Battery materials investments

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Investment summary

- Umicore to invest in new production and development capabilities in Japan, South Korea and China
- Focus on production of new cathode materials. NMC production capacity to be trebled
- Investment amount of some €60 million, primarily in 2010 and 2011
- New greenfield operation in Japan
- Site expansion in flagship operation in South Korea
- Expansion of precursor material capacity in China

Umicore's focus on clean technologies

Clean Technologies

Energy solutions

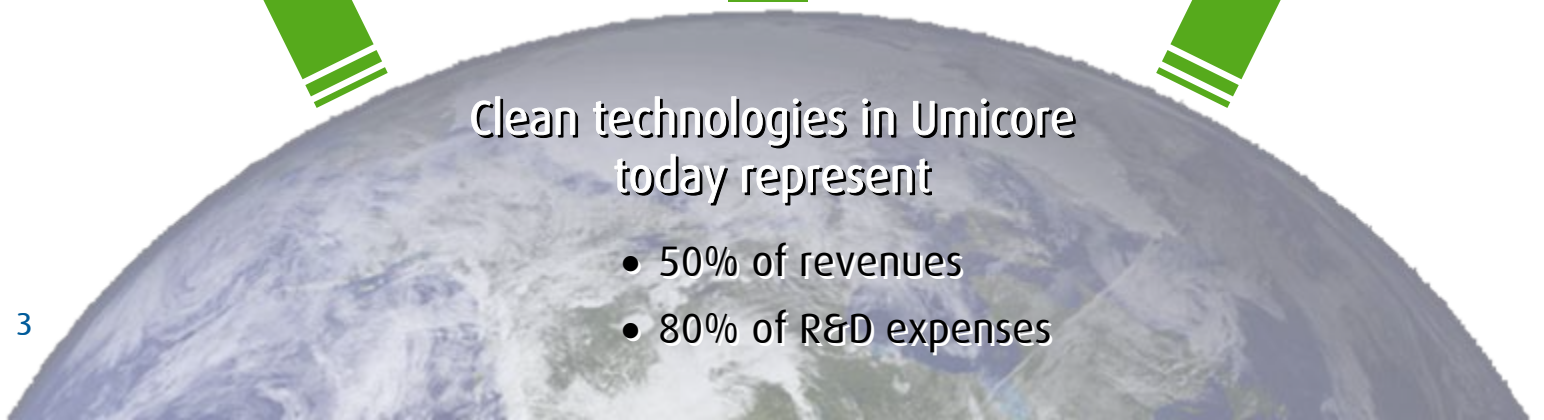
Materials for energy storage and sustainable energy production

Recycling solutions

Addressing resource scarcity and emissions by closing the materials loop

Environmental solutions

Technologies to mitigate environmental impacts



Clean technologies in Umicore today represent

- 50% of revenues
- 80% of R&D expenses

Investments contribute towards energy solutions

Clean Technologies

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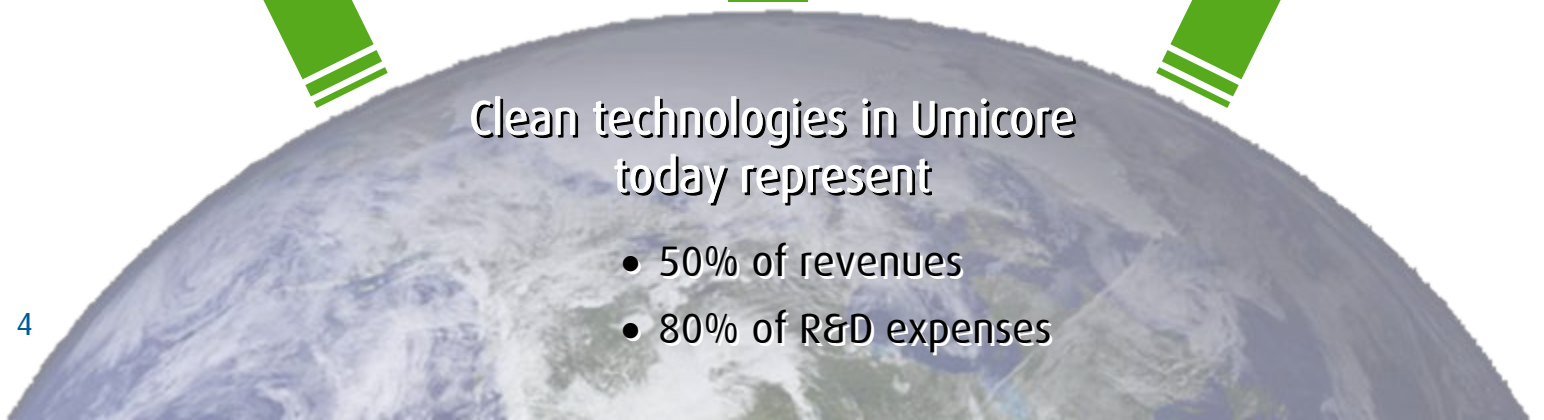

