

# ICAO Working Group on Lithium Batteries on October 4-5, 2007



## Safety and Transportation Issues - Lithium Batteries -

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# Safety and Transportation Issues

## - Lithium Batteries -



- Survey of the Lithium batteries and its applications
- Causes of the accidents triggered by Lithium batteries
- Appropriate preventive measures for passenger and cargo aircraft
- Compliance with the Transportation Regulations within the whole battery industry

# Safety and Transportation Issues

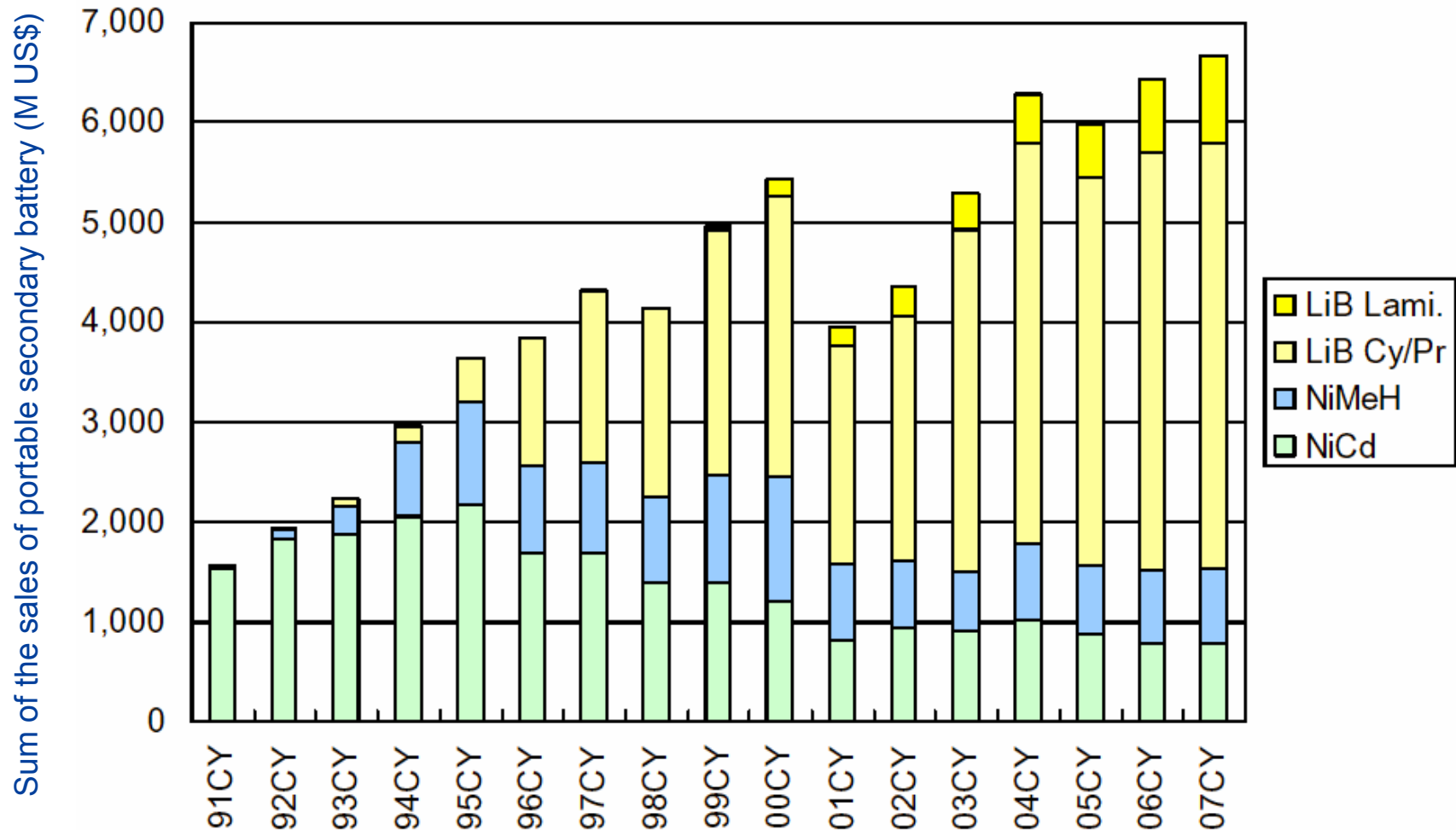
## - Lithium Batteries -



- Responsible revision of the safety tests (UN Manual of Test and Criteria, section 38.3 Lithium Batteries ) by the battery industry
- Trusty cooperation between the industry and the competent authorities
- Consequences of an air transportation ban for all Lithium batteries regarding the whole Lithium battery system and its applications

