

# **Role of Technology in ELV Management – Process and Challenges**

Presented by:

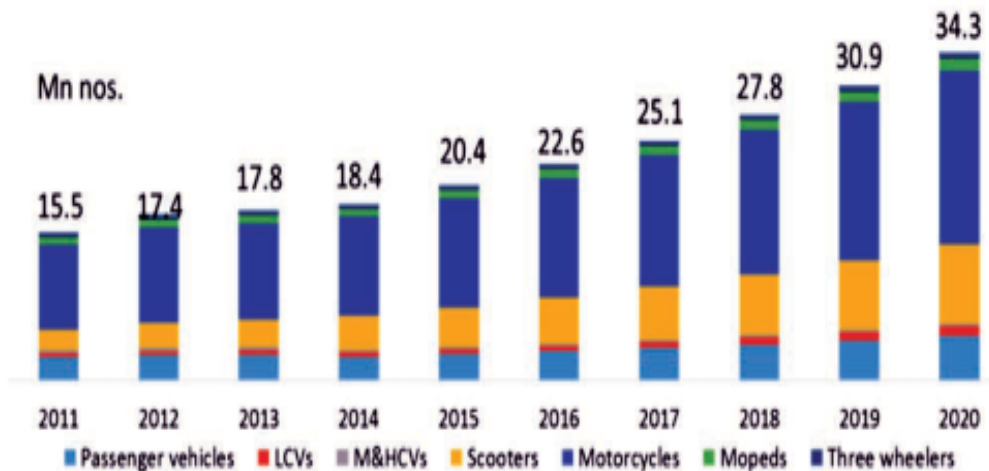
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# Present ELV Scrapping in India

- India Steel Scrap Policy, 2019
- India Vehicle Scrapping Policy 2021
- National Urban Air Quality Campaign 2019
- National Resource Efficiency Policy 2019 with Steel as Focus Area
- India National Emission Reduction Target submitted to Paris Climate Agreement
- Extended Producer Responsibility guidelines 2020 (Under Consideration)



