BATTERIE

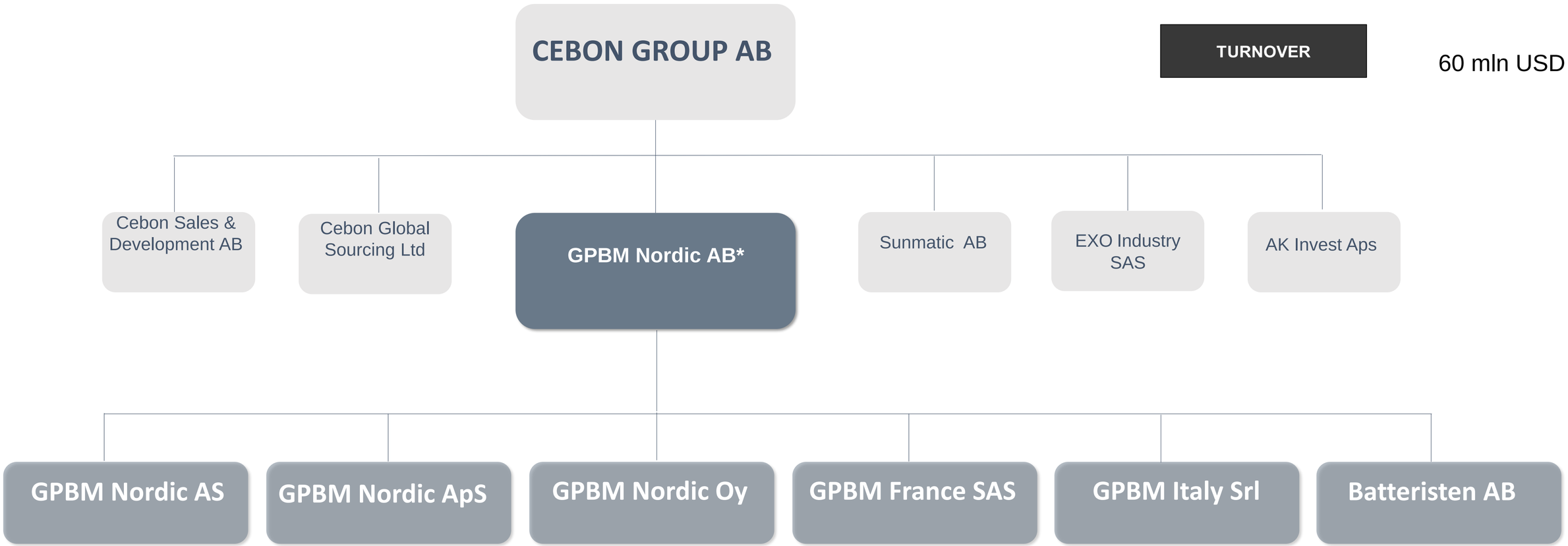
LA TEMPERATURA NON E’ PIU’ UN PROBLEMA

Come i nuovi prodotti riescono a supportare sempre più nuove applicazioni IoT con richieste di temperatura estreme

A cura di Luca Negri
18/05/2021

LA NOSTRA STRUTTURA

NUMBERS	105 employee >3000 customer
TURNOVER	60 mln USD



INDUSTRY | CONSUMER | SAFETY | CEBON HUB

GPBM Industry

BATTERIE PRIMARIE

ALKALINE

Accreditations

- ISO 9001
- ISO14001

LITHIUM MANGANESE DIOXIDE

Certificates

- UN
- UL1642
- UL2054
- 2013/56/EU
- ISO 9001
- ISO14001

COIN CELLS

Certificates

- UL
- SGS RoHS
- RE ACH
- ISO9001:2008
- ISO 4001:2004

LITHIUM THIONYL CHLORIDE

Certificates

- IATF16949:2016
- ISO9001
- ISO14001

BATTERIE RICARICABILI

LI-POLYMER

Certificates

- UN38.3
- UL1642
- IEC62133

NiMH

Accreditations

- ISO 9001
- ISO14001
- OHSAS18001
- IEC QC080000

LITHIUM

Certificates

- UN38.3
- UL1642
- IEC62133

LAVORAZIONE PACCHI BATTERIA PERSONALIZZATI

Le Fasi

Start

R&S > > > > > > > Prodotto finale

Ricerca & Sviluppo | Celle | Progetto | BMS e Assemblaggio | Caricatore | Casing | Test e certificazione

LE BATTERIE NEL MONDO DI OGGI

L’indipendenza, comodità d’utilizzo e il monitoraggio delle case e/o persone ha portato allo sviluppo di nuovi device wireless che ci agevolano nella vita quotidiana.

