# Recent Activities and Topics on Battery Technology in Japan

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Setsuko Wakabayashi

Deputy Director

NEDO Europe

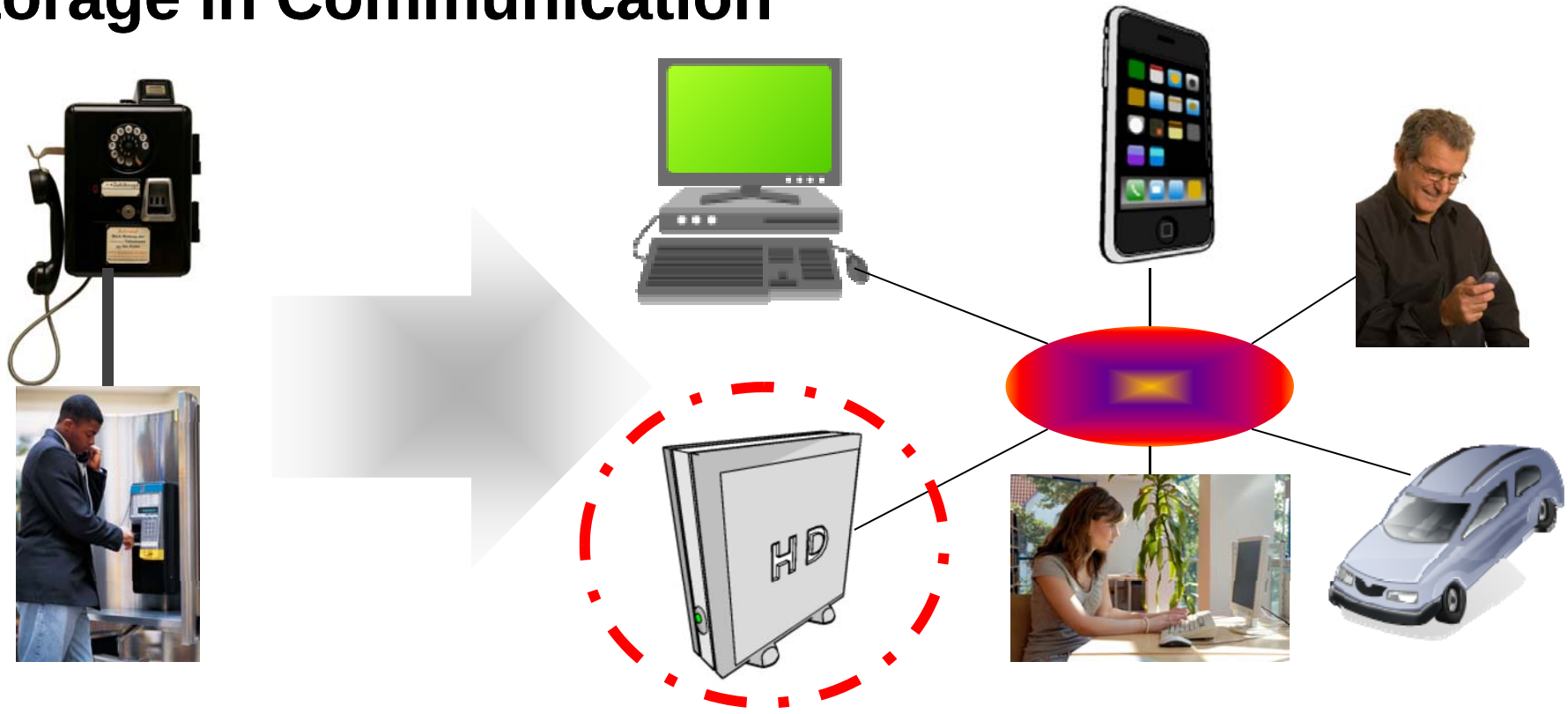
# Outline

1. Impact of Storage Technology
2. Direction of R&D - Battery Roadmap 2010 –
3. NEDO's R&D Program
4. Conclusion

# 1. Impact of Storage Technology

# Impact of Storage Technology

## Storage in Communication




Real Time

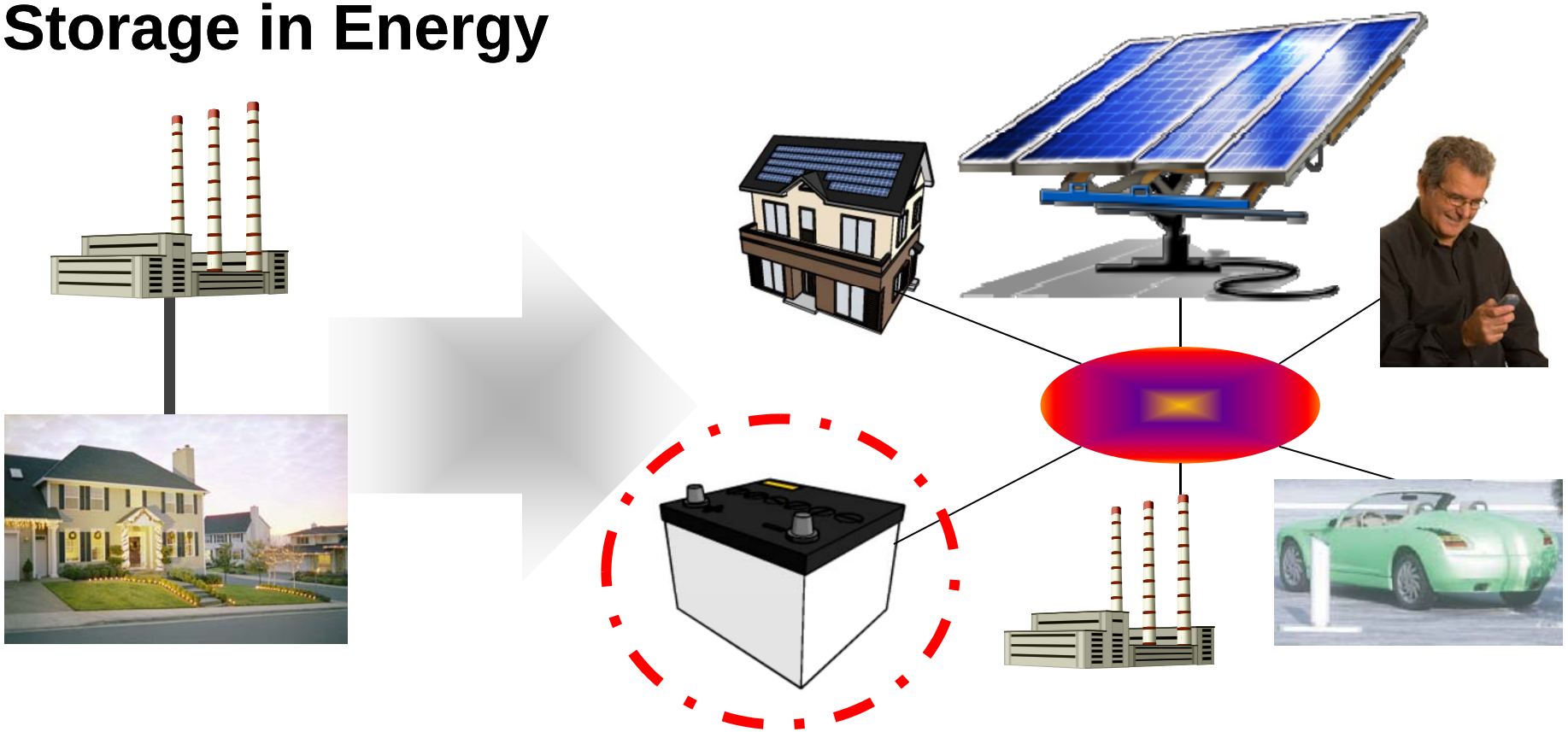
w/ Storage & Network Tech.

Right Time

New Service

# Impact of Storage Technology

## Storage in Energy



Real Time

w/ Storage & Network Tech.

Right Time

New Service??

# 2. Direction of R&D
# – Battery Roadmap 2010 –

# Battery Roadmap

- NEDO calls upon industry, academia, and government experts to formulate a roadmap for energy storage biannually.

- R&D target has discussed from the market prospective.

- NEDO has been conducting energy storage technology R&D program based on this target.