# Survey of rechargeable batteries

source: Hideo-Takeshita-Tutorial 2007



# Safety and Transportation Issues

## - Lithium Batteries -

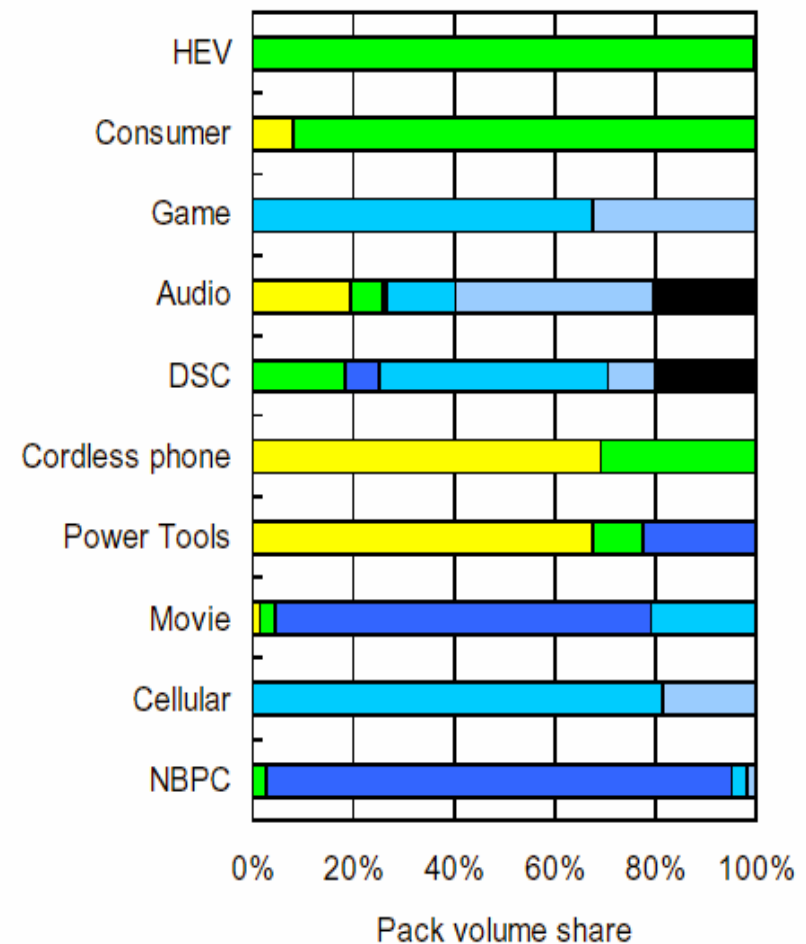
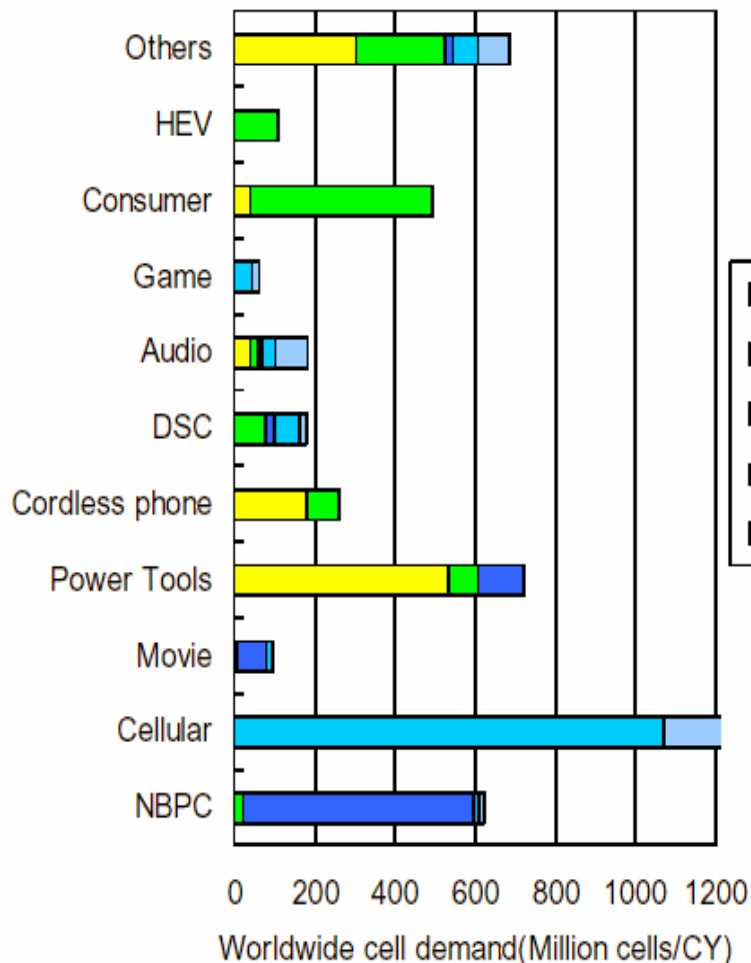