Grazie e questa nuova richiesta, tutti i costruttori di componentistica si sono impegnati nello sviluppo di nuove tecnologie con consumi sempre più ridotti ed ingombri miniaturizzati legati alle necessità delle nuove richieste del mercato.

COME EFFETTUARE LA SCELTA

Energia

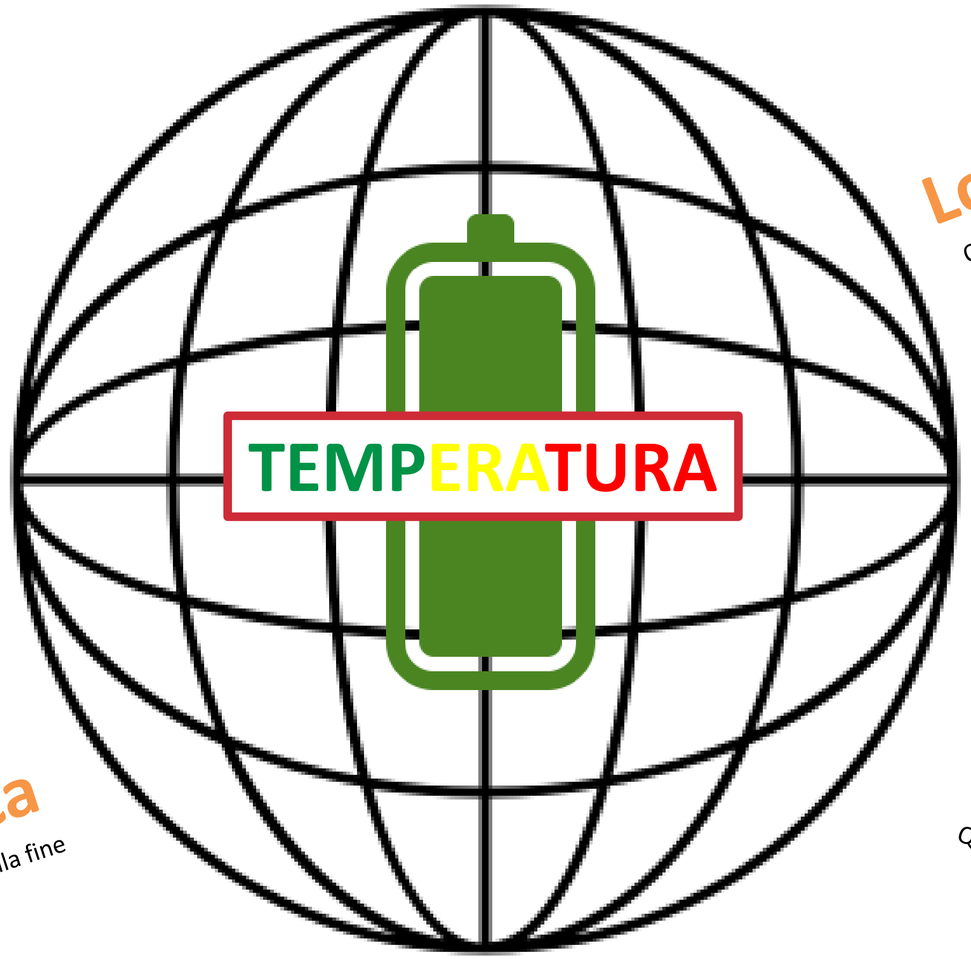
Quanta ne abbiamo realmente bisogno?

Utilizzo

Dove e come la usi?

Logistica

Organizzata e caotica



Scarica

Questione di vita o di morte (batteria)

Sicurezza

Che certificazioni/test hai bisogno?

Meccanica

Piu' piccola, sempre alla fine

Durata

Quanto tempo?