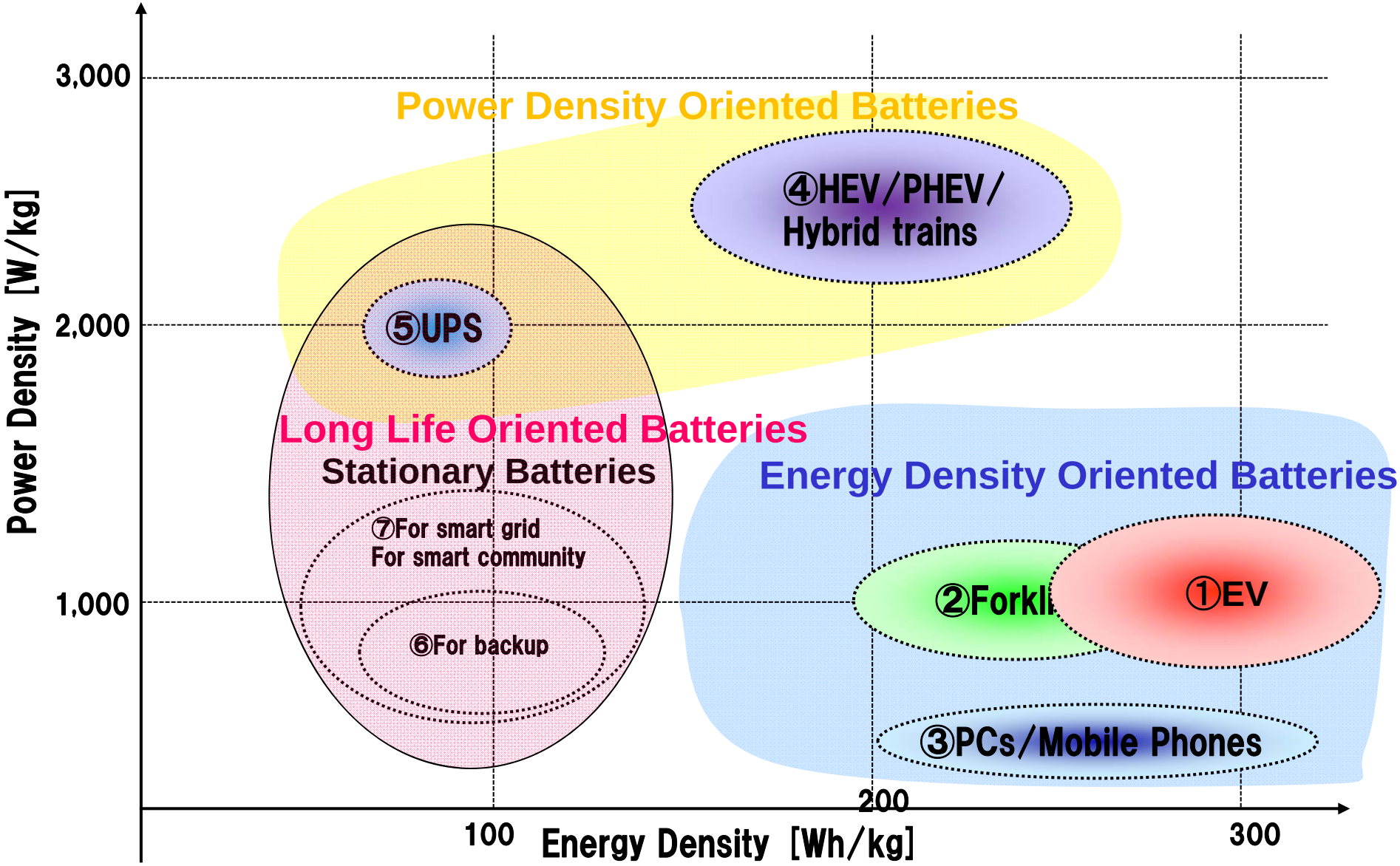
# Battery Roadmap 2010

- Categorized 3 types of fields based on performance of demand.

- Categorized 7 types of devices based on application.

- Set target by each type of devices.

