

Today and Tomorrow of Secondary Lead Manufacturing in Japan

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Japan Secondary Lead Association

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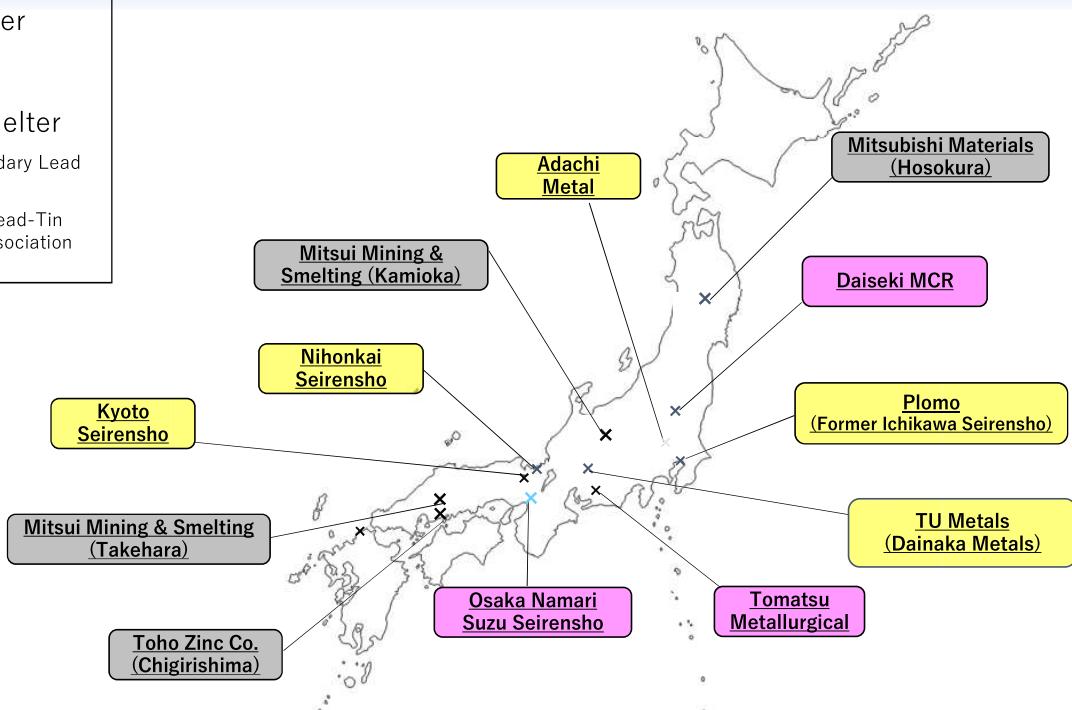
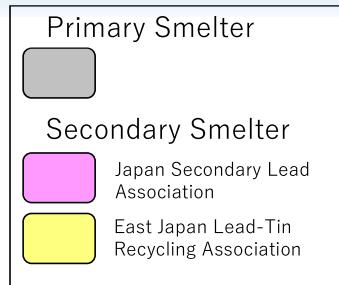
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2023 ILZSG Lisbon

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Lead Smelting in Japan in 2023

Furnace types: Blast & Cupola >> Rotary



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Historically, number of secondary smelters have decreased due to environmental requirements / decrease in domestic Pb demand

Association Name	Established (Year)	Number of Corporation in	
		Year 1992	Year 2023
Japan Secondary Lead Association	1951	8	3
East Japan Lead-Tin Recycling Association	1971	16	5
West Japan Lead-Tin Recycling Association	1971	13	0
TOTAL		37	8

- In addition to these 3 associations, there are 2 other lead-related associations in Japan
 - Lead Solder Association
 - Lead Pipes and Sheets Association

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Environmental regulations as compared to EU

Environmental Regulation Exhaust Gas		
Material	Japan (Osaka)	Europe (BAT)
SO2	≤ 65 ppm	50~350 mg/Nm ³ (18~126 ppm)
NO2	≤ 180 ppm	NA
Pb	≤ 3 mg/Nm ³ (K-value equiv)	≤ 1 mg/Nm ³
Dust	≤ 0.1 g/Nm ³	≤ 0.005 g/Nm ³
Hg	400 μg/Nm ³	NA

