and also no one was found capable to meet the solar electric car backup requirement due to High Discharge as required minimum Discharge 3C & Charge 0.4C to 1C .
- Then the company was pushed to enter in to R&D and after detail collection of knowledge from all over the world decided to manufacture these batteries.
- However at first phase cells to be imported as raw material and installed with locally designed & manufactured Equalizer with accessories & Body, and in second phase cells will be manufactured locally by importing the raw material of cells & at the final phase the raw material Lithium enrichment will be incorporated in the cell manufacturing setup.



EDB's LETTER FOR LITHIUM-ION BATTERY MANUFACTURING

2



Engineering Development Board
Ministry of Industries & Production
Government of Pakistan



16053
EDB-PL/01/14-Tech.II
November 27, 2014

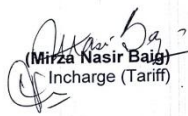
DETERMINATION OF LOCAL MANUFACTURING STATUS M/s AGECO (Pvt) Ltd

Enclosed please find copy of M/s AGECO (Pvt) Ltd., letter No. AGE-EDB/2512P/L/14 dated 03.10.2014, concerning the subject matter.

02. Based on the confirmation received from the local industry, it is conveyed that "Lithium Ion Battery Cells", being imported by M/s AGECO (Pvt) Ltd., are not being manufactured locally.

03. The admissibility of other relevant conditions of 5th schedule and Import Policy Order are to be determined by FBR.

Best regards,


(Mirza Nasir Baig)
Incharge (Tariff)

The Secretary (Tariff-II)
Federal Board of Revenue
Islamabad

cc:

Mr. M. Aslam Azad
Chief Executive
Ageco (Pvt) Ltd
7 & 8, 1st Floor, Hill View Plaza Blue Area
Islamabad
Tel: 051-2823336/ 2872988
Fax: 051-2270126



GOVERNMENT OF PAKISTAN
REVENUE DIVISION
FEDERAL BOARD OF REVENUE

C.No.2(5)Mach./99/172469

Islamabad, dated 18th December, 2014.


The Collector,
Model Customs Collectorate of Appraisalment (West),
Custom House, Karachi.

Subject: **DETERMINATION OF LOCAL MANUFACTURING STATUS**

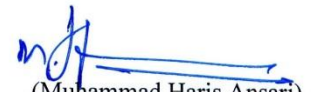
Please refer to the subject cited above and find enclosed copy of Engineering Development Board's letter No. EDB-PL/01/14-Tech.II, dated 27th December, 2014 in respect of M/s Ageco (Pvt) Ltd., for necessary action under the law.

2. The admissibility of the concession and fulfillment of other requirements shall be determined and ensured by the Collectorate.

Encl: As above.


(Muhammad Haris Ansari)
Secretary (Tariff-II)

Copy to M/s Ageco (Pvt) Ltd., 7 & 8, 1st Floor, Hill View Plaza Blue Area,
Islamabad.


(Muhammad Haris Ansari)
Secretary (Tariff-II)

ABOUT THE LITHIUM-ION BATTERY

Lithium-ion batteries are popular because they have a number of important advantages over competing technologies:

- They're generally much lighter than other types of rechargeable batteries of the same capacity. The electrodes of a lithium-ion battery are made of lightweight **lithium** and **carbon**.
- Lithium is also a highly reactive element, meaning that a lot of energy can be stored in its atomic bonds. This translates into a very high **energy density** for lithium-ion batteries. Here is a way to get a perspective on the energy density. **A typical lithium-ion battery can store 150 watt-hours of electricity in 1 kilogram of battery. A lead-acid battery can store only 25 watt-hours per kilogram.** Using lead-acid technology, **it takes 6 kilograms to store the same amount of energy that a 1 kilogram lithium-ion battery can handle.** That's a huge difference.
- They hold their charge. **A lithium-ion battery pack loses only about 0.5 percent of its charge per month,** compared to a **20 percent loss per month for Lead Acid batteries.**
- They have no **memory effect**, which means that you do not have to completely discharge them before recharging, as with some other battery chemistries.
- **Lithium-ion batteries can handle over 4,200-6,000 charge/discharge cycles** depend on temperature in comparison to **lead acid dry battery (Gel/AGM) claimed maximum to 1,800 cycles.** **But on ground reality it expires from 500 to 1,000 cycles.**