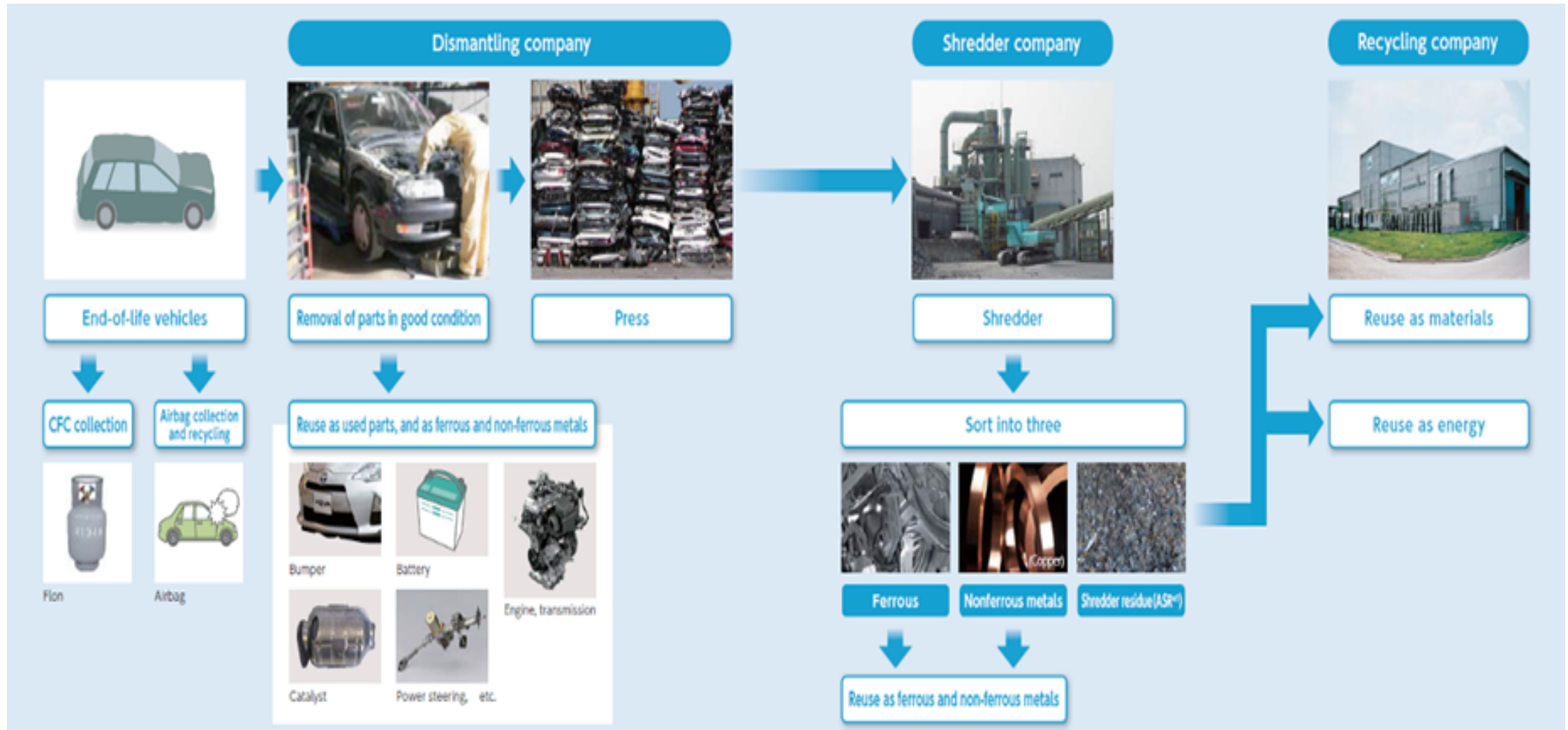
- In 2014, 50 lac vehicles achieved ELV, but only 4.1 lacs were dismantled.
- Rest dumped at garbage yards, resulting in dumping of 0.3 Mn tons of Steel and 0.4 Nm tons of Al.
- Interesting fact is the maximum ELV status car will be ALTO and vehicles of Maruti.
- By 2021 90 lac vehicles will achieve ELV, which is expected to increase to 140 lacs.

Type of vehicle	Total ELV count in 2025
Two Wheelers	1,77,23,951
Three Wheelers	7,57,932
Private Cars/SUVs	28,09,966
Commercial passenger Vehicles	94,757
Commercial goods vehicles	11,88,833
<b>Total vehicle count likely to be ELV in 2025</b>	<b>2,18,95,439</b>

City	Survey Area	Number of Units Operating
Delhi	Mayapuri	3000
	Gokul Puri	90
	Jama Masjid	68
	Abul Fazal	6
	Karam Pura	4
	Karol Bagh	3
	Gehvra Mor	2

City	Survey Area	Number of Units Operating
Merut	Chatriwala Peer	15
	Soti Ganj	55
Kolkata	Phool Bagan	1000
Nazibabad	Kabari Bazaar	150
Moradabad	Landgey ki puliya	100
	Nawabpura	Only informal discussion
	Karaula	Only informal discussion
	Transport Nagar	Only informal discussion

# Standard ELV Management Process



# Indian ELV Standards & Difference with EU standards

- Automotive Industry Standards for End of Life industries (AIS 129), published by organizations of the Indian automotive industry in 2015 (AIS Commitment 2015).
- ISO 22628:2002(E): Road Vehicles – Recyclability and Recoverability –Calculation Methods
- ISO 1043 – 2: Symbols and abbreviated terms. Part 1: Basic polymers and their special characteristics.
- ISO 1043 – 2: Symbols and abbreviated terms. Part 2: Fillers and reinforcing materials.
- ISO 11469: Generic identification and marking of plastic products.
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- Considering the significant population of two wheelers in India, it was decided to cover the 2-wheelers along with the M1 category vehicles in the scope. On the other hand, the European directive covers M1 and N1 category in the scope.
- The inclusion of N1 category in India was debated at length. Based on the experience with implementation of M1 category, a decision will be taken for inclusion of N1 category vehicles.
- The marking of the parts is limited to only plastic components unlike Europe where rubber components are also required to be marked.
- The concept of an assessment to be carried out by appropriate agency before type approval certificate is issued to the manufacturer has been capture
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# International ELV Standards Comparison

