The status of the four new legislative proposals on waste as part of the EU Circular Economy Package

Electronics & Cars Recycling WRF 2017,
November 14-17, 2017, Macau, China

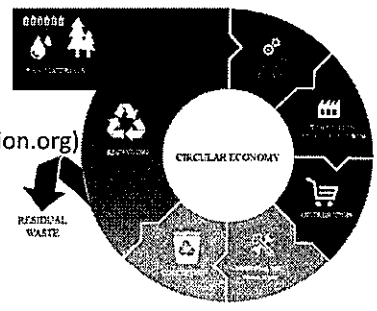
PRINCIPLE OF CIRCULAR ECONOMY

"As envisioned by the originators, a circular economy is a continuous positive development cycle that

- preserves and enhances natural capital,
- optimizes resource yields, and
- minimizes system risks by managing finite stocks and renewable flows.

It works effectively at every scale."

Source: The Ellen MacArthur Foundation (https://www.ellenmacarthurfoundation.org)



FOCUS AREAS- EU CIRCULAR ECONOMY PACKAGE

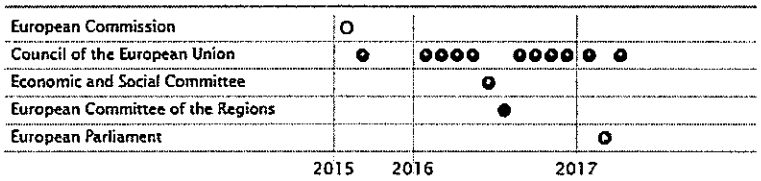
1. Product Design and Procurement
   - Reparability, upgradability, durability, recylability
2. Production processes
   - Guidance on waste management and resource efficiency, industrial symbiosis
3. Consumption
   - Reuse activities, availability repair information and spare parts
4. Waste Management
   - Recycling targets and landfill reduction
5. Secondary materials market
   - Setting quality standards

THE FOUR LEGISLATIVE PROPOSALS ON WASTE:

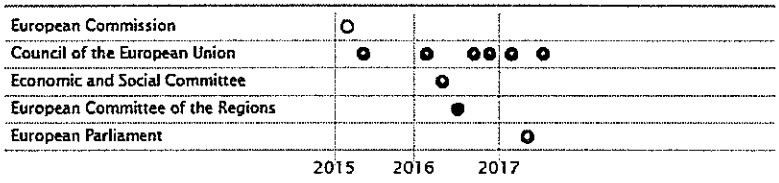
- Directive 2008/98/EC on waste
- Directive 1999/31/EC on the landfill of waste
- Directive 94/62/EC on packaging and packaging waste
- Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment

IMPLEMENTATION STATUS

Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2008/98/EC on waste



Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment



POTENTIAL IMPACT ON PRODUCER - EXTENDED PRODUCER RESPOSNIBILITIES

- Producer should provide information that re-use operators have access to instruction manuals, spare parts, technical information, or any other instrument, equipment or software required for the re-use of products, without prejudice to intellectual property rights.

- The producer should cover the entire cost of waste management for the products it puts on the Union market, as follows– costs of separate collection, sorting, transport and treatment operations required to ensure the proper management of waste taking into account the revenues from re-use or sales of secondary raw material from their products.

- Potential risk for mandatory visible fees

POTENTIAL IMPACT ON EPR SCHEMES / RECYCLING COMPANIES

- Extended producer responsibility schemes for at least packaging, electrical and electronic equipment, batteries and accumulators, and end-of-life vehicles are mandatory in Member States.
- Minimum requirements for new and existing producer responsibility to reduce costs and boost performance, as well as ensure a level-playing field.
- Member States should put in place safeguards against conflicts of interest between contractors and extended producer responsibility organizations.
- New requirements on reporting and calculation of recycling targets
- Additional reporting requirements for the EU countries: Countries should report data on all companies which are collecting and processing WEEE

STRATEGY ON PLASTICS IN A CIRCULAR ECONOMY

Background

- plastics production has been growing exponentially since the 1960s and is expected to double by 2036.
- There are over 1 000 types of plastic,
- 90 % of plastics are derived from virgin fossil fuels.
- In Europe, post-consumer plastic waste is either incinerated with energy recovery (39 %), landfilled (31 %) or recycled (30%).
- It is estimated that half of the plastic waste recycled is treated in the EU, while the other half is exported for recycling

STRATEGY ON PLASTICS IN A CIRCULAR ECONOMY

The Strategy will target the the following three key areas:

- reducing the use of fossil-based feedstock
- boost the market for secondary raw materials
- increase the sustainability of plastics.

As an initial step a roadmap was established by the European Commission on 26/01/2017.

CONCLUSION

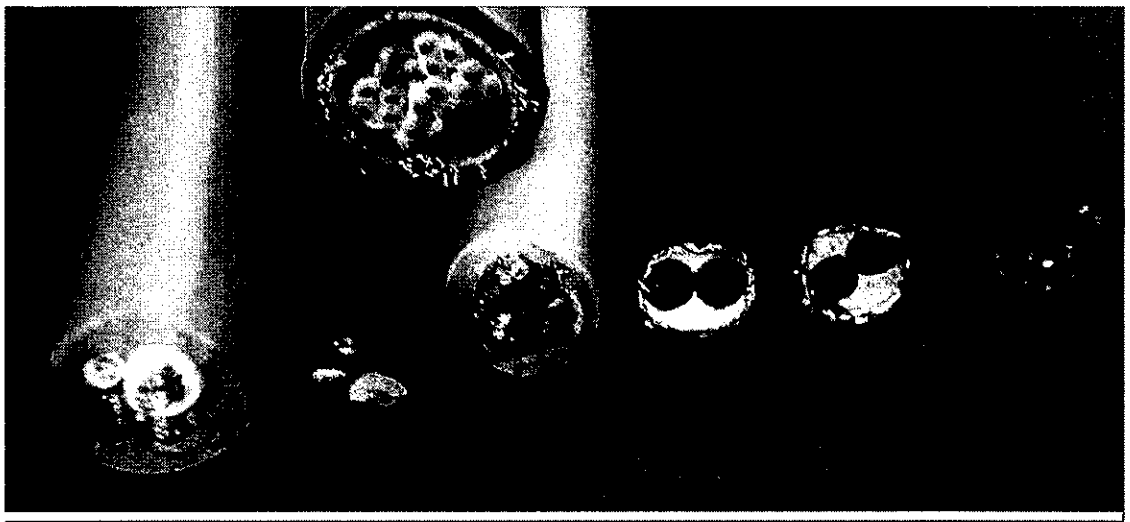
☑ It is important to follow closely the developments of the four legislative Proposals on Waste

☑ Prepare for the outcome as this could have an impact on your business.

THANK YOU!

Ofira Varga
Senior Consultant
T +1 469 222 0745
o.varga@1cc-consulting.com

1cc Corp
580 Decker Drive , Suite # 285
Irving, TX 75038
USA
www.1cc-consulting.com



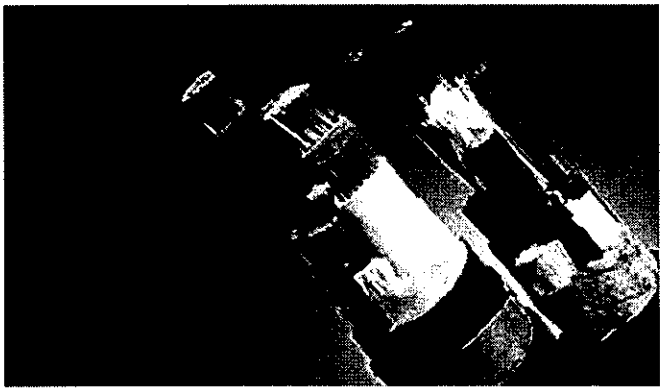
CABLE RECYCLING– E-WASTE MANAGEMENT

PRESENTATION

Leimen Zhang– CEO of 3E Machinery

3E MACHINERY

Waste Cable World wide



每年都有大量的电缆被废弃，这些被废弃的电缆中都是铜线或者铝线，对于废电缆回收是一项有利于环境的投资项目。

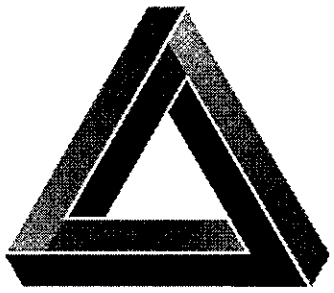
报告显示，2016-2020年，全球电缆市场需求年复合增率约为5.89%。回收废旧电缆，将其铜芯进行加工二次利用，可以节约成本，提高利润，又符合可持续发展规律。

To be estimated, there is approx 5.89% increase for the cable global market in 2016-2020.