### Explanation of the following abbreviations

- HEV = Hybrid Electric Vehicles
- DSC = Digital Cameras
- Cellular = Mobile Phones
- NBPC = Notebooks or Laptops
- PDA = Personal Digital Assistant
- PHS = Personal Handphone System
- PT = Power Tools
- CAM = Camcorder
- BT = Smartphone

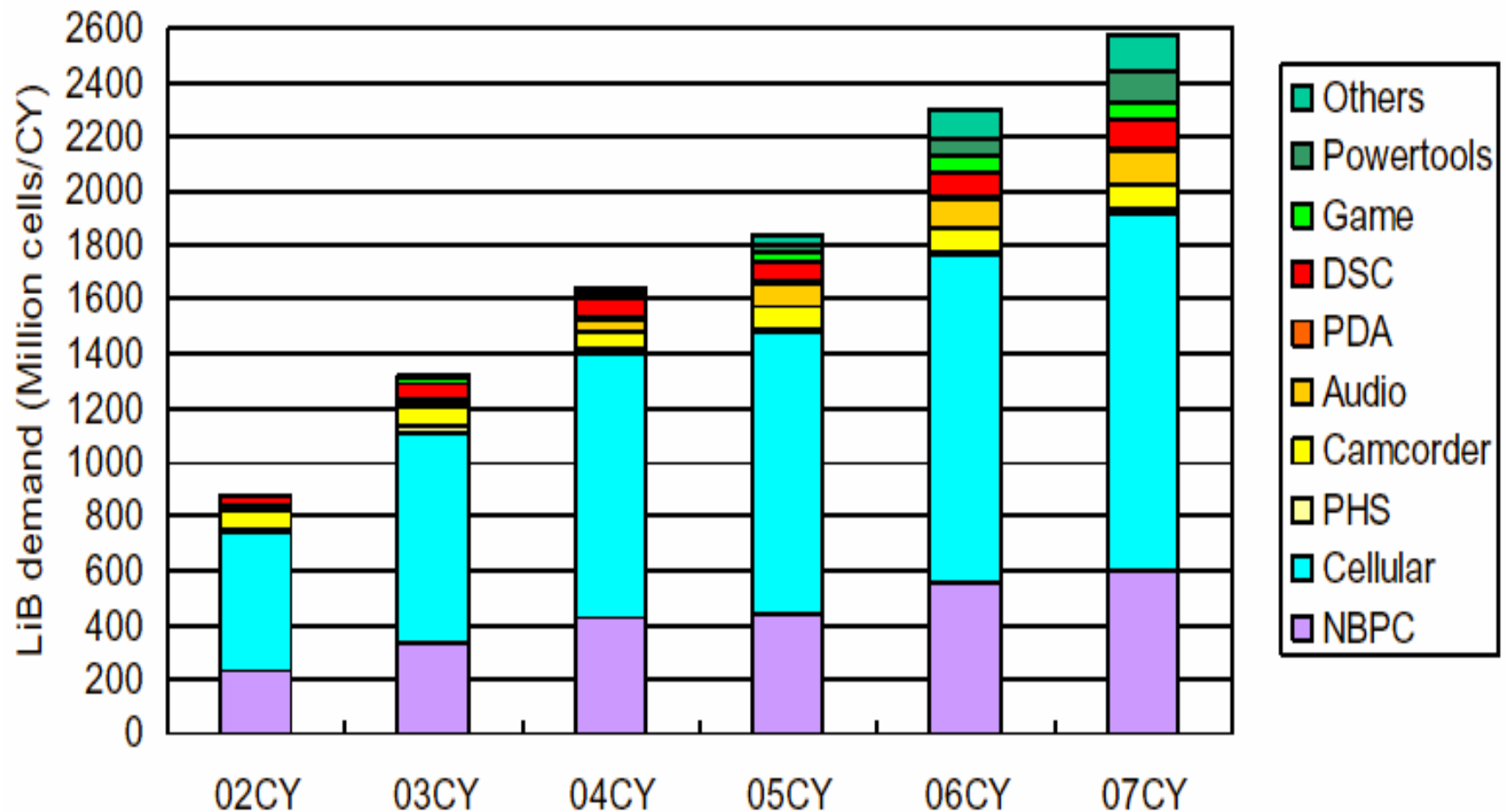
# Survey of rechargeable batteries by applications