	EU	Japan	Korea	China	US
ELV management system	Law Directive 2000/53/EC Of The European Parliament And Of The Council of 18 September 2000 on end-of life vehicles (enforced in 2000) [26]	Law Law for the Recycling of End-of-Life Vehicles (enforced in 2005) [24]	Law Act for Resource Recycling of Electrical/ Electronic Equipment and Vehicles (enforced in 2008) [30]	Law End-of-Life Vehicle Recycling Regulation (enforced in 2001) [34] Automotive Products Recycling Technology Policy (declared in February 2006) [35]	Related law [5] Resource Conservation Recovery Act Clean Air Act, etc.
Background of the management system	Measures for increasing ASR [27] Measures for abandoned automobiles Environmental measures of dismantling sites	Lack of final disposal sites [28] Illegal dumping of ASR [29] Effective use of resources [29]	Measures for ELVs [31] Effective use of resources Management of information on ELVs	Measures for illegal assembly [22] Effective use of resources Measures for recycling economy	Strict implementation of regulations [5] Environmental conservation measures associated with ELV recycling
Parties responsible for recycling costs	Automobile manufacturers and importers (if the recycling incurs cost), finally users	Users	Automobile manufacturers and importer (if the recycling incurs cost), finally users	No regulation (traded as a valuable secondary resource)	No regulation (traded as a valuable secondary resource)



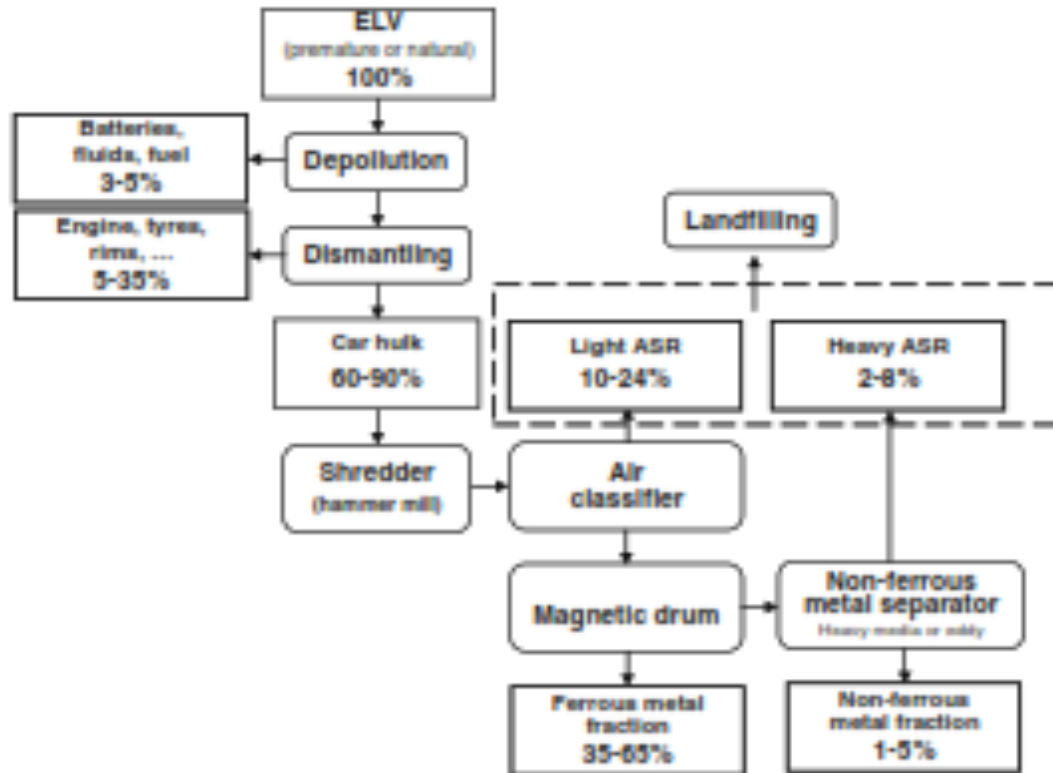
# International ELV Standards Comparison

