SWAPPABLE BATTERIES MOTORCYCLE CONSORTIUM

SBMC

Swappable Batteries Motorcycle Consortium

A common standard to boost electric mobility

14th International Motorcycle Conference
Cologne, Germany
October 2022

Roland Berger - Honda Motor Europe

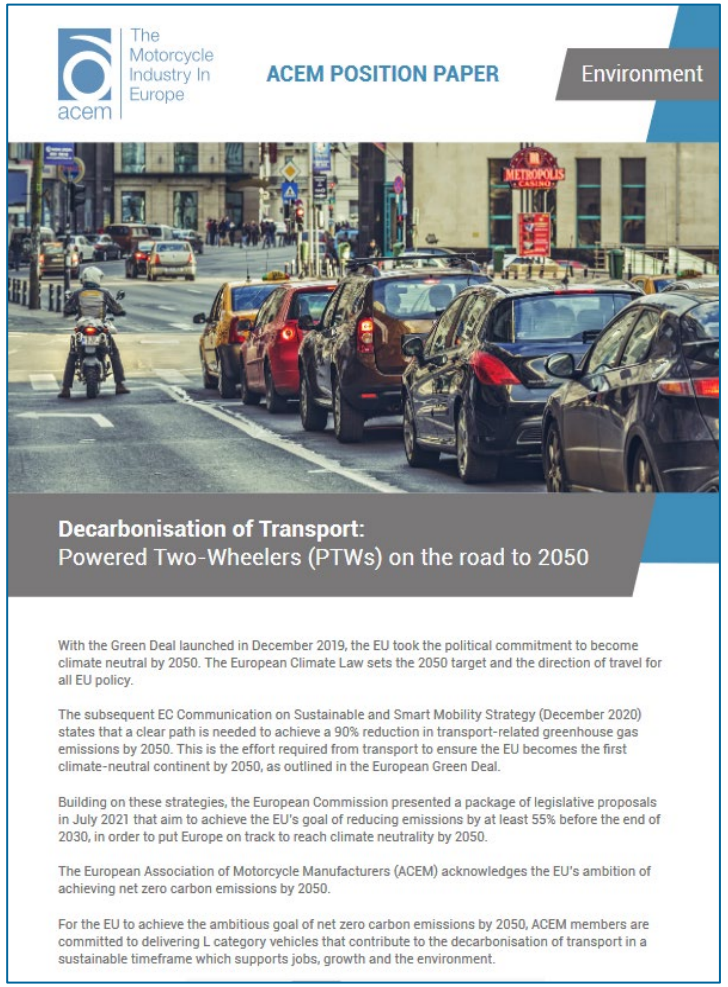
Worldwide electrification effort to reduce CO2

Motorcycle Industry intention: expand usage of electric motorcycles

Key success factors:

- extending the range,
- shortening the charging time
- lowering vehicle and infrastructure cost

"The Swappable Batteries Motorcycle Consortium turns the global challenge of urban mobility and its green transition into a unique opportunity. As the reference organization in that area, the SBMC accelerates the deployment of Swappable Batteries to L-Vehicles and beyond: we provide a global ground for industrial players along the L-Vehicle electrification value chain to harmonize the framework of this deployment and pave the way to an environmentally viable and user-friendly urban mobility.


The Motorcycle Industry In Europe

acem

ACEM POSITION PAPER

Environment

Decarbonisation of Transport:
Powered Two-Wheelers (PTWs) on the road to 2050

With the Green Deal launched in December 2019, the EU took the political commitment to become climate neutral by 2050. The European Climate Law sets the 2050 target and the direction of travel for all EU policy.

