Organized by:

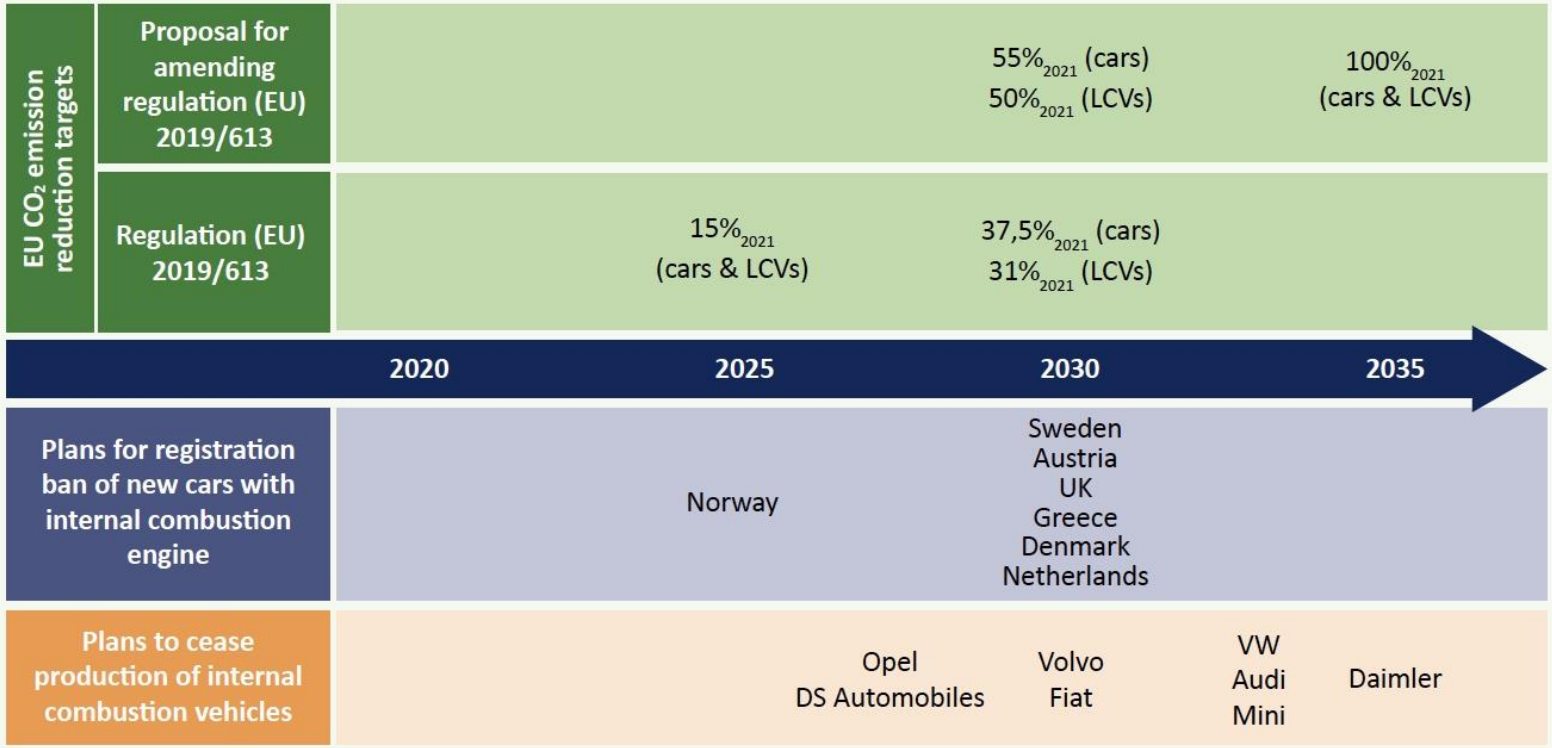
LaserEMobility

Network and know-how for laser based manufacturing in the eV sector

Organizers:
Alessandro Fortunato - Università di Bologna
Alessandro Ascari - Università di Bologna
Gokhan Ali Demir – Politecnico di Milano
Johannes Kriegler - Technische Universität München

State of the art and background

Figure 1: Targets regarding the reduction of emissions from cars and LCV as well as communicated timeline for a phase-out of internal combustion engine. [2-16]