	EU	Japan	Korea	China	US
Recycle target	<p>[26]</p> <p>Until 2006: Reuse + Recovery: 85 % Reuse + Recycle: 80 %</p> <p>Until 2015: Reuse + Recovery: 95 % Reuse + Recycle: 85 %</p>	<p>[24]</p> <p>Airbag: 85 % ASR: 70 % (from 2015 onwards) 50 % (2010 to 2014) 30 % (2005–2009)</p>	<p>[15]</p> <p>Until 2014: Material + energy recovery: 85 % (of which energy recovery rate is within 5 %)</p> <p>After 2015: Material + energy recovery: 95 % (of which energy recovery rate is within 10 %)</p>	<p>[35]</p> <p>Possibility of recycling: 2010: about 85 % (material recycling of 80 % or more) 2012: about 90 % (material recycling of 80 % or more) 2017: about 95 % (material recycling of 85 % or more)</p>	<p>[36]</p> <p>No specific goals (95 % of ELVs enter the recycling route, of which 80 % of the materials are recycled)</p>
Information management	<p>Issuance of Certificate of Destruction (CoD), monitoring of target values by the government</p>	<p>Electronic manifest system</p>	<p>Intensified collection of information on deregistration and recycling</p>	<p>Issuance of ELV collection certificate [34]</p>	<p>Information collection management by recycling industry groups</p>
Characteristic of the system	<p>Based on the subsidiarity principle and the principle of Extended Producer Responsibility [27]</p> <p>Regulation to prohibit inclusion of heavy metals (mercury, cadmium, hexavalent chromium, lead)</p> <p>Domestic laws are being enforced but the manner of operation varies with country.</p>	<p>Automobile manufacturers and importers take responsibility for the recycling</p> <p>No target for the recycle rate/ recovery rate regarding the total automobile weight.</p> <p>Thermal recovery is recognized in ASR recycling.</p>	<p>Based on the Extended Producer Responsibility (EPR) [32]</p> <p>System planning adjusted to fluctuations in ELV price is being done.</p> <p>Operated under the Eco-assurance system [32, 33]</p>	<p>In the End-of-Life Vehicle Recycling Regulation, ELV management is being done with the aim to prevent accidents resulting from illegal remodeling and use of aging automobiles. [21]</p> <p>The recycle of the 5 components (engine, steering, transmission, axle, and frame) is prohibited by the above mentioned law but the ban was partly lifted based on the Regulation of Remanufacturing of Pilot Automotive Parts (enforced in 2008) [14]</p>	<p>There is no regulative system that directly manages ELV on the national level [5]</p> <p>Under the Anti-Car Theft Act (1992), information on vehicles collected by recyclers is managed by the National</p> <p>Motor Vehicle Titling Information System.</p> <p>The Automotive Recycling Association of the ELV recycling industry operates an information website for related regulations to attain stricter compliance. [37]</p>