source: Hideo-Takeshita-Tutorial 2007



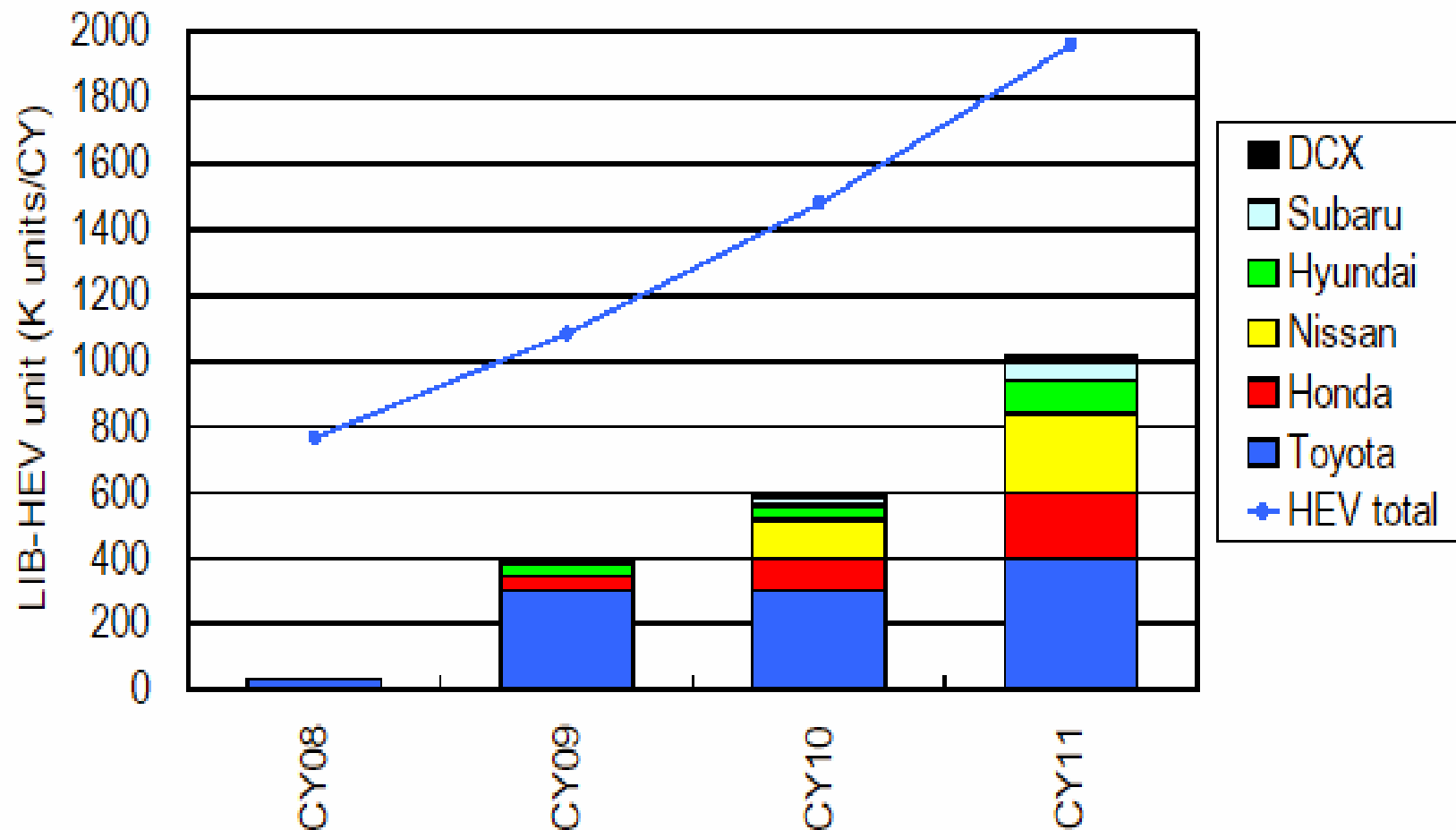
# Survey of rechargeable Lithium batteries by applications

