EV Strategic Direction
Hyundai Motor Company

2019. 10

Product Division
Product Strategy Sub-Division
Product Strategy Group
1. Regulatory Trends in Major Markets

Demand growth of eco-friendly vehicles led by stricter regulations on fuel efficiency / mandatory sales quota of EV / ban on ICE vehicles

**Enhanced Regulations on Fuel Efficiency**
- Enhanced by 5%p each year from 2015
  - Approximately by 4~5%p annually
  - Violation will result in sales ban or penalty proportionate to overall vehicle sales

<table>
<thead>
<tr>
<th>Region</th>
<th>2017 → 2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>40 → 56 mpg (+40%)※ Passenger Cars</td>
</tr>
<tr>
<td>EU</td>
<td>130 → 81 g/km (+38%)※ NEDC standard</td>
</tr>
<tr>
<td>China</td>
<td>6.4 → 4.0 L/100km (+38%)※ NEDC standard</td>
</tr>
<tr>
<td>Korea</td>
<td>140 → 89 g/km (+36%)※ Preliminary draft by government</td>
</tr>
</tbody>
</table>

**Mandatory Sales Quota of EV**
- U.S. then followed by China & more
  - U.S.: Initial 4.5% in 2018
    - 2.5%p annual hike
    - 10 states including California
  - China: 10% in 2019 → 12% in 2020

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<tr>
<th>Region</th>
<th>2018 → 2025</th>
<th>2019</th>
<th>2020</th>
</tr>
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<tbody>
<tr>
<td>U.S.</td>
<td>2.0% 6% 16% EV, FCEV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>2.5% 6% 10%</td>
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</tbody>
</table>

**Ban on ICE Vehicles**
- Legislative ban on ICE vehicles planned by major countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Target Year</th>
<th>Announced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>2025</td>
<td>2016</td>
</tr>
<tr>
<td>Netherland</td>
<td>2030</td>
<td>2016</td>
</tr>
<tr>
<td>Sweden</td>
<td>2019</td>
<td>2019</td>
</tr>
<tr>
<td>U.K.</td>
<td>2017</td>
<td>2017</td>
</tr>
<tr>
<td>Canada</td>
<td>2040</td>
<td>2019</td>
</tr>
<tr>
<td>France</td>
<td>2017</td>
<td>2017</td>
</tr>
</tbody>
</table>

※ Passenger Cars
※ NEDC standard

[ Fuel Efficiency Regulation ]
[ Mandatory Sales Quota ]
2. Electrification Trend of Major OEMs

Recent trend of electrification strategies by global major OEMs generally has been in transition to line-up expansion skewed around BEVs.

**Electrification Lineup**
- Portfolio Lineup oriented around BEV
- Expanding BEV (EV dedicated platform with e-TNGA)
  
**Sales Plan**
- By 2025
  - 2 million units / annum
- By 2030
  - cumulative 7 million units
- By 2028
  - cumulative 22 million units
- By 2025
  - 1 million units / annum (5 years earlier than original plan)
- By 2030
  - 5.5 million units

**Expected new models**
- By 2028
  - 70 new models
- By 2022
  - 12 new models (BEV)
- By 2023
  - 20 new models (BEV)
- By early 2020
  - 10 new models (BEV)
- By 2025
  - Electrification Roadmap
Beginning with first production of EV in 2012, HMC has won numerous awards from first production of EV in 2012, based on superb product competitiveness.

**I. R&D Phase**  
(HMC’s first high-speed EV with i10 model)

**II. Mass-production**  
(Global & Urban EV)

**III. Market Expansion**  
(Diversification of range & body-type)

**IV. Leadership in EV**  
(dedicated platform & high-speed charging)

### IONIQ EV (Best Fuel Efficiency)

<table>
<thead>
<tr>
<th>Models</th>
<th>Fuel Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>IONIQ EV</td>
<td>136 MPGe</td>
</tr>
<tr>
<td>MODEL3</td>
<td>133 MPGe</td>
</tr>
<tr>
<td>KONA EV</td>
<td>120 MPGe</td>
</tr>
<tr>
<td>BOLT</td>
<td>119 MPGe</td>
</tr>
</tbody>
</table>

※ MPGe : Mile per gallon equivalent

### KONA EV (AER : 258 miles)

- North America U.V. of the Year 2019
- Wards Auto 10 Best Engines 2019

※ AER : All Electric Range
4. Winning Strategy in Electrification

**BEV strategic direction**, in pair with core technology roadmap was established and will be executed accordingly to **enhance HMC’s EV competitiveness**.

