AMTE POWER

AMTE Power –Manufacturing High Power and Sodium-ion Cells for Next-Generation Batteries

AMTE POWER

UK battery pioneers.

AMTE Power is one of the UK's leading battery cell manufacturers, with products for EVs and BESS.

Our manufacturing plant in Thurso, Scotland, can trace its roots to the birth of lithium-ion battery cell technology.

We're now developing new technologies for a net-zero world.

In 2027 we will start manufacturing our cells at our first GigaFactory in Dundee.

AMTE POWER

A history of innovation.

1997

AGM Batteries starts trading, producing high-quality lithium-ion batteries for automotive, aerospace, defence and energy storage.

2013

AMTE Power acquires AGM Batteries Ltd, utilising the Thurso plant to scale and transfer new cell technologies to manufacture.

2021

AMTE Power plc lists on the Stock Exchange.

New agreement sees large-scale manufacturing at **UKBIC.**

2022

Dundee selected for **GigaFactory**; a fast path to volume production.

Powered by people

AMTE Power Senior Leadership Team

Alan Hollis | CEO

Anita Breslin | CFO

Kevin Brundish|
Strategy Director

Steven Farmer|
Innovation Director

John Valentine|
Supply Chain Director

Wes Simons |
Corporate Development Director

Paul Tillett|
Commercial Director

John Burrin|
Head of Industrialisation

The team has a broad mix of experience; **built from proven global battery cell and blue-chip organisations**:

QINETIQ · Johnson Matthey (Inspiring science, enhancing life) · SVOLT · CATL

THE FARADAY INSTITUTION · BRITISHVOLT · UK BATTERY INDUSTRIALISATION CENTRE

WMG (THE UNIVERSITY OF WARWICK) · dyson · TOYOTA · BENTLEY

RENAULT NISSAN · THE VITEC GROUP · pwc · CRANE

HALLIBURTON · Baker Hughes · VATTENFALL · BG GROUP

AMTE POWER

Products & Technology

	Ultra High Power	Ultra Safe	Ultra Prime
Product			
Status	• Stage – **A Sample** • UN38.3 – **Q2 2023** • Samples to customers – **Q2 2023**	• Stage – **A Sample** • UN38.3 – **Q2 2023** • Samples to customers – **Shipped**	• Stage – **A Sample** • UN38.3 – **Q4 2023** • Samples to customers – **Shipped**
Customer	**MoUs and JDA's** with; Cosworth, Viritech, MAHLE Powertrain, TAE (Sprint) power solutions and BMW	**Initial orders received** for Ultra Safe cells	**Development and supply agreement** in place

AMTE POWER

Products already in customers hands with positive feedback

Industrialisation

Process | Operational Capabilities

2023 | 2024 | 2025 | 2026 | 2027+

Thurso, Scotland

Scale up Ultra Safe & Ultra Prime

Full series production Ultra Prime

UKBIC, Coventry

Scale up Ultra High Power

c.1 GWh Gigafactory

Full series production
U. Safe & UHP

Developing fully integrated business capability to support Thurso and c. 1 GWh Gigafactory

AMTE POWER

Bridging the gap from product development to full scale Manufacture

Supply Chain

Process | Functional Capabilities

Strategy

- **De-risk volatility** and **improve profitability**
- **Sustainable, RoO compliant** supply chain
- **Re-designing processes**
- **Assessing opportunities for vertical integration** e.g. recycling, mining, CAM etc.

Current Status

- ✓ **100% of bill of materials has been secured**
- ✓ **Capacity confirmed for all raw materials** including CAM and anode
- ✓ **9 MoU's in place** with suppliers
- ✓ **Pricing confirmed for 100% of active materials**

Supplier MoU's

BASF We create chemistry
当升科技 EASPRING
BTR Better our world
IMERYS Graphite & Carbon
Ashland always solving
CELGARD
国泰君安证券 GUOTAI JUNAN SECURITIES

Strengthened the Supply Chain function to accelerate time to secure material supply

AMTE POWER

AMTE POWER

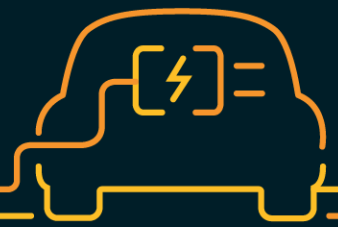
Electrochemistry

UHP 300x100 cell.