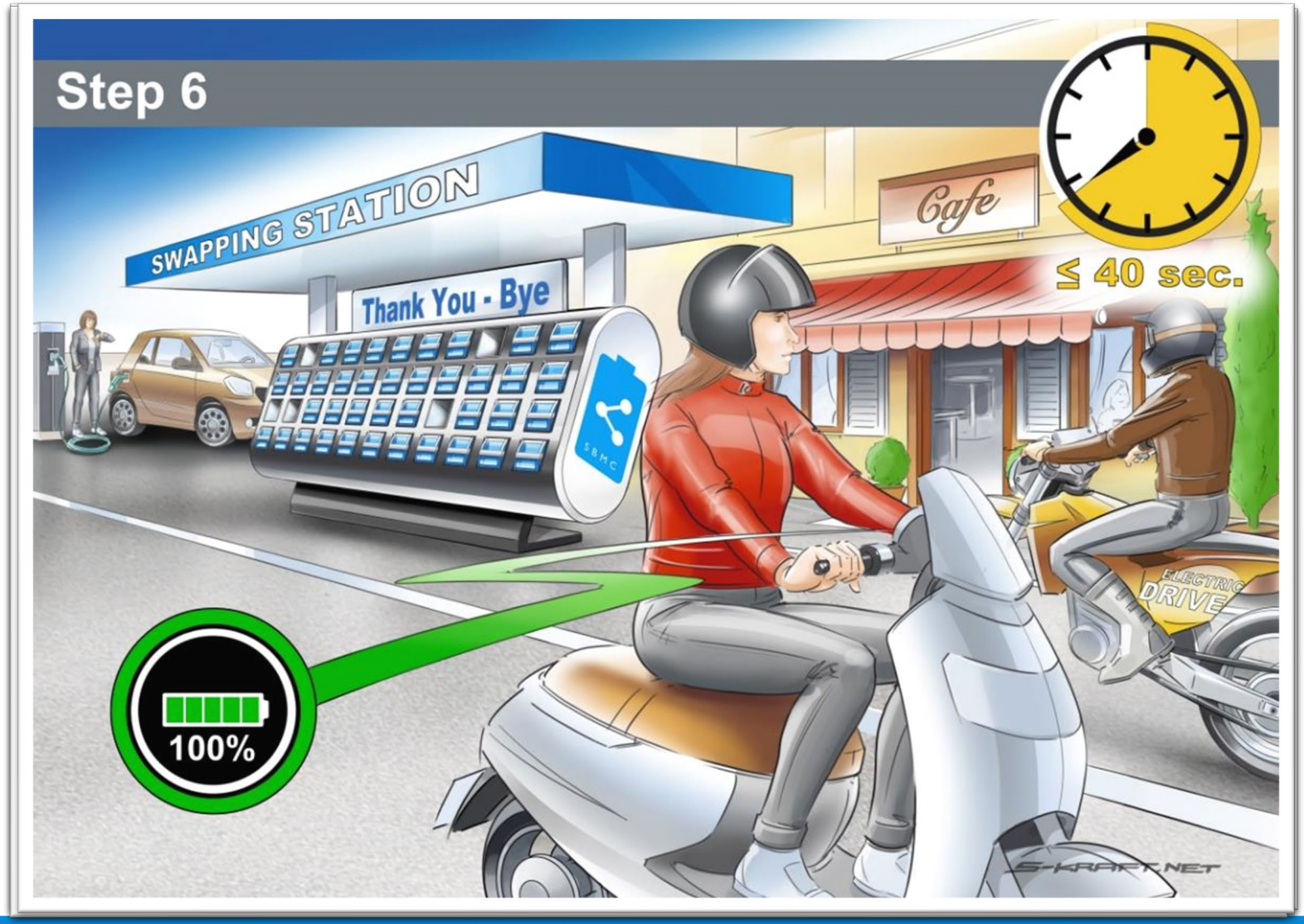
The subsequent EC Communication on Sustainable and Smart Mobility Strategy (December 2020) states that a clear path is needed to achieve a 90% reduction in transport-related greenhouse gas emissions by 2050. This is the effort required from transport to ensure the EU becomes the first climate-neutral continent by 2050, as outlined in the European Green Deal.

Building on these strategies, the European Commission presented a package of legislative proposals in July 2021 that aim to achieve the EU's goal of reducing emissions by at least 55% before the end of 2030, in order to put Europe on track to reach climate neutrality by 2050.

