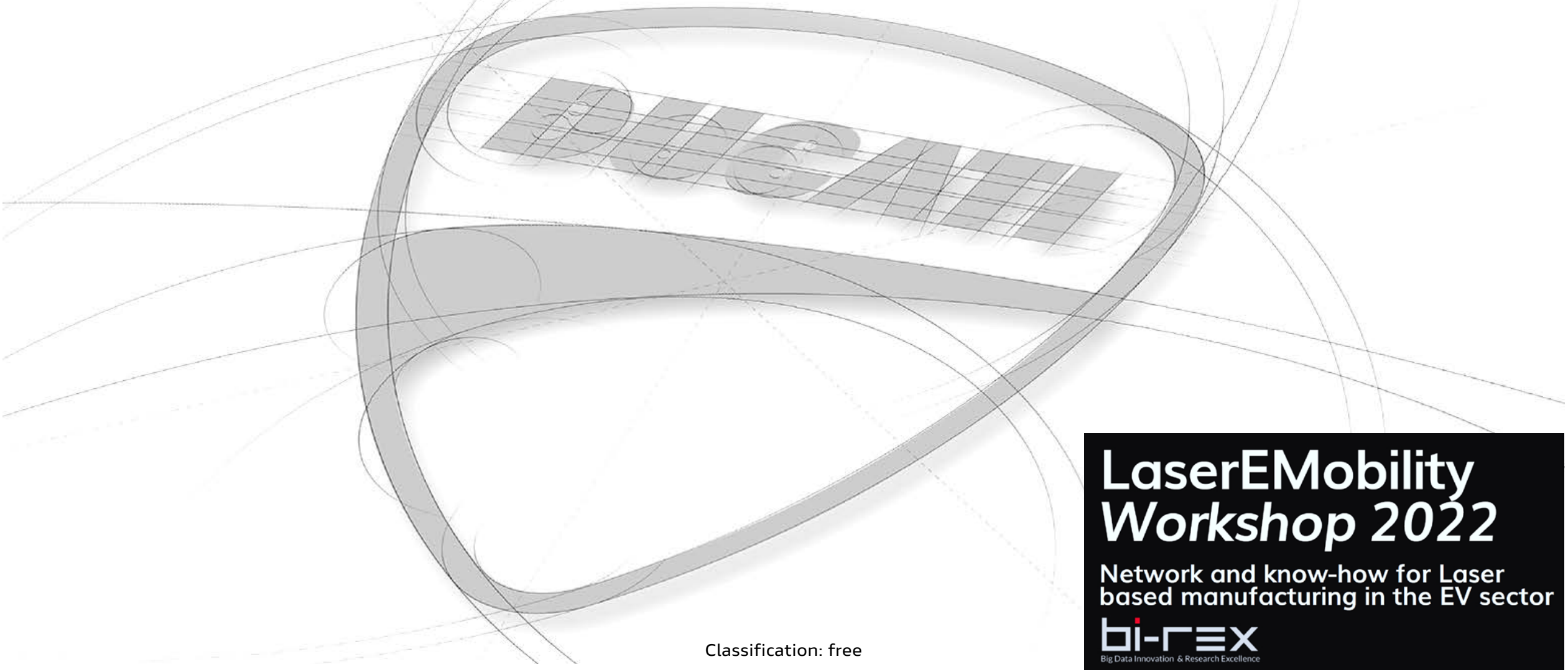
Ducati's electrification challenges

Roberto Canè e-Mobility Director



LaserEMobility *Workshop 2022*

Network and know-how for Laser based manufacturing in the EV sector

bi-rex Big Data Innovation & Research Excellence

Ducati Motor

Ducati Motor Holding

Ducati at a glance

Italy

Main Production Plant:
Borgo Panigale, Bologna

Site surface: 114,873 m²
Built surface: 71,657 m²

Thailand

Assembly Plant:
Amphur Pluakdaeng Rayong

Site surface: 40,000 m²
Built surface: 20,500 m²

Brazil [Dafra] Service Provider

CKD Assembly Plant:
Manaus

Ducati Motor Holding

Headoffice and main plant
Bologna, Italy

DNA	DWE	DJ	DNE	DDE	DCH	DAPAC	DDB	DIND	DC	DANZ
Ducati North America	Ducati West Europe	Ducati Japan	Ducati North Europe	Ducati Deutschland	Ducati Switzerland	Ducati Asia Pacific	Ducati do Brazil	Ducati India	Ducati China	Ducati Australia
Sunnyvale California	Paris France	Tokyo Japan	Silverstone Great Britain	Neuburg Germany	Feusisberg Switzerland	Rayong Thailand	Sao Paolo Brazil	New Delhi India	Shangai China	Sydney Australia