3E®

MACHINERY

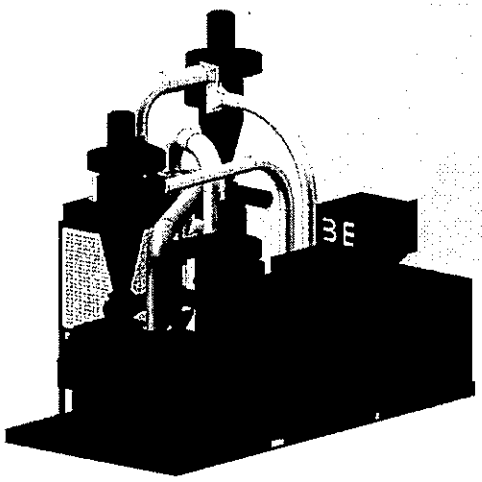
Waste Solutions



3E technology of Recycling

- Started from 2003
- Main market: China/ Europe / Southeast Asia
- Profession: Plastic/Rubber/Metal/E-waste/MSW/ Hazardous
- 44 patents
- CE certified/ISO certified/BV certified

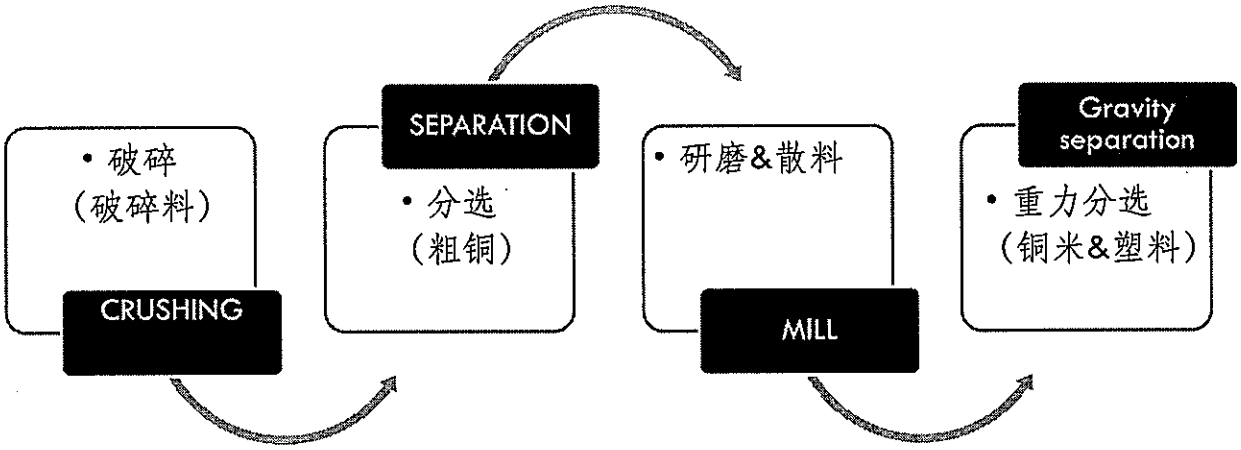
3E Cable Recycling system



- Shredding/Granulating
  破碎
- Separation
  分离分选
- Environmental protection
  环保
- Auto control
  自动控制系统

Process description **处理描述**

Process description **处理描述**



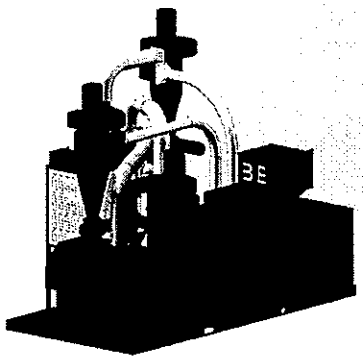
Output specification 规格

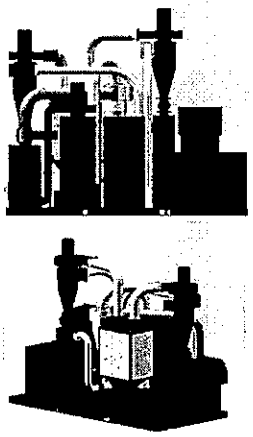
Specification	
Capacity 产能	200- 300kg/hour
Installed Power 装机容量	36kw
Power consumption 能耗	处理一吨料消耗108度电
Cu Recycling rate 铜回收率	≥99%;
Cu contain in the non-metal 铜在非金属内的含量	≤0.5-1%

Key points 关键点

Moveable

方便移动





Key points

Environmental Friendly

无粉尘污染

- Cables and wires are crushed and separated in a full-closed system. Fully enclosed conveyor belt or pipe negative pressure conditions, and the production line is equipped with the dust collector dust collecting system and exhaust gas purification treatment facilities. No dust and air pollutions.
- 电线电缆分破碎、分选时在密闭空间进行，物料的运输采用负压风力运输，没有粉尘污染，不造成二级污染。

Key points

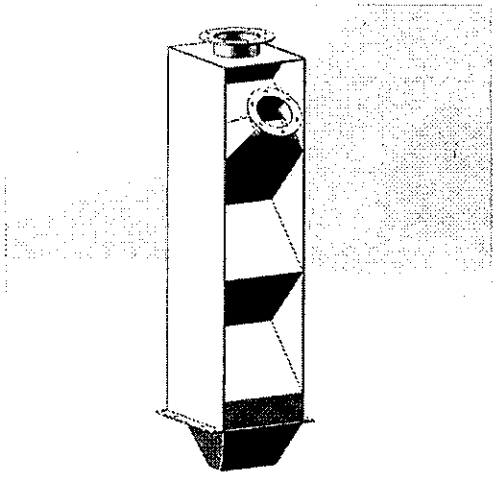
The purity of separated metal

金属粉体的纯度

- Through the precise control of optimization and parameter optimization design, equipment system, metal purity separation can be controlled. The highest purity could be up to 99.5% or more. Such produced copper powder can be directly applied as refined copper.
- 分选后，铜米的纯度可达**99.5%**以上，分选出的塑料力度均匀，有利于后续在塑料中二次分选铜粉，进一步提高回收率。

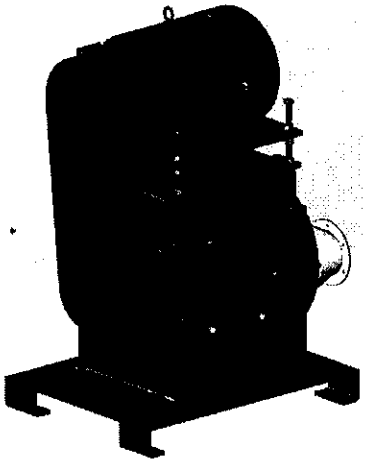
Key points——The control of Process

- 1ST – Adopts the Z separator as the first separation, the big cupper can be acquired at this steps . The copper from this step is high quality and it can increase the rate of recovery.
- 采用Z型分选，可直接选出粗铜，提升铜米品质，减少设备不必要的磨损。



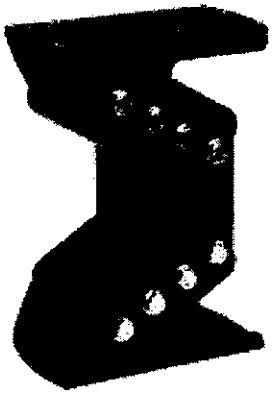
Key points——The control of Process

- 2ND the cables are milled with high speed to ensure cupper and plastic well separated.
- 采用涡电流散料设备，高速冲击破碎后的物料以及塑料，与铜米彻底分离，尽可能使物料力度均匀。再利用重力分选，提高铜米的回收品质。

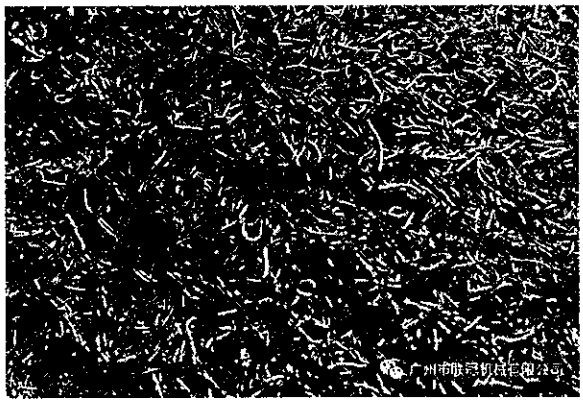


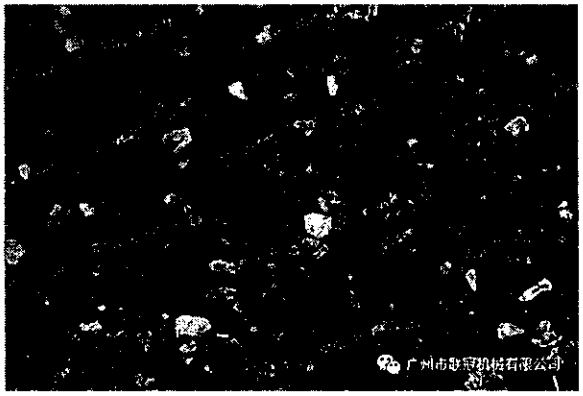
Key points——The control of Process

- Gravity separation
  Adopt ROSTA elastic support to reduce the impact and enable the vibrating system more statble.
- 重力分选机采用瑞士ROSTA弹性支撑，可减少工作时对支架的冲击，保持震动筛体的稳定性。