The European Association of Motorcycle Manufacturers (ACEM) acknowledges the EU's ambition of achieving net zero carbon emissions by 2050.

For the EU to achieve the ambitious goal of net zero carbon emissions by 2050, ACEM members are committed to delivering L category vehicles that contribute to the decarbonisation of transport in a sustainable timeframe which supports jobs, growth and the environment.

The "Idea"


Step 6
SWAPPING STATION
Thank You - Bye
Cafe
≤ 40 sec.
100%
ELECTRIC DRIVE
S-KRAFT.NET

The "Idea"


Step 1
SWAPPING STATION
Welcome
Cafe
0 sec.
4%


Step 2
7 sec.
SBMC

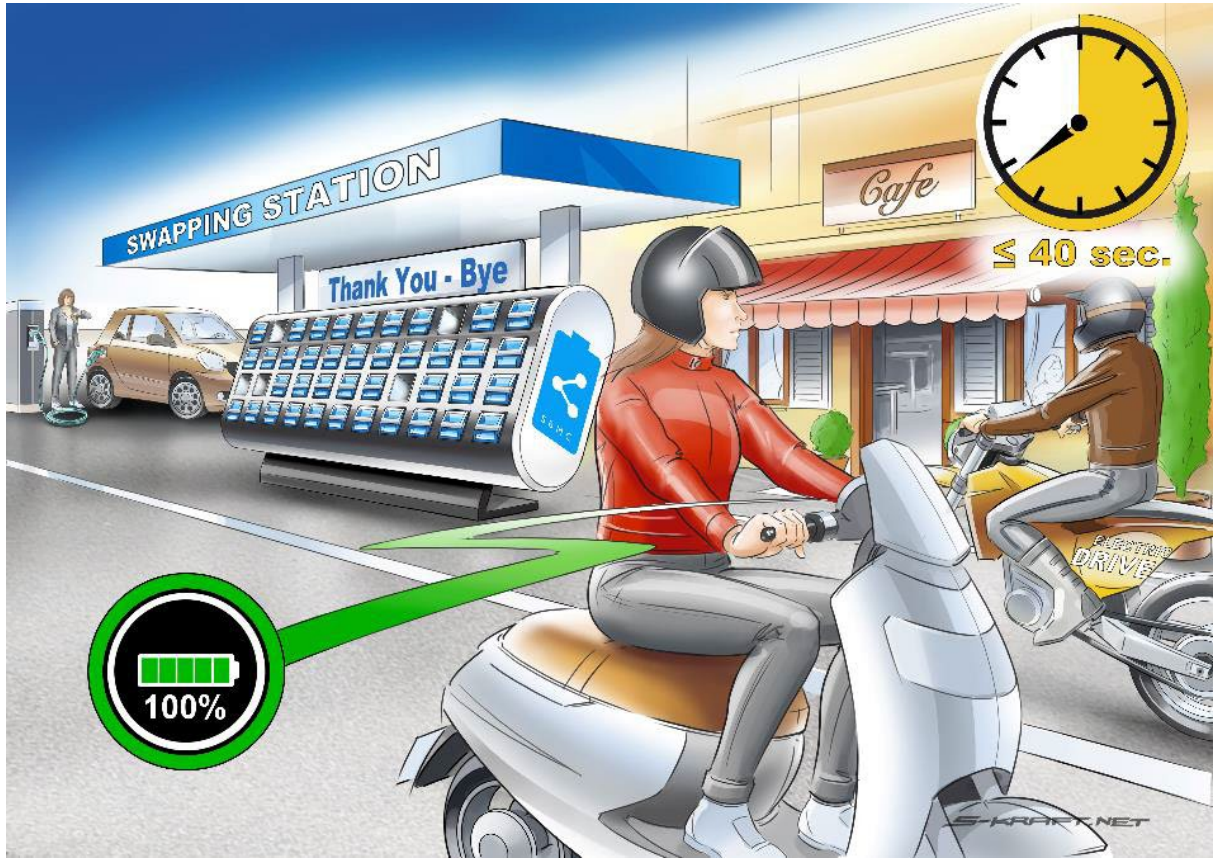

Step 3
„Insert Empty Battery"
15 sec.
SBMC


Step 4
„Take Out Full Battery"
22 sec.
SBMC


Step 5
29 sec.
SBMC


Step 6
SWAPPING STATION
Thank You - Bye
Cafe
≤ 40 sec.
100%

Swappable batteries = Game changer for electric PTW

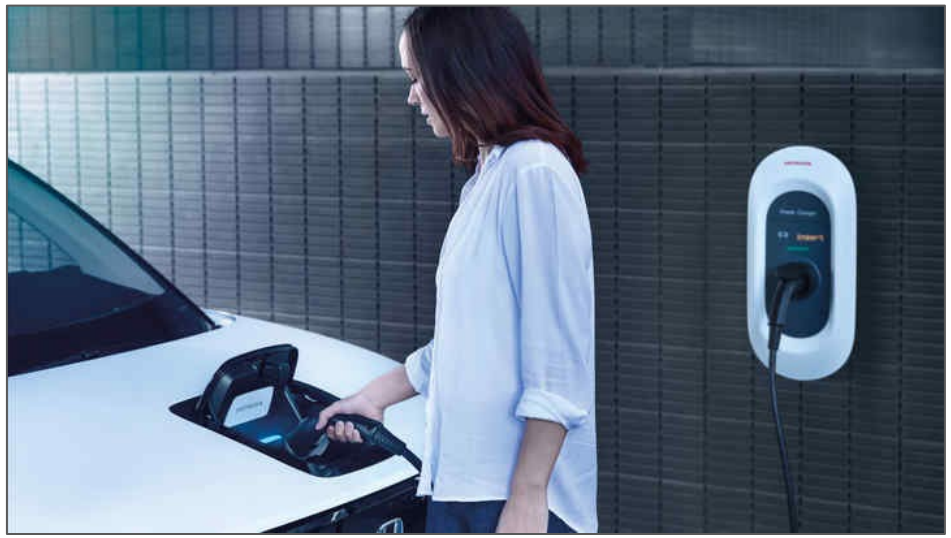


- No significant disadvantages for riders
- Charging faster than refueling
- Attractive business models (both B2C & B2B)

Swappable batteries = Game changer for electric PTW

- 30 minutes to 1 hour time

- 40 seconds time



Key advantages of swappable batteries

For customers