COMPARISON OF LITHIUM-ION BATTERY VS. VRLA (AGM, GEL)

Nomenclature	Lithium-Ion Battery	VRLA (AGM, Gel)
No. of Cycles	4200 at 50% DOD 2500 at 94% DOD	1800 at 50% DOD
Volume	1/4 th VS AGM, Gel	
Weight	11.2 KG	32 KG
Charge	0.4C to 1C	0.1C to 0.2C
Continue Discharge	1C to 5C (100% to 500%)	0.2C (20%)
Body	Metal	Plastic
Safety	In Built Fuse	No Safety
Surge Discharge	10C to 50C	5C
Replacement Warranty	2 Years	6 Months to 1 Year (with Deduction Charges of used Days)
Expected Life	8-15 Years	2-3 Years



SPECIFICATIONS OF "ECONOMIA" LITHIUM-ION BATTERY SET

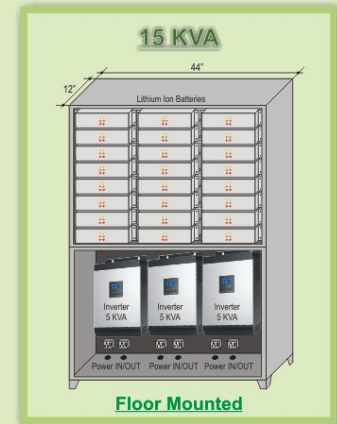
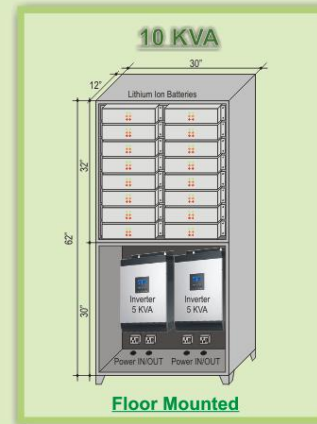
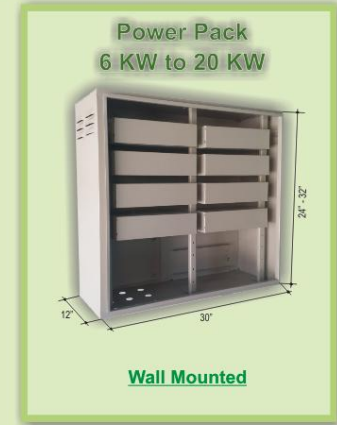
ECONOMIA POWER PACK

LITHIUM ION BATTERY



ECONOMIA POWER PACK

LITHIUM ION BATTERY



Technical Data

Specification	Power Pack Watts							
	Rack Mounted				Portable			
	684 W	1.37 KW		1.37 KW		2.74 KW		
Operating Voltage	24 V	24 V	48 V	24 V	48 V	24 V	48 V	
Limit DOD 94%	640 W	1.28 KW		1.28 KW		2.56 KW		
Recommended Discharge Setting	10 Amps	20 Amps	10 Amps	20 Amps	10 Amps	40 Amps	20 Amps	
Charging Limit	0.4 C							
Discharging Limit	1 C							
Surge Discharge	3 C for 10 Sec							
Upper Charging Limit	28 V	28 V	57 V	28 V	57 V	28 V	57 V	
Lower Cut Off	20 V	20 V	40 V	20 V	40 V	20 V	40 V	
Self Reconnect	21 V	21 V	42 V	21 V	42 V	21 V	42 V	
Over Heat Cut Off	51 °C							
Auto Reconnect	35 °C							
Weight of each Module (Approx.)	5 Kg	10 Kg		10 Kg		20 Kg	20 Kg	
Dimension of each Module (LxWxH)	6" x 3" x 11"	12" x 3" x 11"		12" x 3" x 11"		12" x 6" x 11"		

Manufacturer:

AGECO (Pvt.) Ltd.