BAT: Best Available Technique

Environmental Regulation Wastewater to city sewage		
Material	Japan (Osaka)	Europe (BAT)
Pb	≤ 0.1 mg/L	≤ 0.5 mg/L
As	≤ 0.1 mg/L	≤ 0.1 mg/L

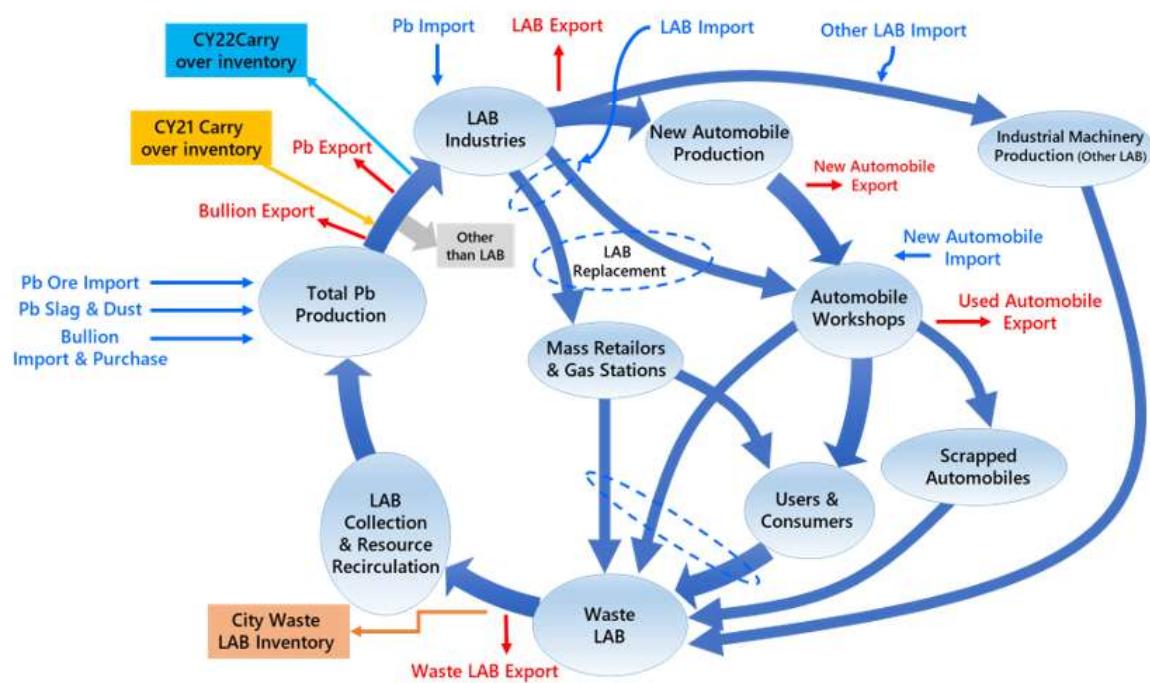
Ref: Official Journal of the Europe Union L 174/32 2016
 "COMMISSION IMPLEMENTING DECISION (EU) 2016/1032 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the non-ferrous metals industries."