For the last 5 years AMTE have been developing a range of cells with the UHP cell at the centre of that product offering.

AMTE Power **Ultra High-Power cells** have been developed with automotive OEMs to provide superior charge & discharge rates. This cell is now seen as a next generation technology and AMTE are presently engaged with multiple OEMs and various F1 teams amongst other interest across all sectors.

These automotive products are designed specifically to power **high-performance cars, hybrid applications and FCVs** to help decarbonise travel.



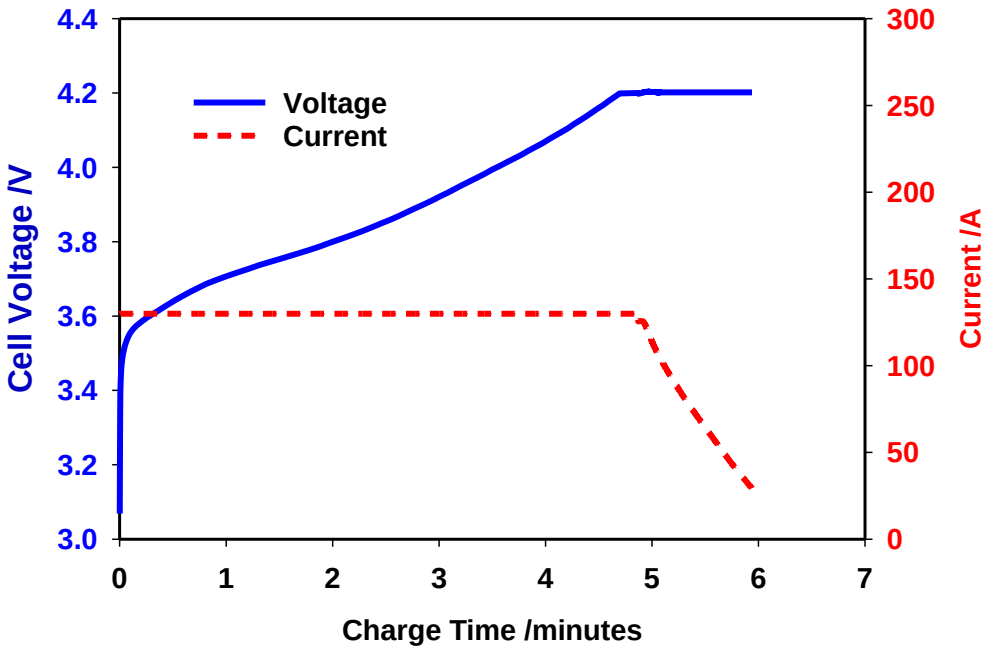
UltraHighPower

- Width: 100mm Thickness: 5 - 5.2mm
- Height: 300mm Mass: <300g

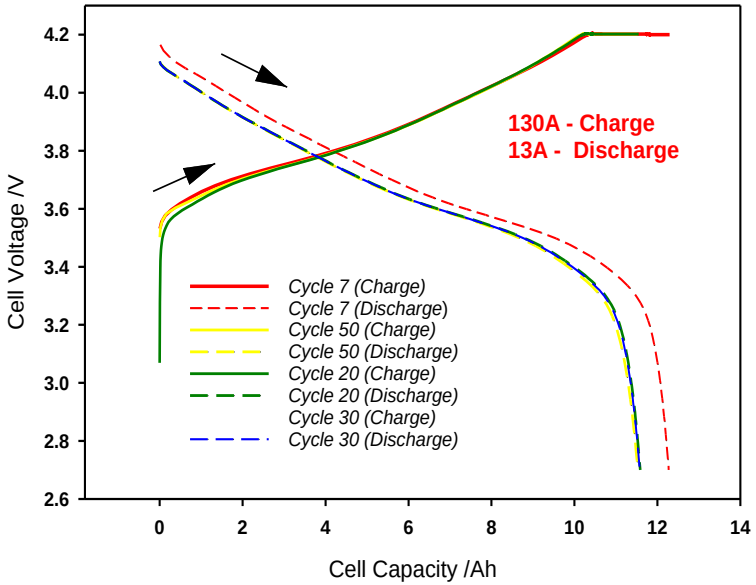
- *The data contained in this document is for representation purposes only and could be subject to changes. AMTE Power plc cannot be held liable for the successive products not meeting the attached specifications.*