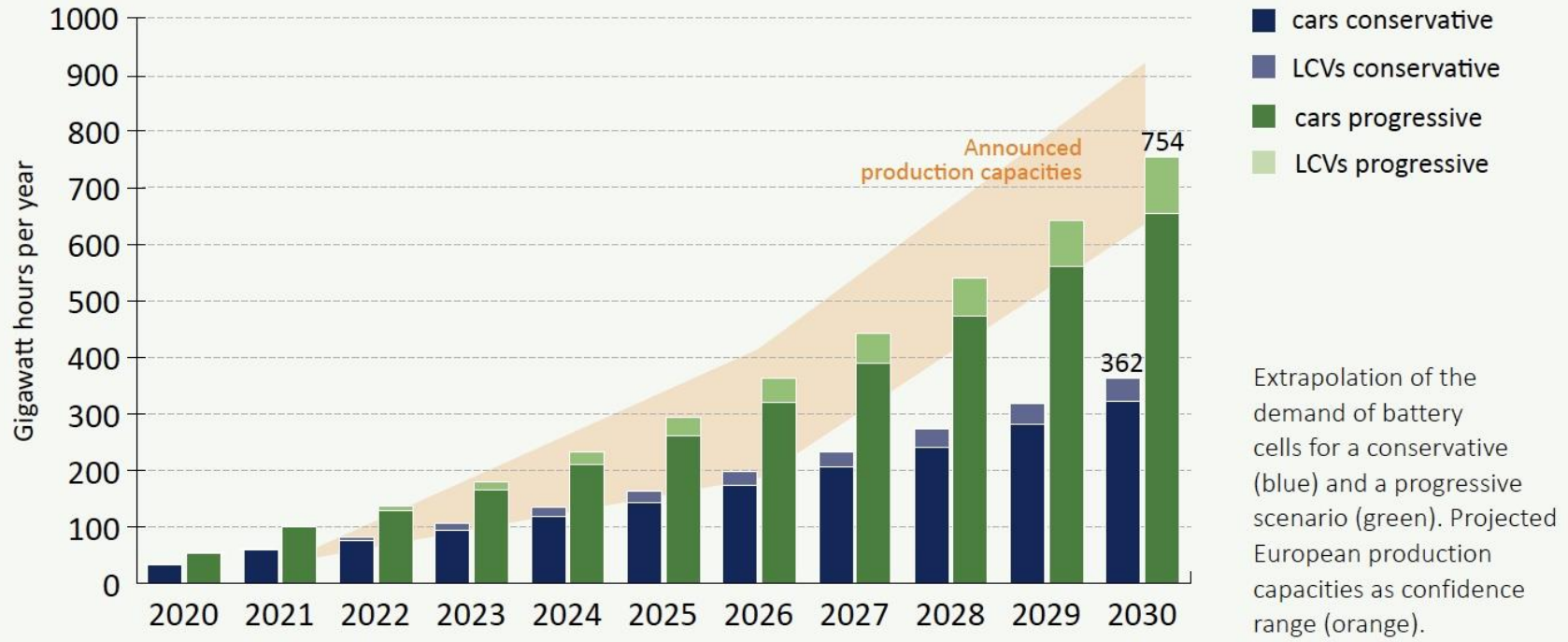


Extract, no claim to completeness. Own figure.

https://www.ipcei-batteries.eu/fileadmin/Images/accompanying-research/market-updates/2022-01-BZF_Kurzinfo_Marktanalyse_Q4_ENG.pdf

