



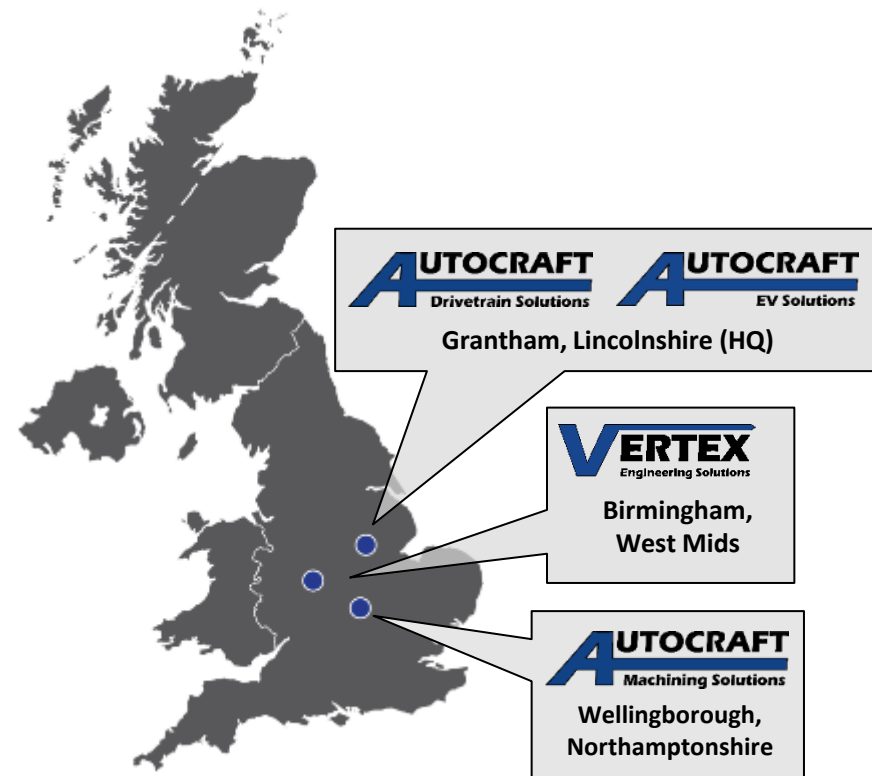
# **Autocraft EV Solutions**

## **Rematec Webinar**

27<sup>th</sup> September 2022

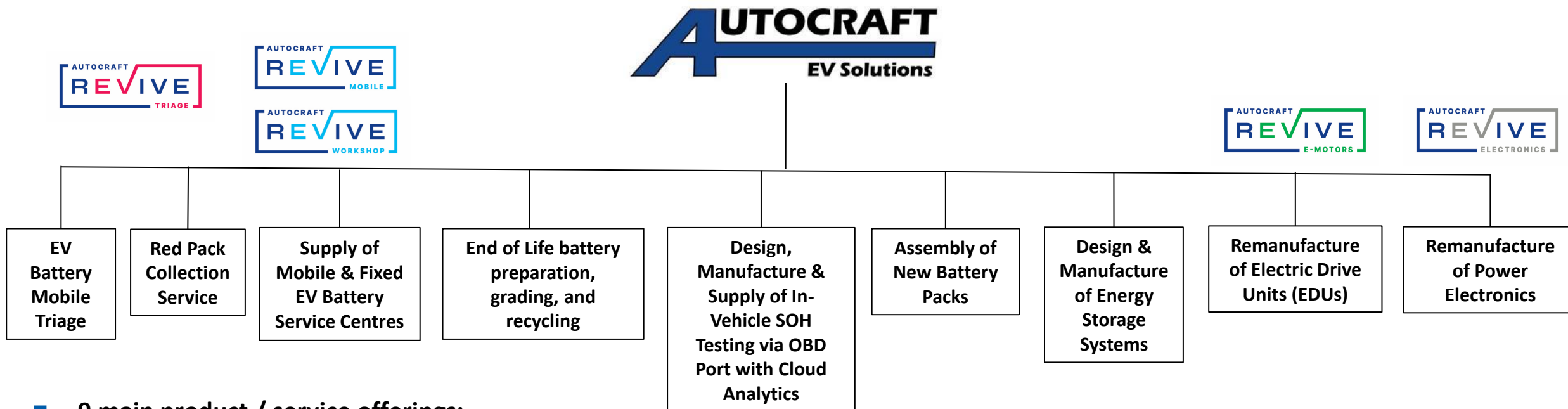
# Autocraft Solutions Group – a £71m Company