- A longer range by simply swapping the battery at a station
- Peace of mind, less range anxiety
- Widespread charging infrastructure
- No worries about battery deterioration during its lifespan: always a good one
- The ease of not having to set up a charging facility at home or at work

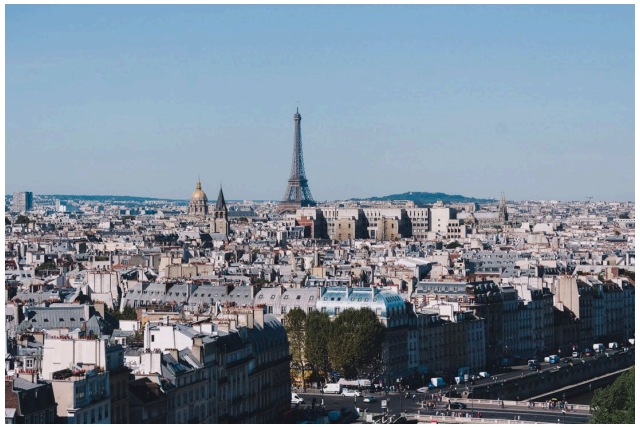
For the environment

- Earlier electrification (vs gasoline-powered vehicles)
- The efficiency of swapping systems
- Light vehicles contribute to less congestion
- Reduced emissions in urban areas
- Improved re-use / recycling opportunities;
  Enhanced circular economy

For manufacturers

- Efficient R&D due to standardization of components
- Quicker time-to-market
- Efficient production, economies of scale
- Increased attractiveness of the product in the eyes of the consumer

Key advantages of swappable batteries



For cities

- Swapping stations for light vehicles are very space efficient compared to car-charging stations that necessitate wide areas for parking while recharging.
- Light vehicles could swap their battery on the spot within minutes, with minimal space occupation.
- The station's batteries can be stacked in height = less area on the ground.