Prezzo

Il piu' basso possibile

GP60AAAH NiMH AAA

- **Rated voltage:** 1.2v
- **Rated Capacity:** 600mAh (Min)
- **Standard Charge:** 60mA for 16hours
- **Standard Discharge:** 60A to 1950mA
- **Maximum charge current:** 600mA with TCO = 45-50℃ and –ΔV
- **Maximum charge current:** 600mA
- **Internal impedance:** ≤40mΩ
- **Cell weight:** ≤13g

IATF16949:2016
TARGET – MAY 21

Operating temperature
0℃ to +45℃ (charge)
-20℃ to +50℃ (discharge)
Storage Temperature
- 20℃ to +35℃ (≤1 year)

IEC62133-2:2017
TARGET– MAR 21

 # Based on standard charge/discharge

GP60AAAHT NiMH AAA

- **Rated voltage:** 1.2v
- **Rated Capacity:** 600mAh (Min)
- **Standard Charge:** 60mA for 16hours
- **Standard Discharge:** 120mA to 1.0V
- **Maximum charge current:** 300mA with TCO = 55℃ and –ΔV
- **Maximum charge current:** 600mA
- **Internal impedance:** ≤40mΩ
- **Cell weight:** ≤14g

GP125AAMT NiMH AA

- **Rated voltage:** 1.2v
- **Rated Capacity:** 1250mAh (Min)
- **Standard Charge:** 125mA for 16hours
- **Standard Discharge:** 250mA to 1.0V
- **Maximum charge current:** 600mA with TCO = 55℃ and –ΔV
- **Maximum charge current:** 1250mA
- **Internal impedance:** 23mΩ
- **Cell weight:** ≤24 g

IATF16949:2016
TARGET – MAY 21

Operating temperature
0℃ to +50℃ (charge)
-20℃ to +70℃ (discharge)
Storage Temperature
- 20℃ to +35℃ (≤1 year)
-20℃ to +60℃ (≤1 week)

IEC62133-2:2017
TARGET– MAR 21

 # Based on standard charge/discharge

** Temperature @ 20℃±5℃*

◆ Through -30℃ to +85℃

^ Storage at high temperature will have a risk of cell deterioration.

GP60AAAHT4 NiMH AAA

- **Rated voltage:** 1.2V
- **Rated Capacity:** 600mAh (Min)
- **Standard Charge:** 60mA for 16hours
- **Standard Discharge:** 120mA to 1.0V
- **Maximum charge current:** 300mA with TCO = 55℃ and –ΔV
- **Maximum charge current:** 1000mA
- **Internal impedance:** ≤50mΩ
- **Cell weight:** ≤14g

GP120AAHT4 NiMH AA

- **Rated voltage:** 1.2v
- **Rated Capacity:** 1200mAh (Min)
- **Standard Charge:** 120mA for 16hours
- **Standard Discharge:** 240mA to 1.0V
- **Maximum charge current:** 600mA with TCO = 55℃ and –ΔV
- **Maximum charge current:** 2000mA
- **Internal impedance:** ≤23mΩ
- **Cell weight:** ≤24.5g

IATF16949:2016
TARGET – MAY 21

Operating temperature
0℃ to +70℃ (charge)
-20℃ to +85℃ (discharge)
Storage Temperature
- 40℃ to +35℃ (≤1 year)
-40℃ to +85℃ (≤1 week)

IEC62133-2:2017
TARGET– MAR 21

 # Based on standard charge/discharge

** Temperature @ 20℃±5℃*

◆ Through -30℃ to +85℃

^ Storage at high temperature will have a risk of cell deterioration.

GP50AAAHT5 NiMH AAA

- **Rated voltage:** 1.2v
- **Rated Capacity:** 500mAh (Min)
- **Standard Charge:** 50mA for 16hours
- **Standard Discharge:** 100mA to 1.0V
- **Maximum charge current:** 250mA with TCO = 55℃ and –ΔV
- **Maximum charge current:** 1000mA
- **Internal impedance:** ≤50mΩ
- **Cell weight:** ≤13g

GP100AAHT5 NiMH AA

- **Rated voltage:** 1.2v
- **Rated Capacity:** 1000mAh (Min)
- **Standard Charge:** 100mA for 16hours
- **Standard Discharge:** 200mA to 1.0V
- **Maximum charge current:** 500mA with TCO = 55℃ and –ΔV
- **Maximum charge current:** 2000mA
- **Internal impedance:** ≤50mΩ
- **Cell weight:** ≤25g