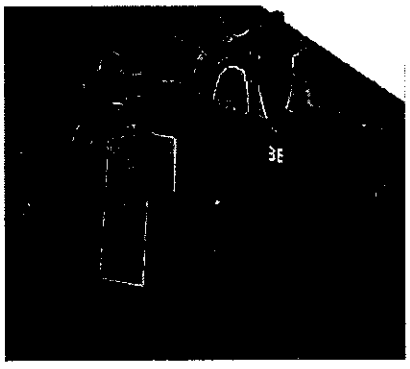


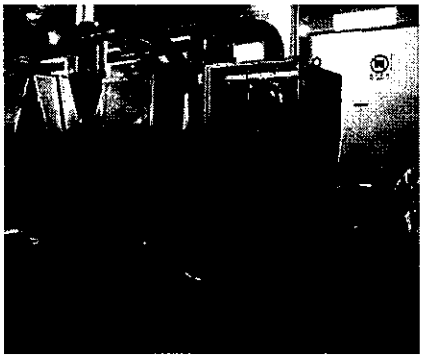
Output

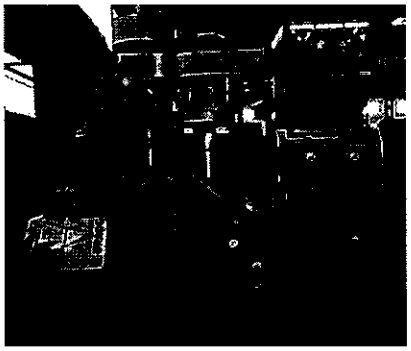




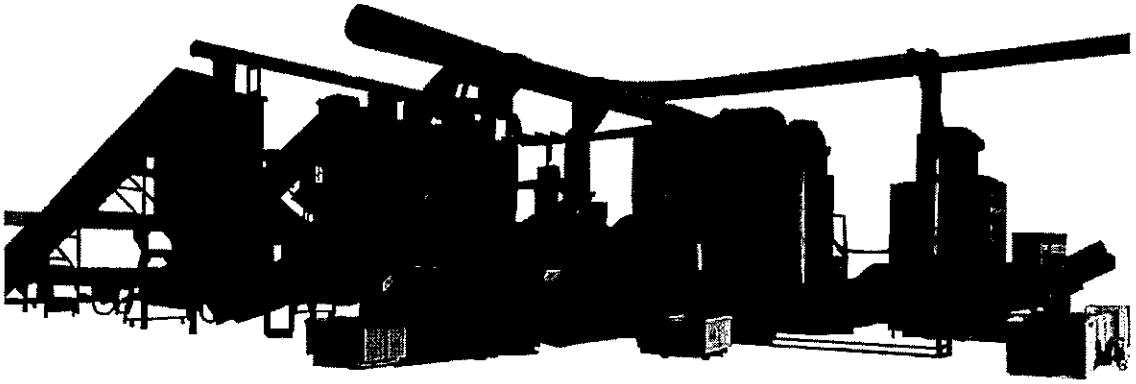
Cases– 200kg/hour



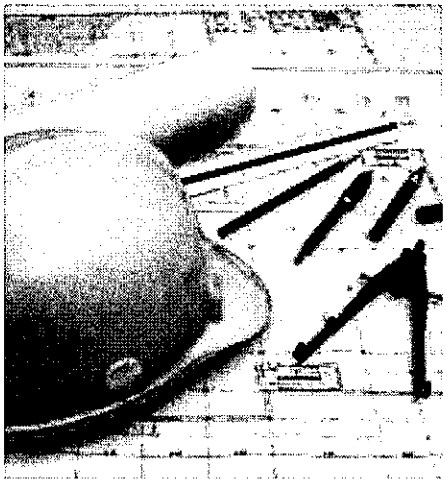




Cases– 2 tons/hour Capacity



Thank you for your attention!



Contact person: Leimen Zhang

Email: manager@ 3e-recycling.com

Website: www.3e-recycling.com

Plant site: Guangzhou, China

Welcome to visit us

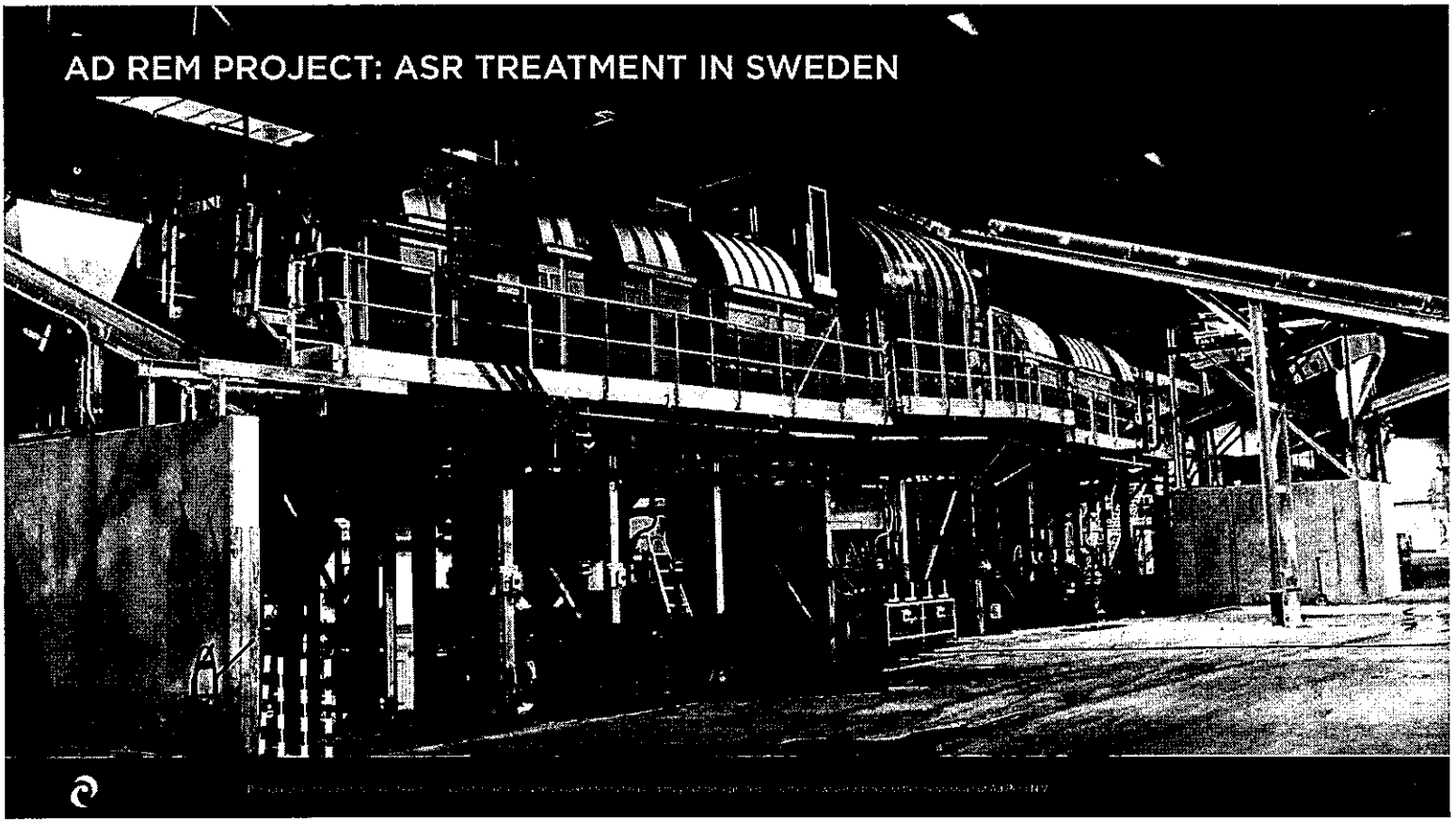
OPTIMIZATION OF MATERIAL FLOWS IN DENSE MEDIUM SEPARATION

AD REM
ADVANCED DESIGN OF RECYCLING MACHINES

AD REM N.V.

Based in:	Menen - Belgium
Founded in:	2008
Member of:	**Valtech Group:** Machinery for recycling, textiles and environmental industry. **Group Galloo:** Recycling of ferrous and non-ferrous metals.
Employees Valtech:	300
Employees Galloo:	650 (+150 social economy)

AD REM PROJECT: ASR TREATMENT IN SWEDEN



GENERAL GOAL OF THE STUDY

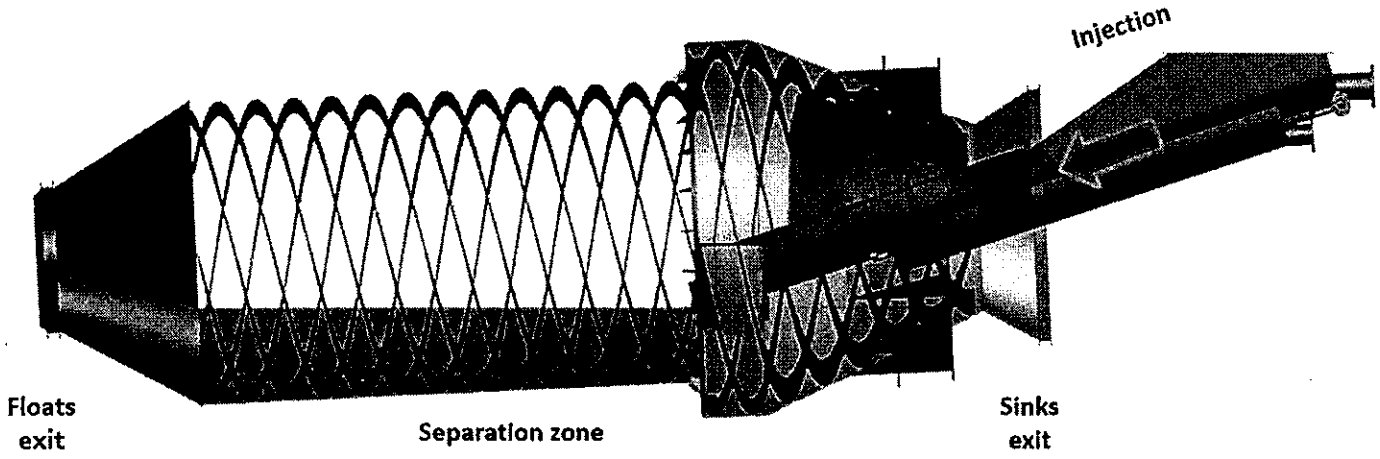
Avoiding misplaced material during flotation by:

- Optimization of material flows
- Correct medium flow rate
- Improving feed of material

Quantified goal of the study:

- Yield before optimization: 93%
- Yield after optimization: 98 - 99%

FLOTATION PRINCIPLE



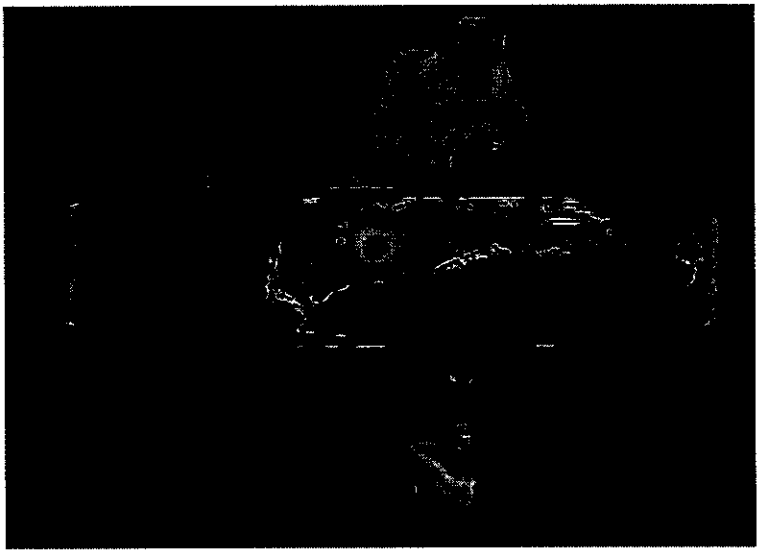
PARAMETERS FOR SEPARATION EFFICIENCY

- Medium density
  Too low density causes aluminum to sink
  Too high density leads to loss of ferro-silicon
- Medium flow rate
  Turbulent or unstable flow is unwanted
- Flow direction
  An incorrect flow direction leads to a longer residence time
- Feeding of the material
  Incorrect feeding can cause aluminum decantation

STEP 1: GENERATING A COMPUTER MODEL

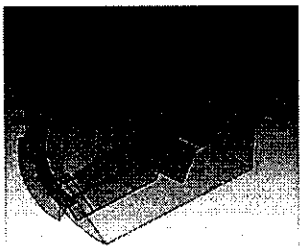
- Technique:

The model was made by using Computational Fluid Dynamics (CFD)



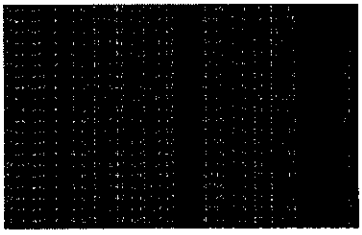
TOOL CHAIN

CAD Software (Solid Works, ANSYS Design Modeler)



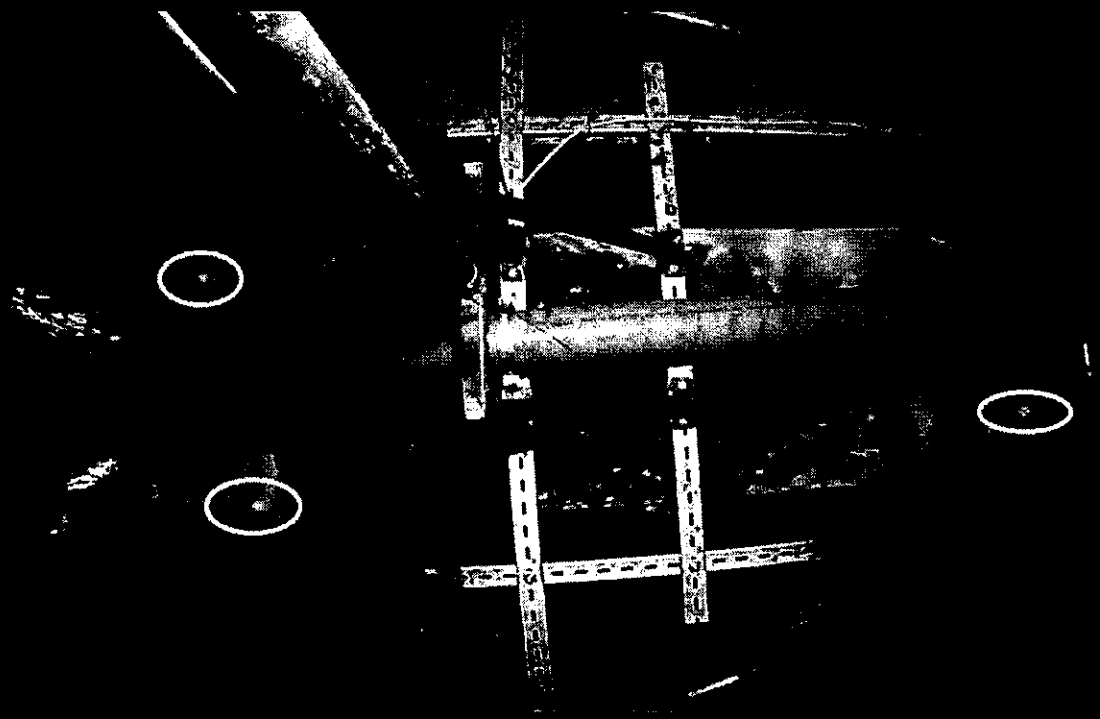
Grid Generation Software

Numerical Solver (OpenFOAM)