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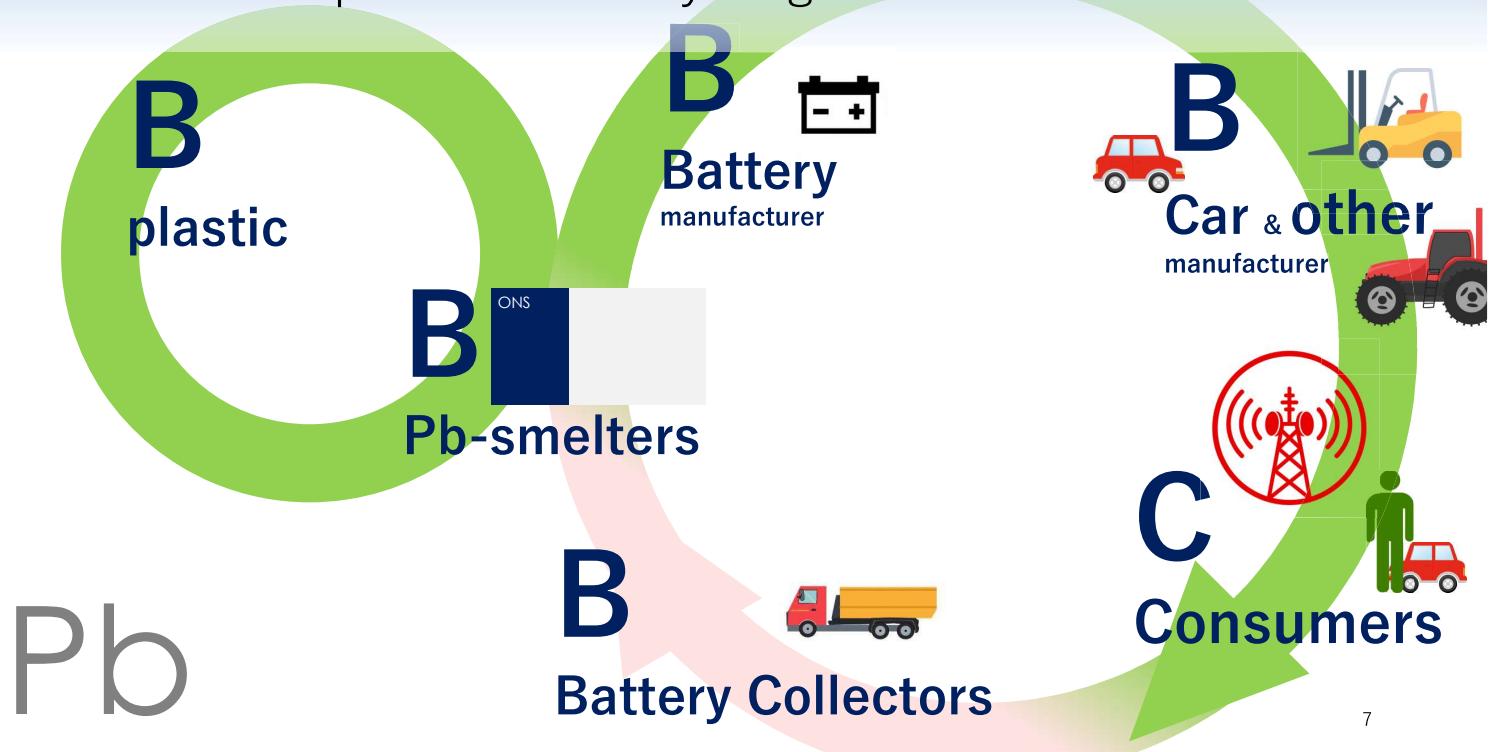
Ties to Battery Companies demonstrate the Fire Refining Quality of Japanese Secondary Lead Smelters



Japan Domestic Pb Circulation is well-balanced



The weak-point of Pb-recycling is in the uLAB collection

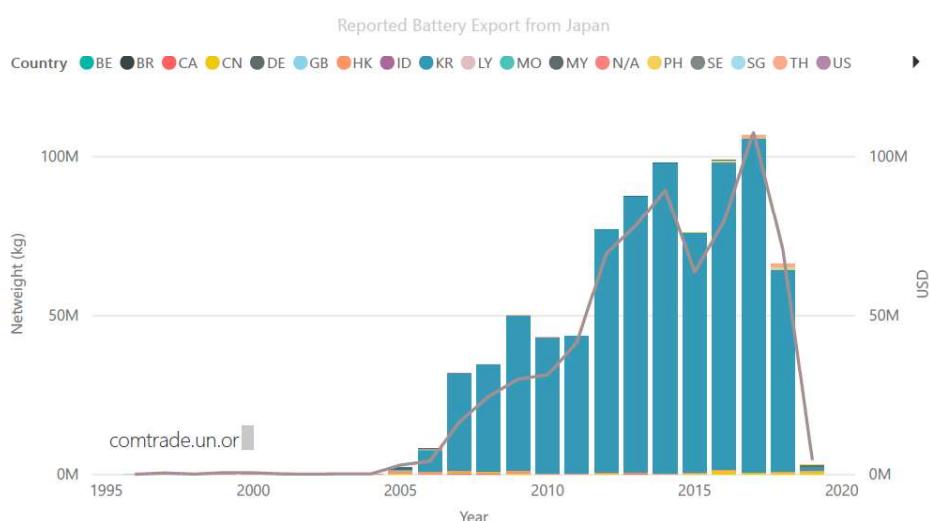


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Threats to Domestic Lead Material Balance in recent years