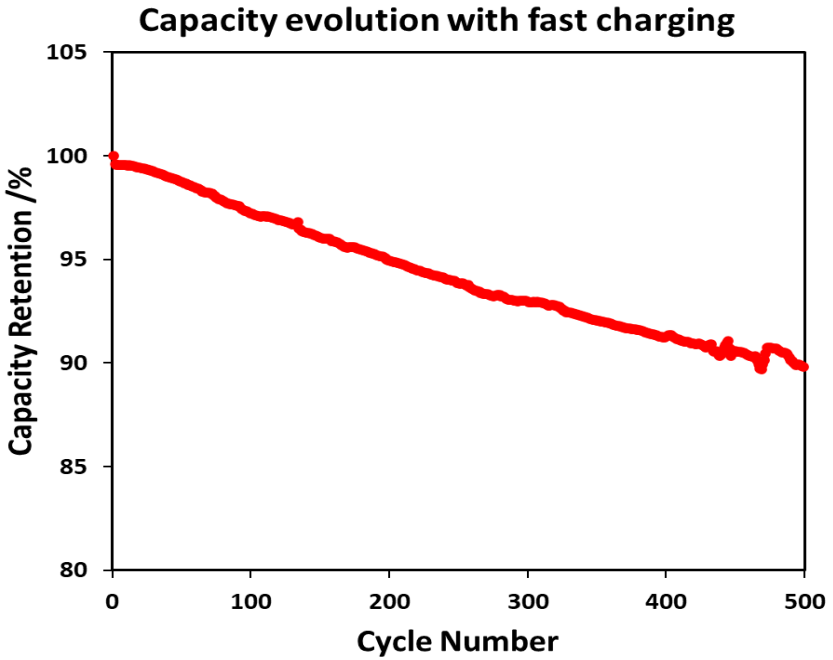
Cell Characteristics at 25 °C		
Capacity	Minimum	12 - 13 Ah
	Typical	12.0 Ah
Energy		44.3 Wh
Cell Voltage	Nominal	3.7 V
	Charge	4.2 V
	Discharge	2.7 V
Continuous Charge Current	Standard	12.0 A
	Maximum	120 A
Discharge current Continuous	Maximum	>460A
Pulse	Maximum	>960A
Internal Resistance	AC (100mHz)	1.2 mΩ
	DCIR (10s)	1.5 mΩ
Ambient Temperature	Charge	0°C – 45°C
	Discharge	-20°C – 60°C
Energy Density	Gravimetric	145 – 150 Wh/kg
	Volumetric	300 – 310 Wh/l

Voltage - Current - profile during 6 mins. charge at 25^{O}C (cycle 30)



Fast charge cycling (<6minutes, 130A)





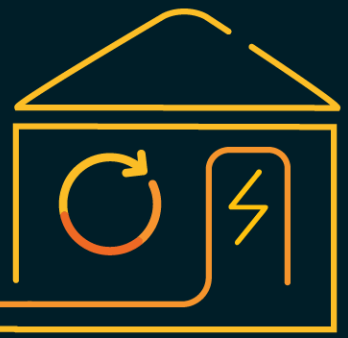
AMTE POWER

AMTE POWER

Ultra Safe

Ultra Safe is AMTEs sodium ion chemistry offering

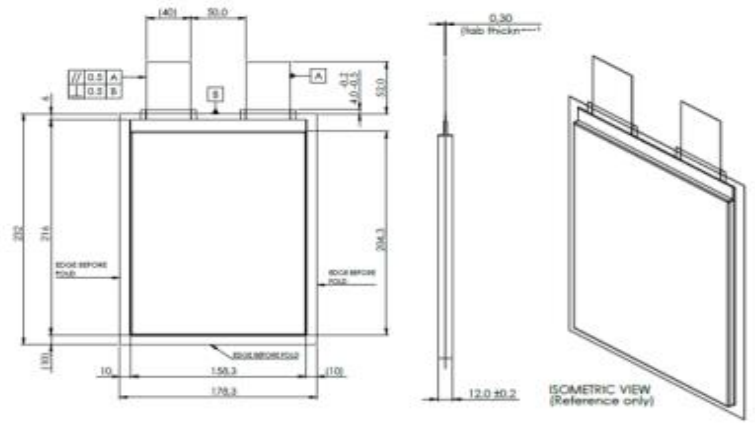
AMTE started developing a viable, alternative sodium-ion cell for energy storage systems some 6 years ago. This product is now starting to be delivered to our clients.
Ultra Safe will deliver the full potential for renewable energy, and as the technology evolves and as demonstrated by the latest news from CATL this product offers a viable alternative for the automotive markets.