Works:

262, Kahuta Triangle Industrial Area, Kahuta Road, Islamabad
 Tel: +92-51-4490807, 4490838 Fax: +92-51-4491318
 E-mail: ageco@economia.com.pk, URL: www.economia.com.pk



TEST REPORT OF ECONOMIA LITHIUM-ION BATTERY (LiFePO₄ 5-C DISCHARGE CELL)

TEST REPORT

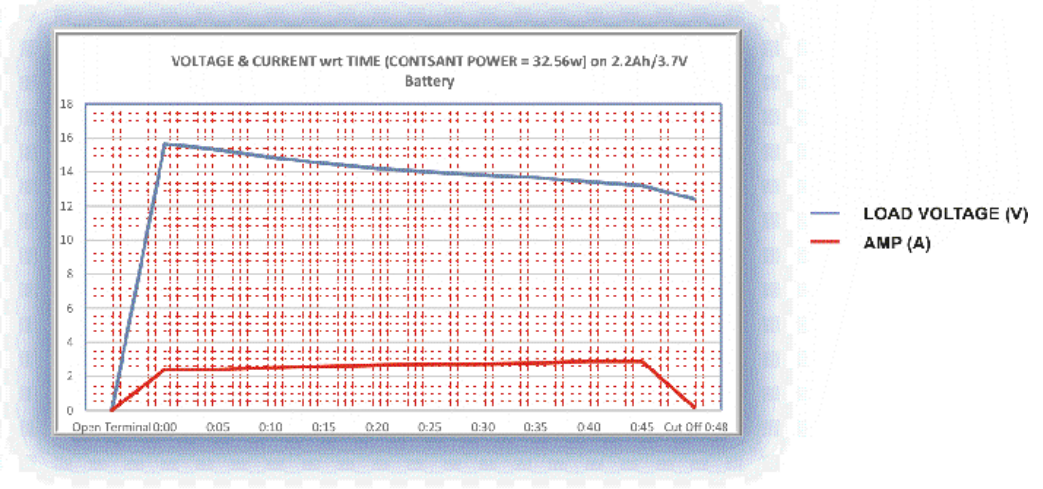
TEST CONDUCTED OF 2.2 AMPS, 3.7 V X 4 = (14.8 V) 16.12 TOP VOLTS ON 120% LOAD

3.7V X 4 = 14.8V (2.2 Ah)

DISCHARGING CURVE BETWEEN CURRENT AND OPEN/LOAD VOLTAGE WITH TIME

S.#	TIME	OPEN VOLTAGE (V)	LOAD VOLTAGE (V)	Amps (A)
1	0:00	16.12	15.65	2.40
2	0:05	----	15.30	2.40
3	0:10	----	14.87	2.50
4	0:15	14.93	14.51	2.58
5	0:20	----	14.21	2.66
6	0:25	----	14.00	2.72
7	0:30	14.27	13.83	2.72
8	0:35	----	13.67	2.77
9	0:40	----	13.42	2.89
10	0:45	13.66	13.02	2.89
11	0:48	13.20	12.04	CUT OFF

48 MINUTES AT 1.20 C DISCHARGE



COMPARATIVE PRICE ECONOMIA LITHIUM-ION BATTERY VS EXISTING VRLA (AGM/GEL) BATTERIES

Nomenclature	Existing VRLA (AGM/GEL) Batteries	ECONOMIA Lithium-Ion Battery	
Capacity of Battery	100 AH	1.3 KW	60 AH
Price Range	Rs. 17,000 –Rs.25,000	Rs.45,500	Rs.25,000
DOD	50%	94%	94%
Cycles	1,000	2,500	2,500
Net Output to Extent	12V x 100 Ah = 1,200 W at 50% DOD = 600 W	1.3 KW= 1,367 W at 94% DOD = 1,285 W	12V x 60 Ah = 720 W at 94% DOD = 676 W