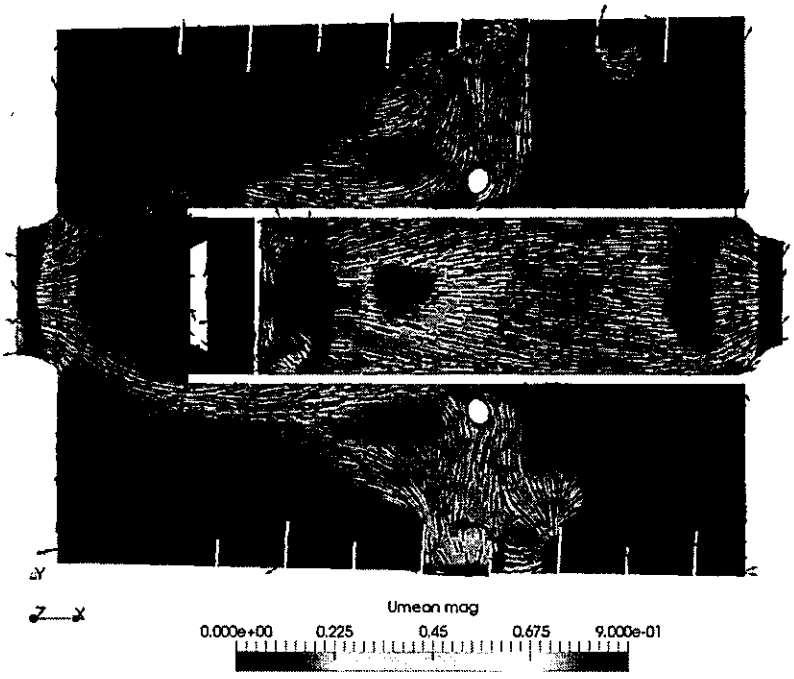


Post Processing Tools

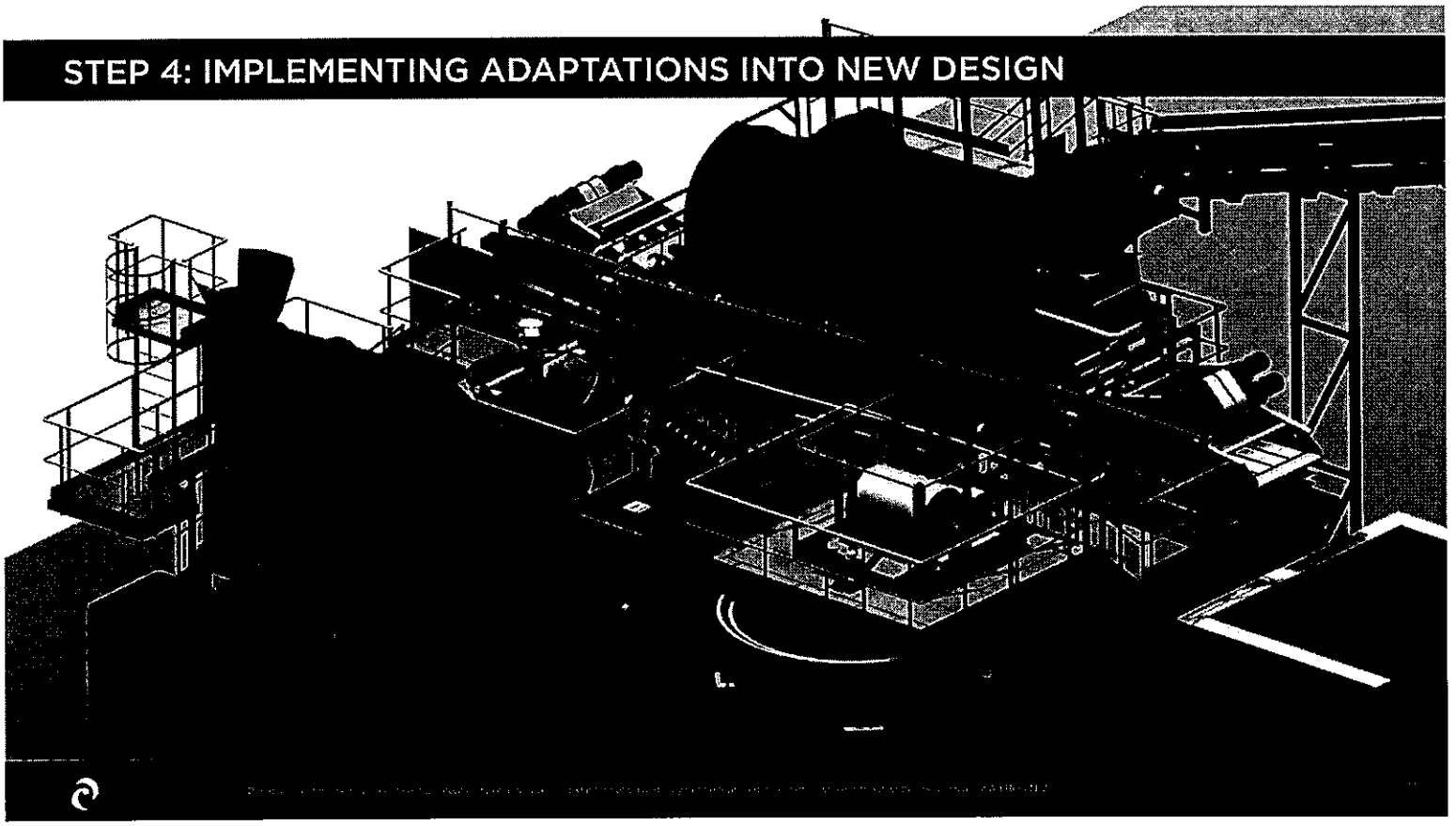
STEP 2: VALIDATING THE MODEL: PHYSICAL EXPERIMENTS



STEP 3: SIMULATING DRUM ADAPTATIONS



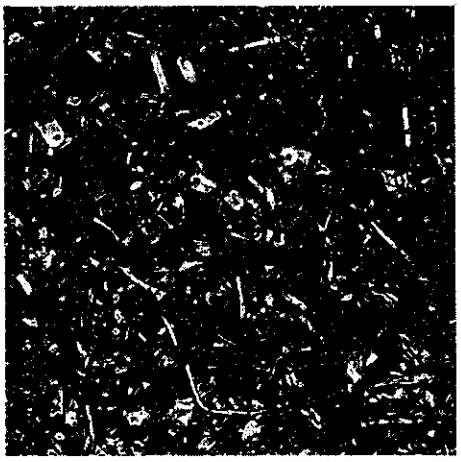
STEP 4: IMPLEMENTING ADAPTATIONS INTO NEW DESIGN



RESULTS OF THE OPTIMIZATION

Quantified result of optimization:

- Misplaced aluminum in heavy metals:
  From 7.1% to 0.3%
- Annual gain of aluminum:
  7700 MT
- Estimated increase in turnover within 5 years:
  8.7 million Euro (when running 100 kT/y)



CONTACT US

info@adrecyclingmachines.com - +32 56 521 130
Krommebeekstraat 14, 8930 Menen - Belgium
www.adrecyclingmachines.com

中国报废车回收拆解市场简述

China Brief introduction of waste car recycling and dismantling Market

国内报废车回收拆解与再利用市场现状与未来方向

Present situation and future trend of domestic scrap car recycling, dismantling and reuse

演讲人：张莹 Speaker：Ying Zhang

中国再生资源回收利用协会
报废车回收拆解与再利用分会
CELVE China scrap automobile recycling, dismantling and reuse branch

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目录
CONTENTS

第一部分 报废车行业综述

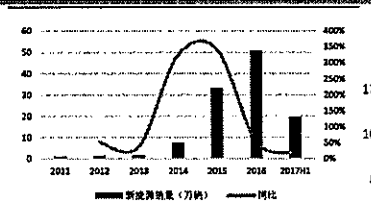
◎汽车保有量与报废车之间的关系 ◎国内报废车市场规模

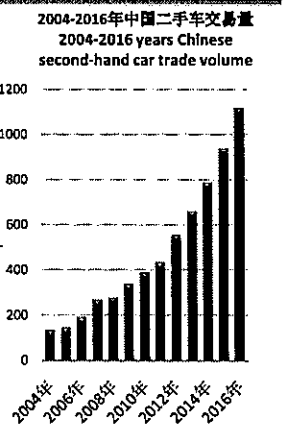
- 据公安部交管局统计：截至到2017年6月底，全国机动车保有量达3.04亿辆，其中汽车2.05亿
- 据有关数据统计参考：目前报废率约一线城市在2% - 3%，二线及其它城市不足1.5%，整体约在2.5%左右

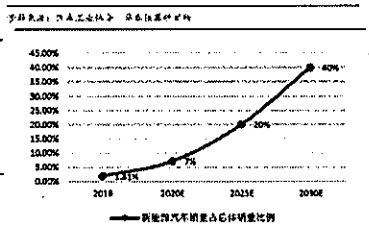
CELVE

我国汽车保有量突破2亿辆 China's car ownership exceeded 200 million vehicles

1	超100万辆	49个城市
2	超200万辆	23个城市
3	超300万辆	6个城市

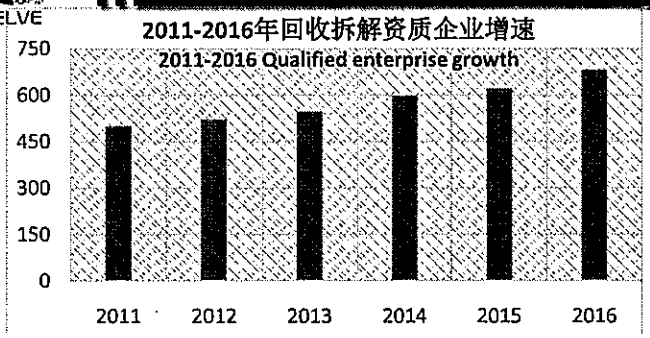






截至2017年上半年汽车保有量超过200万辆的城市
By the first half of 2017, cities with more than 2 million cars

报废汽车回收拆解行业简析 ELV Brief analysis of recycling and dismantling industry

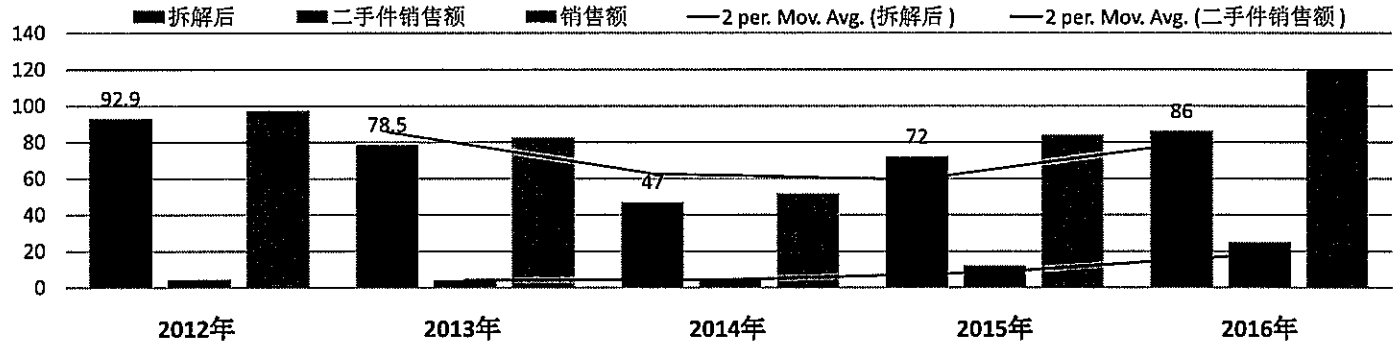


报废车回收网点已覆盖全国80%以上的县级行政区

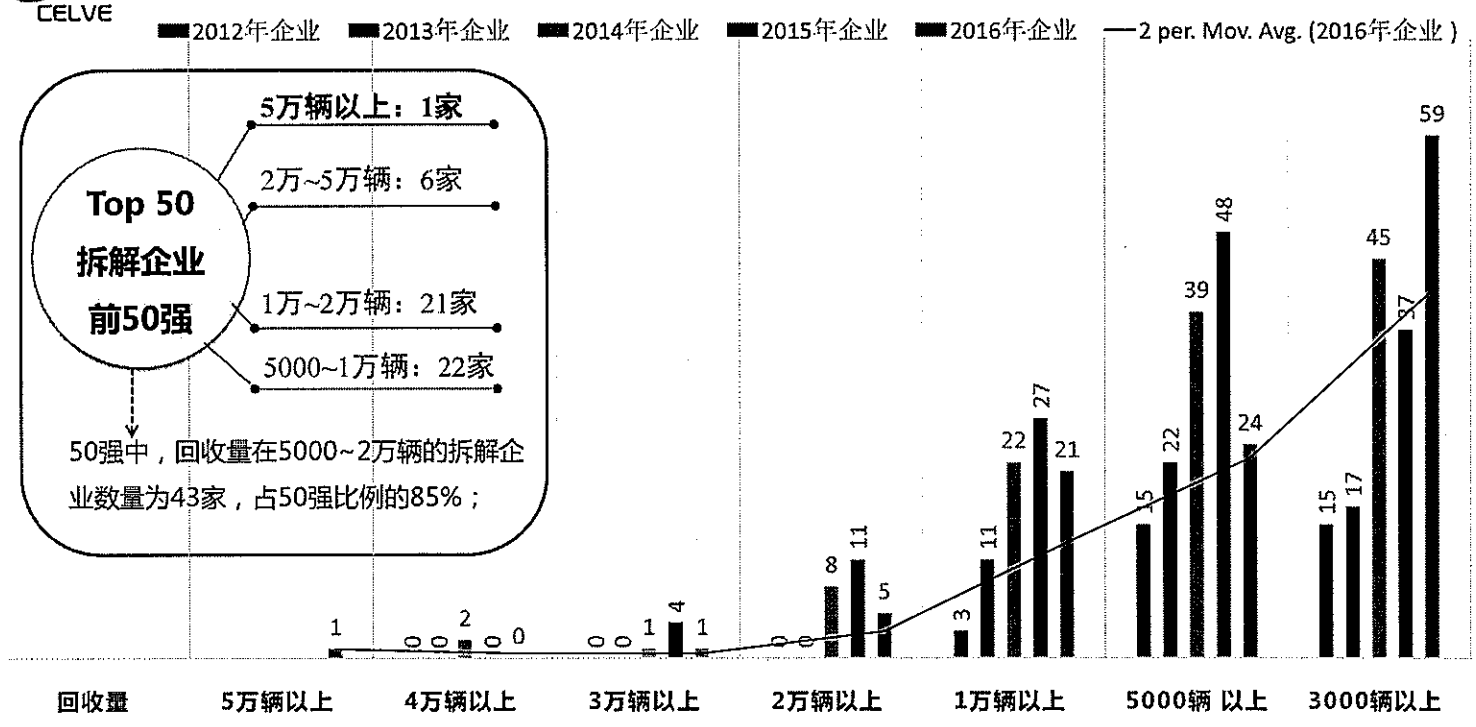
资质企业635余家 Qualification enterprise more than 635 回收网点2300余家 Recycle bin more than 2300	面积1600万平方米 Area of 16 million square meters 从业人数2.9万人左右 Employing about 29 thousand people	资产约120亿元左右 Assets of about 12 billion yuan 回收车辆180万辆以上 More than 1 million 800 thousand vehicles were recovered	拆解再生资源超过721.29万吨 Dismantling renewable resources more than 7 million 212 thousand and 900 tons 实现市场价值128亿左右Achieve market value of about 12 billion 800 million