Cell Characteristics

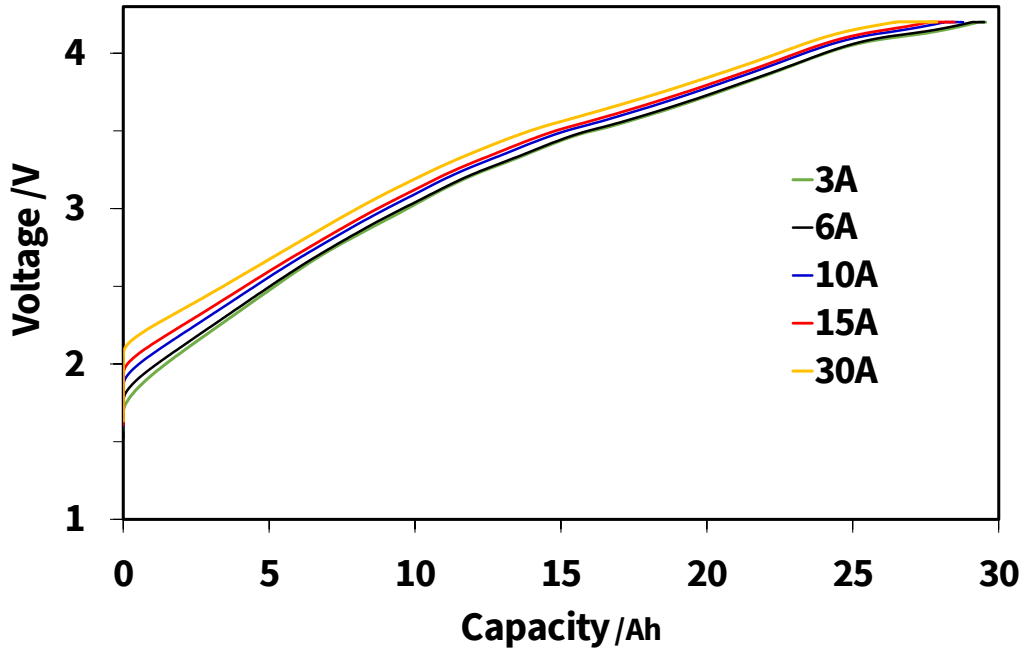
Nominal Capacity	30Ah
Average Voltage	3.1V
Gravimetric Energy Density	140Wh/kg
Volumetric Energy Density	230Wh/l
Continuous Power Density	0.23kW/l
Peak Power Density (10sec pulse)	0.5kW/l
Weight	670g
Voltage Range	1V – 4.2V