Ducati Motor Holding

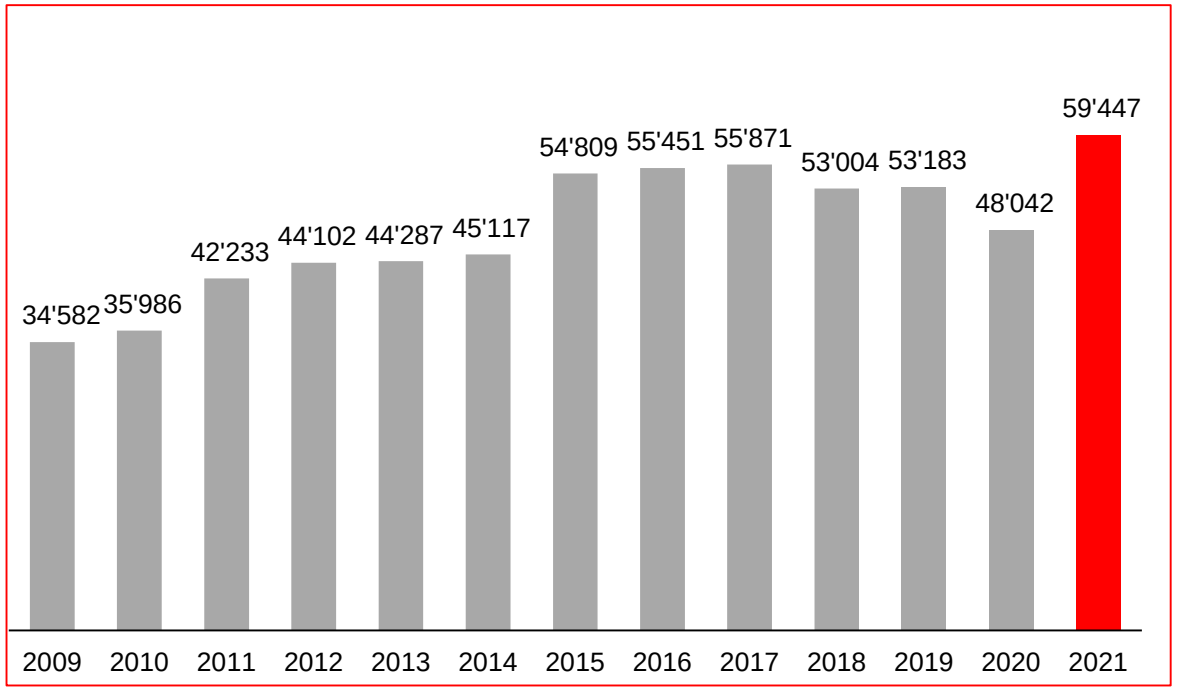
Ducati last year results

Ducati Posts Record Sales in 2021

Ducati posts record sales in 2021, with **59,447** motorcycles delivered worldwide, an increase of 24% over 2020 (48,042) and 12% over 2019 (53,183).

In 2021 Ducati's growth came in all major countries, starting with the United States, which regained the place of leading market for Ducati with 9,007 units (+32% over 2020), followed by Italy with 8,707 bikes (+23%) and Germany with 6,107 units (+11%). The Chinese market also grew, with 4,901 motorcycles (+21%), as well as France with 4,352 units (+12%) and the UK with 2,941 units (+30%).

https://ridermagazine.com/2022/01/18/ducati-posts-record-sales-in-2021/



A very interesting market for big-displacement ICE motorcycles

Ducati confirmed as single manufacturer for MotoE™

Legendary Italian factory announced as the new supplier to the FIM Enel MotoE™ World Cup from 2023 - 2026 inclusive

Dorna Sports and Ducati are delighted to announce a new partnership, with the legendary Italian motorcycle marque set to become the single manufacturer for a new era of the FIM Enel MotoE™ World Cup from 2023 to 2026.

