

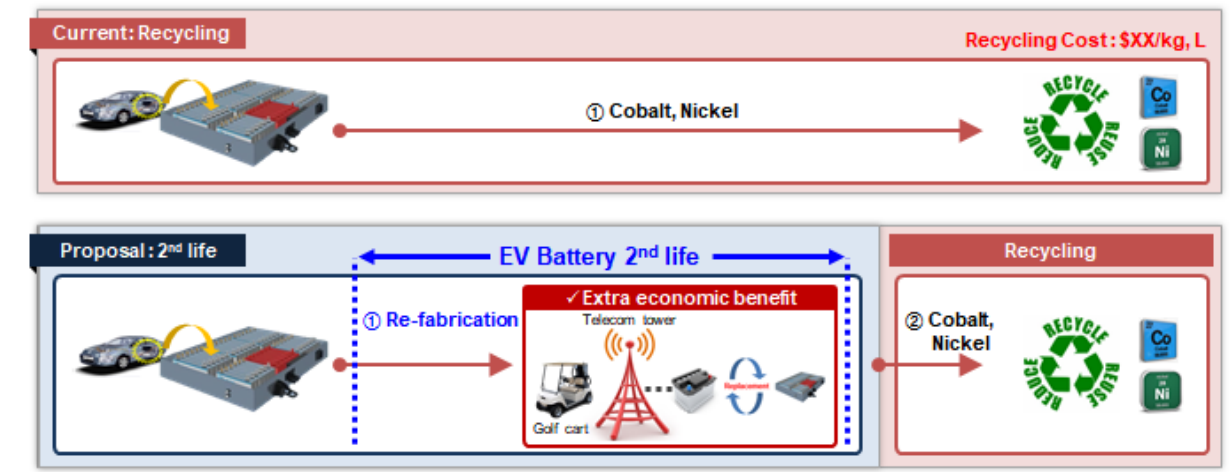
# LITHIUM-ION BATTERY RECYCLING PRIZE



U.S. DEPARTMENT OF ENERGY

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<b>Submission Title:</b>	<b>Sustainable Battery Re-fabrication and Recycle Process and Business model</b>
<b>Submission Track:</b>	<b>Track 5 : Other Ideas</b>

## A Public Document



### Concept

- The basic idea involves developing a compression combustion method to cover recycle costs through re-fabrication and reduce recycle costs by making battery recycle costs "zero".
- The first suggestion is to use the refabricated battery for the replacement of existing battery in cell phone tower backup power or hybrid power of PV or power source of golf cart where the back hand cost is very high.
- The second suggestion is a technology that saves cost in the recycling stage after 2<sup>nd</sup> Life application.
- it is important to reduce transportation costs, because inland and overseas shipping costs cost more than 25%.

### Approach

- Today second life batteries are traded at between \$60 and \$300 per kWh, depending on market and application.
- On the other hand, the price of industrial lead-acid batteries is low at \$150~300/kWh, so it is true that there is a limit to adapt of existing lithium batteries due to price gap.
- Lithium batteries for electric vehicles are priced at \$ 300/kWh and industrial lithium batteries are at \$ 500~700/kWh as price still is remained high.
- The proposed "compression combustion process" is a technology that reduces the weight and volume by burning the battery before transporting it, thereby reducing transportation and processing costs.

### Potential Impact

- Ultimately, if the battery can be used 1,000 times under the same conditions through the battery, the life span of 5 years or more can be secured for industrial use.
- Application to the proposed field aims to reduce costs equivalent to the cost of recycling after the end of life of the 2nd Life battery
- The 2-hour evaluation method is known as a technique for evaluating the residual performance through impedance analysis of the battery through the capacity and DC ERS measurement method.
- Costs for recycling can be divided into collection (xx%), disassembly (xx%), transportation (xx%) and recycling (xx%). 5% Savings are expected by reduce the volume and weight for transportation