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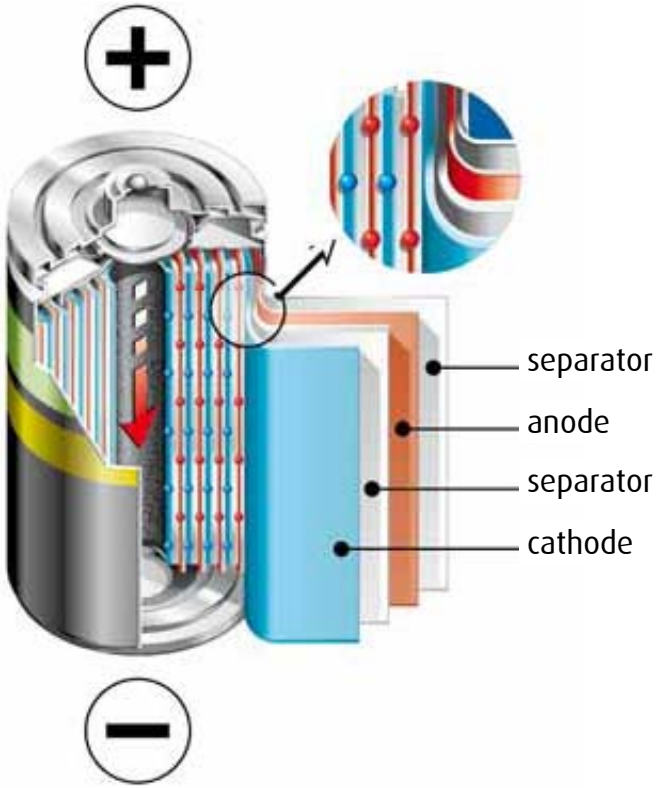
Investment rationale

- Umicore has an excellent track record in developing materials for rechargeable batteries used in portable electronics
- Umicore has developed a wide customer base and has the broadest portfolio of technologies
- With these investments Umicore aims to:
  - translate the success of previous years to new battery applications esp automotive
  - provide a platform to support Japanese customer base
  - strengthen global offering

Rechargeable Battery Materials
Providing cathode materials to the battery industry



- Anode (= negative)
  graphite/carbon
- Separator
  Ion permeable inert membrane
- **Cathode (= positive)**
  Lithium cobaltite & new generation materials
- Electrolyte
  Liquid or gel

- Charge: Li-ions from cathode to anode
- Discharge: Li-ions from anode to cathode

materials for a better life

Rechargeable Battery Materials
Umicore and Li-ion cathode materials history

1992	Start of business as cobalt oxide (Co_3O_4) supplier to Japan
1997	Cobalt oxide reference in Japanese market
2000	Start-up of South Korean Lithium Cobaltite ($LiCoO_2$) plant
2005	Initiation of Umicore Battery Recycling
2005	Introduction mixed metal cathode material (NMC, NCA)
2008	Start-up Chinese cathode material plant
2009	Capacity expansion in Korea and China
2010	**Announcement of NMC investments in Japan, Korea and China**