- Privately owned company based in Grantham (HQ)
  - ▶ Remanufacturing & Assembly of Engines & EV Batteries
  - ▶ Currently remanufacturing per month
    - 2,000 engines
    - 300 EV EDUs
    - 200 EV Battery Packs
- Rescued Grantham Facility in 2010 with MBO, since then:
  - ▶ Saved 98 jobs (now 243)
  - ▶ Grown from £7M PA to £40M PA
- Rescued Vertex in 2016
  - ▶ Rescued 8 skilled jobs (now 18)
  - ▶ Grown to £1M PA
- Acquired Wellingborough Facility in June 2018
  - ▶ Already created 162 jobs
  - ▶ Grown to £30M PA
- EV Solutions is established and has significant growth opportunities
  - ▶ Expanding into Europe in Q4 2022 with a new EV Battery repair facility in The Netherlands followed by other locations in 2023
  - ▶ New UK facility planned to open in 2024 to assemble new EV Battery Packs 20,000PA



- Currently expanding into Europe
  - ▶ Dates flexible based on the realisation of customer demand forecasts
    - Netherlands Q4 2022
    - Oslo / Gothenburg late 2023
    - South Germany / Austria Q2 2024
- Global footprint to follow once European model established

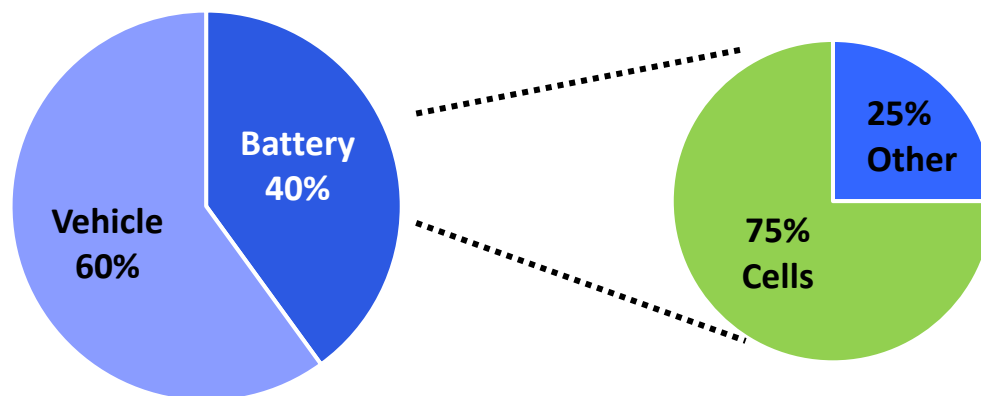




## ■ 9 main product / service offerings:

1. EV Battery Mobile Triage - On-the-road Van solution (**Autocraft REVIVE™ Battery Triage**) for fast response, non-invasive triage & limited repair
2. Red Pack Collection Service – Triage Ambulance™ safely collects red packs and transports them to a REVIVE™ EV Battery Centre for processing
3. Design, manufacture & supply of MOBILE and FIXED EV Battery Service Centres (**Autocraft REVIVE™ Mobile / Autocraft REVIVE™ Workshop**)
4. End of Life battery preparation, grading, and recycling (**Autocraft REVIVED™ SECOND LIFE**)
5. Design, manufacture & supply of in-vehicle SoH testing via OBD port with cloud analytics (Launch in 2023)
6. Assembly of New EV Batteries (Niche Automotive and Non-Automotive Markets)
7. Design and manufacture of Energy Storage systems (Power Walls)
8. Remanufacture of Electric Drive Units (EDUs)
9. Remanufacture of Power Electronics