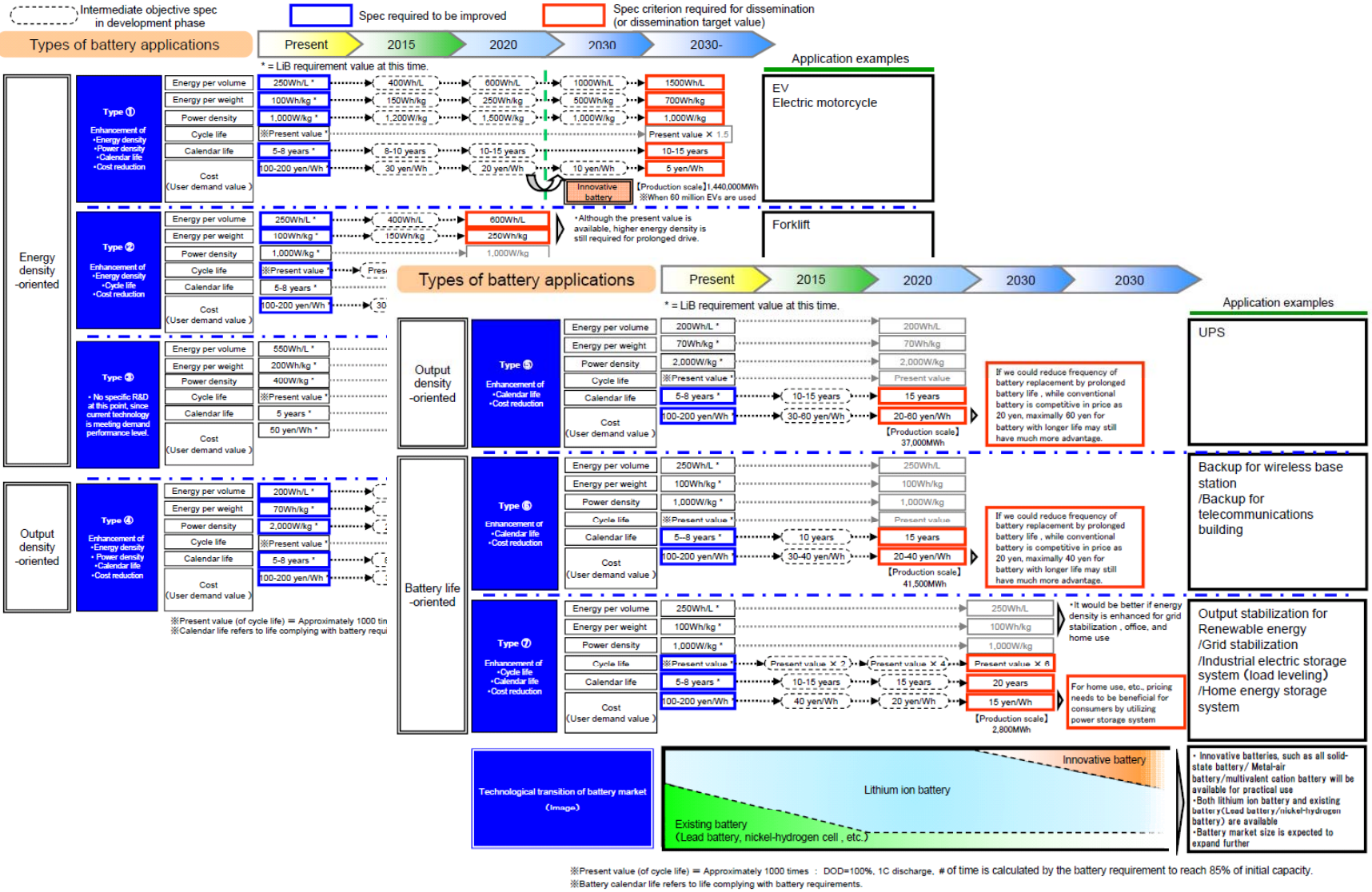
# Battery types on the Roadmap



# Battery types on the Roadmap

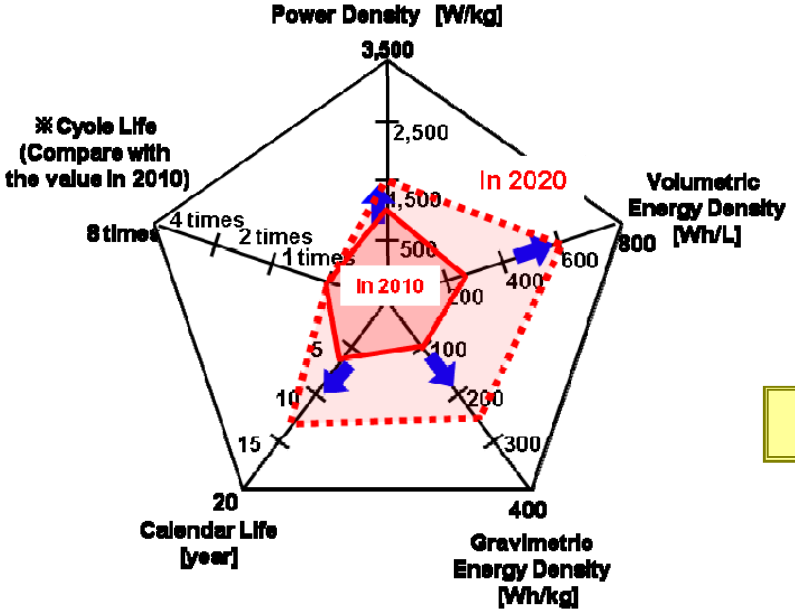
| Battery performance on demand | Type | Application examples |
|---|---|---|
| Energy density-oriented | **Type ①**<br>Enhancement of ・・・<br>・Energy density<br>・Power density<br>・Calendar life<br>・Cost reduction | ・EV<br>・Electric motorcycle |
| | **Type ②**<br>Enhancement of ・・・<br>・Energy density<br>・Cycle life<br>・Cost reduction | ・Forklift |
| | **Type ③**<br>・No specific R&D at this point, since current technology is meeting demand performance level. | ・PC<br>・Mobile phone<br>・Digital camcorder |
| Power density-oriented | **Type ④**<br>Enhancement of ・・・<br>・Energy density<br>・Power density<br>・Calendar life<br>・Cost reduction | ・HEV / PHEV<br>・Diesel HEV<br>Bus, Railroad vehicle, hydraulic excavator, Snowplow, etc. |
| | **Type ⑤**<br>Enhancement of ・・・<br>・Calendar life<br>・Cost reduction | ・UPS |
| Battery life-oriented | **Type ⑥**<br>Enhancement of ・・・<br>・Calendar life<br>・Cost reduction | ・Backup for wireless base station<br>・Backup for telecommunications building |
| | **Type ⑦**<br>Enhancement of ・・・<br>・Cycle life<br>・Calendar life<br>・Cost reduction | ・Output stabilization (for renewable energy)<br>・Grid stabilization<br>・Industrial electric storage system (load leveling)<br>・Home energy storage system |