ELV recycling network has covered more than 80% of the county level administrative region

报废汽车回收拆解行业原材料与零部件销售对比情况（参考值）
Comparison of raw materials and parts sales in scrap car recycling and dismantling industry (reference value)



回收企业回收量前100名 Enterprise Business recovery Top 100



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第二部分 2017市场变化分析

◎国五标准 ◎国六、新能源 ◎国I国II车限行 ◎国III 国IV遭遇限迁 ◎黄标车收尾◎

国五标准 将于2017年1月1日起在全国实施第五阶段国家机动车排放标准。

国六标准 2020年1月1日期，凡不满足国六排放标准的新车将不得生产、销售、注册登记。

国I国II车限行 国III鼓励淘汰或迁出 报废国I国II排放的轻型汽油车可获得政府最高1.2万元补助。国III鼓励淘汰或迁出 最高补10万元。

国III 国IV遭遇限迁 由于全国推行国V标准，多省市各地市之间国五以下的二手车无法互相流通，而只能在本市行政范围内流通。

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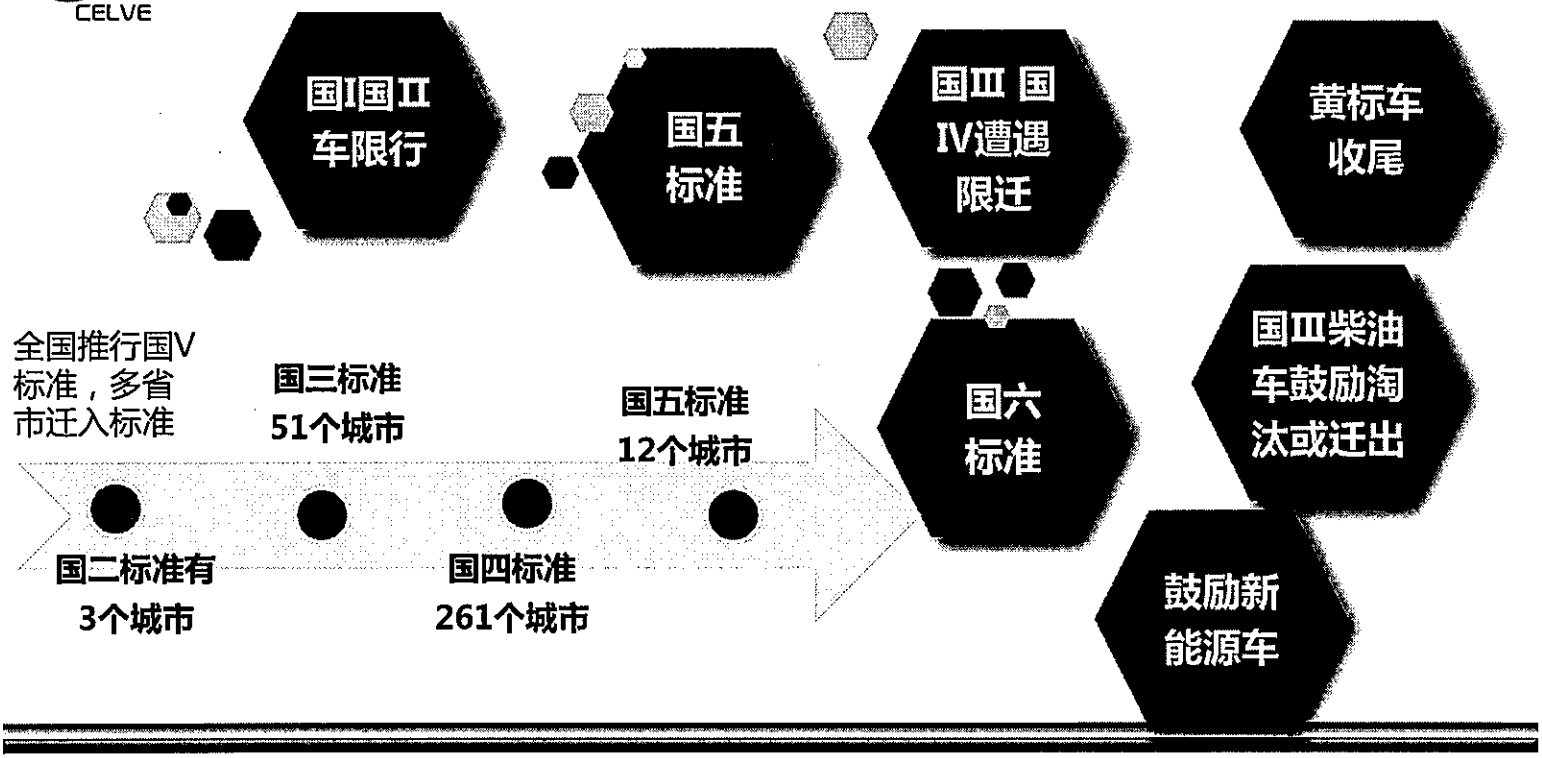
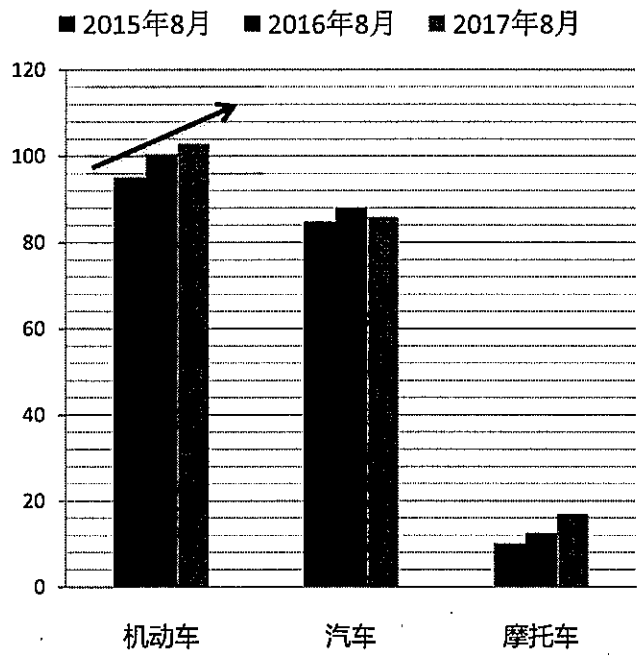
2017排放标准 升级加快是大势所趋



2017年前8个月回收情况分析



2017年 冰火两重天 政策是看点
In 2017 "Ice and snow two days" policy is important

利好 good

黄标车、国I国II在内的老旧汽车报废淘汰工作与淘汰监管力度的不断加强，2017年报废车回收由量转化为质。非法回收拆解企业生存空间被压缩.