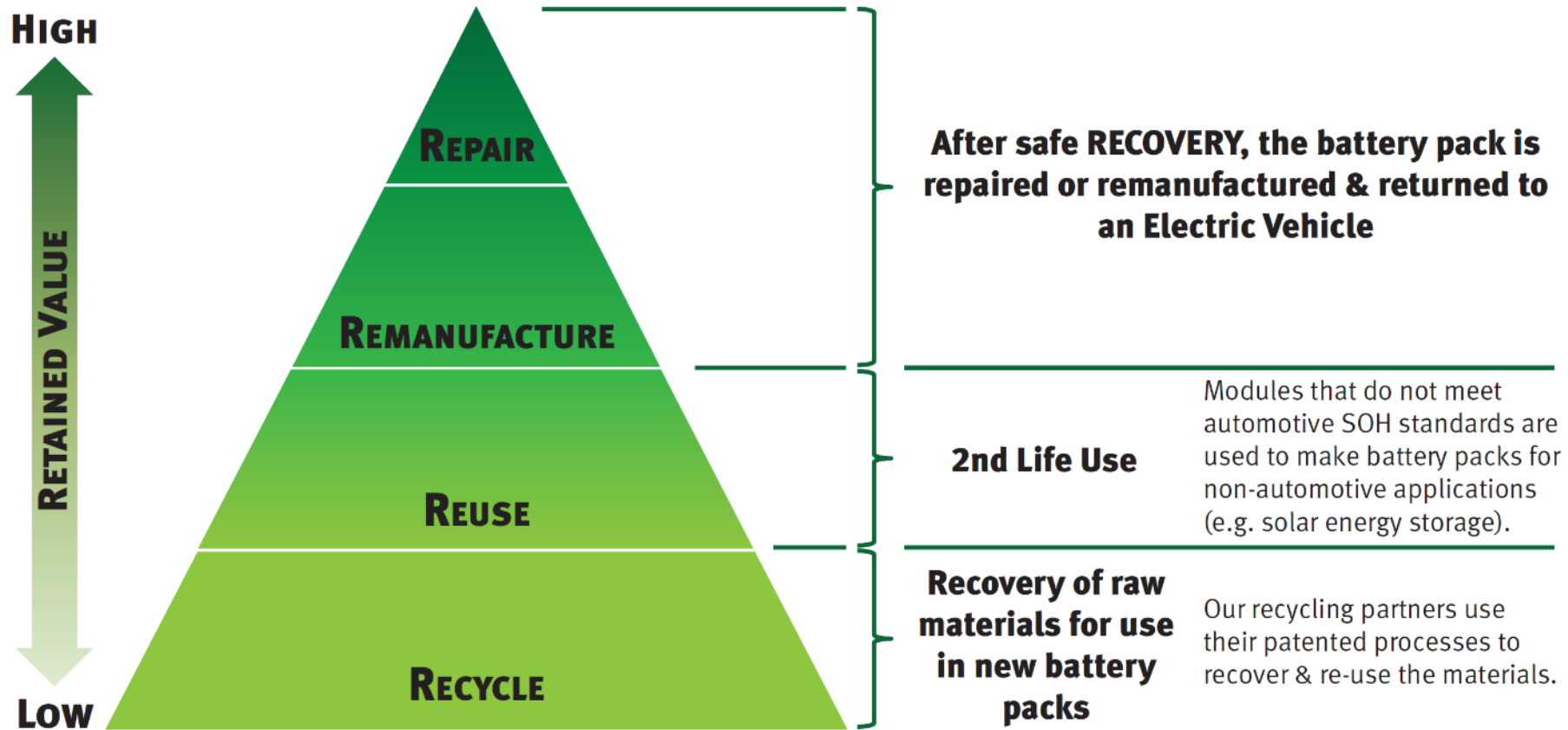
## Costs for a Battery in a Vehicle



**Battery cells account for 30% of the costs for an all electric vehicle  
therefore there will be a multi billion dollar market for testing,  
repairing, remanufacturing and 2<sup>nd</sup> life re-purposing of EV Batteries**