The announcement was made in a special Press Conference on Thursday at Misano World Circuit Marco Simoncelli ahead of the Gran Premio Nolan del Made in Italy e dell'Emilia Romagna, with Dorna Sports CEO Carmelo Ezpeleta joining Ducati Motor Holding CEO Claudio Domenicali to reveal the new project.

MotoGP.com - 21 October 2021

Ducati MotoE

Ducati MotoE

Technical specifications

Vehicle

- Inspired by Ducati MotoGP and Panigale bikes
- Designed to be light and fast

Electric powertrain

- Motor and driver water cooled
- Battery pack: high-voltage, power cells
- Water cooling system sized for racing use

Electronics

- Custom Ducati and off-the-shelf
- In-house made VCU
- Ducati Corse software controls and strategies

Weight

- Considerably lighter than the current one

Timeline

- Next MotoE championship-ready
- From 2023 to 2026 seasons

Ducati MotoE

Track tests

MotoE “V21L” prototype tests

- Misano – 16 Dec. 2021
- Nardò – 18-20 Jan. 2022
- Vallelunga – 1-3 Mar. 2021
- … and there’s more to come

Ducati MotoE

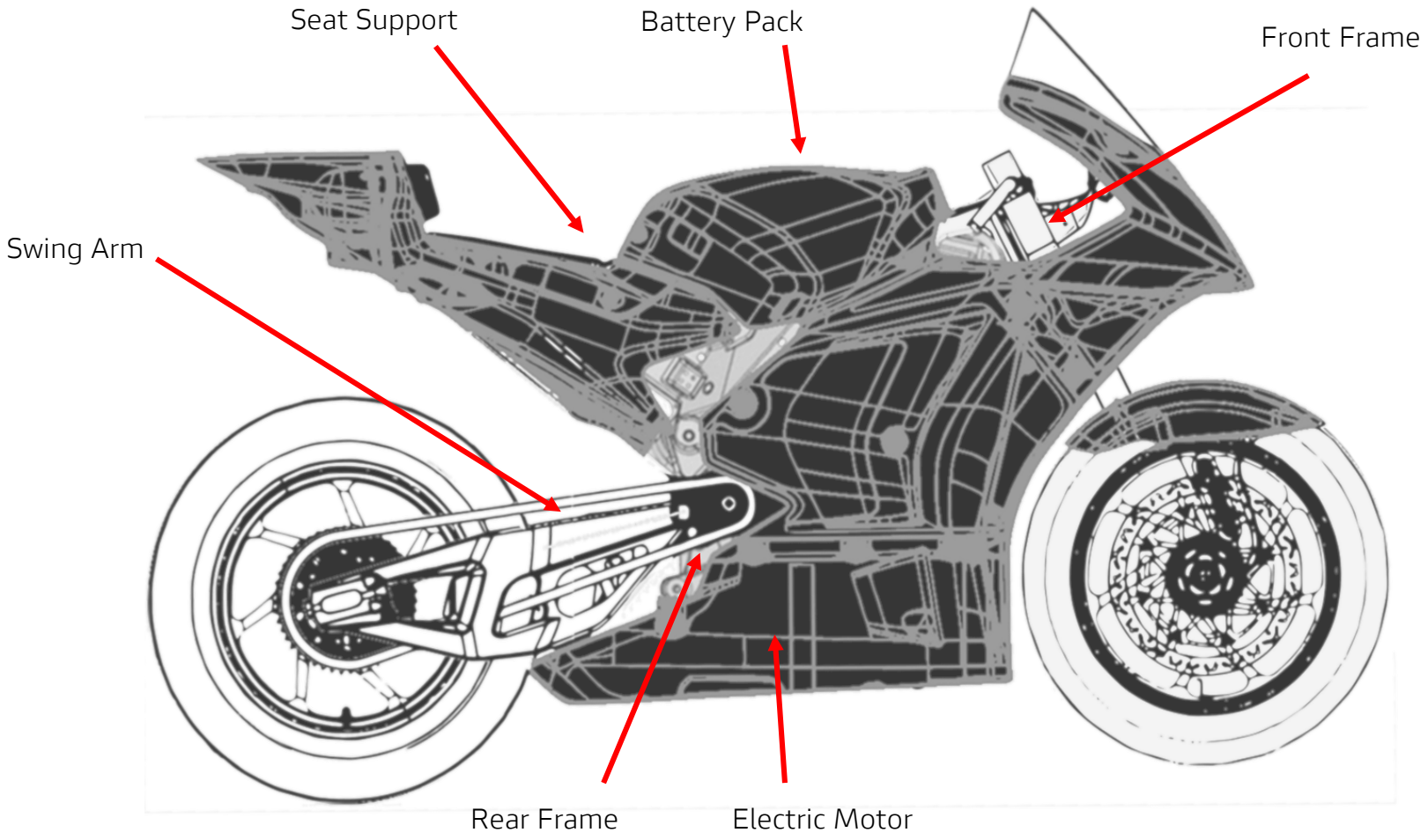
Track tests

Ducati MotoE

Track tests

Ducati MotoE

Vehicle Layout



Vehicle project technologies

- Front Frame : Aluminum casting