IATF16949:2016
TARGET – MAY 21

Operating temperature
0℃ to +70℃ (charge)
-30℃ to +85℃ (discharge)
Storage Temperature
- 40℃ to +35℃ (≤1 year)
-40℃ to +85℃ (≤1 week)

IEC62133-2:2017
TARGET– MAR 21

 # Based on standard charge/discharge

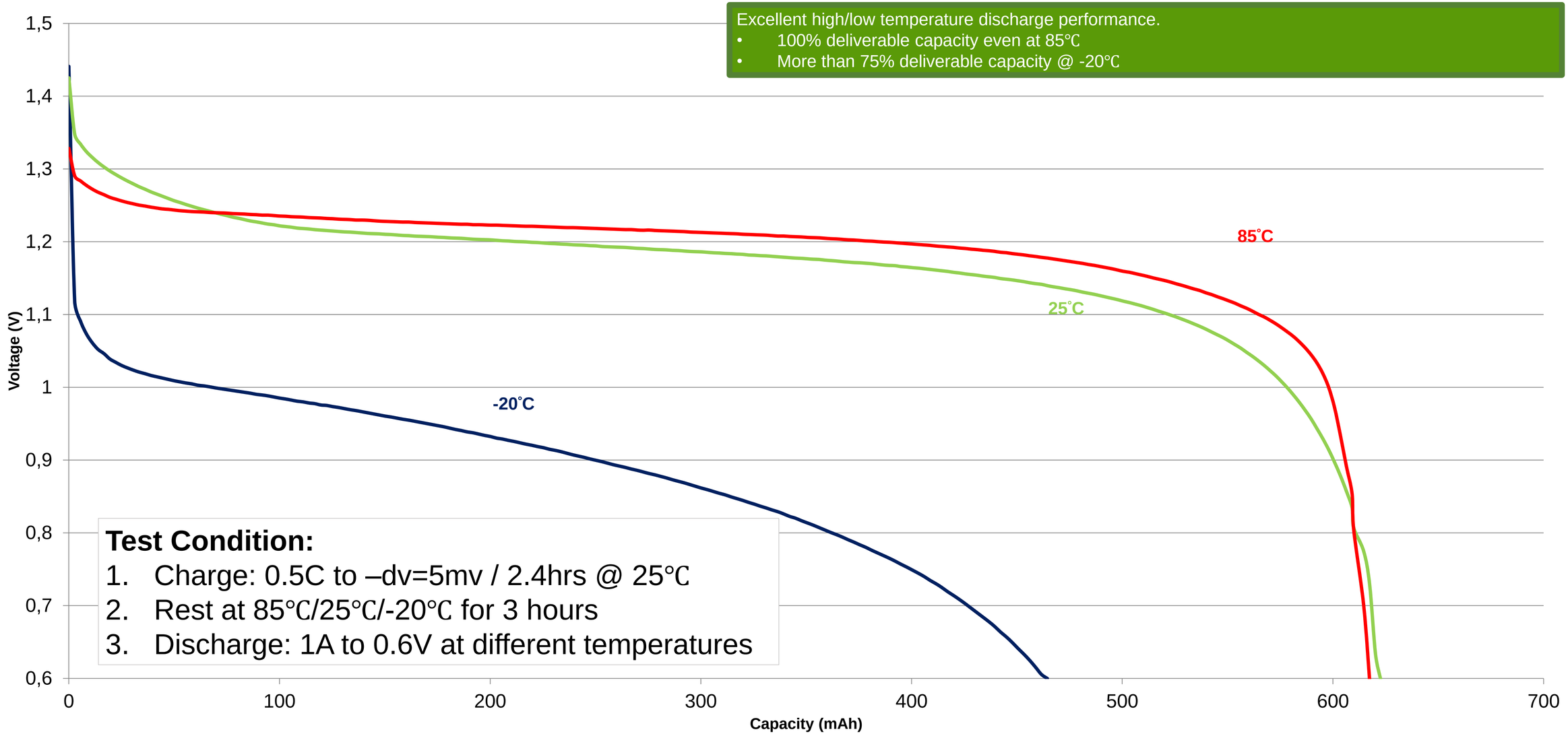
** Temperature @ 20℃±5℃*

◆ Through -30℃ to +85℃

^ Storage at high temperature will have a risk of cell deterioration.

