Recent Development and Future Trends

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Four Issues for Sustainability

Energy

Global Warming

Congestion

Traffic Accident
Four Issues for Sustainability

- Energy
- Global warming

Toward Zero Emission

- Congestion
- Traffic Accident

Toward Zero Fatality
Nissan LEAF is the Best-Selling EV

More than 83,000 sold  (Sep 2013)

NISSAN 46%

Others 56%

Global EV share 2004-2012*

* MarkLines Automotive Information

Switch EV Project in UK

Nissan LEAF Owner’s event in San Francisco

EV introduction ceremony in Kanagawa
“Real” EV market

- Nissan LEAF tops Norway Oct. car sales
- Over the last 10 months, the Nissan LEAF has been Norway’s 4th best-selling car

**Car sales share***
(Norway Oct. 2013)

**Car sales Volume***
(Norway YTD 2013)

* JATO Automotive data
“Leaf” Vehicle Platform Outline

- EV Tailored Platform

**Battery**
- Energy capacity **24kWh**
- 199km Drive Range (NEDC)

**Motor & Inverter**
- Max power/ torque
  - 80kW / 280Nm
What is 24kWh?

- Energy necessary to travel 199km (NEDC) is equivalent to 2.7L gasoline

Paella

20 plates = 24kWh
1 Plate = 1030kcal ⇒ 1.20kWh

Fat

2.95 kg = 24kWh
1kg = 7000kcal ⇒ 8.12kWh

Gasoline

2kg (2.7L) = 24kWh
1kg=44MJ ⇒ 12.2kWh
Nissan LEAF in Numbers

Number of Cars
83,000
@ Sep 2013

Battery capacity
1,992,000kWh
More than 134 games of Camp Nou Stadium*

* During evening matches, the stadium consumes 14,860kWh in five hours. (FC Barcelona HP)
Storage Batteries on Wheels

- Nissan LEAF supplies electricity to home

Renewable energy

Peak shaving

Power supply while black out

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<th>Solar generation</th>
<th>Electricity demand peak</th>
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Demand in house

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WWW.nissan-global.com
LEAF to Home

- PCS* enables bi-directional electricity management

*PCS: Power Control System
“LEAF to Home” is Well Received in Japan

“LEAF to Home” passes 2000 units sales in Japan
Toward to Zero Emission World

- Large-scale field tests have begun all over the world

**Amsterdam**

**Bornholm**

**Yokohama, Toyota, KEIHANNA, Kitakyushu**

**Boulder**

**Amsterdam city**

**EDISON Project**

**Next-generation energy, social system proof**

**Smart Grid City**

**London**

**Malaga**

**Tianjin**

**Jeju**

**Maui**

**Austin**

**Low Carbon London**

**Smart City Málaga**

**ECO-CITY**

**Jeju Smart Grid**

**Smart grid project**

**Pecan Street Project**
NISSAN MOTOR IBÉRICA (Barcelona) will be home to Nissan’s second all-electric vehicle.
e-NV200 is in the Final Development Phase

- e-NV200 is scheduled to launch in 2014
- Positive feedback has been received from fleet customers; it is quiet and comfortable with generous carrying capacity
NISSAN e-NV200 Electric Barcelona Taxi
Summary

- Nissan Leaf is the first step for achieving sustainable and electric support mobility in social energy infrastructure.

- We all need to increase awareness with the public that EVs are here and a real alternative for us and our lives.

- People in Barcelona will be able to experience the eNV200 taxi in 2014.
Enjoy your ride soon!
Appendix
Energy Balance of Powertrain & Vehicles

- Numerous energy losses before putting a vehicle in motion
- To improve CO2 (fuel consumption),
  1. Minimize the energy loss and 2. Regenerate lost energy

Energy Flow

- Fuel Energy (Petrol)
- Power Train output
- Mechanical loss (Friction)
- Heat loss (Exhaust loss)
- Heat loss (Cooling loss)
- Pumping loss
- Break Heating
- Running resistance
- Energy loss reduction
  - Thermoelectric element
  - Rankine cycle
- Regenerate lost energy
  - Generative alternator
  - Hybrid

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Technology arrangement

- Technologies have to be arranged to consider all stages under “Powertrain” and “Powersource Evolution” concept.

- Powertrain:
  - Conventional PT: High technological complexity, cost, etc., Energy loss reduction
  - HEV: Regenerate lost energy
  - Plug-in HEV: Use renewable energy

- Powersource Evolution:
  - ICE CO2 Limit
  - HEV CO2 Limit
  - P-HEV CO2 Limit

Technologies have to be arranged to consider all stages under “Powertrain” and “Powersource Evolution” concept.
NISSAN e-NV200 in Barcelona
New Nissan LEAF

Range: 199 km (NEDC)
Capacity: 5 passengers
Motor: 80 kW, 254 Nm
Battery: 24 kWh Li-ion
AC Charger: 3.3/6.6kW (option)
DC Charger: 50 kW (CHAdeMO)