- Battery Pack: Carbon Fiber
- Rear Frame: Machining Part
- Seat Support: Carbon Fiber
- Swing Arm: Aluminum casting

Ducati MotoE

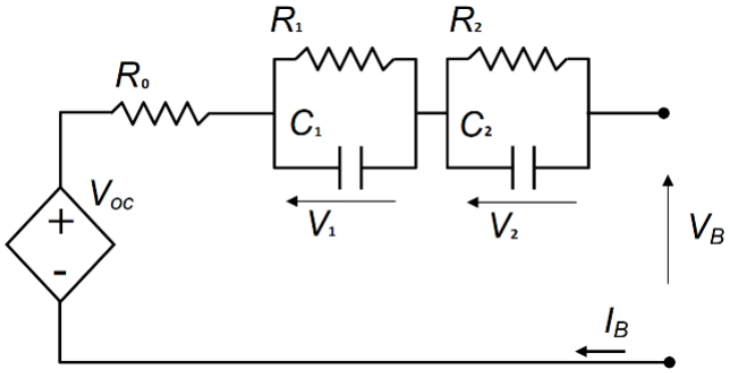
Battery Pack

Main ePWT challenges

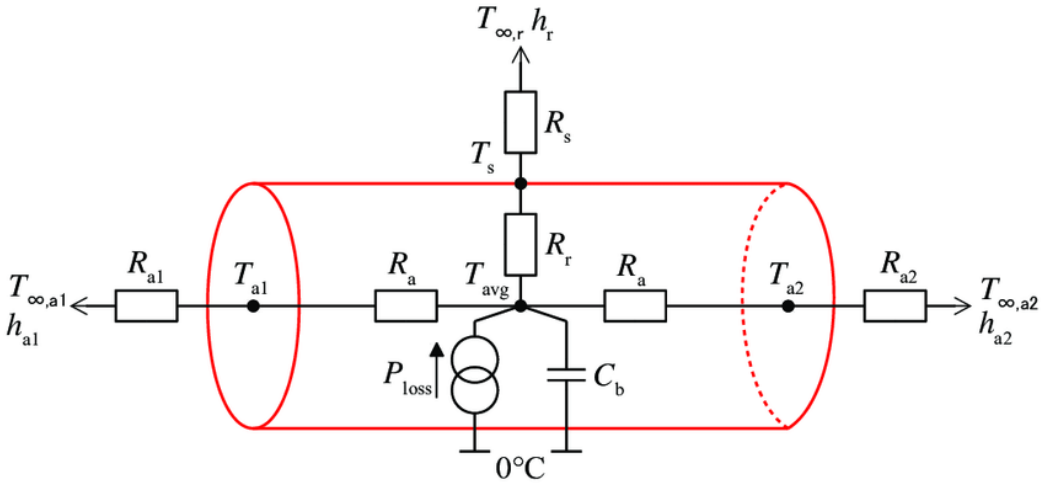
- Maximum power and energy vs. weight and volume
  - Minimum overall electric resistance
  - Most efficient cooling system

As we are talking about laser welding …

- Laser welding was and is one option
  - Minimize connection resistance
  - Helps heat exchange through poles



- **Welding**
- Bus bars
- Contactors
- Wires
- …



Item	Value
Installed Nominal Energy	Comparable with big e-bikes
Voltage	Superfast-charge ready
Cooling system	Internal to battery pack, liquid coolant

Other electrification projects at Ducati

Ducati and University

UniBO Motostudent

Team UniBo Motorsport triumphs at Motostudent International Competition 2021

The **UniBo Motorsport Team**, sponsored and supported by the Ducati Foundation, **wins the Motostudent International Competition 2021** in the Electric category. Team UniBo Motorsport ranked first having accumulated a total of 712.6 points in the various phases, with a gap of about 30 points from the second.