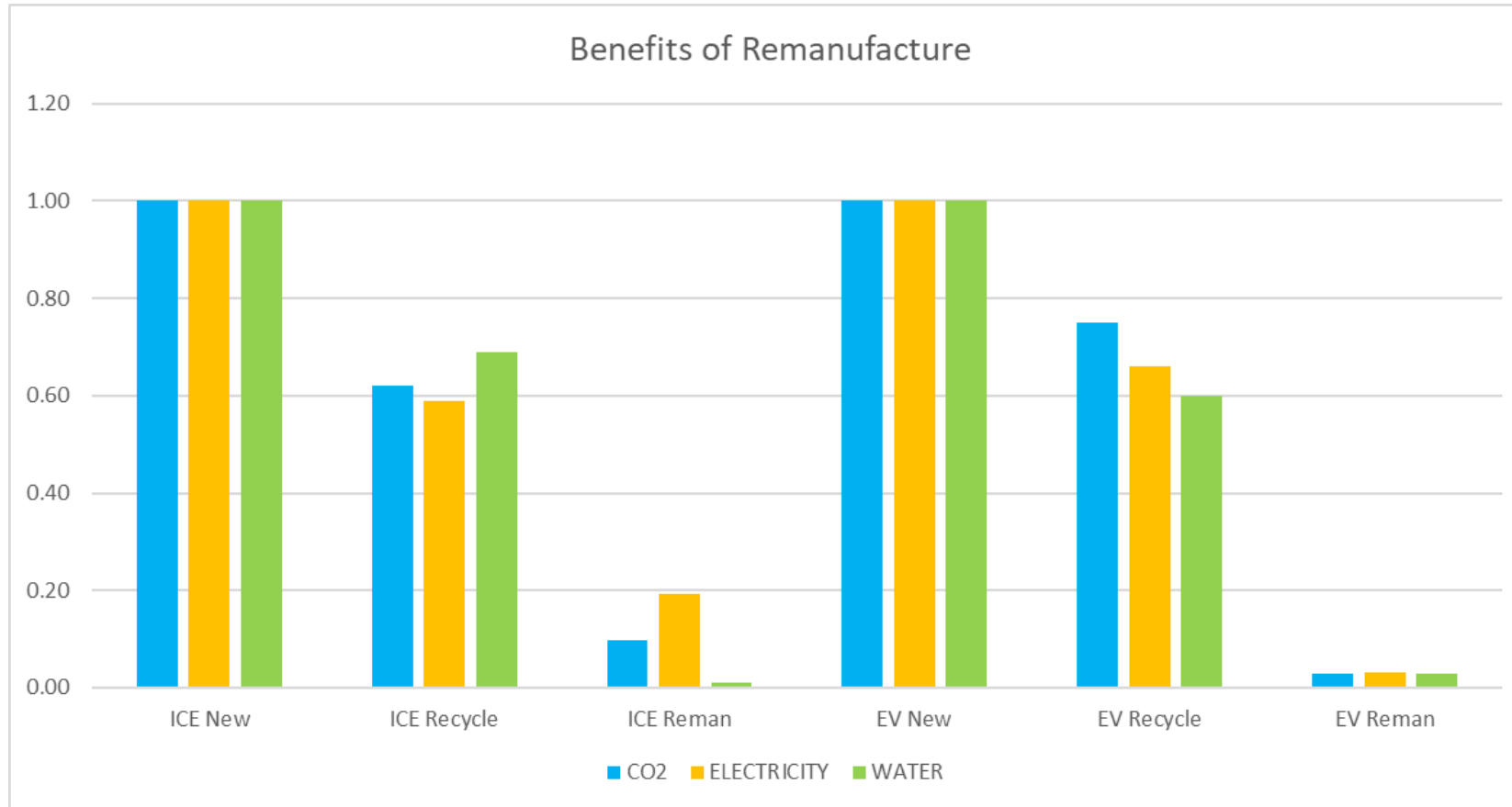
**Reference: BEV vehicle cell price around  
€120 / kWh**