Nomenclature	Existing VRLA (AGM/GEL) Batteries 100 AH	ECONOMIA Lithium-Ion Battery 60 AH
Net Comparative Status	Rs.17,000-Rs.25,000 Output: 600 W At 1,000 Cycles	Rs.25,000 Output: 676 W At 2,500 Cycles



INTERNATIONAL MARKET PRICES OF LITHIUM-ION BATTERY



12v black shell 60Ah LiFePO4 lithium battery IFR battery pack for

US \$481.00 / piece

Free Shipping



12v 100Ah lifepo4 solar system battery LiFePO4 battery for solar

US \$874.85 / piece

Shipping: US \$425.07 / piece



Solar Power Station Battery 12V 600AH Factory Price lifepo4

US \$2,109.00 / piece

Shipping: US \$1,207.37 / piece



12v high capacity lithium battery 50ah LiFePO4/LFP battery for

US \$510.97 / piece

Shipping: US \$224.25 / piece



4S20P 12v rechargeable lithium ion batteries 32650 battery pack for LED Strip/LED Panel/LED light/ Solar system

US \$600.00 / piece

Shipping: US \$528.37 / piece
is_customized: Yes ; Brand Name: SN
Battery ; Voltage: 12v ; Size: 215*171*323mm ; Nominal Capacity: 100ah ; Weight: 15kg



high quality 12V40AH LiFePO4 golf cart battery LiFePO4 car battery

US \$428.23 / piece

Shipping: US \$184.08 / piece

Order (1)



Factory price 12v 60Ah LiFePO4 lithium battery pack 32650 cell for

US \$481.50 / piece

Free Shipping



12V LiFePO4 Car/Automobile Starter Battery 12V 20Ah for

US \$295.39 / piece

Shipping: US \$154.67 / piece



12v 60Ah LiFePO4 lithium battery pack 32650 cell apply for led and

US \$481.00 / piece

Free Shipping

BATTERIES PLACED AT STREET LIGHT IN POLE & AT SOLAR PANEL



NEW FACTORY & ACADEMIC BLOCK PROPOSED SITE



New Factory Site Plan
for the manufacturing of
Solar Car/Lithium-ion Battery
&
“ECONOMIA” Technology Park



INVESTMENT MANUFACTURING PROPOSAL

11

Phase-1: (Cells to be imported & other Equipment/Material Locally):

Market Price of each Battery (1.367 KW): (Equivalent to 2 x 100 AH)	Rs.45,500
Investment Range (Starting From):	For 2,500 to 5,000 Batteries
Investment Cost:	Rs.40,000 each Battery
Minimum Investment Required:	Rs.100 Million for 2,500 Batteries for 1 Cycle
Estimated No. of cycles:	3 to 4/Year
Estimated Manufacturing/Year	7,500 to 10,000 Batteries
Profit Margin: 3 Cycles/Year	Rs.5,500 x 7,500 = Rs.4,12,50,000
4 Cycles/Year	Rs.5,500 x 10,000 = Rs.5,50,00,000

Profit Margin

Each party will take 50/50 profit or as per actual sale price determined at the time of manufacturing and sale.

Terms of Investment

Investment Time: 10 Years minimum

In case of withdrawal from investment 12 months notice will be served and refund will be made on disposal of stock available.



INVESTMENT MANUFACTURING PROPOSAL

12

Phase-2: (Cells Raw Material will be imported and total manufacturing with setup including import of Machinery & its infrastructure)

Estimated Cost 100 Million. However the project details will be submitted later for the capacity of production/day.

Profit Margin

After completion of Phase-2, the number of cycles will increase up to 12 per year and profit will be 3-4 times as shown in Phase-1.

General Information

Warranty: 2 Years. However Expected Life is 8-15 years depending on temperature and number of cycles.

1.3 KW Lithium-ion battery (94% DOD) will replace 2 x 100 Ah AGM/Gel Battery.

OEM Based Manufacturing

We are offering OEM based manufacturing for one year based order with 20% discount on list price with minimum order 1,000 KW & 50% down payment.



THANK YOU