



## Automotive Electrification - Japanese Perspective

Published February 2011 and with over 40 tables and 326 figures, this highly detailed 165 page report includes sections on market forecasts from leading research institutes, analysis of Japanese automakers and the outlook for supercapacitors.

Furthermore the report features mini plant reports and includes details of suppliers by model for Toyota, Honda, Mitsubishi, Nissan, Subaru and Mazda.

### Background to this Research

Japanese automakers will be the leaders in hybrid and pure electric vehicles in 2020 for four main reasons - their early start in both segments dating back to the early 1990s, relatively strong balance sheets, skilled suppliers of electronics, batteries, high-tensile steel and other core components, and manufacturing superiority built around the world's leading machine tool industry.

In 2020, depending on three growth scenarios respectively calling for total global vehicle sales of 80 million, 90 million or 100 million units, demand for hybrids including plug-in types will reach 8.8 million, 9.9 million or 11 million units while electric vehicles (EVs) will grow to between 1.6 million and 2 million.

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i) IHS AUTOMOTIVE

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258) Smyrna plant workers preparing to lift Altima Hybrid engine into the car's engine compartment

259) The jig onto which Altima engines, both standard and hybrid, are placed before lifting them into the engine compartment

260) Smyrna plant workers lifting an Altima Hybrid engine into the engine compartment

261) A 'kit' containing a set of 5-10 engine parts sitting alongside the Altima Hybrid's engine dressing line

262) A 'kit' containing a set of engine parts moving down the Altima Hybrid's engine dressing line

263) A 'kit' containing a set of engine parts moving down the Altima Hybrid's engine dressing line

264) Engine dressing area at Nissan North America's Smyrna plant showing virtually no difference between the standard 4-cyl. Altima engine and the 4-cyl. Altima Hybrid engine except for the hybrid's orange high-voltage cables

265) A single worker manning the hybrid battery preparation area at Nissan's Smyrna plant

266) A single worker manning the hybrid battery preparation station at Nissan's Smyrna plant

267) A single worker at Nissan's Smyrna plant putting the hybrid battery assembly onto a pallet for transport to the main line

268) A single worker at Nissan's Smyrna plant putting the hybrid battery assembly onto a pallet for transport to the main line

269) Hybrid batteries stacked on pallets awaiting transport to the main Smyrna assembly line

270) A single worker completing assembly of the Altima Hybrid's inverter and electronic braking modules at a dedicated offline station inside Nissan's Smyrna plant

271) A single worker attaching high-voltage cables to the inverter and electronic braking modules at a dedicated offline station inside Nissan's Smyrna plant

272) A worker attaching high-voltage cables to the inverter and electronic braking modules at a dedicated offline station inside Nissan's Smyrna plant

273) A worker attaching high-voltage cables to the inverter and electronic braking modules at a dedicated offline station inside Nissan's Smyrna plant

274) A worker attaching high-voltage cables to the inverter and electronic braking modules at a dedicated offline station inside Nissan's Smyrna plant

275) An unspecified offline operation at Nissan's Smyrna plant

276) Nissan Smyrna plant worker attaching small parts to the Altima Hybrid's inverter module

277) Inverter modules awaiting transport to main Altima assembly line at Nissan North America's Smyrna plant

278) The Altima Hybrid on an in-floor turntable at Nissan North America's Smyrna plant

279) The Altima Hybrid on an in-floor turntable at Nissan North America's Smyrna plant

- 280) A Nissan associate conducting a series of electronic tests on the Altima Hybrid at the automaker's Smyrna plant
- 281) A Nissan associate conducting a series of electronic tests on the Altima Hybrid at the automaker's Smyrna plant
- 282) Large display registering Altima Hybrid test results
- 283) A Nissan associate showing a safety glove worn by Altima Hybrid inspectors
- 284) Pallet containing motor-generators next to a dedicated motor module subassembly station at Mitsubishi's Mizushima plant
- 285) Assembly of the i-MiEV's motor module begins at a dedicated substation along the main assembly line in Mitsubishi's Mizushima plant with a worker attaching the motor-generator to the module's frame
- 286) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 287) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 288) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 289) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 290) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 291) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 292) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 293) i-MiEV motor module assembly at Mitsubishi's Mizushima plant
- 294) Completed i-MiEV motor module assembly
- 295) The motor module being machine-lifted into the i-MiEV's rear compartment
- 296) The motor module being machine-lifted into the i-MiEV's rear compartment
- 297) The i-MiEV's motor module being manually tightened
- 298) The i-MiEV's motor module being manually tightened
- 299) Hoses and other components being attached to the i's 660cc gasoline engine on the same line as the i-MiEV
- 300) Hoses and other components being attached to the i's 660cc gasoline engine on the same line as the i-MiEV
- 301) High-voltage wiring (orange wires) being attached to the underbody of the i-MiEV
- 302) High-voltage wiring being attached to the underbody of the i-MiEV
- 303) High-voltage wiring being attached to the underbody of the i-MiEV
- 304) High-voltage wiring being attached to the underbody of the i-MiEV
- 305) High-voltage wiring being attached to the underbody of the i-MiEV
- 306) The underbody of the i-MiEV showing orange high-voltage wiring
- 307) The i-MiEV's 16-kWh lithium battery pack on a pallet along the Mizushima plant's trim line
- 308) The i-MiEV's lithium battery shown from the rear of the car covered by a plastic sheet
- 309) The i-MiEV's lithium battery, covered by a plastic sheet, shown from the front door of the car
- 310) Leaf shown on Oppama No. 1 plant trim line with other models
- 311) Leaf seen with another model
- 312) Leaf motors awaiting installation alongside the line
- 313) Oppama plant worker attaching underbody components as the car's lithiumion battery awaits installation
- 314) The Leaf's lithium battery awaiting installation
- 315) The Leaf's battery being installed
- 316) Inverter module being readied for installation
- 317) Inverter-motor assembly being mounted
- 318) Leaf inspection at the end of Oppama's No. 1 production line
- 319) Leaf inspection at the end of Oppama's No. 1 production line
- 320) The Leaf being rolled off the line

- 321) Completed Leafs lined up for shipment to dealers
- 322) The Leaf's lithium-ion battery being assembled at AESC's Zama plant
- 323) The Leaf's lithium-ion battery being assembled at AESC's Zama plant
- 324) Motor winding station at Nissan's Yokohama engine plant
- 325) Inverter assembly at AESC's Zama plant
- 326) Inverter assembly at AESC's Zama plant

Note: Photos 310, 315, 316, 317, 318, 320, 322, 323, 324, 325 & 326 were supplied by Nissan.