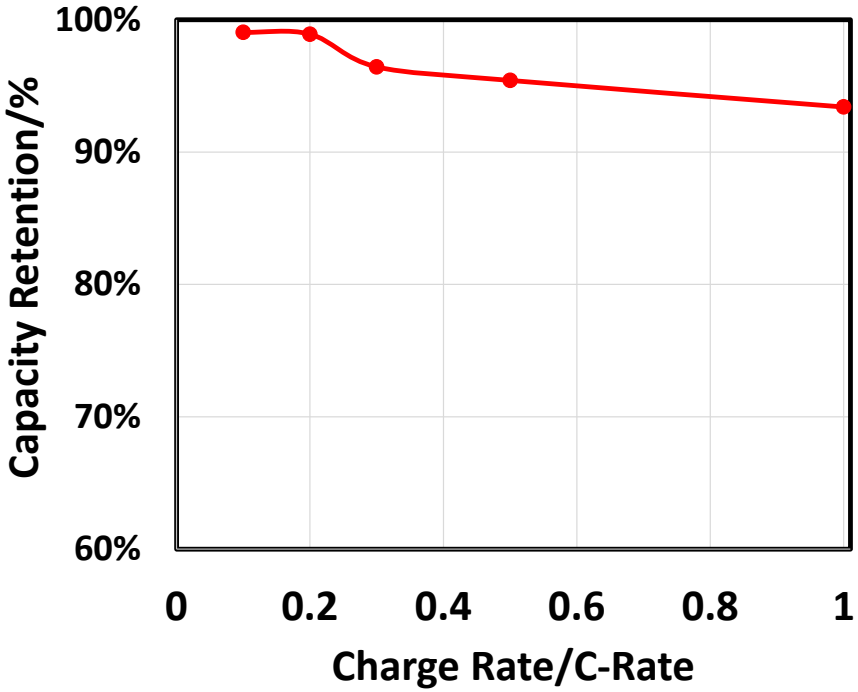
Physical Characteristics



UK Registered Design No. 6237351

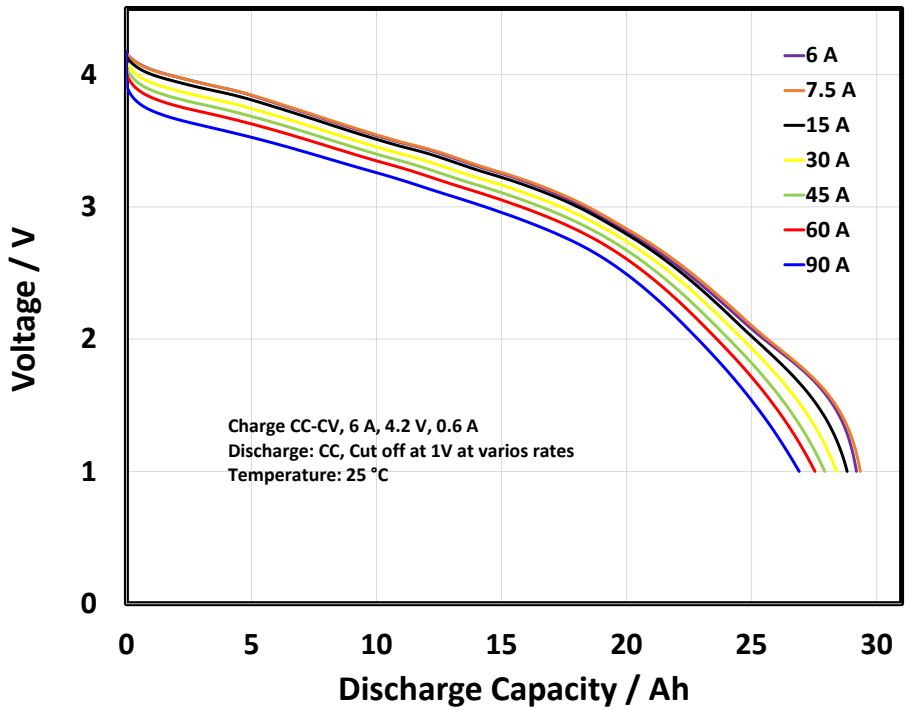
Charge Rate performance

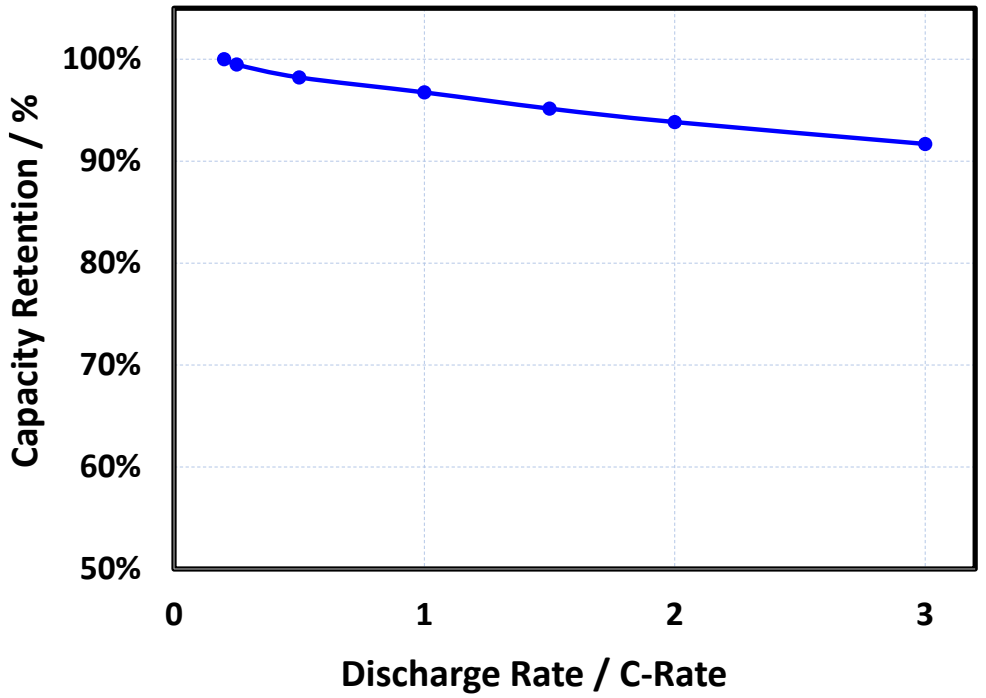