Rechargeable Battery Materials
Umicore's position in Li-ion cathode production

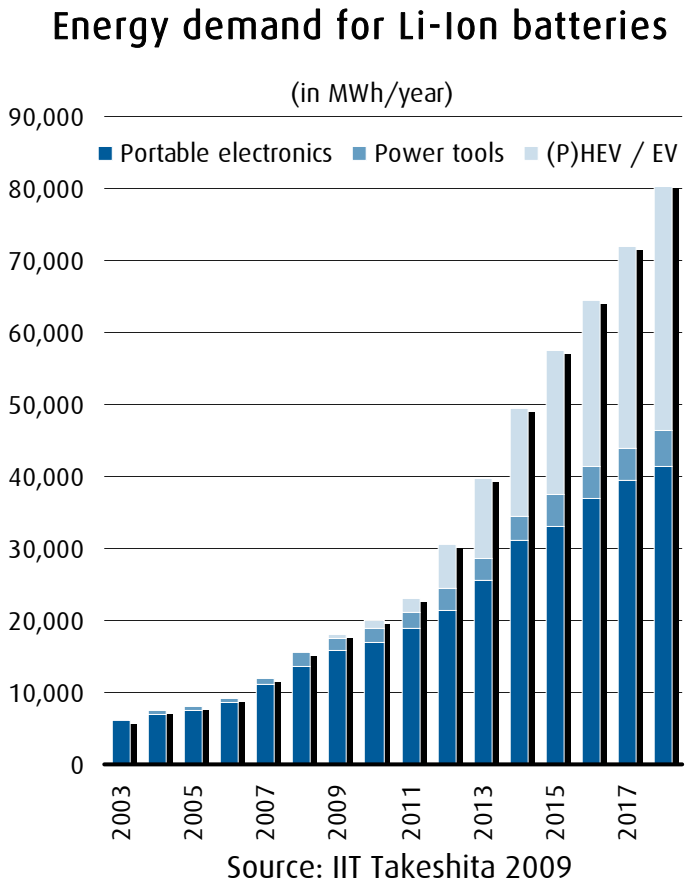
- Existing production base
  - Cheonan, Korea
    - Production of a wide range of cathode materials for li-ion
    - Applied research centre
  - Jiangmen, China
    - Li-Ion cathode precursors & materials production
  - Olen, Belgium
    - Battery materials research / precursor production
- Investments in 2008 enabled larger scale production of new materials

Cheonan

Jiangmen

materials for a better life

The Li-ion cathode materials market



- Growth driven to date by portable electronics
- Future growth will be increasingly driven by new applications

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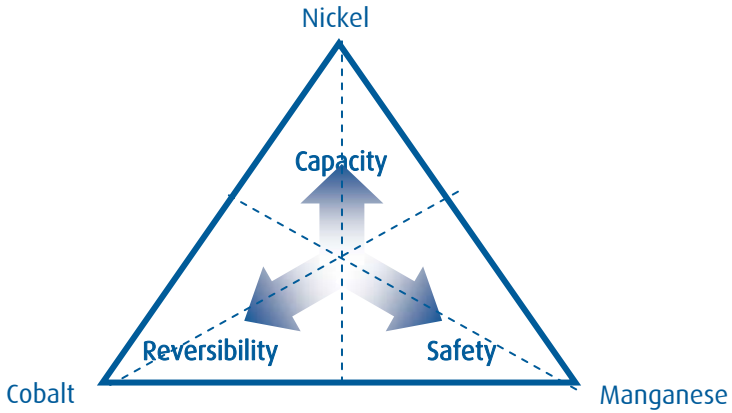
Hybrid & electric vehicles

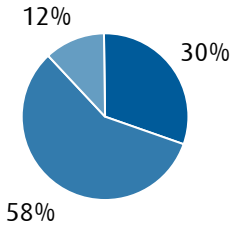
- Almost all HEV batteries currently use nickel metal hydride (NiMH)
- Li-ion provides excellent power / energy compromise but qualification is a long process
- New materials will be needed to provide best possible system costs for customers (NMC may provide lower overall cost than “cheaper” materials)
- Li-ion will make up an increasing share of the hybrid battery market: most platforms under development will be Li-ion
- Accelerated hybridization (eg mild to strong) and electrification will speed up this process with a growing focus on NMC materials