Major lead manufacturing countries seek lead scrap sources in Japan

- Waste lead-acid battery export stopped since 2019
- Application for export of lead-acid battery scrap to Ministry of Environment continues
- Increase in application for secondary lead smelting factories (4 new cases in 2023) intended for export



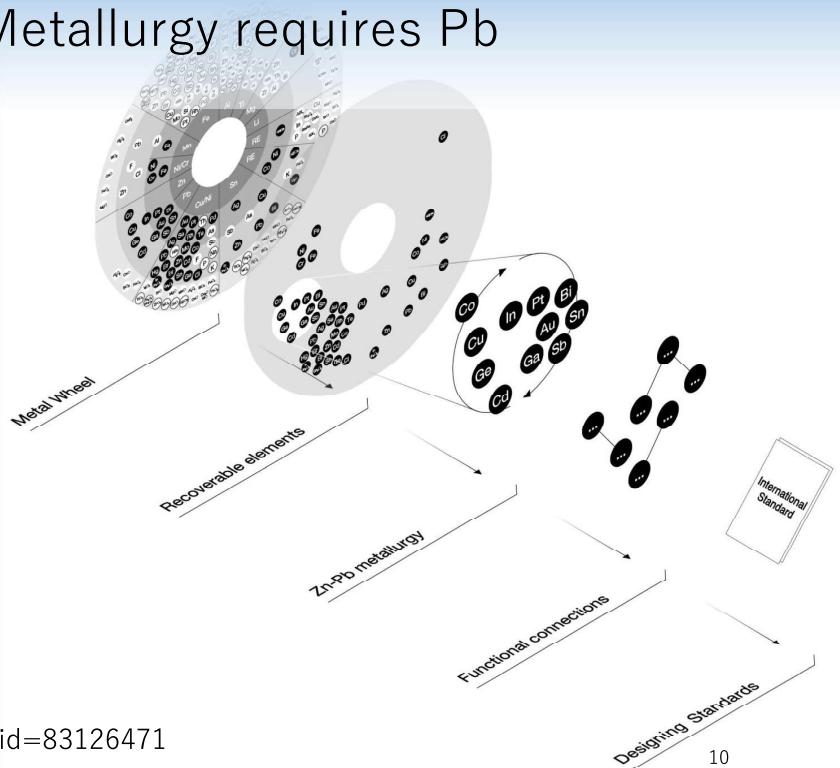
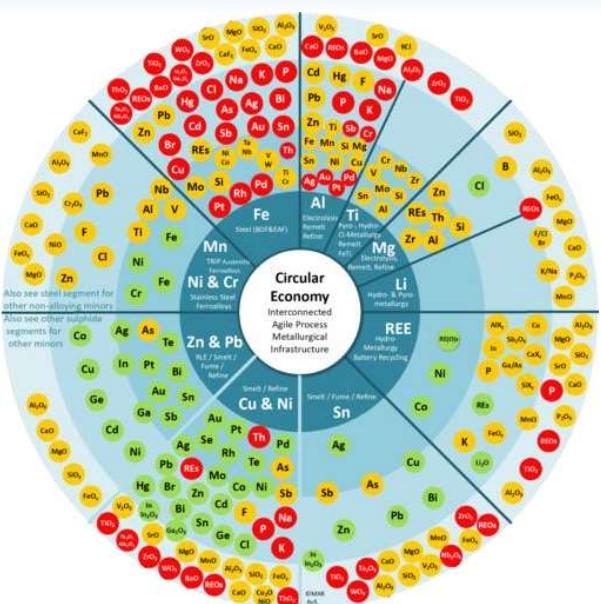
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Characteristics of Secondary Lead Smelting in JP

- Pb Production follows environmental regulations comparable to global standards
- 99.995% Pb can be produced by pyrometallurgical refining by secondary lead smelters
- Nation-wide Pb recycling is well-developed
- Domestic Pb Material Balance is well-balanced
 - 93% of domestic lead is consumed by lead-acid battery manufacturing
 - Secondary lead manufacturers depend > 90% on used lead-acid battery (uLAB) scrap