The cell can be charged to 93% of its initial capacity in 1 hour (1C) continuous

Discharge Rate performance





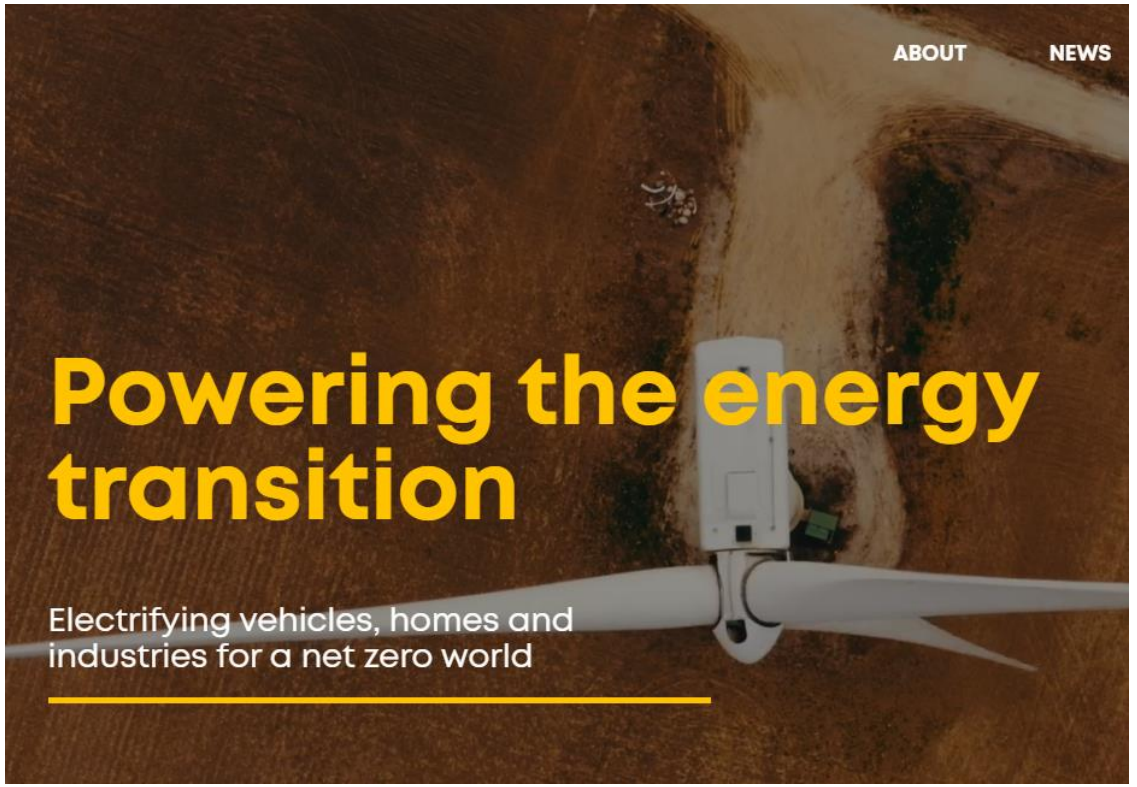
Capacity retention is 90% @ 3C (90 A) continuous discharge current
The cell show very low resistance of 5-8 mΩ @ 50% SOC @ 10 s