北京	天津	深圳（方案）
国I国II 补贴4000-12000 国III柴油车 淘汰或迁出最高 补10万元	国I国II 2500-8000	国I国II 2000-20000
	南京 国I 2750-7500	杭州 国III柴油车 4000-40000

国I国II淘汰方案将陆续出台……。

利空 bad

环保监管力度加大，中频炉停产已成定局，汽车板散料、矽钢片、刨花等料型一时间销售渠道受阻，库存增加

中国再生资源回收利用协会
报废车回收拆解与再利用分会
CELVE China scrap automobile recycling, dismantling and reuse branch

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第三部分 行业政策简析

报废汽车回收管理办法征求意见 技术规范征求意见 生产者责任延伸制度

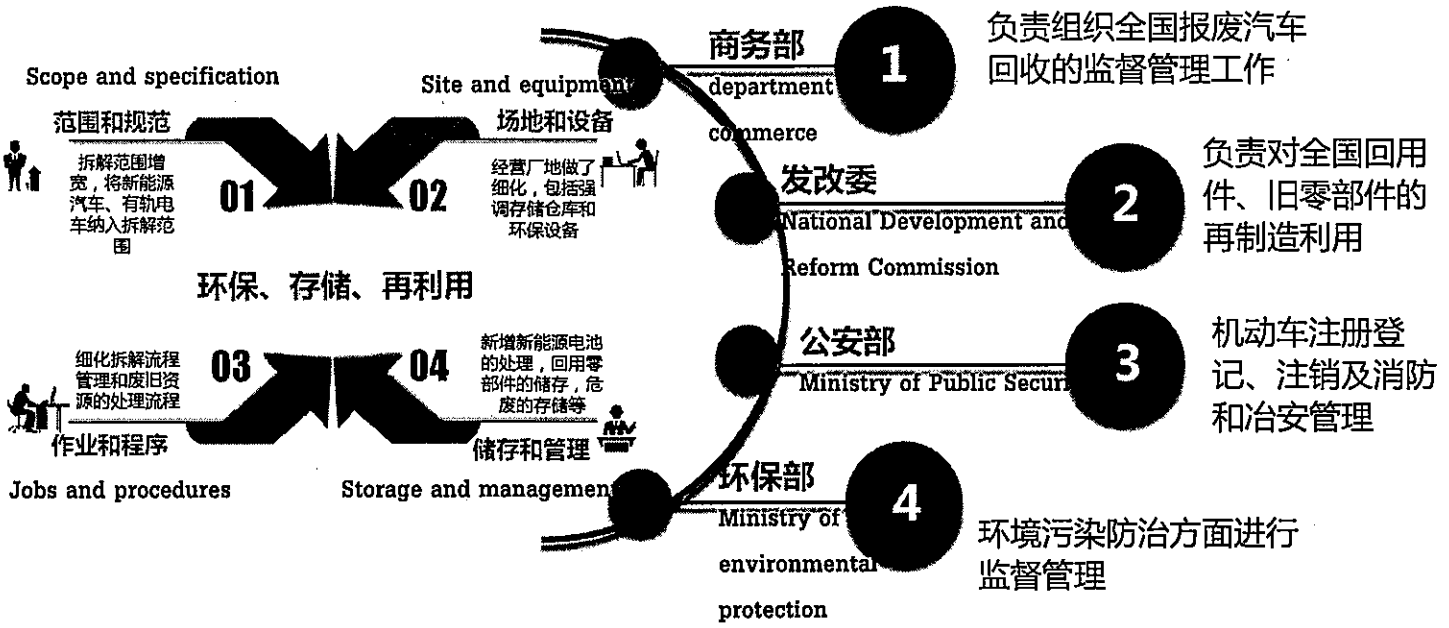
➢日前修订工作已进入最后阶段，重点推进三方面改革：

一是取消报废汽车回收拆解企业总量控制合理规划布局的要求，实行先照后证的制度，

二是允许旧件进入流通，开展绿色汽车消费。

三是废除报废机动车的收购价格，参照废旧金属价格计价的规定，市场主体自主协商定价。

政策与行业发展均在变化过程中



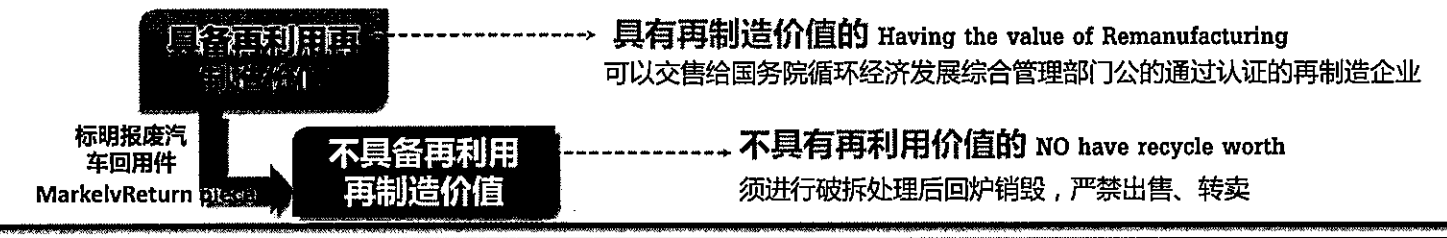
对拆解能力划分为6档

各地区依据汽车保有量划分为6档，单个企业拆解能力标准车型为GA802中的小型载客汽车，其他车型依据重量换算。(以正式出台文件为准，以下为参考）

地区类型	地区汽车保有量 Regional car ownership （万辆）	地区报废汽车总拆解能力 Scrap car dismantling capacity （辆）	单个企业拆解能力（辆） Dismantling capability of a single enterprise
I档	超过500	200000	不低于30000
II档	200（含）-500	150000	不低于20000
III档	100（含）-200	60000	不低于10000
IV档	50（含）-100	30000	不低于7000
V档	20（含）-50	15000	不低于5000
VI档	0-20	6000	不低于2000

新政策中新增新能源车与废旧零部件回收管理（征求意见）

New policy of new energy vehicles and waste parts recycling management (for comments)



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第四部分 目前市场存在的问题

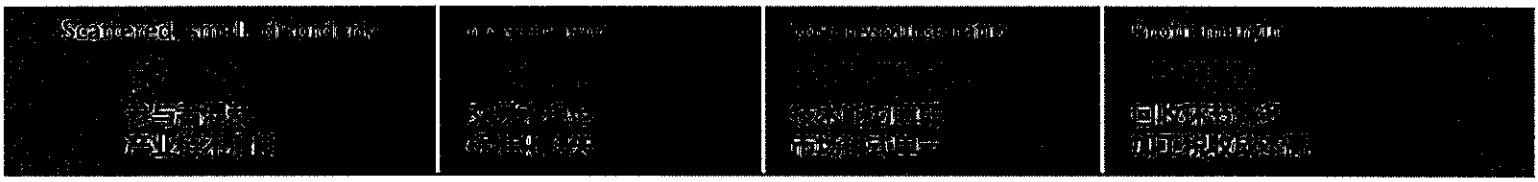
企业要求 作业程序 资源再生利用 盈利模式

- 拆解技术普遍处于低端水平
- 回收市场乱象丛生，非法拆解企业“抢饭碗”
- 税负重 17%以上的税负
- 用地难 环保压力行业不能被正视
- 盈利模式单一，企业运营成本增加

CELVE

· 新势力的加入，打破传统，改写行业模式是关键

The new forces join, break the tradition, rewrite the industry model is the key



行业闭塞！信息不透明！

盈利困难！业务模式单一化！

专业技术缺失！行业无序竞争！

环保.....

改写传统

传统行业存在危机状况与市场机遇

商业环境闭塞？

交易模式单一？

解决核心问题，如何打通产业链.....

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第五部分 报废车行业发展趋势

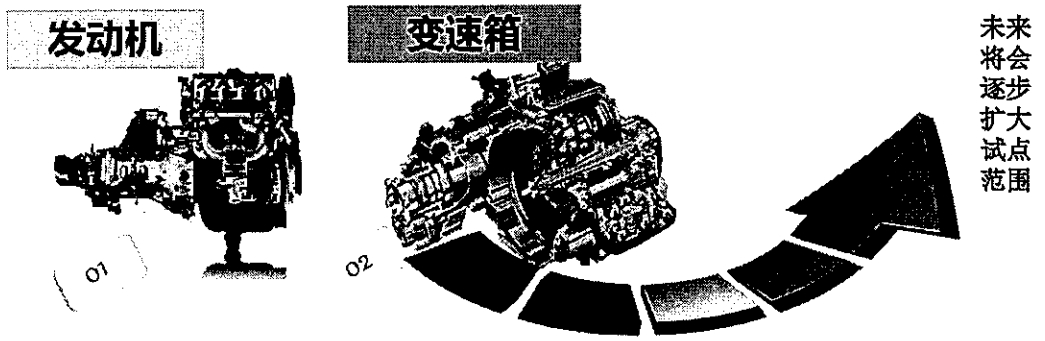
改变市场结构 增强企业管理模式 强化拆解技术 建立行业规范标准

从车辆注销，到报废车回收拆解，垃圾处理、再到市场资源化交易等环节均需要国家和地方出台配套政策，规范市场，引导行业健康、有动力的发展方向。

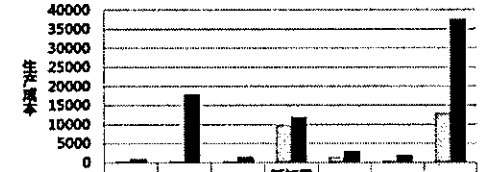
基于全生命周期理论，从回收原材料升级为再生利用零部件，大幅提高了报废汽车回收价值。同时，再生零部件进入新车或维修市场，相比新零件可节约大量能源和原料消耗，符合社会发展方向。

国家鼓励发展再制造，增加零部件的循环利用率

The State encourages the development of remanufacturing,Increase the utilization rate of parts and components

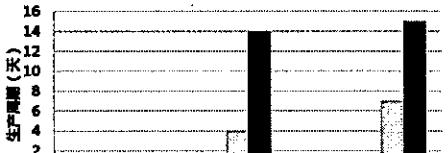


再制造发动机与新发动机生产成本比较



	设备费	材料费	能源费	新加零件费	人力费	管理费	总计
再制造发动机	400	300	300	10000	1600	400	13000
新发动机	1000	18000	1500	12000	3000	2000	37500