1A DISCHARGE FOR FULL RANGE TEMPERATURE – GP60AAAHT4

Excellent high/low temperature discharge performance.
- 100% deliverable capacity even at 85℃
- More than 75% deliverable capacity @ -20℃



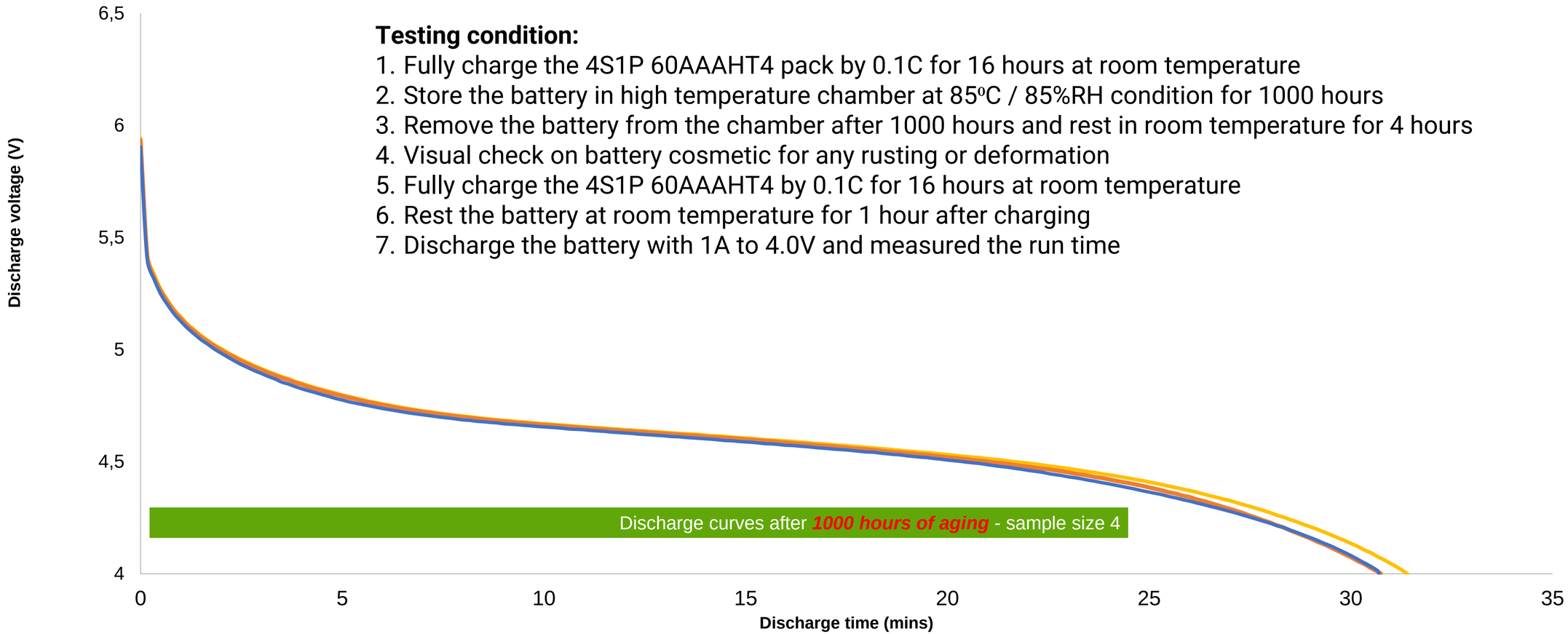
Test Condition:
1. Charge: 0.5C to –dv=5mv / 2.4hrs @ 25℃
2. Rest at 85℃/25℃/-20℃ for 3 hours
3. Discharge: 1A to 0.6V at different temperatures