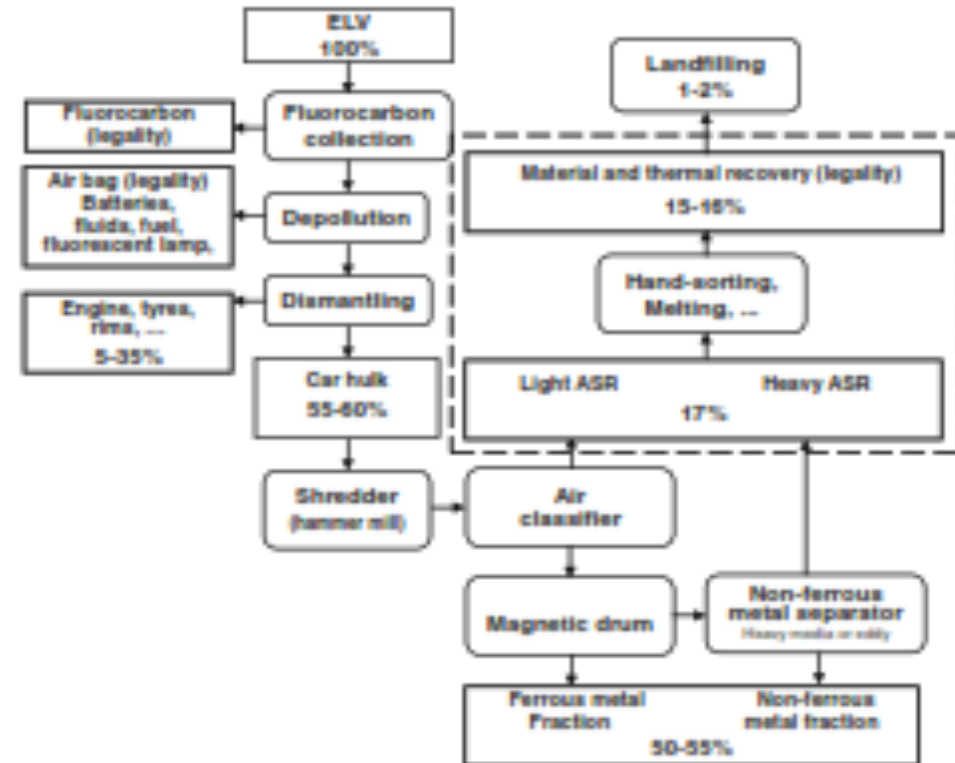
M1, 4-wheeled vehicles with seating capacity of nine or less, including passenger vehicles; M2, seating capacity of nine or more, vehicle weight under 5,000 kg; M3, vehicle with seating capacity of nine or more, vehicle weight over 5,000 kg; N1, freight vehicle with maximum load capacity under 3,500 kg; N2, maximum load capacity of 3,500 kg or more, freight vehicle weight under 12,000 kg; N3, freight vehicle with maximum load capacity of 12,000 kg or more

# ELV Recycling Flow in EU & Japan

## In the EU



## In Japan

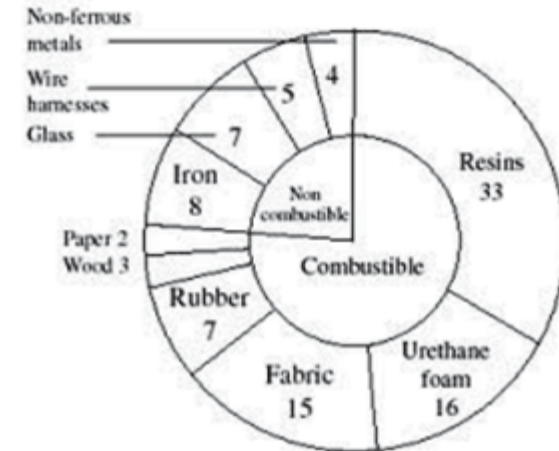




# Auto Shredder Residues Management



Shredder residue composition (weight in %)



There are two basic approaches to ASR post treatment.

1. Mechanical processes which use systems of magnetic separation, eddy current separation and high speed air and water streams for mechanically segregating different materials by density
2. Pyrolytic/chemical processes for recovering materials and producing energy.

Treatment method	ASR applications and resource recovery		
	Fuel substitution	Thermal recovery (Steam/electricity)	Gas recovery (Fuel gas)
Gasification melting furnace	--	○	○
Incineration furnace + melting furnace	○	○	--
Fluidized bed furnace	○	○	○
Carbonization furnace (Includes reduction furnaces)	--	○	○
Cement process	○	--	--

