Intelligent Powertrain for Next-gen e-POWER
Next-gen e-POWER with Intelligence

- Battery charging is optimized to individual’s driving habits to improve real-world fuel efficiency and quietness
- e-POWER will gain wisdom by the day, using machine learning & deep learning to optimize performance according to driver behavior
Energy management by sensor

- Engine control uses latest sensing technologies to realize outstanding quietness and EV feel
  - Engine ON/OFF switching based on road surface detection
  - Engine ON/OFF scheduling based on road-surface database construction

**Engine ON/OFF Switching**

- Rough road
  - Engine on
  - Quiet driving (Engine off)
- Smooth road

**Road surface database construction**

![Road noise sensing](image)
Predictive energy management

- Real-world fuel efficiency improved by predictive charging schedule incorporating up-to-the-minute forecasts of traffic and environmental conditions
  - Control engine by prediction of energy needs based on external information such as navigation, and 3D HD map

**Predictive charging scheduling**

- **Navigation**
- **Road/environment information via connected**

- Silent driving near home
- Engine sound masked by rough road
- Efficient driving on up & down hill
- Engine ON triggered by road noise detection
- Regenerative brake
- Battery
- Motor

NISSAN INTELLIGENT MOBILITY
Test result of energy management

- Test condition: Suburban route with up and down hill
- CO₂ improvement: approx. 5%, time of engine noise awareness: -35%

- Travel distance (round trip): 37km
- Difference in level: 270m
- Travel time: 3700s
- Average speed: 35km/h

Period when driver can hear engine noise

<table>
<thead>
<tr>
<th>Current</th>
<th>Test car</th>
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<tbody>
<tr>
<td>310s</td>
<td>-35%</td>
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<td>200s</td>
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e-POWER with more intelligence

- e-POWER will gain wisdom by the day, using additional outside information for machine learning & deep learning to optimize performance according to driver behavior.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Future</th>
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<tbody>
<tr>
<td>Sensing road noise</td>
<td>Navigation</td>
<td>Navigation</td>
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<tr>
<td>Sensing car in front</td>
<td>Road/environment information via connected</td>
<td>AD sensor</td>
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<td>Personalize</td>
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<td>Machine learning -</td>
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<td>Deep learning (AI)</td>
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Machine learning - Deep learning (AI)