4S1P 60AAAHT4 BATTERY 85°C / 85% RH 1000 HOURS AGING TEST

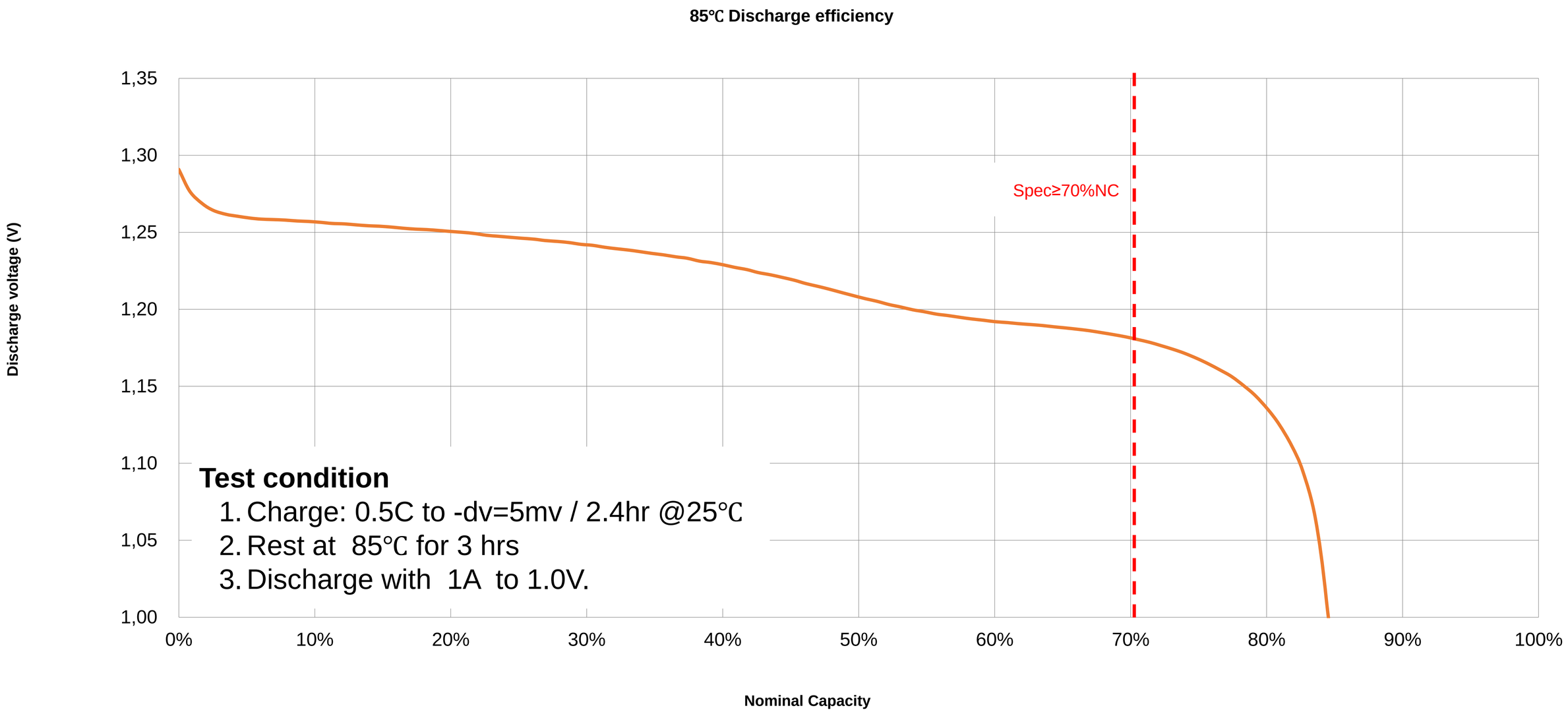
Deliverable capacity: >80%

Testing condition:

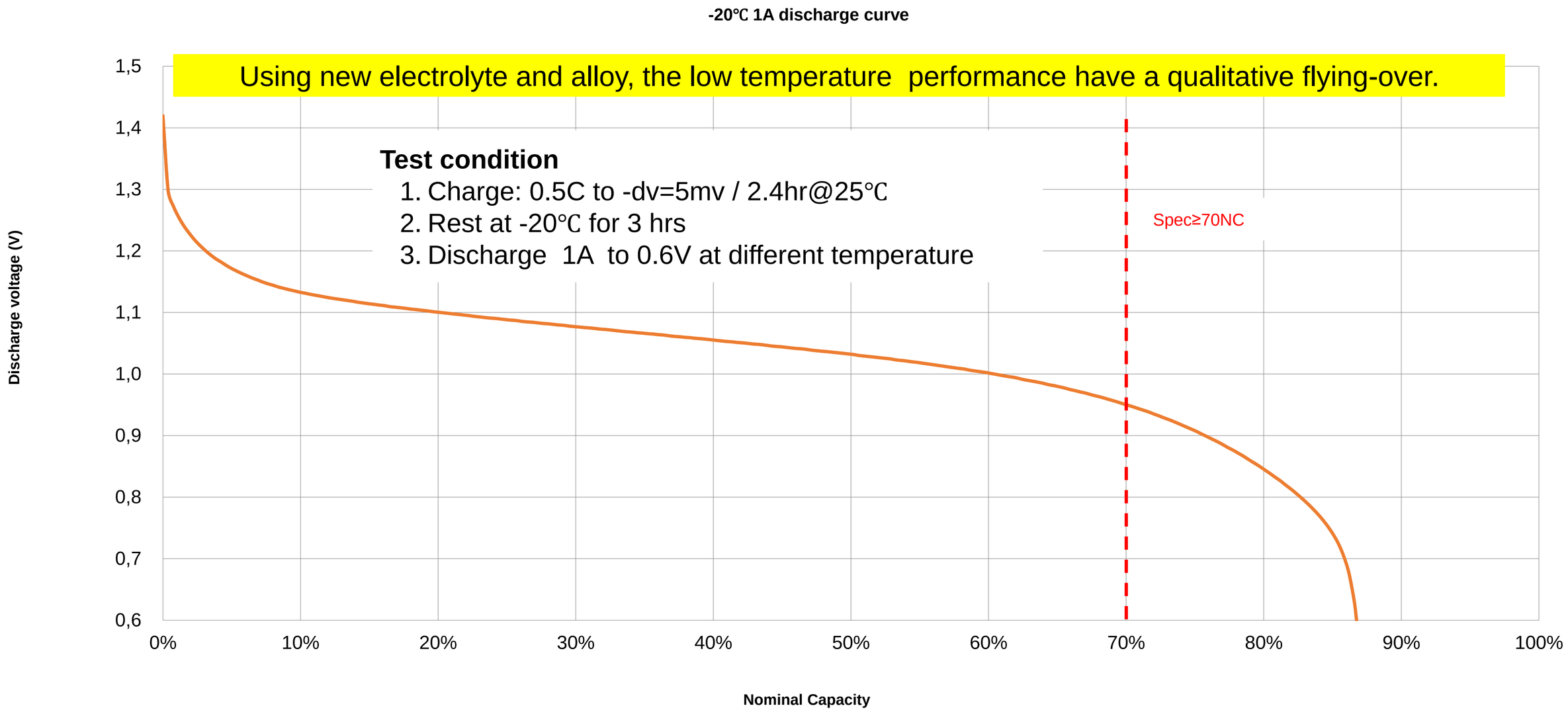
1. Fully charge the 4S1P 60AAAHT4 pack by 0.1C for 16 hours at room temperature
2. Store the battery in high temperature chamber at 85°C / 85%RH condition for 1000 hours
3. Remove the battery from the chamber after 1000 hours and rest in room temperature for 4 hours
4. Visual check on battery cosmetic for any rusting or deformation
5. Fully charge the 4S1P 60AAAHT4 by 0.1C for 16 hours at room temperature
6. Rest the battery at room temperature for 1 hour after charging
7. Discharge the battery with 1A to 4.0V and measured the run time



T5 CELL 85℃ DISCHARGE EFFICIENCY



T5 CELL DISCHARGE CURVE



TECHNICAL PLATFORM ROAD MAP

2006 LAUNCHED — T1

- *Usage in eLight*

- 600mAh AAA
- 4 years service life @ 40℃
- -20℃ to +70℃ Discharge (0.3A)
- GP60AAAHT

2015 LAUNCHED — T2/3

- *End of Life*

- 600mAh AAA
- 4 years service life @ 30℃
- -20℃ to +85℃ Discharge (0.6A)
- GP60AAAHT2/3

2018 LAUNCHED — T4

- 600mAh AAA
- 5 years service life @ 30℃
- -20℃ to +85℃ Discharge (0.6A)
- GP60AAAHT4 | GP120AAHT4

NOW 2021 — T5

- *Samples ready*

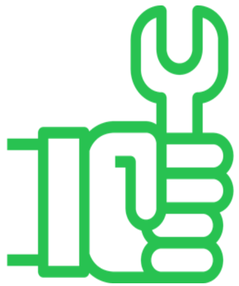
- 500mAh AAA
- 5 years service life @ 45℃
- 10 years service life @ 30℃
- -30℃ to +85℃ Discharge (1.0A)
- GP50AAAHT5 | GP100AAHT5