source: Hideo-Takeshita-Tutorial 2007



# Survey of rechargeable Lithium batteries in Hybrid EV

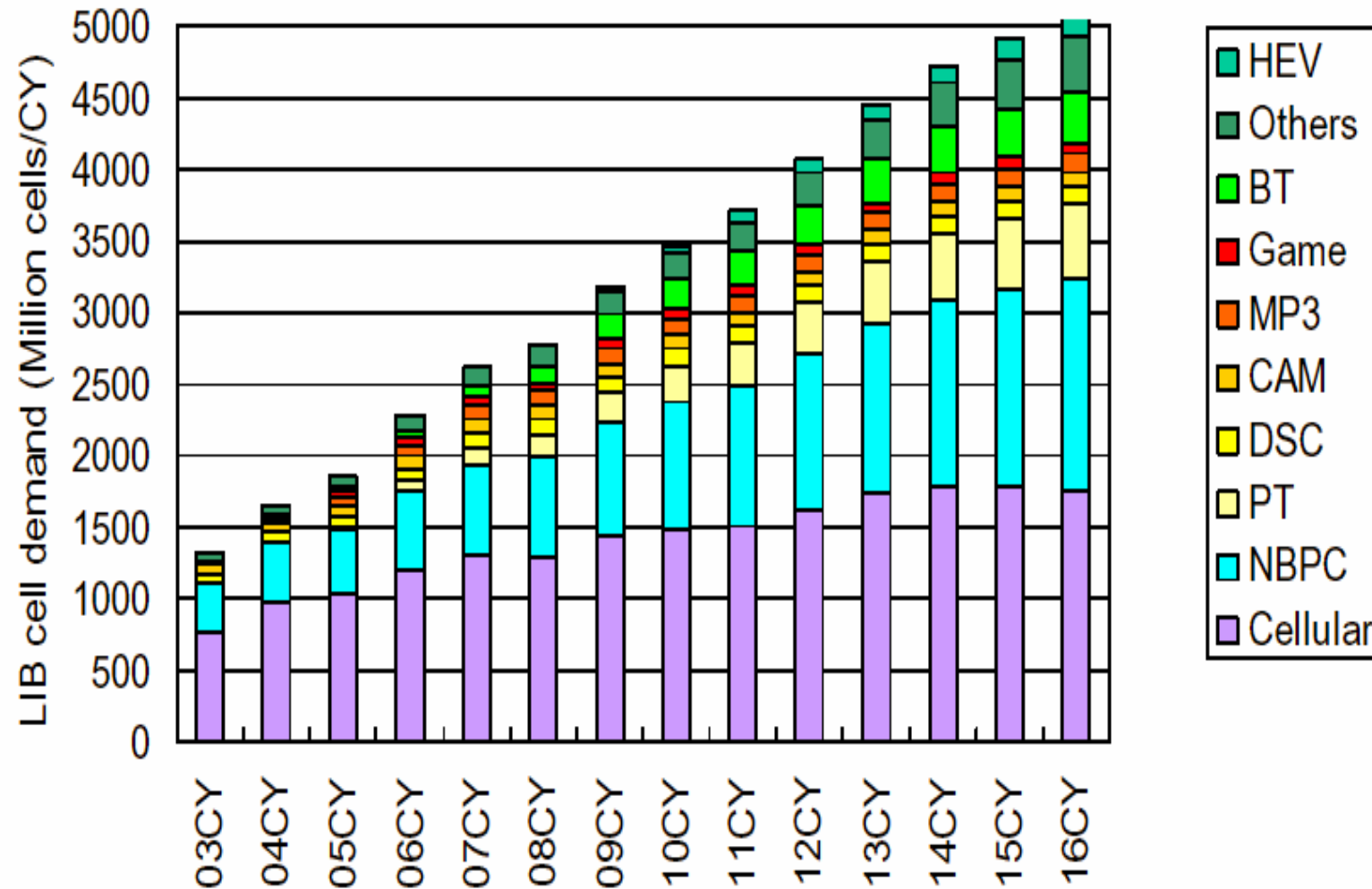
source: Hideo-Takeshita-Tutorial 2007





# Survey of rechargeable Lithium batteries by applications - future market forecast -

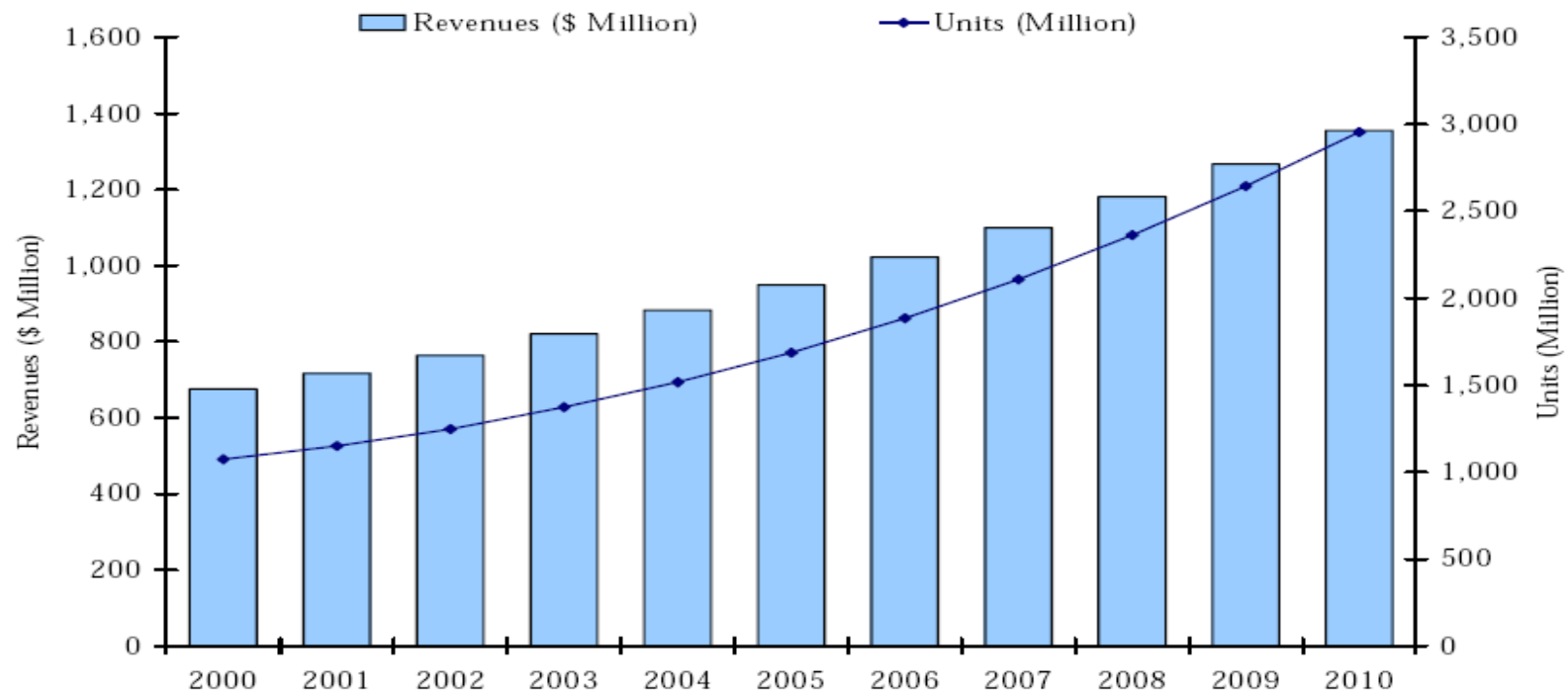
source: Hideo-Takeshita-Tutorial 2007