Recover → Repair → Remanufacture → Reuse → Recycle



REDUCE WARRANTY COST | MINIMISE ENVIRONMENTAL IMPACT | GENERATE EXTERNAL REVENUE

# Remanufacture – Environmental Benefits

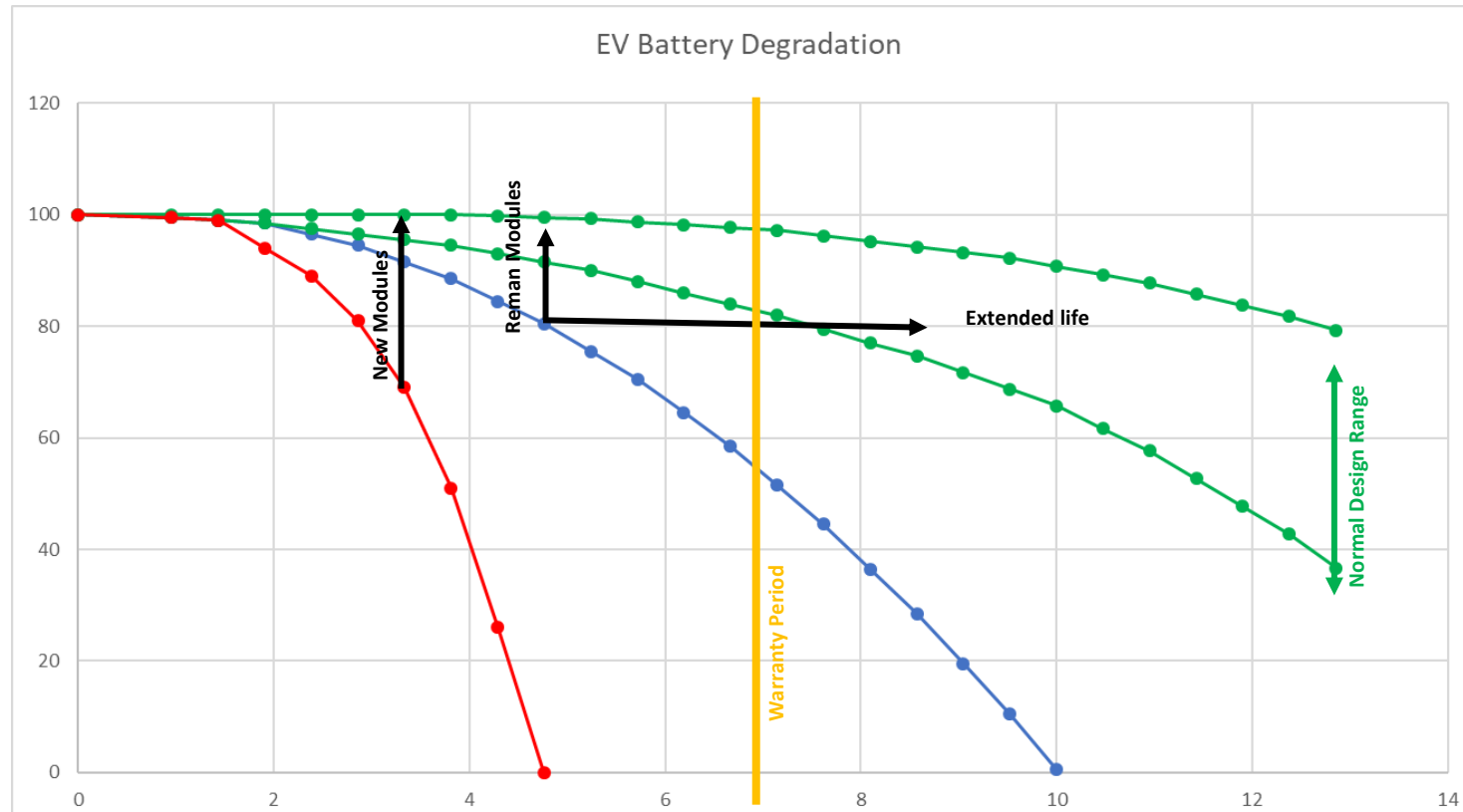


- The environmental case for EV Battery reman is the strongest case we have ever seen
- As an industry we must take advantage of this to help our world become Nett Zero