2023 TARGET — T6

- *Testing Time: 30months @ 65℃*
- *MP: Needs special process*

- 500mAh AAA
- 5 years service life @ 55℃
- 10 years service life @ 45℃
- 15 years service life @ 30℃
- -40℃ to +85℃ Discharge (1.0A)

GLI SVILUPPI FUTURI



SVILUPPANDO (Breve Termine)

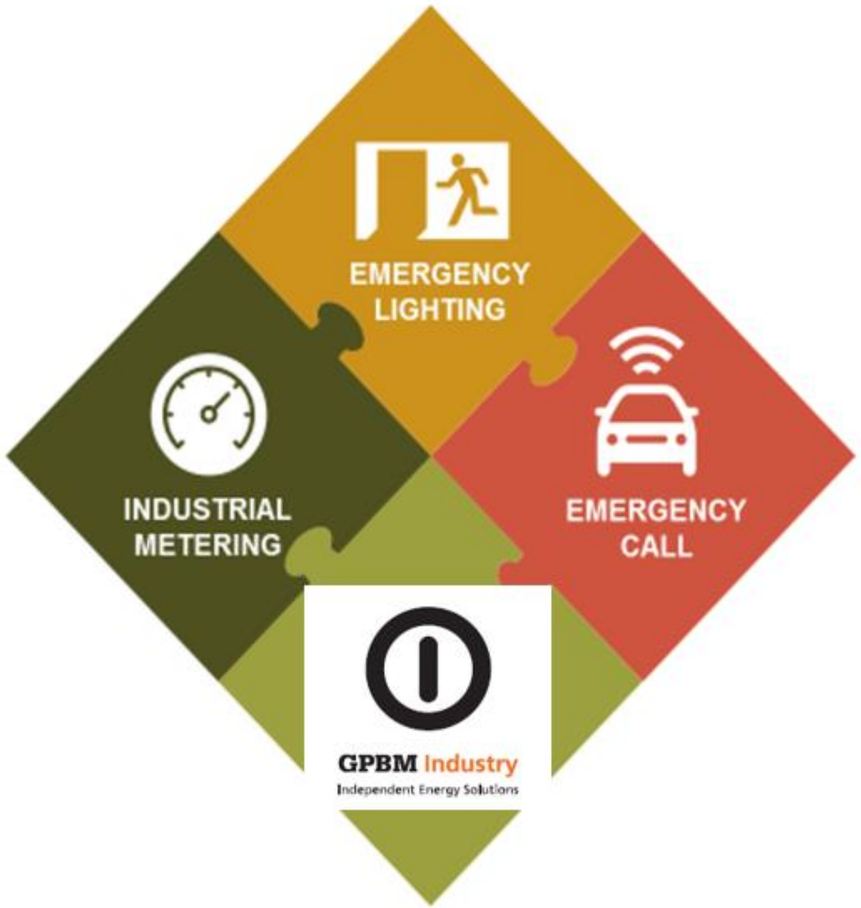
- Formato AA della serie T4 [-20℃ to +85℃] (Data di lancio: inizio 2021)
- T5 serie [-30℃ to +85℃] nel formato AAA and AA (Data di lancio: metà 2021)

SPERIMENTANDO (Medio Termine)

- Serie T6 [-40℃ to +85℃] nel formato AAA
- $LiFePO_4$ 18650 Ampio range di temperature

INVESTIGANDO (Lungo termine)

- Elettroliti a stato solido(SSE) – Sviluppo sperimentale del passaggio di un elettrolita a stato solido per prestazioni notevolmente estese ad alta temperatura.
- LFP + LMO – Mix per un'elevata corrente di scarica a temperature estremamente basse mentre è in grado di funzionare a temperature elevate.



AMPIO RANGE DI TEMPERATURE

AMPIA OPZIONE DI APPLICAZIONE

Grazie allo sviluppo delle nostre tecnologie si aprono le porte verso nuove applicazioni.

Il mercato è in continuo cambiamento, e noi siamo presenti.

THANK YOU

https://www.youtube.com/watch?v=fDAUGXnHvY8