# Survey of primary Lithium batteries



Total Primary Lithium Battery Markets: Unit Shipment and Revenue Forecasts (World), 2000-2010



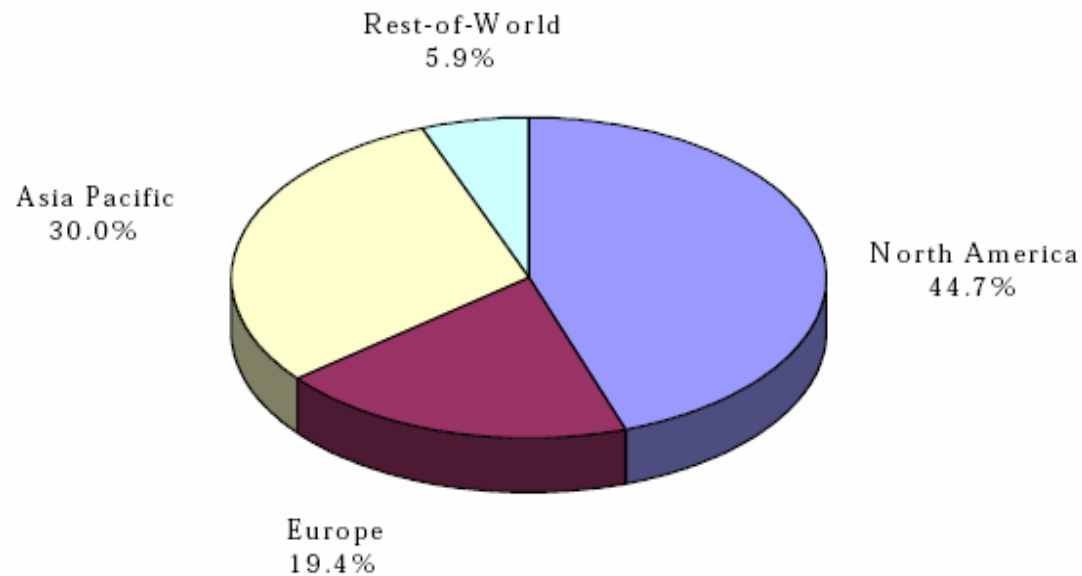
*Note: All figures are rounded. Source: Frost & Sullivan*

# Survey of primary Lithium batteries



Total Primary Lithium Battery Markets: Percent of Revenues by Geographic Region (World), 2003