State of the art and background

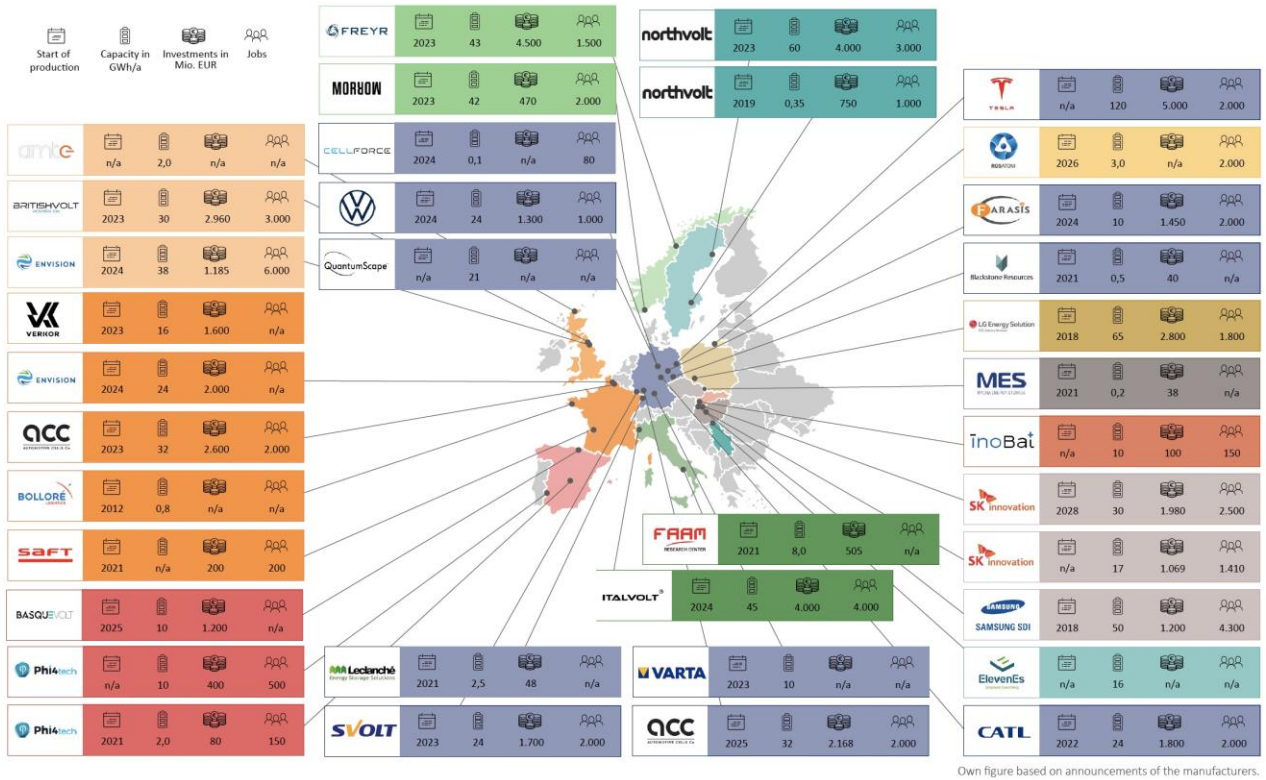
Figure 2: European battery cell production can meet automotive industry demand.
Confidence range of announced European production capacities compared to the modelled battery cell demand in Europe until 2030.



https://www.ipcei-batteries.eu/fileadmin/Images/accompanying-research/market-updates/2022-01-BZF_Kurzinfo_Marktanalyse_Q4_ENG.pdf