- *Right now we have discussions with cities on a public road test, to explore the usage behaviors of todays and future customers both in B2C and B2B area.*
- *In the first tests we will use existing products, later the first SBMC prototypes.*

Task of SBMC

1. Develop common technical specifications of "the battery systems"
2. Define common usage of the swapping systems
3. Make & promote the Consortium's common specifications a standard within European and International standardization bodies (de jure standard)
4. Expand the use of the Consortium's common specification to global level (de facto standard)

Common technical specification battery/systems

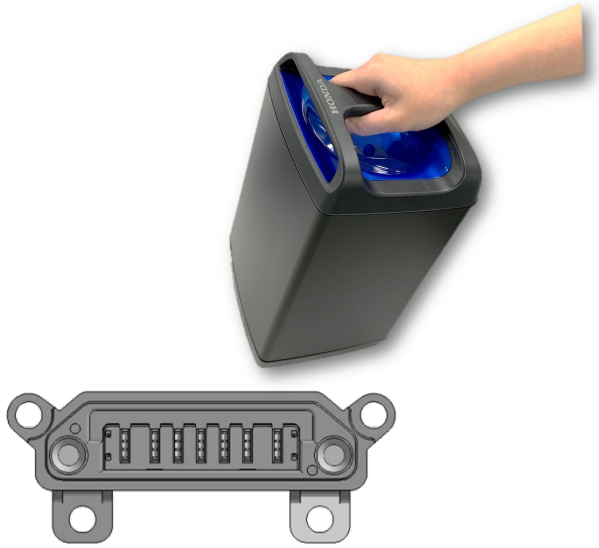
Core requirements

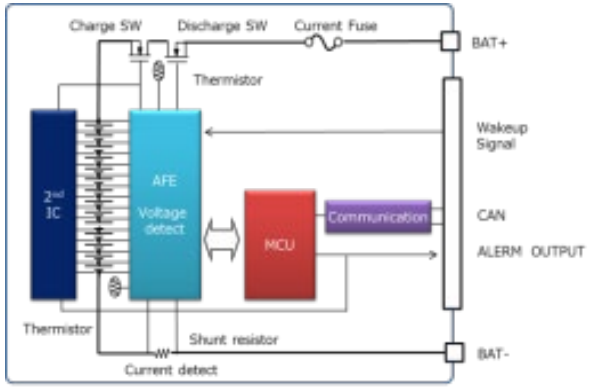
1. Suitable for different vehicle categories and usages:
   - L1e-B, L2e, L3e-A1/A2, L5e, L6e, L7e → Drive Train power up to 11kWnom (~20kWp)
   - Commuting, sport, light off-road
   - Worldwide usage
2. Portable battery: Weight below 12kg, battery energy up to 2000Wh
3. Battery within voltage Class A limits: Safety against electrical shock while maintaining cost efficiency
4. Vehicle usage with single or multiple battery connection possible
   max 2 in serial and max 8 in parallel