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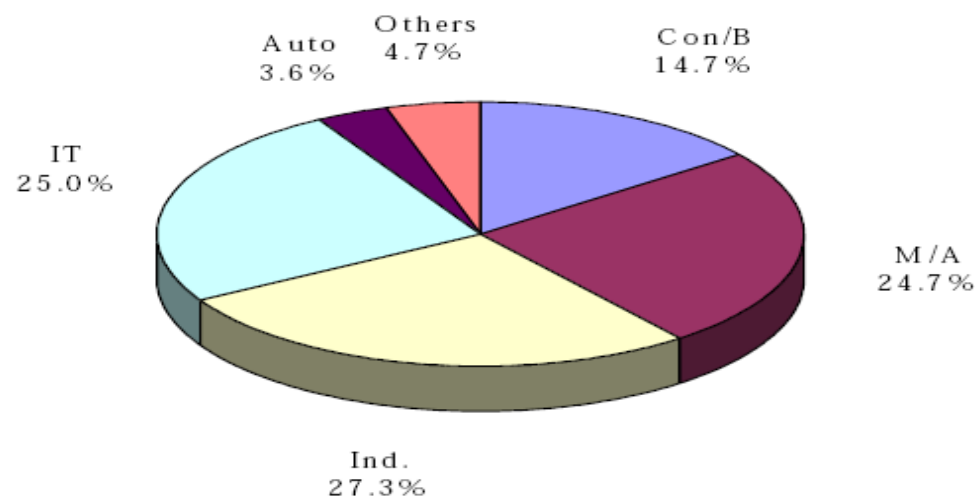
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*Note: All figures are rounded. Source: Frost & Sullivan*

# Survey of primary Lithium batteries by applications

Total Primary Lithium Battery Markets: Percent of Revenues by End-User Application (World), 2003

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Key: Con/B = Consumer/Business  
M/A = Military/Aerospace  
Ind. = Industrial  
IT = Information Technology  
Auto = Automotive

*Note: All figures are rounded. Source: Frost & Sullivan*

# Primary Lithium batteries

## Example for industrial applications



- Millions of primary Lithium batteries are used in automated or smart utility meters, such as
  - Water meters with AMR facility
  - Electronic gas meters (photo)
- This technology is one step towards
  - sustainable use of resources
  - increase of domestic energy efficiency
  - reduction of greenhouse gas emissions
  - increase of supply security.



# Causes of the accidents triggered by Lithium batteries



**The battery industry will discuss the causes of the accidents triggered by Lithium batteries, e.g. recalls from**

- Dell
- Toshiba
- Nokia

**as a confidence-building measure !!!**

# Appropriate preventive measures for passenger and cargo aircraft



- Safekeeping of applications with Lithium batteries and replacements  
Lithium batteries only in the hand baggage
- Visual check of the outer packaging of Lithium batteries (UN 3090 in the future UN 3480) before loading in passenger and cargo aircraft
- Use of appropriate containers on board of passenger aircraft to the control of possible single accidents with corresponding instruction of the staff

## Appropriate preventive measures for passenger and cargo aircraft



- Training and appropriate handling precautions for forwarders, officials and companies handling Lithium battery cargo in warehouse, during customs or drug examinations and while loading the freight to the aircraft => prevention of cargo damage with time delayed events
- Implementing of a self-binding „Quality & Safety Label“ for the battery and pack assembling industry can be meaningful



# Compliance with the transportation Regulations within the whole battery industry



- Improvement of the communication within the battery industry and with the battery users
- Appropriate quality control within the whole branch (including the pack-assembler) and with the battery users

# Responsible revision of the safety tests by the battery industry



## The German Battery Industry will develop

- DIN/DKE K371.05 – German Pre-Standard  
(Main focus: Safety of large Lithium batteries e.g. for Hybrid EV)
- IEC TC21A/SC21A WG5 - Large Lithium batteries
- as guideline for the responsible revision of the safety tests (UN Manual of Test and Criteria, section 38.3 Lithium Batteries ) for all Lithium battery systems (primary and rechargeable) by the battery industry

# Responsible revision of the safety tests by the battery industry



- The battery industry is responsible for the safety of the Lithium batteries  
(see also the reversal of the burden of proof concerning REACH)
- The battery industry has an immense and fundamental interest in ensuring
  - ❖ that all batteries find their way to all customers safely
  - ❖ by all modes of transport
  - ❖ in the assured product quality

## Trusty cooperation between the industry and the competent authorities



- Common Meetings of the German Battery Industry together with the German Civil Aviation Authority „Luftfahrt-Bundesamt“ and the German Airline „Lufthansa Cargo AG“ on 10 July and 7 September 2007
- Common participation at the ICAO meetings in October and November 2007 (The representatives of the German Battery Industry will be in the German delegation)

# Consequences of an air transportation ban for all Lithium batteries



- An air transportation ban for all Lithium batteries would have significant consequences for the Lithium batteries (primary and rechargeable) and the applications
- The whole Lithium battery system could be challenged with serious effects on the applications regarding the safety use and the technological consequences
- However, there are no appropriate replacement solutions e.g.
  - ❖ for portable devices (e.g. mobile phones, notebooks)
  - ❖ for the future market of Hybrid EV

# Consequences of an air transportation ban for all Lithium batteries

From the smallest to the biggest  
Lithium batteries influence our life steadily, increase our all conveniences,  
safety and mobility and help to protect our environment under ecological  
aspects.