State of the art and background

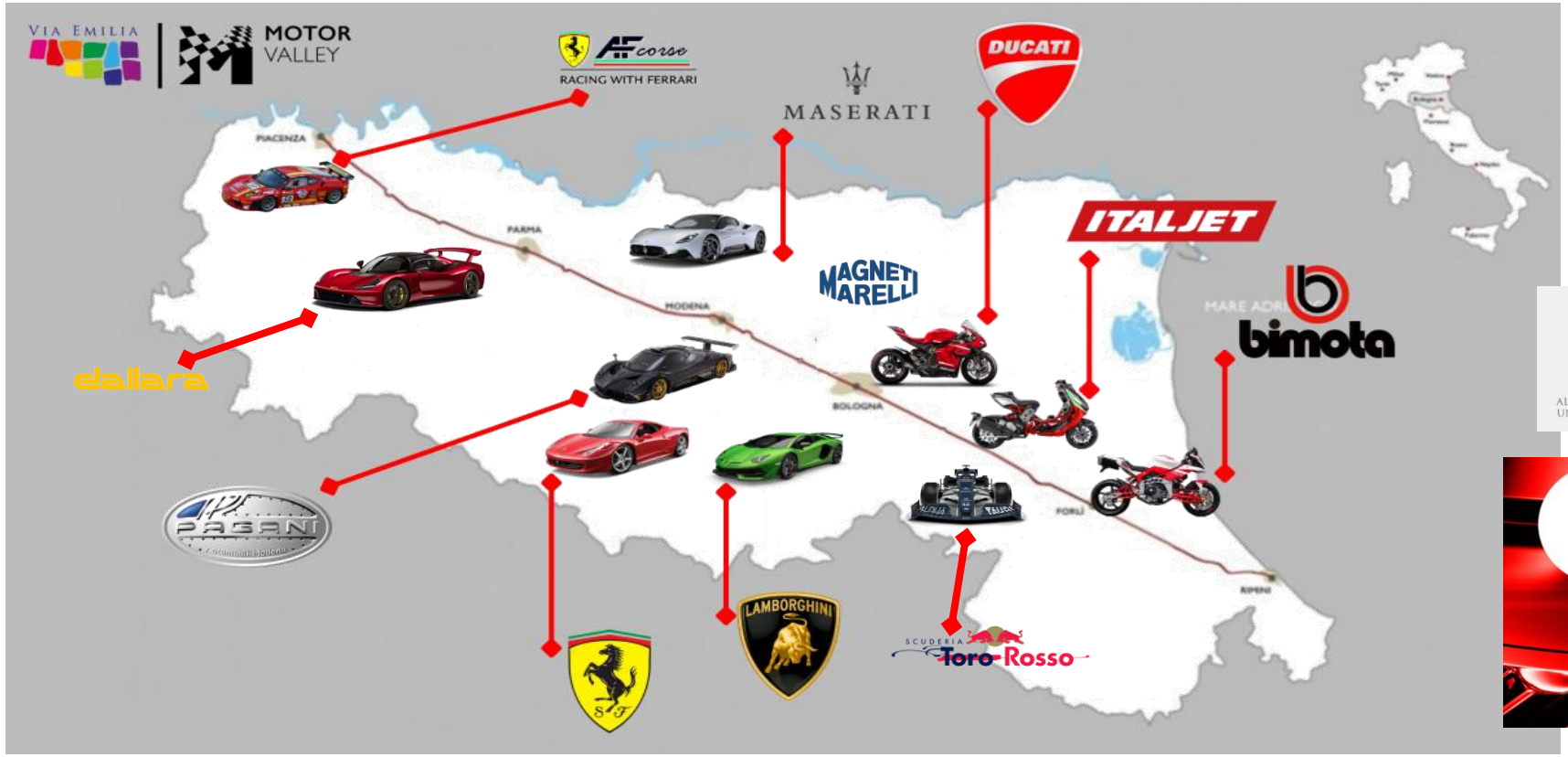
Figure 3: Battery cell production sites in Europe.



Own figure based on announcements of the manufacturers.

- https://www.ipcei-batteries.eu/fileadmin/Images/accompanying-research/market-updates/2022-01-BZF_Kurzinfo_Marktanalyse_Q4_ENG.pdf

Why Emilia Romagna



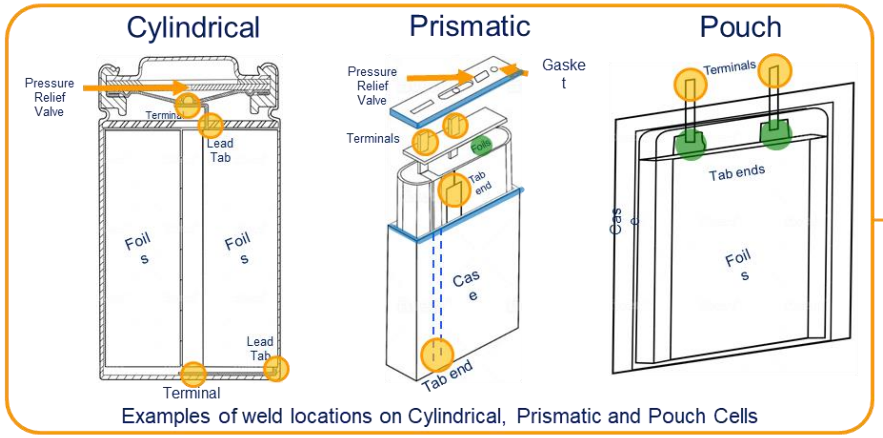
- *Emilia Romagna is known as «Motor Valley»*
- Consolidated partnership between Universities and Car Manufacturers **MUNER**

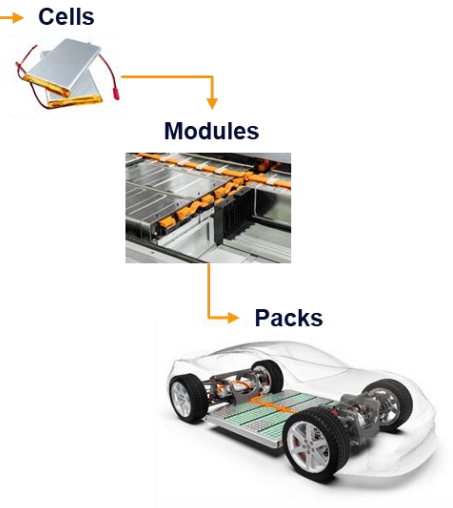
ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA
UNIVERSITÀ DEGLI STUDI DI FERRARA
UNIMORE UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA
UNIVERSITÀ DI PARMA