The **Minerva GN** prototype is an evolution of the first electric motorcycle built by the team for the 2018 competition. With a total weight of approximately 125 kg, the bike is based on a 30 kW electric motor supplied by the Federation together with tires and braking system.

*All the other components of the motorcycle (**battery pack, inverter, chassis, cooling system, engine control system, dashboard, wiring and aerodynamics**) are instead **developed from scratch by the students** with the support of the industrial realities of the Motor Valley and **supported by Ducati engineers.***

Ducati electrification

Ducati reference market

Why Ducati isn't entering the electric motorcycles market?

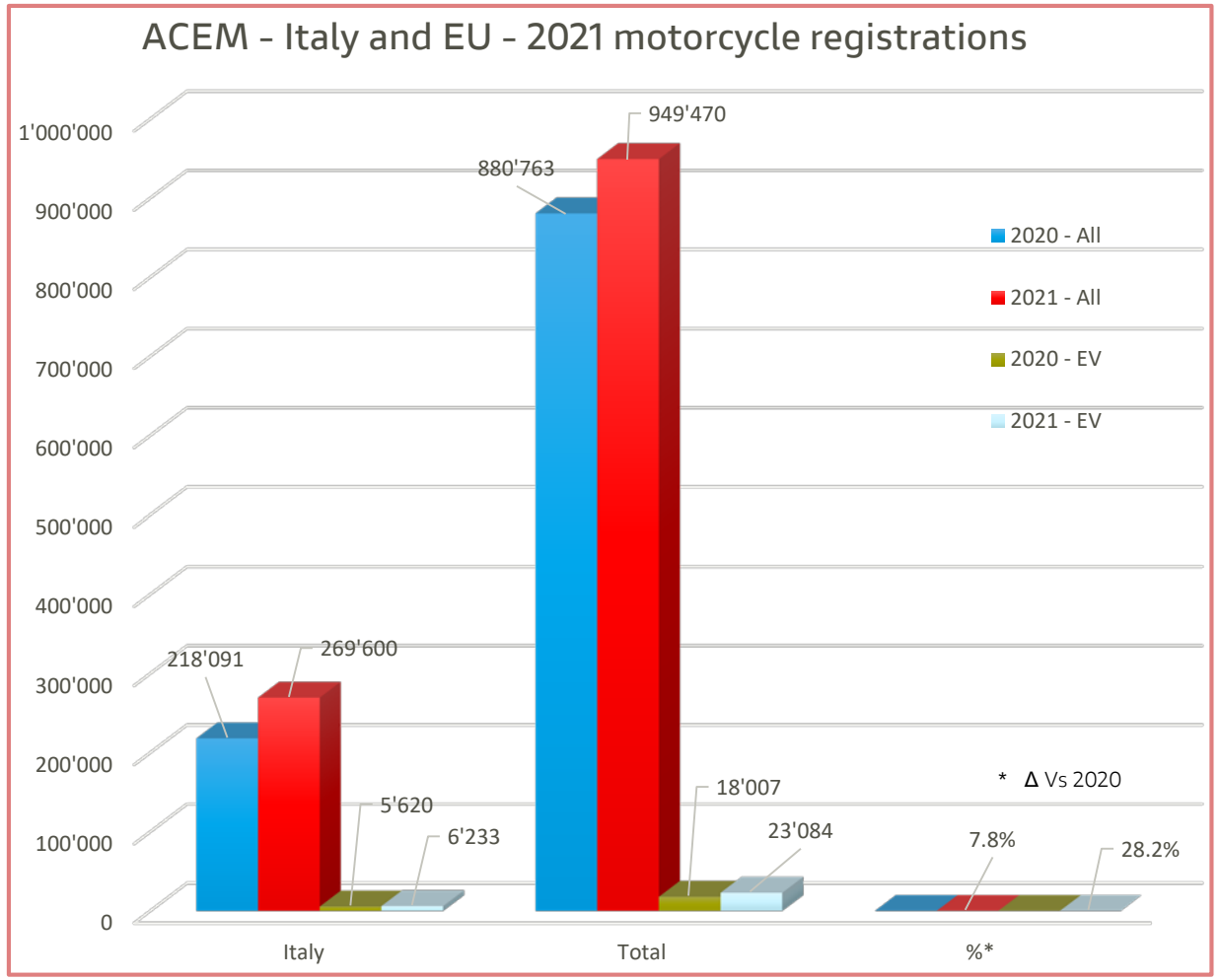
- **A very limited market, still**
  - Electric vehicles only 2.4% of total registrations
    - Mainly mopeds/scooters
  - Small companies struggle to grow
  - Big players are in trouble too