AMTE POWER

Sustainability

The Green Transition

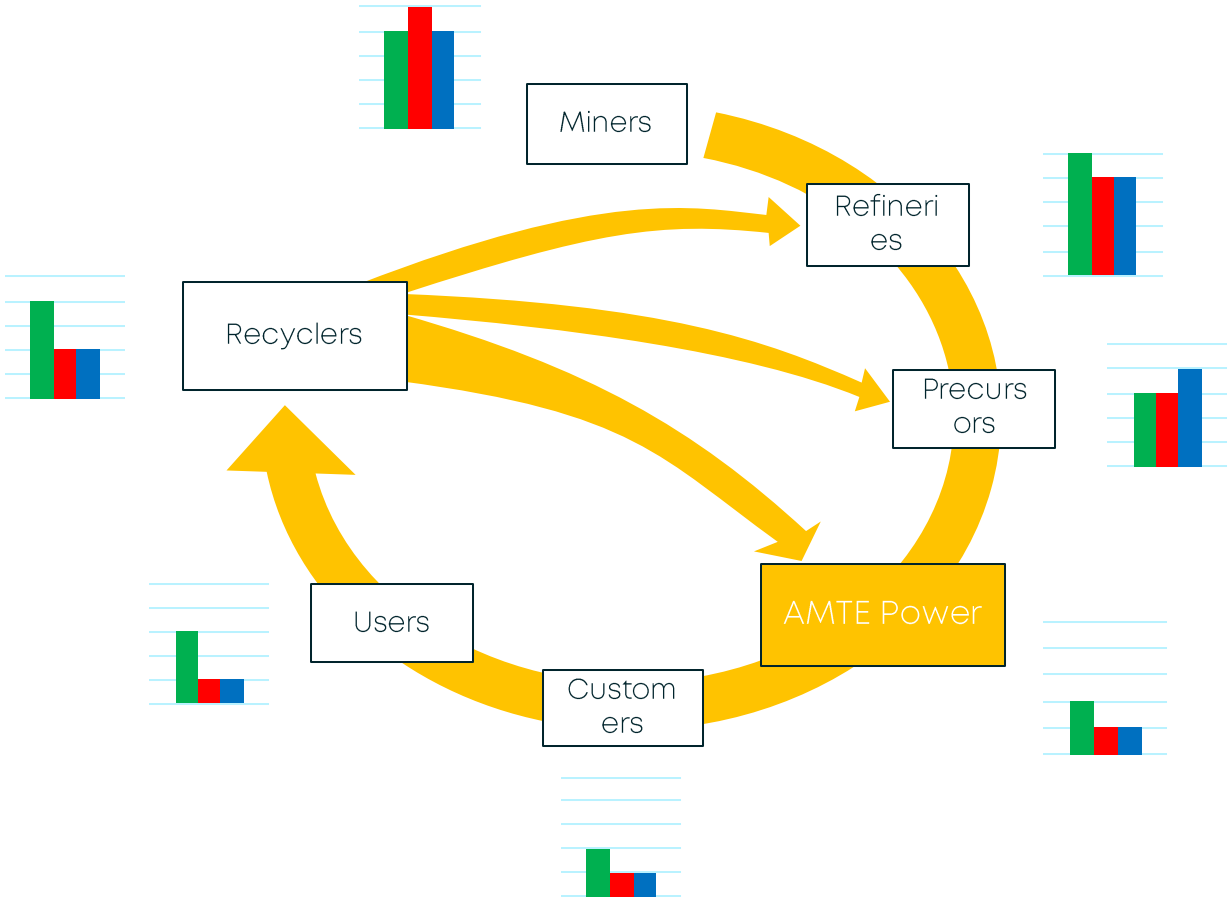
- The urgency of climate change means scale up of green technology must be rapid
- Storing energy is the answer to the renewables challenge
- AMTE Power is at the centre of the effort to decarbonise transport and enable energy storage



AMTE POWER

Environmental, Social and Governance Impacts

Battery Circular Economy



- Mining and refining battery materials often have significant ESG impacts
- Recycling practises can also have high impacts
- Cell manufacturing has a comparatively low impact
- As battery producers we have a responsibility over our supply chain

AMTE POWER

Sustainability Strategy - The Six Pillars

- Energy and Greenhouse Gas
- Responsible Sourcing
- Circularity and Resilience
- Employee Wellbeing and Opportunity
- Governance, Ethics and Transparency
- Advocacy and Influence

- The Sustainability Strategy is divided into six pillars
- Each pillar has:
  - Goals;
  - Sub-goals; and
  - Actions.
- All actions are:
  - Specific;
  - Measurable;
  - Achievable;
  - Relevant; and
  - Time-bound.
- Goals are mapped to the UN Sustainable Development Goals

AMTE POWER

CONTACT

AMTE POWER

Get in touch.

Paul Tillett
Paul.tillett@amtepower.com

www.amtepower.com