STANDARD to be created

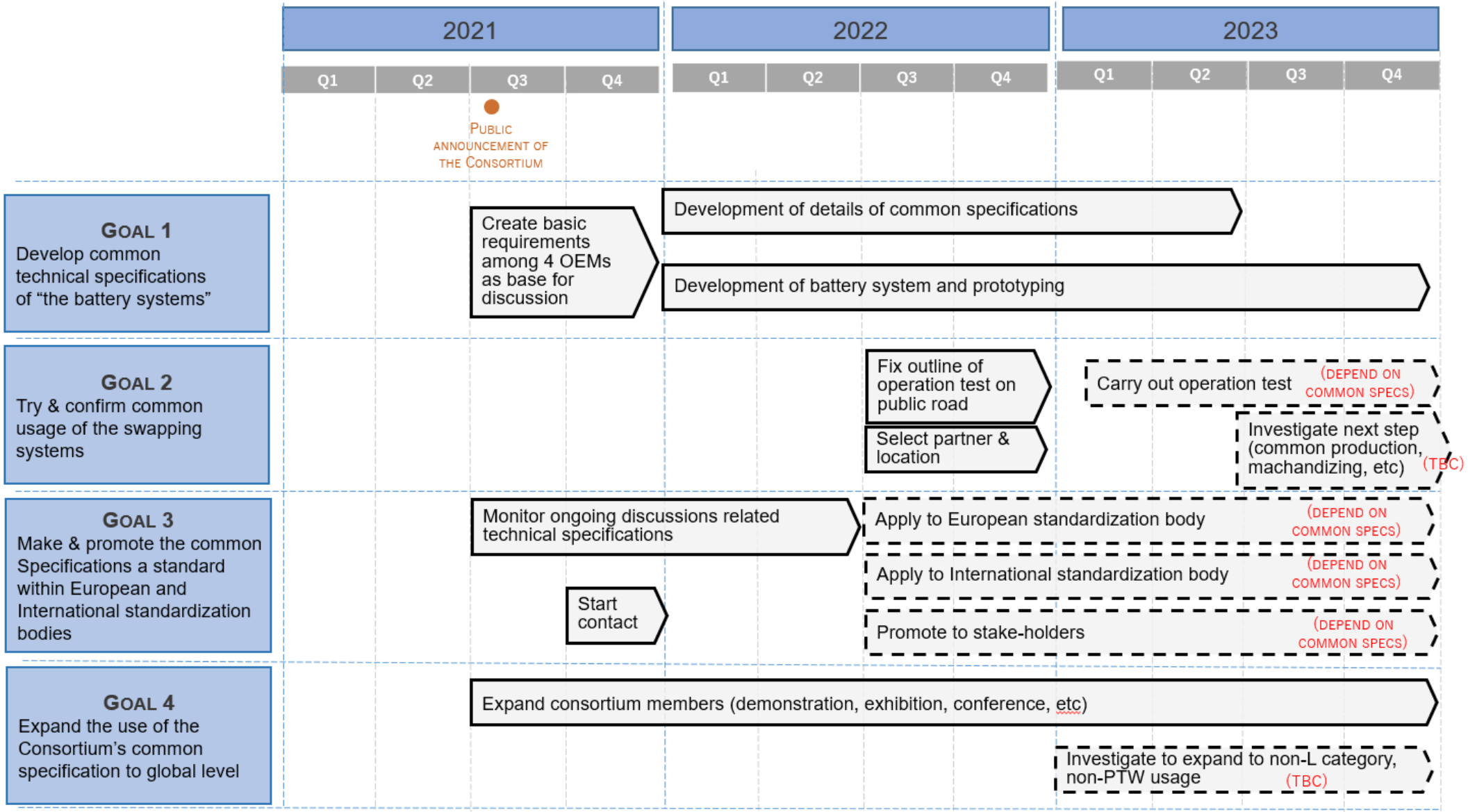
Standardization scope

1. External geometries and vehicle mechanical interface
2. Connectors
3. Communication protocol with vehicle and swapping station
4. Electrical, Mechanical and Safety requirements





Action plan schedule



Thank You

AVL
CIKLO
FIVE
Fabbrica Italiana Veicoli Elettrici
FORSEE POWER
HIOKI
HONDA
OHYBA
POWER THE FUTURE
jama
Japan Automobile Manufacturers Association
Kawasaki
KTM F&E
KYMCO
niu
PIAGGIO GROUP
POLARIS
ROKI
SAMSUNG SDI
SAMSUNG
SINBON
SUZUKI
SUMITOMO ELECTRIC
Connect with Innovation
Swobbee
we share batteries
VeNetWork
TALENTI D'IMPRESA
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TECHNOLOGIES
YAMAHA