# Battery Roadmap 2010

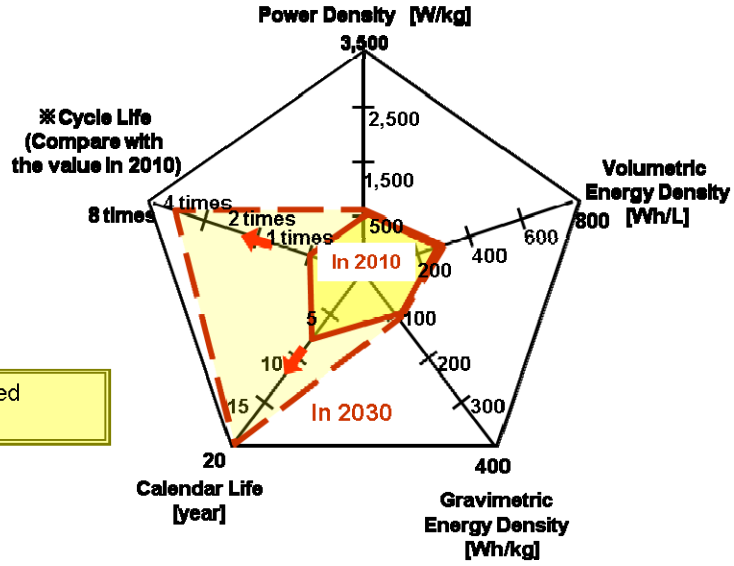


# Difference of Target

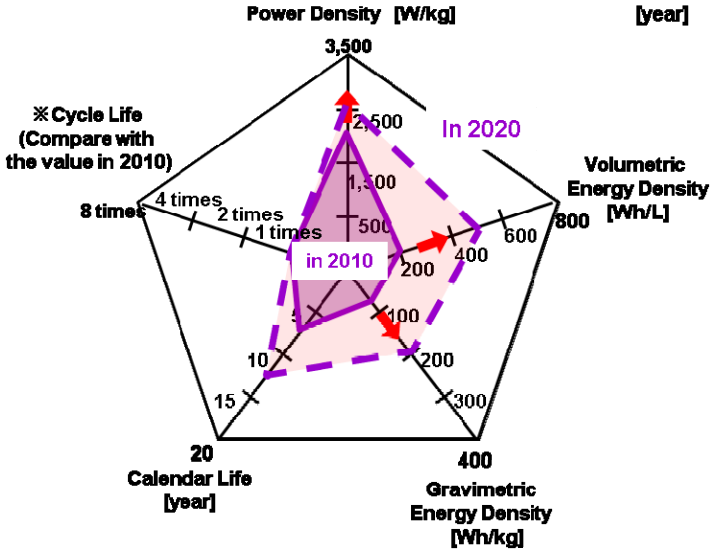
Energy Density Oriented
(Type①)




Long Life Oriented
(Type⑦)




Power Density Oriented
(Type④)