Personal safety by GPS/GPRS/GSM tracking solutions



Personal safety by automotive TPMS systems



Mobile society (PDA, DSC, Cellular, NBPC, CAM)

# Consequences of an air transportation ban for all Lithium batteries



Environment, Heavy Metal reduction (PT)

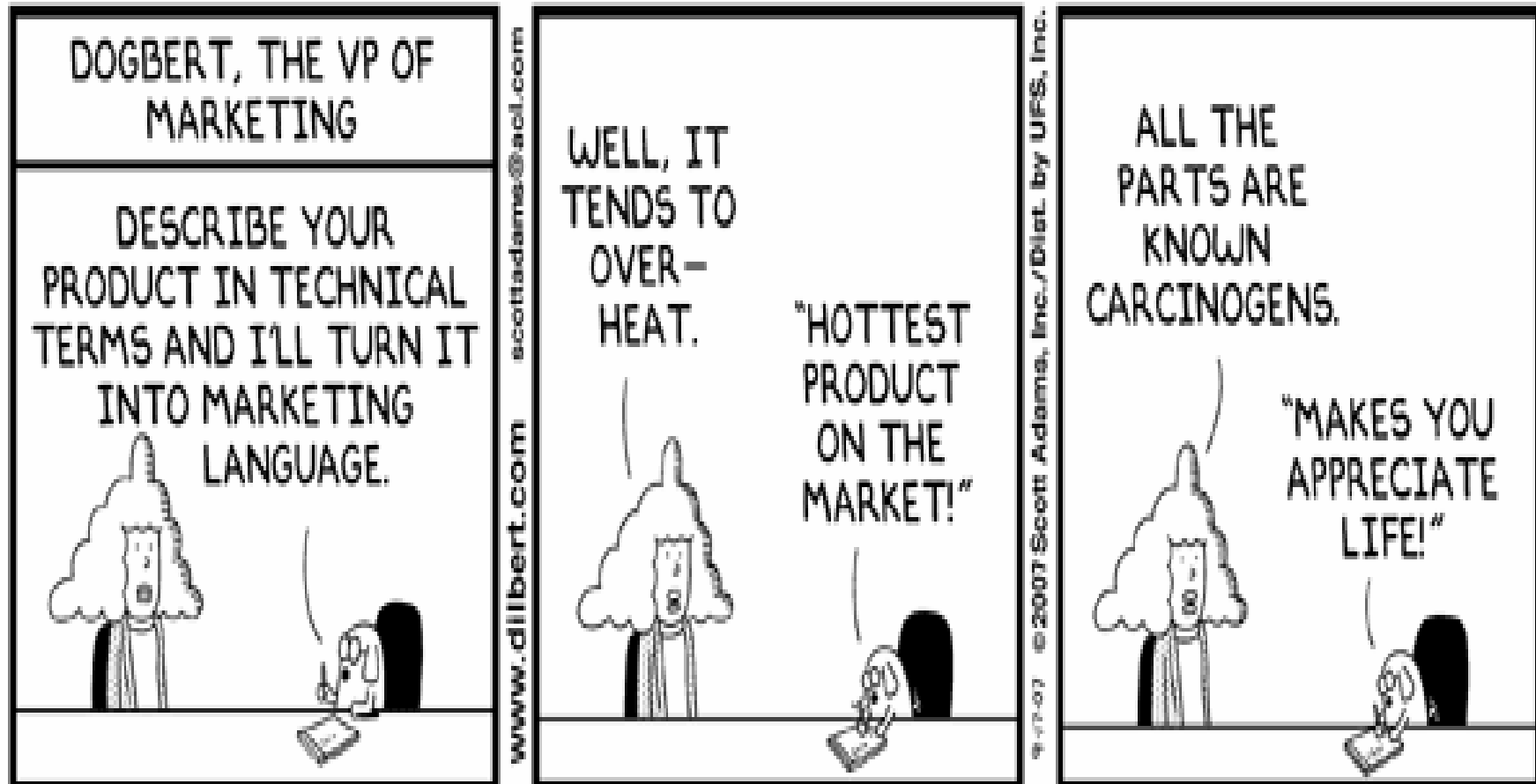


EV, Non-polluting, ecological mobility.  
For industry and home



HEV, PHEV 1. step for an emission free future

# This is not our approach



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