- You cannot “reman” an EV Battery to the true definition of “remanufacturing” but you can bring the pack back to within the OEMs original State of Health specification for its age and usage. The business case for EV Battery Packs is
  - ▶ **Phase 1** - Replace packs with new packs
    - Collect the cores to salvage modules and components
  - ▶ **Phase 2** – Replace modules with new modules
    - Collect the cores to salvage modules and components
  - ▶ **Phase 3** – “Remanufacture” packs
    - Using components and modules saved from Phases 1 & 2
      - » Autocraft SoH checked and validated modules
      - » Autocraft tested and validated components (PCBs etc.)
- Autocraft has the solution to repair, reman and service your EV Battery Packs
  - ▶ Servicing batteries every 3 / 4 years will extend life to 15+ Years





- Since the cells age differently, the pack is limited by the weakest cell/module
- By using reman modules we can return the pack to its expected life capacity so that the pack life is more than the original planned warranty period saving OEMs on warranty costs
- Autocraft SoH testing establishes the condition of each module so that a high quality reman solution is possible

# Autocraft REVIVE™ Battery Triage Response



**Mobile Trailer Facility for In-Vehicle Non-Invasive  
Triage and Repair**



*Patents & Registered Trademarks Pending*

- Highly mobile between locations
- On-grid requirement (3 phase power required)
- Tests EV packs to establish level of SoH of modules
- Initial analysis, identify 'Diagnosis Trouble Codes' (DTC)
- Repair of wiring harness and connection faults
- Out-of-Vehicle Software Reflashes
- Up to 90kW capability and up to 1000Volts
- Safety controls to fully protect technicians
- Optional collection of the battery pack back to an Autocraft fixed or mobile REVIVE EV Battery Repair Centres if modules require replacing



**Expandable & Highly-Mobile facility for full triage, repair and remanufacture of packs, with industry leading safety systems**



*Patents & Registered Trademarks Pending*

## ■ Each facility would be

- ▶ Highly mobile between locations with self unloading and deploying from a HGV trailer
- ▶ On-Grid power requirement (off grid option available)
- ▶ Can be a dual branded facility (Customer & Autocraft)
- ▶ Staffed by either customer or Autocraft Employees
- ▶ Capacity of 6 packs per day per work station based upon a 70/30 PHEV to BEV volume requirement

## ■ Capabilities include:

- ▶ The test, repair and reman of Battery Packs
- ▶ Advanced testing to establish accurate SoH to module level so modules are graded for re-use in vehicles, the correct 2<sup>nd</sup> Life Application or for recycling
- ▶ Enhanced safety controls to protect technicians with camera guided processes and interlocked tools
- ▶ Eject function to enable the automatic removal & isolation of any batteries experiencing an abnormal or thermal event



# Autocraft REVIVE™ Workshop EV Battery Service



**Fixed facility for full triage, repair and remanufacture of packs, with industry leading safety systems, at a location of your choice**

*Patents & Registered Trademarks Pending*

- **Autocraft can install the full REVIVE™ system at your premises**
  - ▶ Supplied for your company to operate on a 3 or 5 year rental basis with online support from our UK Tech Centre
  - ▶ Ideal for customers requiring higher volume processing of EV battery packs
  - ▶ Capacity of 6 packs per day per work station
  - ▶ In build and patented safety systems including the automatic ejection of both battery packs and modules experiencing thermal events
  - ▶ External customer installations targeted for late 2023
    - Quotation proposals available from Nov 2022
    - Currently seeking customers / partners for this offering from Autocraft



# Autocraft REVIVE™ Workshop EV Battery Service



*Patents & Registered Trademarks Pending*





- Autocraft EV Solutions offers a full remanufacturing service for motor drives and ERADs:

- ▶ 48v and HV units
- ▶ Dynamic testing, diagnostic and rectification
- ▶ Board level fault finding
- ▶ Mechanical fault finding
- ▶ NVH analysis
- ▶ Software reflash and updating
- ▶ Recoding
- ▶ Pressure test and leak detection
- ▶ Warranty reporting



- Leveraging our significant in-house experience of power electronics Autocraft EV Solutions can now offer remanufacturing services for EV onboard chargers:
  - ▶ Board level fault finding
  - ▶ Mechanical fault finding
  - ▶ Assembly of subcomponents
  - ▶ Replacement of components
  - ▶ Pressure test and leak detection
  - ▶ EoL test
  - ▶ Warranty reporting







[www.AutocraftEV.com](http://www.AutocraftEV.com)