# Exploring Circularity with ELV Management

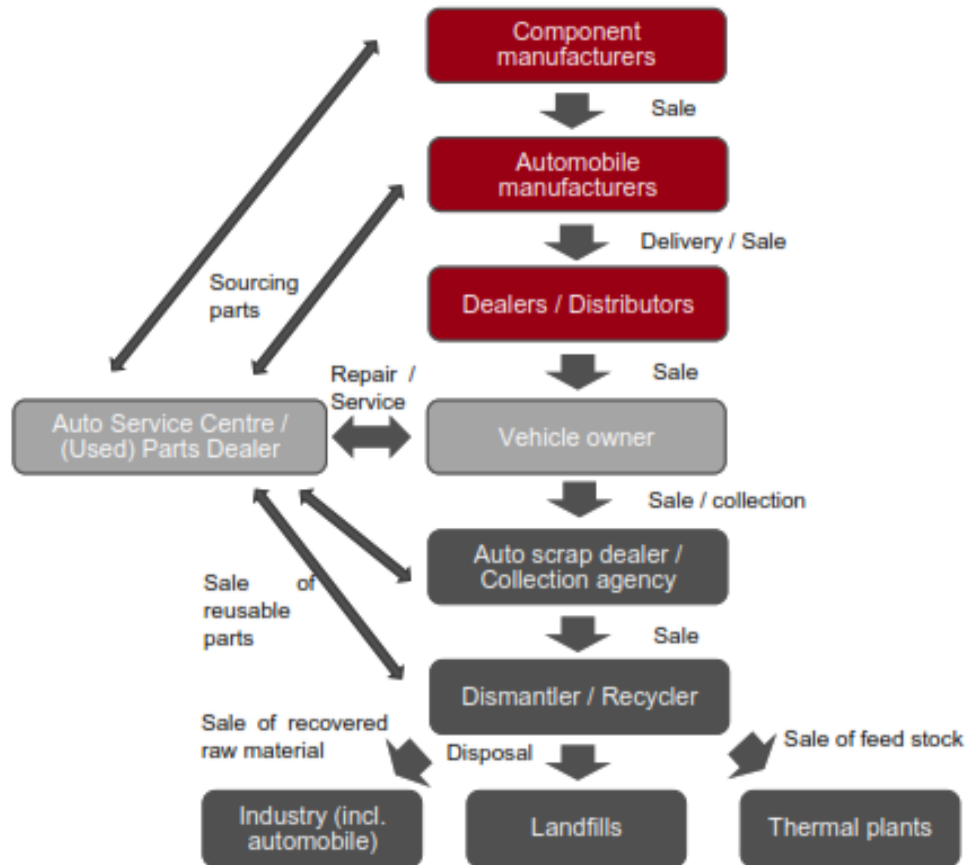


Figure 3: Automotive and ELV value chain

Material / Components	% by weight
Ferrous metal	68%
Non Ferrous Metal	8%
Plastics & Process Polymers	10%
Tires	3%
Glass	3%
Batteries	1%
Fluids	2%
Textiles	1%
Rubber	2%
Others	2%
<b>TOTAL</b>	<b>100%</b>



# Resource Efficiency Targets at National Resource Efficiency Policy 2019



## **SDGs directly linked with Resource Efficiency**

- MoEFCC has released National Resource Efficiency Policy for reducing extermination of natural resources through maximizing waste recycling through circular economy and optimizing resource consumption.
- MoEFCC has identified C&D Waste recycling among national priority areas .

### ***Economic***

- Rs. 60.8 billion in material savings in manufacturing sector alone
- Reduce import dependence for critical minerals to improve the country's trade balance
- In Steel sector, save material cost from 21 MT iron ore, 8.25 MT coking coal and 3.75 MT limestone by 2025
- In Aluminium sector, save cost from 36 million barrels of crude oil eq. energy by 2025
- Improve resource availability that is critical to the growth of industries