M UNER MOTORVEHICLE UNIVERSITY OF EMILIA-ROMAGNA

Why Lasers

EV Battery Cell Types

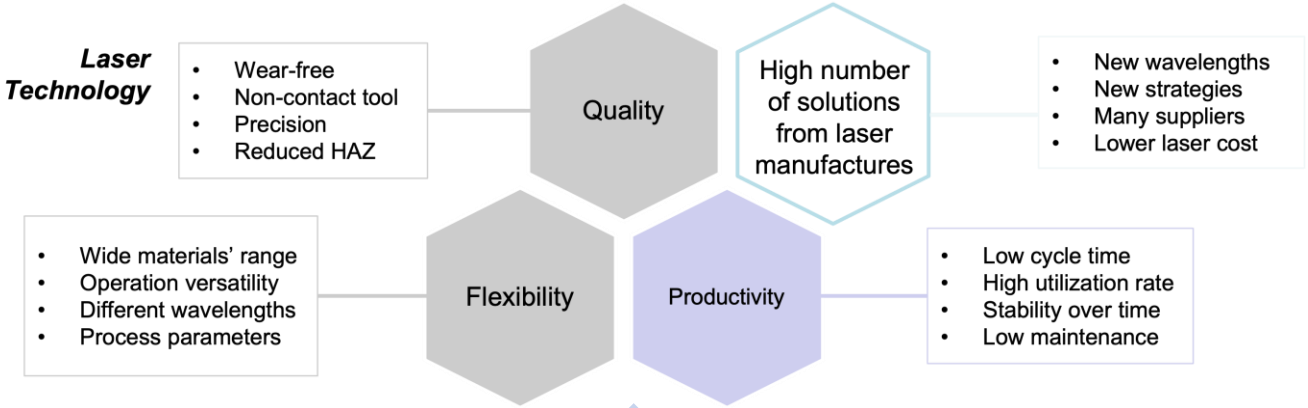




> 70% are Lap Welds Butt/Edge Welds Multi Foil Welds

1. Battery Tray welding
2. Hairpin welding
3. Hairpin Ablation
4. Rotor and stator welding
5. IGBT+MCU -sub welding system
6. Fuel Battery welding

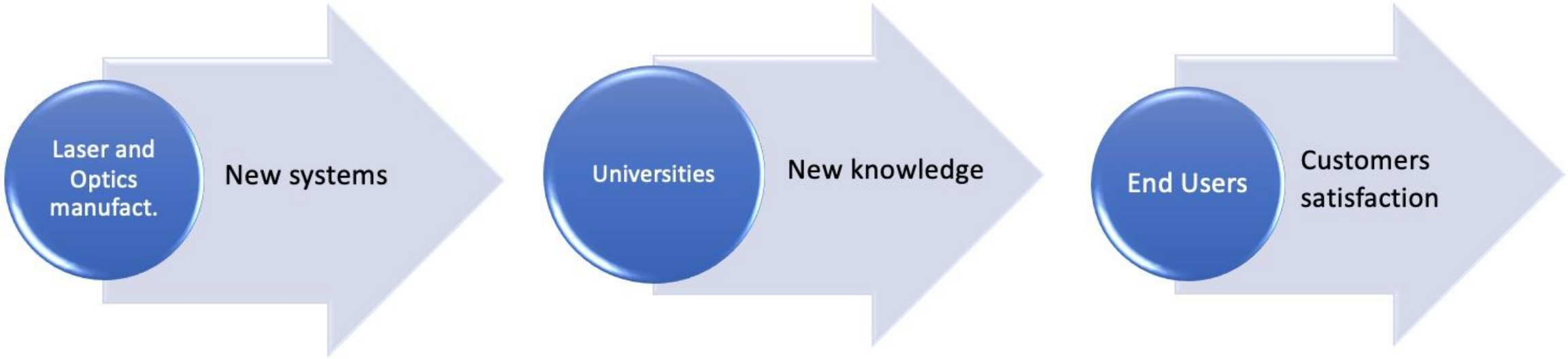
It is estimated that Laser Material Processing can cover between 60% to 80%[1] of all material processing applications for EV manufacturing,



[1] Kogel-Hollacher M., "*The full potential of photonics in e-mobility: an overview*", The Laser User Magazine 2020

Why the Workshop

- *The technological need from industries is to maximise productivity and adhere to sustainability, whilst accelerating strategies for **zero-defect** and **zero-waste,** at both low- and high-volume production*



What we know

- The Federal Ministry of Education and Research (BMBF) and the state of North Rhine-Westphalia are funding the development of battery cell research production in the area with up to a total of EUR 680 million.