# 3. NEDO’s R&D Program

# Target of NEDO's Program

## Energy Density Oriented

for EV (Range: 480 km / charge in 2030）

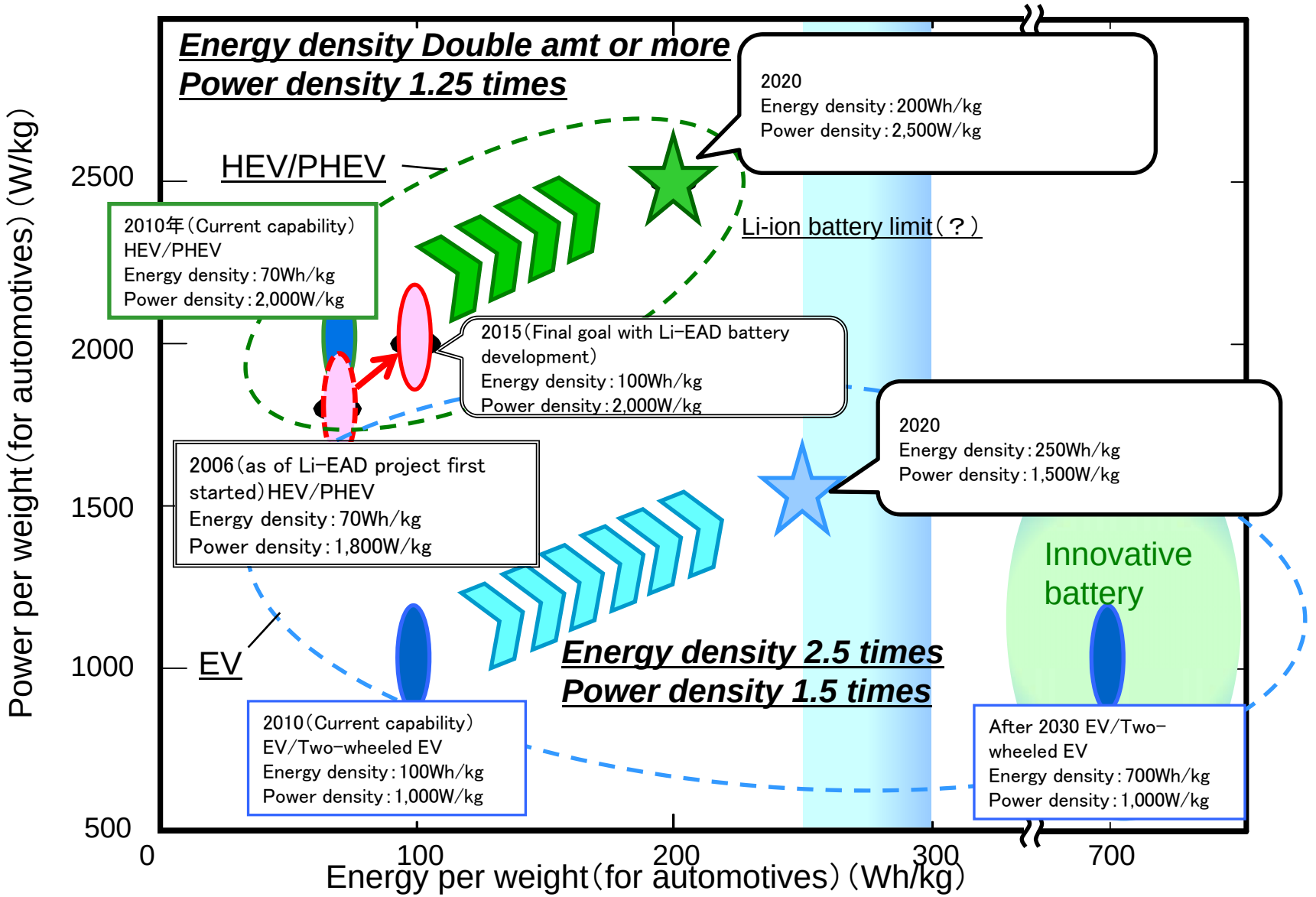
## Power Density Oriented

for PHEV (Power Density: 2,500W/kg in 2020）

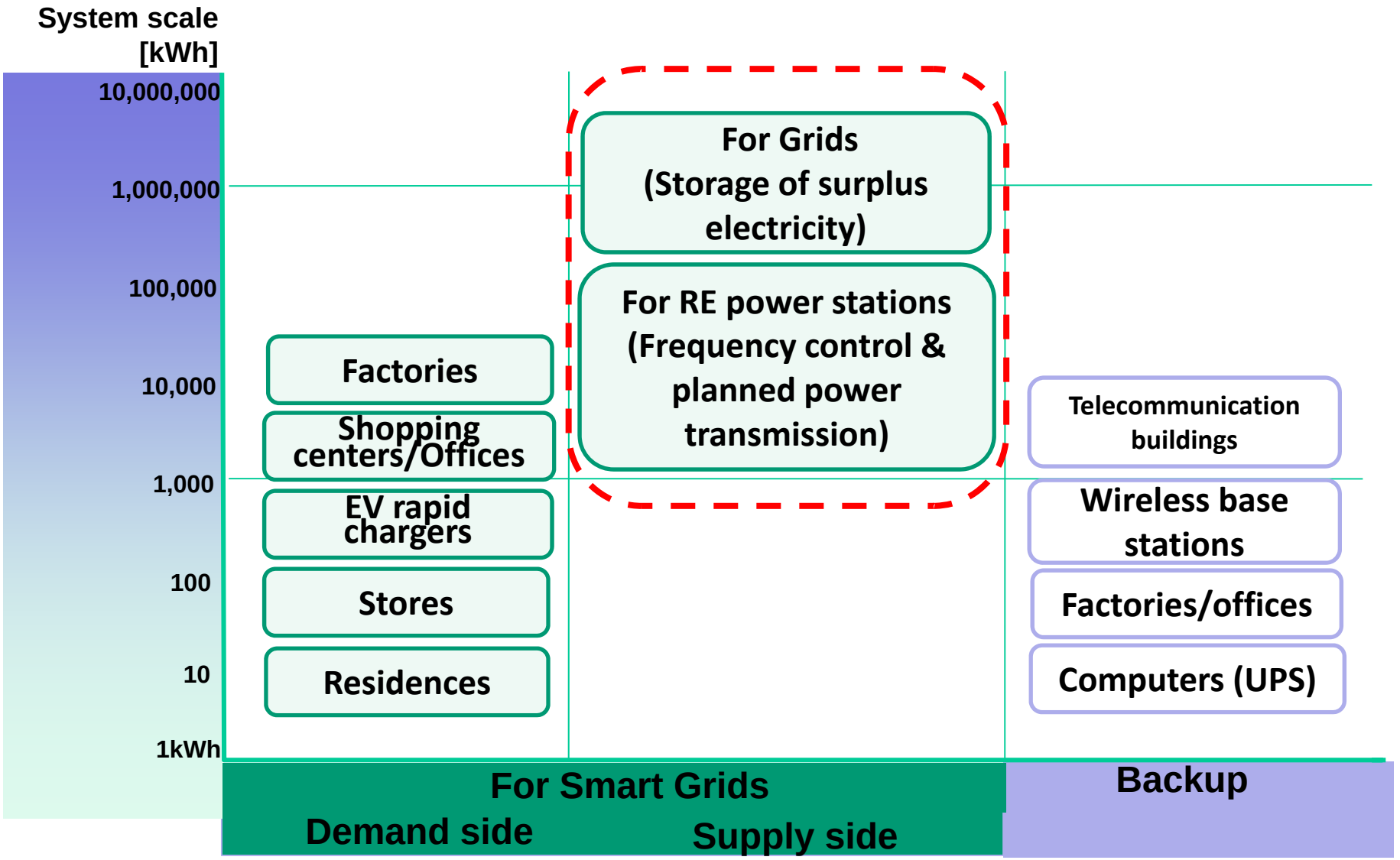
## Battery Life Oriented

for expansion of renewable energy introduction
(Life : 20 years in 2020, Cost : 20 yen/Wh in 2020)