### ***Social***

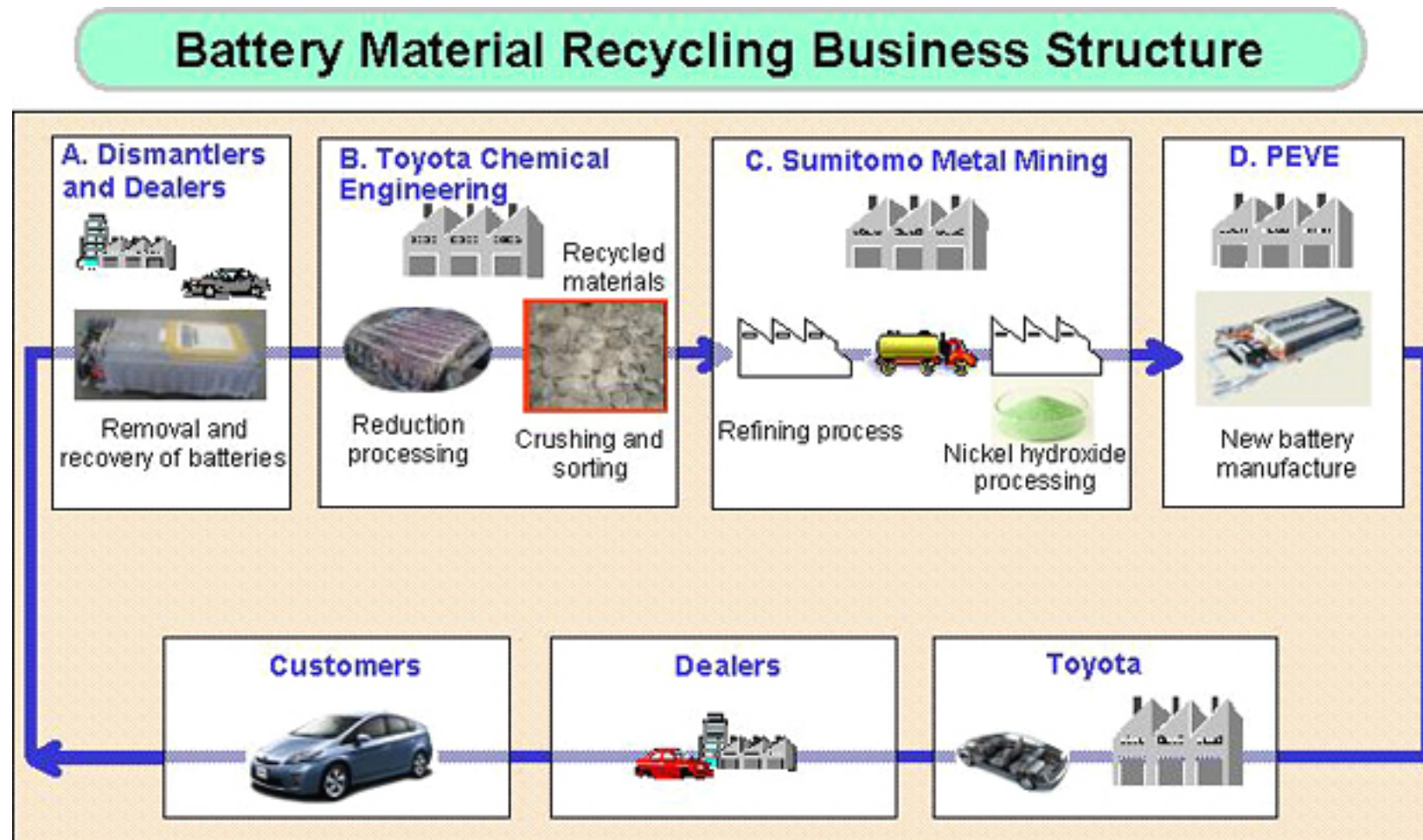
- Reduce conflict and displacement in mining areas, as well as improve health and welfare of local communities due to reduced extraction pressures
- Improve affordability of and access to resources critical for poverty reduction eg. recycled aggregates and other secondary raw materials
- Job creation in recycling sectors, innovative design and manufacturing
- Contribute towards preserving resources for future generations

### ***Environmental***

- Reduce ecological degradation and pollution associated with mining due to reduced extraction pressures
- Reduction in GHG emissions from extraction, manufacturing and use phase
- Avoid 31.5 MT of CO<sub>2</sub> emissions in steel sector and 13.5 MT of CO<sub>2</sub> emissions in aluminium sector
- Avoid industrial wastes and landfill of solid wastes
- Provide opportunities for restoration of landscape and water bodies