Industry

Northvolt invests $750 million to establish world's first R&D campus covering the entire battery ecosystem

October 07, 2021

Northvolt is underway in establishing Northvolt Labs as Europe's leading campus for battery technologies via investment of approximately $750 million.

Outline of the Workshop

10th March 2022

9:00 Registration desk opens for in-person participants

9:20 Welcome speeches
Stefano Cattorini, *Managing Director BI-REX*
Alfredo Liverani
Director of Industrial Engineering Department (DIN)
Luca Settineri, *President of Italian Association of Manufacturing Technologies (AITeM)*
Vincenzo Colla
Councilor for Economic Development and Green Economy, Employment, Training at Emilia-Romagna Region
Alessandro Fortunato
LaserEMobility Workshop Co-organizer

Advanced sources, beam shaping, and monitoring

10:00 *Overcoming challenges in EV production with Adjustable Ring Mode fiber lasers,*
Thomas Hofmeister, *Coherent*

10:20 *Highly integrated laser systems and processes for E-Mobility manufacturing,*
Matthias Beranek, *Trumpf*

10:40 *Advanced laser solutions for the E-Mobility industry,*
Stefano Cattaneo, *IPG Photonics*

11:00 Coffee break

11:40 *Hairpin laser stripping,* **Giovanni Masotti,** *ElEn*

12:00 *Tailored solutions from a partner in laser E-Mobility: Results from wavelengths and beam shaping blend,*
Salvatore Salerno, *Optoprim*

12:20 Laser Processing of EV Battery Electrodes
Philippe Leopold, *Lumentum*

12:40 Lunch break

14:10 *Going green - Laser welding and smart sensor technology driving E-Mobility,* **Jens Reiser,** *Precitec*

14:30 *OCT applications for laser welding in battery production,* **Richard Steinbrecht,** *Lessmüller*

14:50 *How pre-focusing deflection units from Raylase enable E-Mobility applications and optimize process monitoring,*
Jan Habedank, *Raylase*

15:10 *In-line production monitoring of battery welding processes,* **Luca Porcelluzzi,** *MKS Instruments*

15:30 Coffee break

Brainstorming event moderated by EPIC (1h30')

16:10 *Four specific E-Mobility themes, in open discussion, in four corners of the room.*
Moderator: **Antonio Raspa,** *EPIC*

Day 1 closure

17:40 Final Remarks

11th March 2022

End-users and future prospects

9:00 *Ducati's electrification challenges,* **Roberto Canè,** *Ducati*

9:20 *The future of electrification at Ferrari,* **Luca Poggio,** *Ferrari*

9:40 *Title to be defined,* **Stefano Mazzetti,** *Lamborghini*

10:00 *Title to be defined,* **Luca Vescovi,** *Dallara*

10:20 Coffee break

From process to system

11:00 *Improving laser operation performance for the e-drive: From processing to testing,* **Davide Chesi,** *IMA Automation ATOP*

11:20 *Future battery technologies: Manz approach,*
Giorgio Balugani, *Manz*

11:40 *Development of a laser welding cell for prototyping Li-ion batteries,* **Lorenzo Ceccon,** *Nextema*

12:00 *Electrical testing in the production of battery modules and packs,* **Anisa Kapxhiu,** *Marposs*

12:20 Lunch break

13:50 *BorgWarner - LaserEMobility 2022,*
Davide Spazian, *BorgWarner*

14:10 *Laser welding in high performance battery system and manufacturing challenges,* **Giuliano Ellena,** *Podium Tech*

14:30 *The combination of advanced sensors and artificial intelligence to unlock batteries production,*
Massimiliano Moruzzi, *Augmenta*

14:50 Coffee break

LaserEMobility Research

15:30 *Lasers for E-Mobility in Bologna*

15:50 *Lasers for E-Mobility in Milan*

16:10 *Lasers for E-Mobility in Munich*

Rountable discussion

16:30 *Photons for electrons – Towards the LaserEMobility Network*

Vitual lab tour and Workshop closure

17:10 Final Remarks

Organizations and sponsorship

Sponsor