IFRI Round table "EU battery alliance,“
Jens Wiese (Head of Performance Improvement & Battery Strategy, Group Strategy Volkswagen AG)
Brussels, March 28, 2018
Volkswagen invests billions of EUR in its EV portfolio until 2025

- 2018: 3 BEVs (12 PHEVS)
- 2025: 50 new BEVs & 30 PHEVs
OEMs and politics have to join forces to drive EV demand

**DIRECT** eMOBILITY ENABLERS

- > 500 KM Range
- Performance
- € Vehicle Price
- Sales Channels
- Charging Time

Under **DIRECT** influence of the VW Group/OEMs/brands

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**INDIRECT** eMOBILITY ENABLERS

- Charging Standards
- Regulation (Incentivation)
- Tax Exemption
- Billing Standards
- City Restrictions
- ...

NOT under **DIRECT** single influence of an OEM, (across OEMs)
Volkswagen builds up R&D competences across the value chain

- **Materials**: New Center of Excellence with more than 250 specialists until 2020 incl. R&D production line approved.
- **Cell**: Competence established e.g. Audi e-tron
- **Module**: Currently not in focus to be considered in case of strong oligopolistic market development
- **System**: Competence established e.g. Audi e-tron

R&D and Manufacturing

Volkswagen Group Strategy

Stand: 11.04.2018
Cooperation possibilities for Volkswagen to gain competences

No cooperation with other automotive OEMs due to:
- battery-related product differentiation
- difficulties in requirement harmonization
From 2025 more than 300 GWh are required for EV production in EU to meet CO₂ targets

<table>
<thead>
<tr>
<th>Year</th>
<th>EV Volume [in million vehicles p.a.]</th>
<th>Cell Capacity [GWh]</th>
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<tbody>
<tr>
<td>2021</td>
<td>3-4</td>
<td>~100</td>
</tr>
<tr>
<td>2025</td>
<td>6-7</td>
<td>~300</td>
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<tr>
<td>2030</td>
<td>&gt;7</td>
<td>&gt;300</td>
</tr>
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Source: Bain/VW
Volkswagen Group Strategy

Stand: 11.04.2018
Without competence ramp up in EU R&D and manufacturing activities will further concentrate in Asia

**Status quo**

Battery market

**Scenarios for 2025**

Battery market – Competence ramp-up EU not successful

**ICE* market**

For reference only

"R&D competence and lead factories in Asia, first copy paste factories in EU"

"R&D competence and lead factories in Asia, further copy paste factories in EU"

Key

- R&D & lead factory
- Copy paste factory

"R&D competence and factories in EU, no further copy paste factories"

**Value creation**

- R&D competence

*) ICE = Internal combustion engine

Volkswagen Group Strategy
China pushes for EV breakthrough – but seals off local battery market

<table>
<thead>
<tr>
<th>Pro EV regulation</th>
<th>Free market access</th>
<th>Number of competitive suppliers</th>
<th>Market size</th>
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A battery alliance can align competences in the EU – but needs to focus on the crucial gap in cell manufacturing.
Achievement of competitive level takes multiple years for Newcomers - High investments needed

COMPETENCE GAP

2-3 years 2-3 years 2-3 years

Newcomers Followers China leaders Global leaders

Source: Bain
Volkswagen Group Strategy

Stand: 11.04.2018
Thank you!