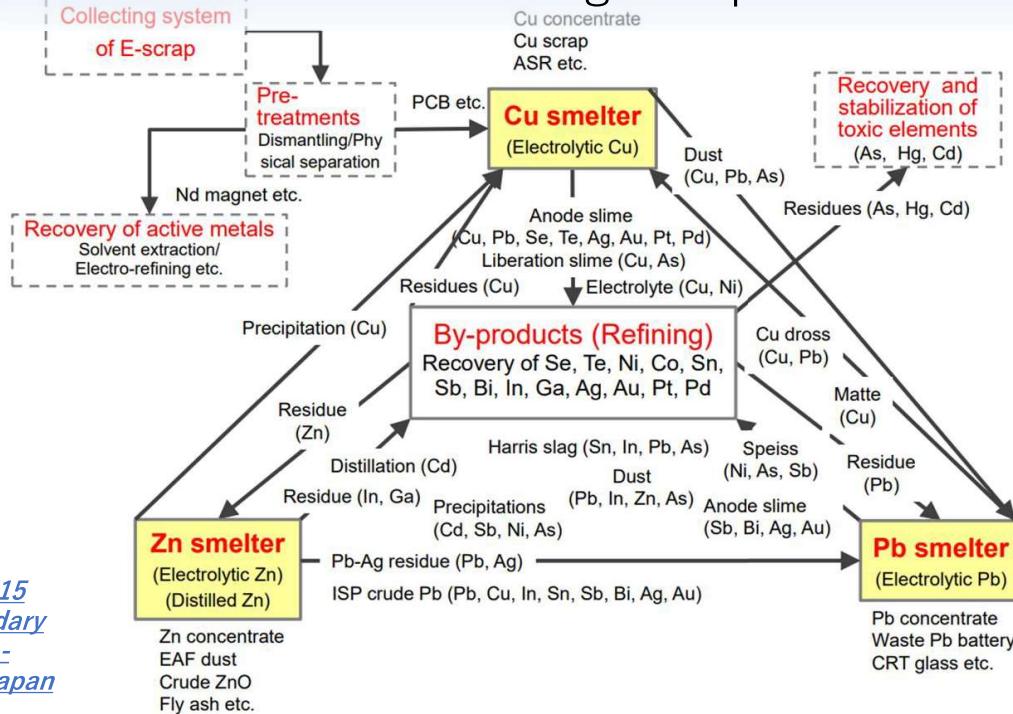
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Sustainable Metallurgy requires Pb



<https://commons.wikimedia.org/w/index.php?curid=83126471>
<https://www.mdpi.com/2079-9276/10/1/5>

Domestic Material Balance in Pb is necessary to operate Non-ferrous Smelting in Japan



Ref. Shibata et. al 2015
 Treatments of Secondary
 Raw Materials in Non-
 Ferrous Smelters in Japan