Cathode material evolution

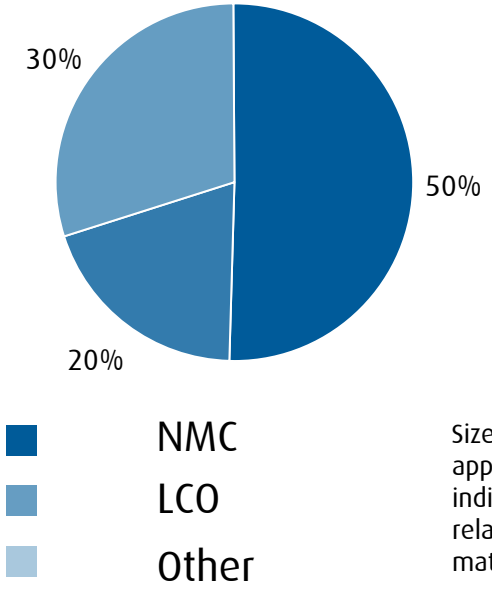
- Mixed compounds (eg NMC: Ni/Co/Mn) introduced by Umicore since 2005
- NMC compounds reduce cobalt use and provide new capabilities
- NMC set to grow at the fastest pace



Global cathode material demand in 2010



Outlook for demand in 2020



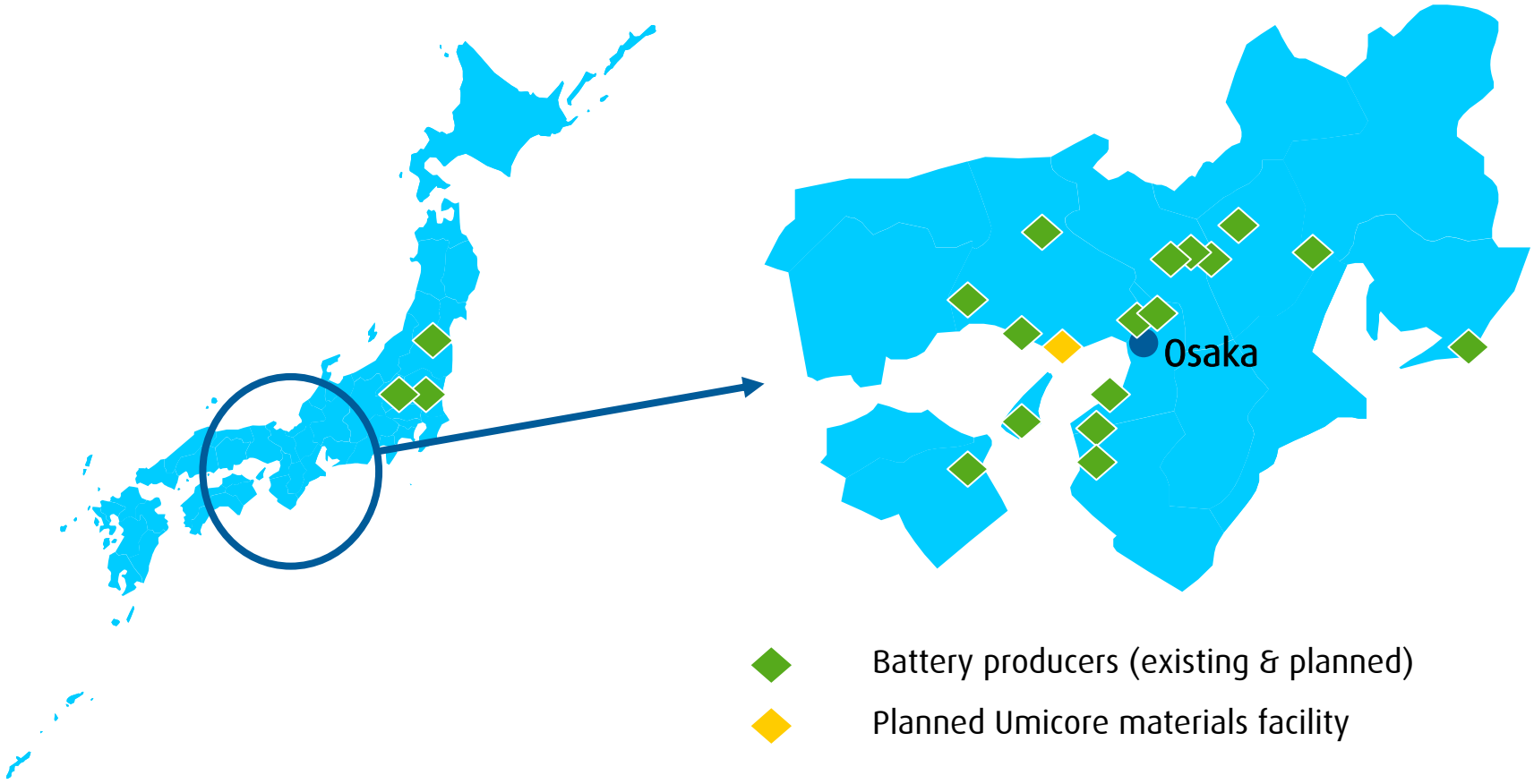
Size of "pie" gives approximate indication of relative total material demand