- **High costs, small revenues**
  - ICE powertrain is far more cheap than an EV battery pack

- **High technical barriers**
  - EV user experience still not able to overcome the EV limitations
    - Battery weight, range, recharge time …

Anyway EV market is growing

- Electric motorcycles (including mopeds) registrations in 2021
  - +28% EU
  - +11% Italy



Ducati electrification

Energy densities comparison

Energy storage for EV

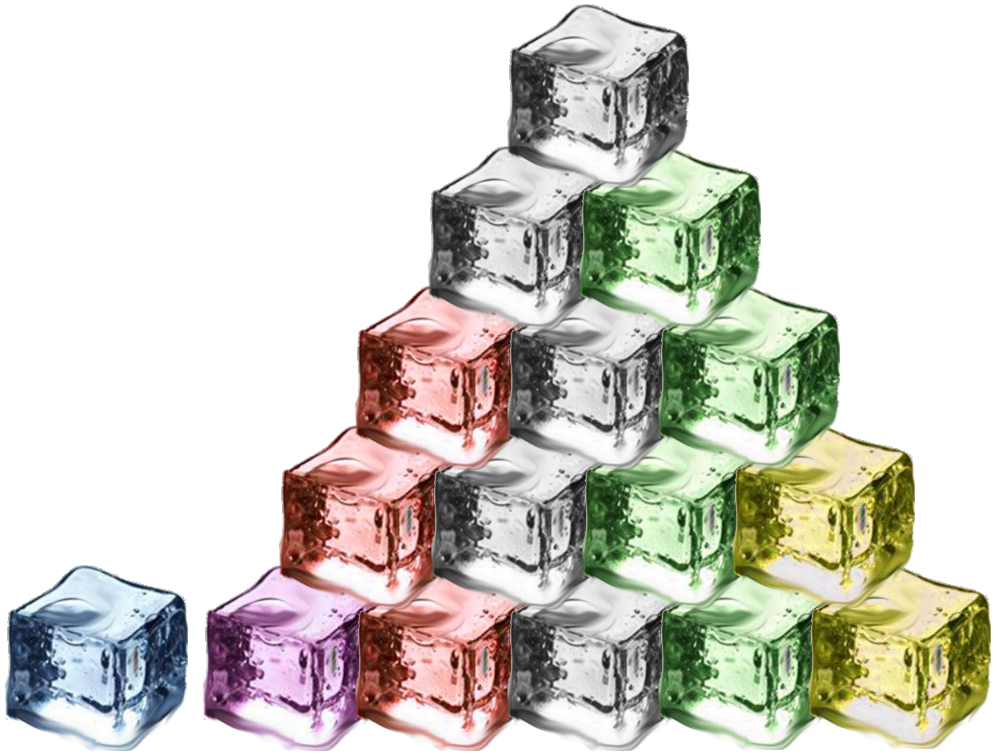
› The battery pack is the “Achilles’ heel” for ePTW

- Weight is a crucial factor for high-end motorcycles. The weight of the current battery packs is one of the most critical aspects that inhibit the development of performing electric vehicles.