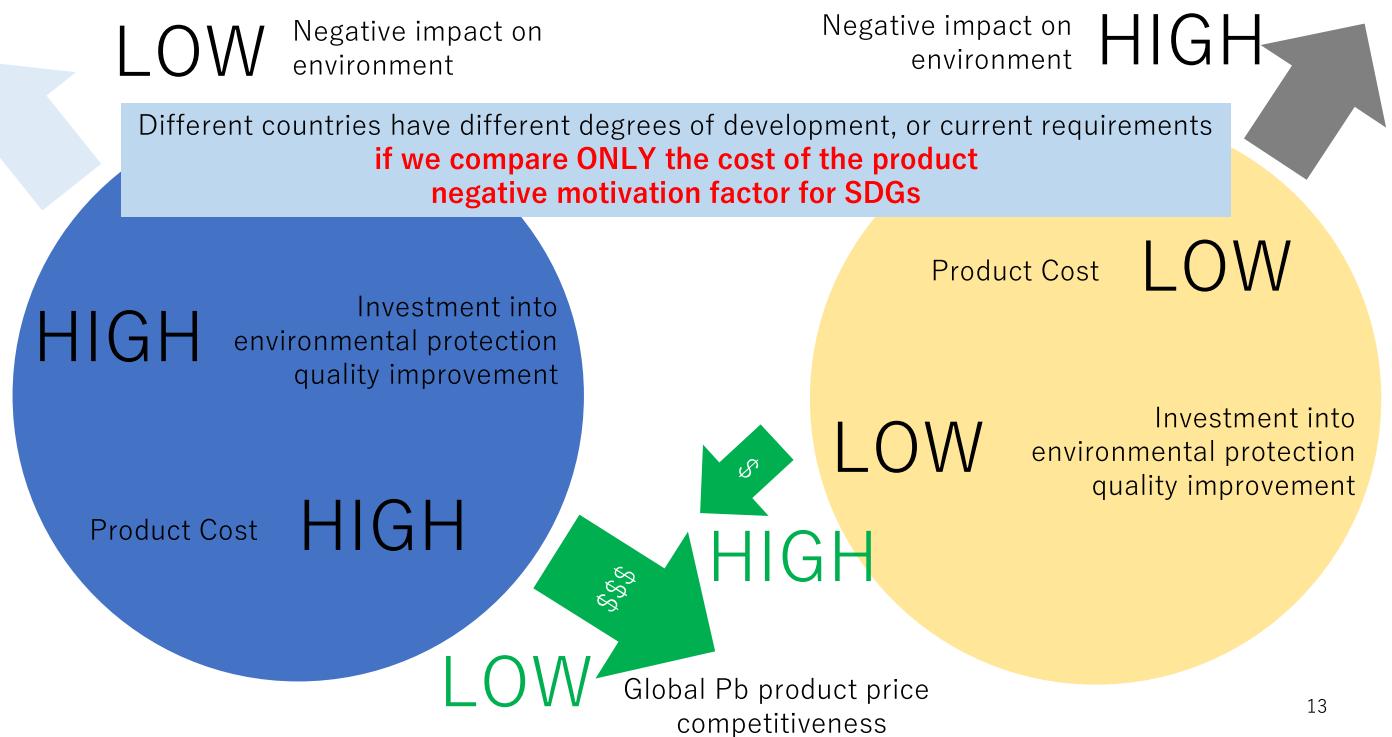
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Future Challenges in Domestic Lead Smelting

- Systematize waste lead-acid battery and lead scrap collection towards a better circular economy
- Develop the most effective smelting and refining process to meet SDGs requirements
 - Develop alternate or intermediate business value measurements other than monetary measurements like cost/profit for SDGs, for example
 - Water usage: supplied water / sewage ratio
 - Heat recycling
 - Fossil resources usage: energy interpretation of fuel per metric ton of product.
 - Climate Change Greenhouse gases not limited to Carbon Neutrality, per metric ton of product
- Entire life cycle of Pb manufacturing should be assessed
 - Supply Chain Scope 1~3
 - Various smelting and refining methods

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Lead Smelting viewed from an international perspective



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AS THE EARTH IS CONNECTED, we share the same waters and the same atmosphere –



if we compete ONLY by price, this is
BAD FOR OUR EARTH

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Future Challenges in ~~Domestic~~ Global Lead Smelting

- Systematize waste lead-acid battery and lead scrap collection towards a better circular economy
- Develop the most effective smelting and refining process to meet **LOCAL** SDGs requirements
 - Develop alternate or intermediate **GLOBAL** business value measurements other than monetary measurements like cost/profit for SDGs, for example
 - Water usage: supplied water / sewage ratio
 - Heat recycling
 - Fossil resources usage: energy interpretation of fuel per metric ton of product.
 - Climate Change Greenhouse gases not limited to Carbon Neutrality, evaluated by CO₂, SO₂, NO₂ etc. per metric ton of product
 - Entire **GLOBAL** life cycle of Pb manufacturing should be assessed
 - Supply Chain Scope 1~3
 - Various smelting and refining methods

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SDGs optimization START LOCAL! → gLOCAL

LOW Negative impact on environment

Negative impact on environment **lower**

HIGH

Investment into environmental protection quality improvement

Product Cost

\$\$\$

LME Pb

LOW

Product Cost

LOW

Investment into environmental protection quality improvement

\$

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let us leave a healthier earth for our children and our grandchildren



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Personal Dream Goals

- Model Clean Lead Manufacturing Factory
 - Automated
 - Gender free
- Japan as a center of competence :
 - Industrial complex for all non-ferrous metal recycling by optimizing primary and secondary Pb and other nonferrous metal manufacturers

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Thank you