Volume target of Hyundai · Genesis

“1.03M Units”

Eco-friendly vehicles in 2025

※ 1.67M Units including Kia

<table>
<thead>
<tr>
<th>HEV</th>
<th>BEV</th>
<th>FCEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>With the best fuel economy</td>
<td>With the best MPG / AER</td>
<td>With global best technology</td>
</tr>
<tr>
<td>Replacing diesel demand</td>
<td>Expand BEV lineup &amp; M/S</td>
<td>Competitive price &amp; lineup</td>
</tr>
<tr>
<td>360K units</td>
<td>560K units (+α)</td>
<td>110K units (+α)</td>
</tr>
</tbody>
</table>

To secure the leading position in EV in 2025

“Strengthen tech-competitiveness + Diversify product lineup +

Expand business in relations with ecosystem”

Ⅰ. Strengthening Technological Edge

Secure core technology and accelerate mass-production to fortify foundation for the leading position in EV

Ⅱ. Diversifying Product Lineup

Diversify product portfolio for business-purpose

Ⅲ. Expanding Ecosystem

Vitalize EV ecosystem and discover new businesses with product / service linkage
BEV strategic direction, in pair with core technology roadmap was established and will be executed accordingly to enhance HMC’s EV competitiveness.

**I. Strengthening Technological Edge**

Fortifying competitiveness through EV core technology (dedicated platform and super-fast charging)

- [ EV-dedicated Platform ]
  - Merchantability
    - Interior / AER
  - Cost Efficiency
    - economies of scales with commonization

- [ Ultra Fast Charging ]
  - 800V System voltage
  - Ultra Fast Charging 20 min. (up to 80%)
  - Close to fueling experience

**II. Diversifying Product Lineup**

More segmented lineup and model development suitable for mobility service

- [ Segment EV ]
  - Future
  - Now
  - Future
  - Small EV
  - B/C-seg
  - Large EV

- [ Mobility/B2B ]
  - New body-type for MPV or Mobility BEV

**III. Expanding Ecosystem**

Strategic plan for EV ecosystem expansion to improve customer accessibility

- [ Charging Infrastructure ]
  - Competition
  - Charging Time
  - Charging Station
  - By region (EU/US/KO/China)
  - ※ Investment in IONITY, high-speed charging infrastructure construction (Sep. 2019)

- [ Charging Infrastructure Investment Strategy ]
  - Low residual value
  - High vehicle price
  - Battery recycling regulation
  - Diversifying new business portfolio

**E-GMP**

1) E-GMP : Electric Global Modular Platform
5. EV Sales Target

Volume target of 560K+ with 16 models of EV in 2025 (Hyundai · Genesis)

<table>
<thead>
<tr>
<th>Line-up</th>
<th>2019</th>
<th>4 Models</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2019</td>
<td>60,000 units</td>
</tr>
<tr>
<td></td>
<td>2025</td>
<td>560,000 + units</td>
</tr>
<tr>
<td>Sales Volume</td>
<td>2019</td>
<td>4% of Global M/S in H1 2019</td>
</tr>
<tr>
<td></td>
<td>2025</td>
<td>Target M/S 6% or more in EV Market (10% + Kia)</td>
</tr>
</tbody>
</table>

- **2019**
  - **4 Models**
    - Focusing on DM with small segments
      - A/B-seg
      - C-seg
      - Light C.V.
    - Kona
    - Ioniq
    - Lafesta (2019)
    - Porter (2019-end)
  - **Sales Volume**
    - 60,000 units

- **2025**
  - **16+ Models**
    - Diversifying market/customer with more models in more segments
      - Micro
      - A/B
      - C
      - D/E
      - MPV/VAN
    - EM
    - DM + Premium Market
    - B2B
  - **Sales Volume**
    - 560,000 + units

- **Rank** | Target sales volume by brands in 2025

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Target Sales Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Volkswagen</td>
<td>600K +</td>
</tr>
<tr>
<td>2-3</td>
<td>Hyundai · Genesis</td>
<td>560K +</td>
</tr>
<tr>
<td></td>
<td>Tesla</td>
<td>500K +</td>
</tr>
</tbody>
</table>

※ Target volume is based on IHS forecast (8.87M of overall EV market in 25)