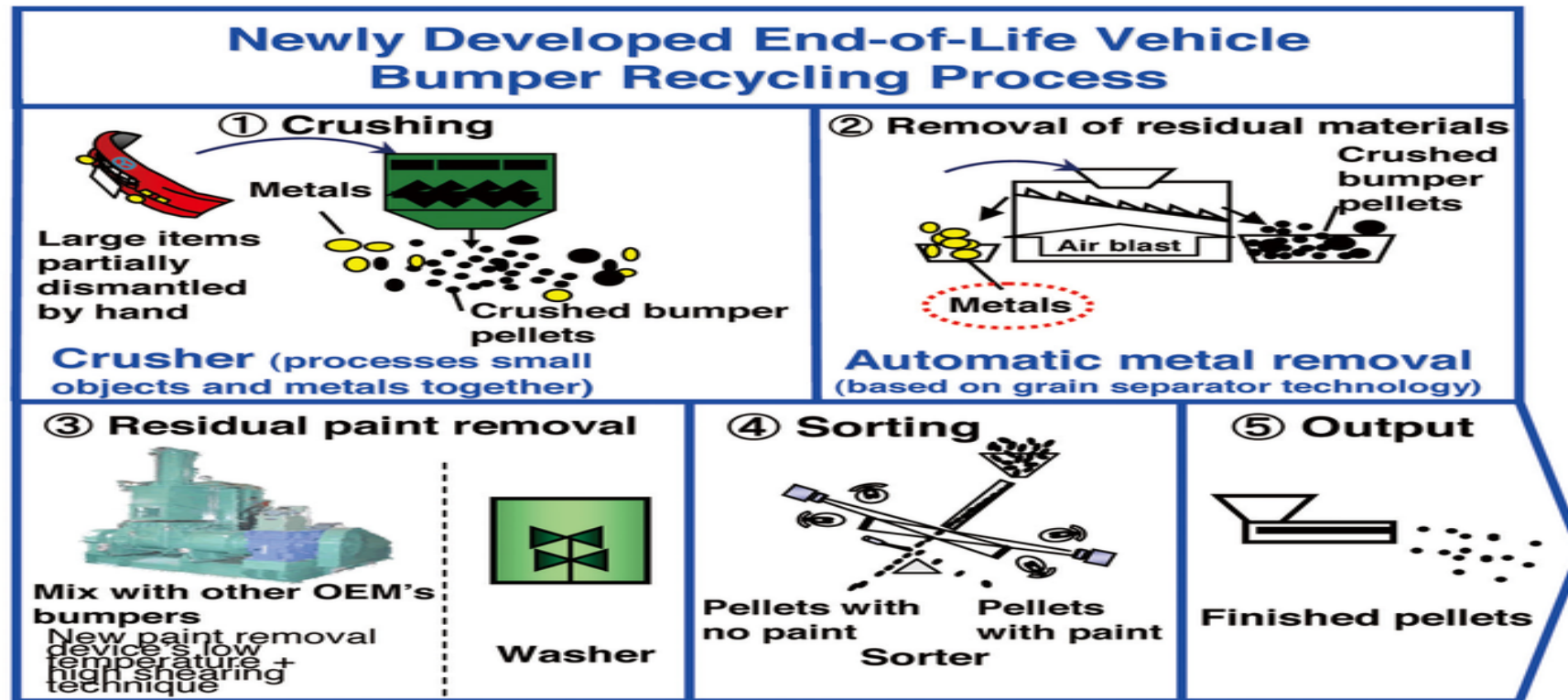
**Benefits of resource efficiency to India (NITI Aayog, 2017; TERI, 2019)**

# Proposed Process for Battery Recycling in ELV Management





# Technology for Multiple Residues Waste Management in ELV Recycling



## **Conclusion**

- India need to explore optimized technology approach, as far as electro-mechanical options are concerned.
- There is a lot of spade work required to define a minimum set of commercially available technologies, which may be made accessible to local entrepreneurs.
- None of companies in India produce auto –grade shredders, which might pose a challenge for setting new facilities.
- Since the facilities might involve an in-depth component related to hazardous waste generation and EHS aspects, it would be a challenge for first take-off facilities to optimize the related performance.
- These ELV recycling facilities have potential to disrupt the existing dry waste and other hazardous waste markets, hence it may attract a lot of commercial realization with passage of time.
- Challenge does exist to link and define legal compliances will be a great challenge, due to complicated mixture of materials emanating at these facilities.