Gasoline

10 kg

*Gasoline: 12kWh/kg * 33% ICE efficiency = 4 kWh/kg net energy*



Electricity

160 kg

Li-Ion cells: up to 250 Wh/kg useable energy (2021 cells)

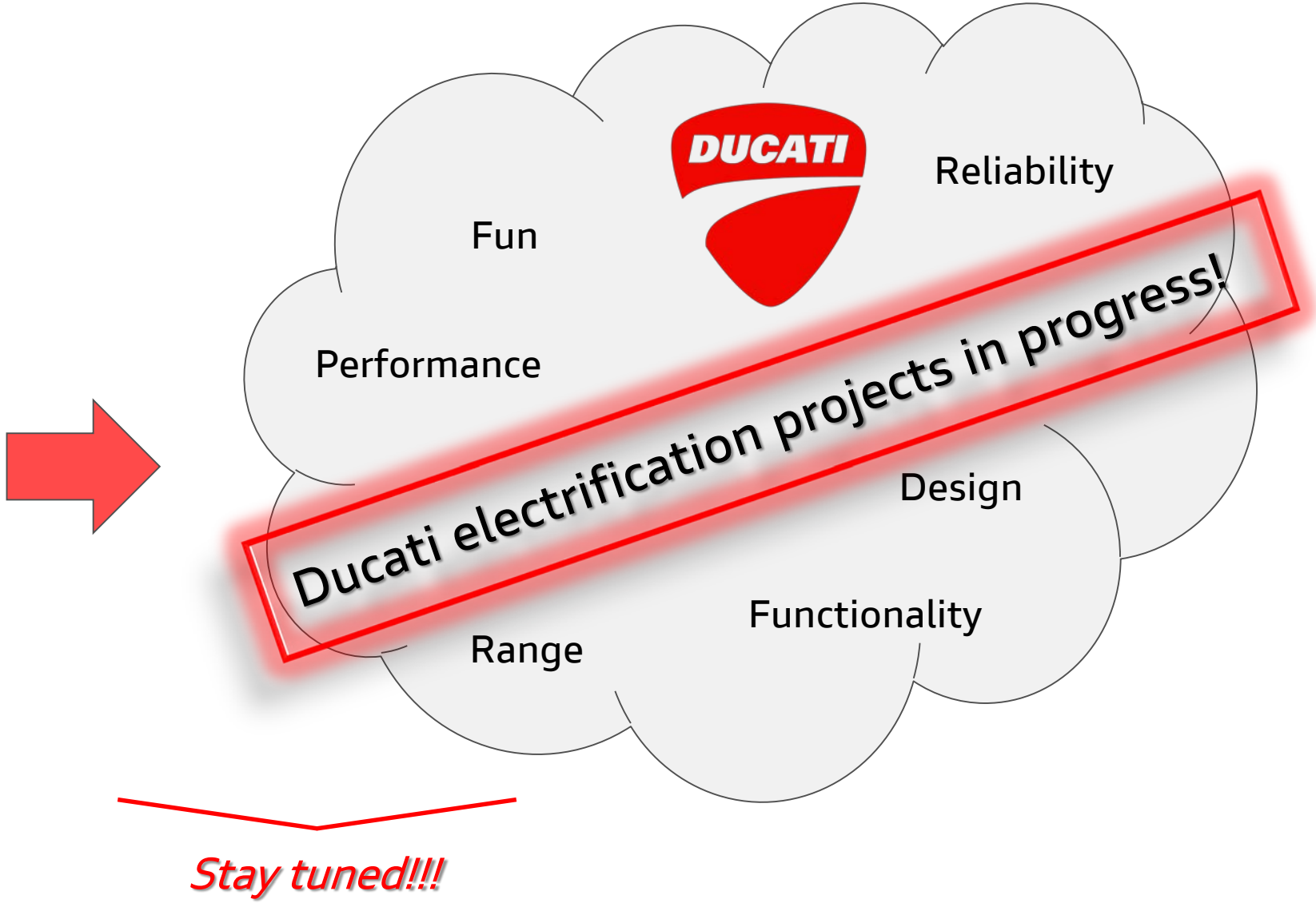

VISION
Be the most desirable brand
for power two wheeler products
... whether it's ICE or EV
DUCATI

Ducati electrification

E-Mobility opportunity

The “new” is coming

- **New regulations**
  - Restrictions for cities and countries
    - ICE bans for the upcoming years
  - CO_2 fines
    - Currently for cars, but …
- **New mindset**
  - Green approach
    - Young generations
  - Social distancing
    - CoViD …
- **New technologies**
  - New chemistries
  - New cooling techniques
  - Advanced ePWT technologies



Stay tuned!!!

Thanks!
Q & A