Investments

Japan

- Greenfield site in Kansai area
- Production capability focused on NMCs
- Technical centre including laboratory for automotive applications
- Access to skilled workforce
- Equipment installed Q1 2011 and production ramp-up thereafter
- Expansion potential
- At the heart of an area with a high concentration of customers and potential customers

Located in “battery bay”



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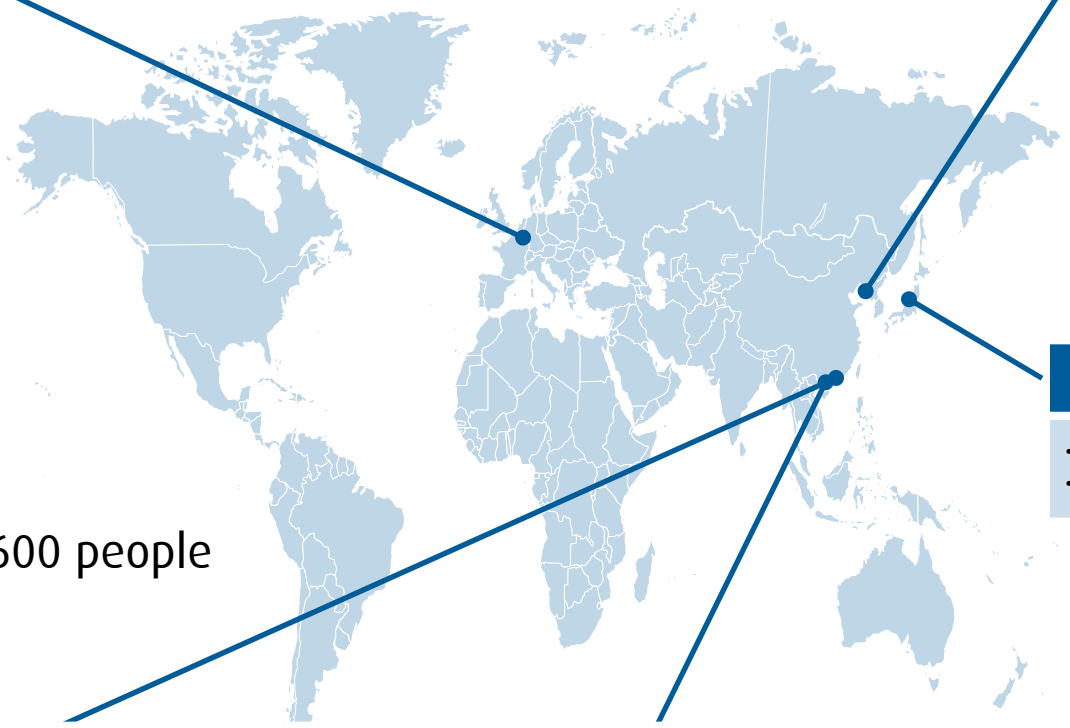
Cheonan, South Korea

- Umicore will also expand the capacity of its flagship plant in Cheonan, South Korea
- The expansion will take place on land adjacent to the current facility
- The lines will begin qualification in early 2011 and start production ramp-up thereafter
- The focus will be on providing NMC cathode materials for both portable electronic (esp notebook PCs) and automotive applications

Cheonan

New configuration from 2011



Olen (Belgium)
- Headquarters
- R&D
- Precursor production

Cheonan (South Korea)
- Cathode material production
- Application Lab
- Research & Technology
- Powder Technology

Kansai (Japan)
- Cathode material production
- Application Lab

Total workforce: >600 people

Jiangmen (China)
- JV (60%)
- Precursor production
- Cathode material production

Jiangmen (China)
- JV (40%)
- Ni-hydroxide production
- Cost-efficient/high-volume

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