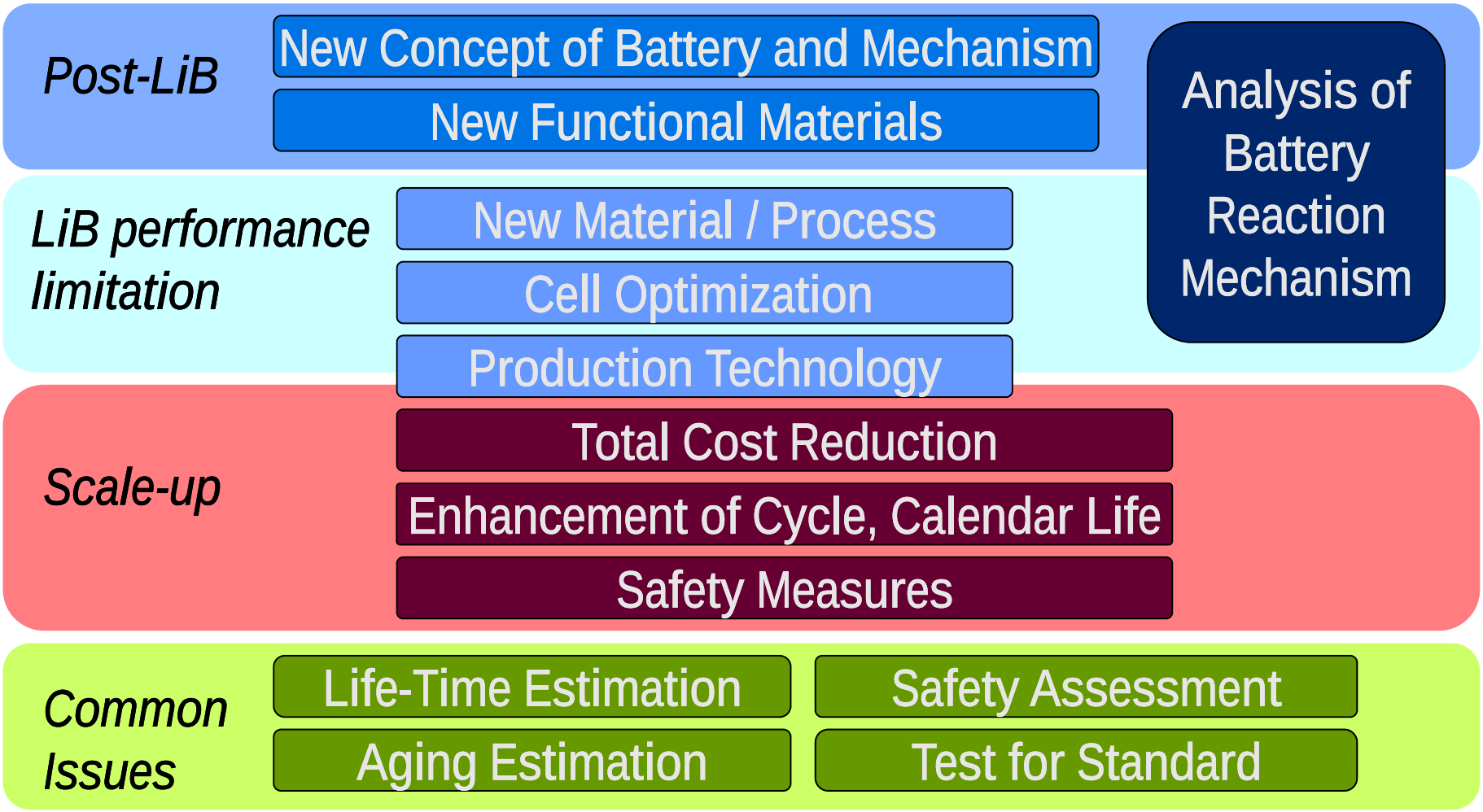
# Target of Energy Storage Technology for Mobility



# Future Applications for Stationary Batteries



# Subject of R&D



# Outline of NEDO's Program

| Project | Main Target | Period | Budget in FY 2011 |
|---|---|---|---|
| Research and Development Initiative for Scientific Innovation of New Generation Batteries (RISING) | - Analysis of Battery Reaction Mechanism<br>- Guideline to develop new material for LiB<br>- New Materials for Post LiB | 2009-2015 | 3,000 |
| Development of High-performance Battery System for Next-generation Vehicles | - Battery Module for PHEV<br>- New Materials for LiB limitation, Post LiB | 2007-2011 | 2,479 |
| Speedy Innovation of Li ion And next Generation battery material's Evaluation R&D | - Battery Material's Evaluation<br>- Cell Optimization | 2010-2014 | 250 |
| Electric Energy Storage System for Grid-connection | - Low Cost, Long Life, Safety System | 2011-2015 | 2,000 |
| Total | | | 7,729 |

In Million JPY

# 4. Conclusion

# Conclusion

## Energy Storage Technology is…

- Key for Business Innovation

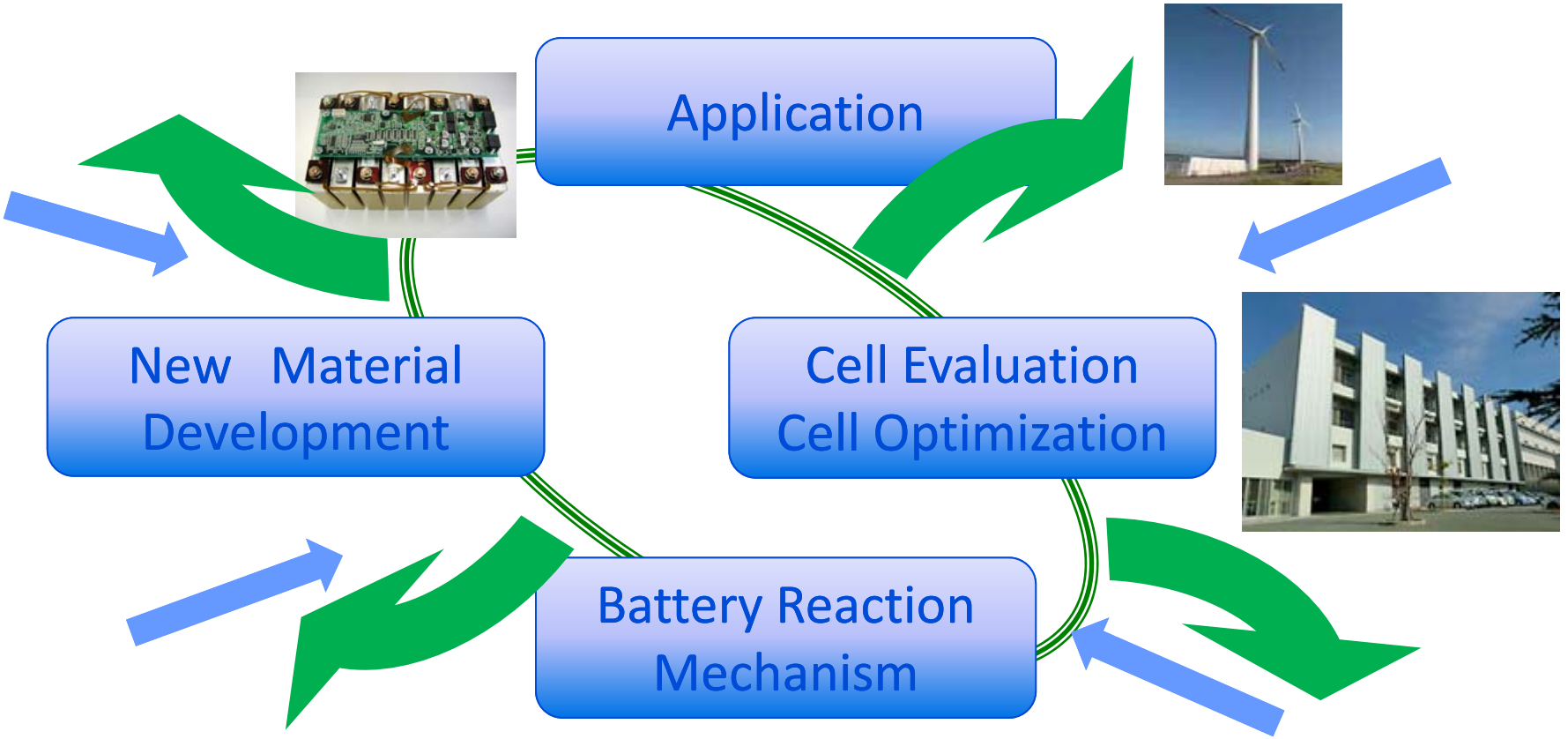
## To promote R&D of technology, NEDO…

- Set a Common Target
- Comprehensive R&D program

## Toward next step, …

- New scheme for integration

# Energy Storage “Eco-System”

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## Contact:


**Setsuko Wakabayashi**
**Deputy Director, Representative**

**NEDO European Office**
**10, rue de la Paix 75002 Paris**
**Tel: +33 (0)1 44 50 18 28**
**Email: wakabayashi@nedoeurope.org**