再制造发动机与新发动机的生产周期对比



	拆解时间	清洗时间	加工时间	装配时间	生产周期
再制造发动机	0.5	1	4	1.5	7
新发动机	0	0.5	14	0.5	15

生产者延伸制度

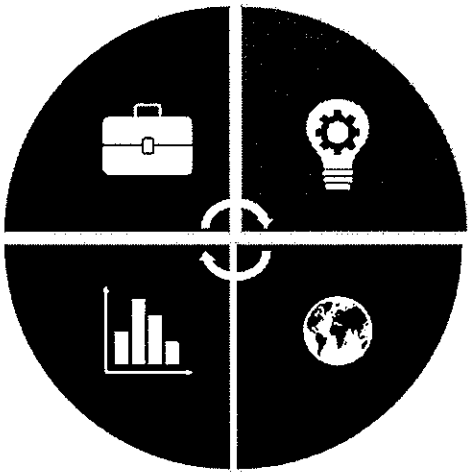
生产企业参与到回收环节，并实施相应的责任制度

Producer extension system

技术改变拆解路线

新的技术创新，新的拆解规范将真正提升拆解行业水平

Technology change dismantling route



五大总成解放

新政策将以市场模式为发展重点，对回用件和五大总成松绑

Five main assembly Can sell

政策鼓励市场化

政策将引导市场定价，放开资质，鼓励创新商业模式

Policies encourage Marketization

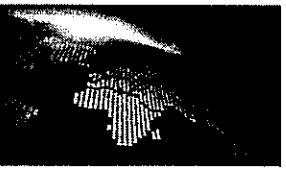
结束语

Concluding remarks

China Resource Recycling Association

中国再生资源回收利用协会
报废车回收拆解与再利用分会

CELVE China scrap automobile recycling, dismantling and reuse branch



报废车分会专业、贴心、与时俱进

- 行业职业培训
- 企业考察学习
- 回用件流通标准

↔ 服务企业 定制标准 促进升级

- 组织专业交流活动
- 完成市场调研工作
- 集合企业建议意见

↔ 服务行业 沟通市场 完善规范

谢谢; Thanks!

演讲人：张莹 YING ZHANG

- 手机：15910908056
- 邮箱：merryzhy@qq.com
- 地址：北京市宣武门外大街甲1号环球财讯中心 B座7层
- 域名：www.crracelve.com www.报废车分会.com

Options to combine metal mining from bottom ash and shredder residue

When economy of scale becomes critical

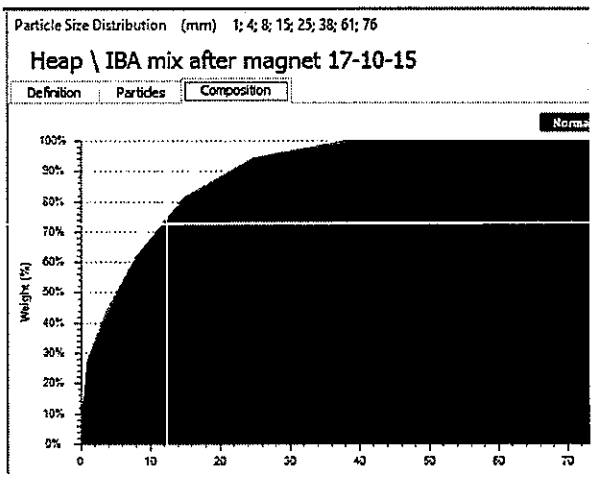
Decistor

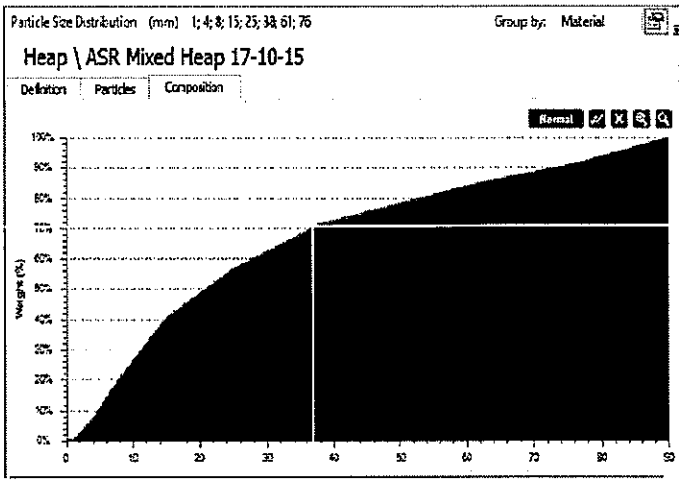
Compare IBA and ASR after magnets

Size < mm	Waste (Plastic)	Waste (Wood +paper +fiber)	Waste (Fe Dirt)	Waste (Glass + Minerals)	Aluminum	Zinc / Copper / Brass	Wires (ICW)	Circuit Boards (ICB)	Stainless Steel	Ferrous	Total
8.00	92.50	50.27	[illegible]		1.37	1.16	0.31		0.14	2.06	206.3
15.00	82.69	44.94	[illegible]		6.47	3.92	1.38		0.16	6.67	198.6
25.00	75.30	32.46	[illegible]		16.46	4.11	2.10		1.16	7.87	161.9
38.00	69.12	25.04	[illegible]		25.76	4.40	3.08		2.15	8.59	144.7
61.00	61.71	22.36	[illegible]		24.24	4.25	2.86		2.41	7.67	132.2
76.00	29.99	11.43	[illegible]		13.31	2.56	1.25		3.11	3.29	67.9
150.00	36.47	12.14	[illegible]		18.71	2.66	1.33		8.65	5.74	88.3
Total	447.8	198.6	89.6	58.5	106.3	23.1	12.3	4.1	17.8	41.9	1000.0

	organic	magnetic slag	non mag slag	Al	Cu/Zn, PM	SS	Fe	water	total
0-2 mm	4.9	[illegible]		0.0	1.0	0.0	1.0	78.3	295.6
2-12 mm	4.9	[illegible]		2.0	1.0	0.0	1.0	39.2	297.5
12-30 mm	4.9	[illegible]		2.0	3.4	0.0	1.0	22.5	231.5
30-100 mm	4.9	[illegible]		7.3	0.0	0.1	1.0	4.9	67.6
100-300 mm	4.9	[illegible]		0.0	0.0	0.1	0.0	1.0	29.5
>300 mm	4.9	[illegible]		0.0	0.0	0.0	0.0	1.0	78.3
total	29.4	141.9	660.7	11.7	5.4	0.2	3.9	146.8	1000.0

Compare IBA and ASR: PSD

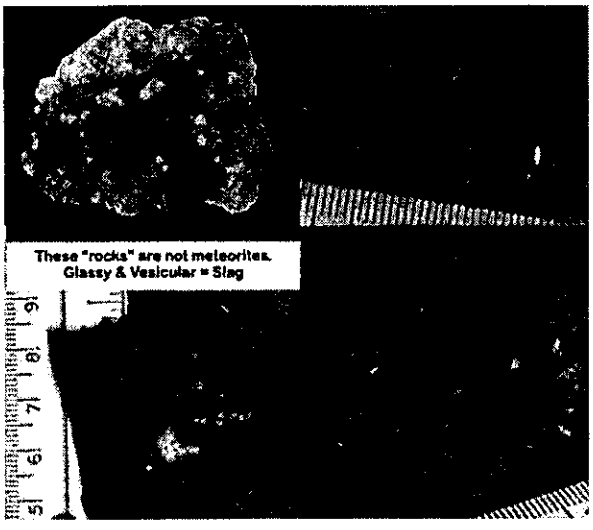




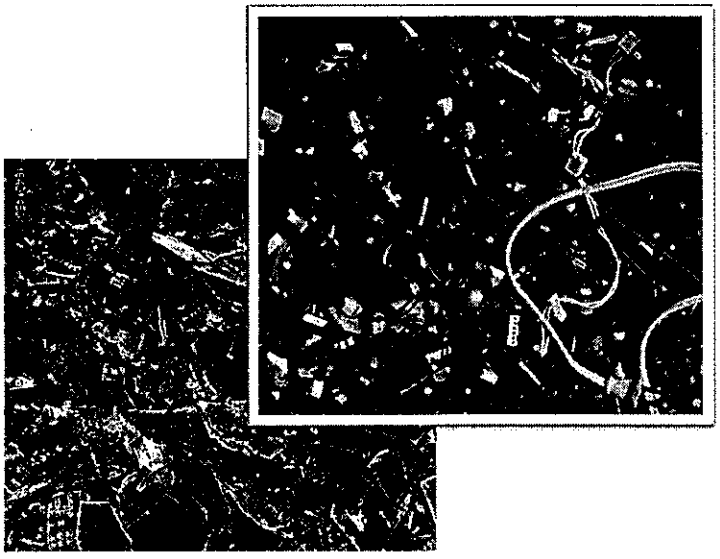
More fines

Compare IBA and ASR: Joint particles

IBA: slags and oxides

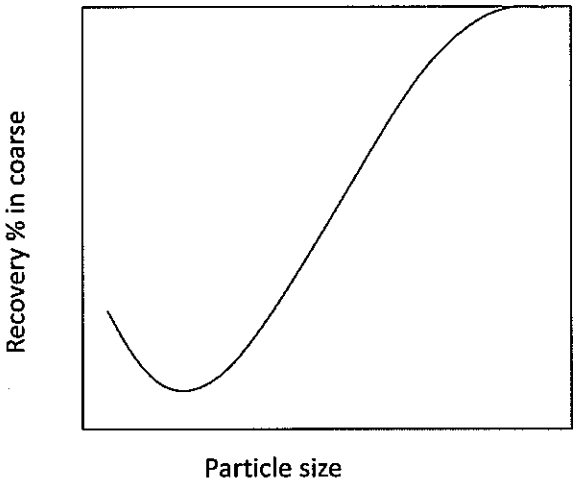


ASR: ICW and ICB



Compare IBA and ASR: Loosely joint particles

IBA: sticky fines



ASR: metal sticks to organics

Would mixing of IBA and ASR be a solution?

Not logical:

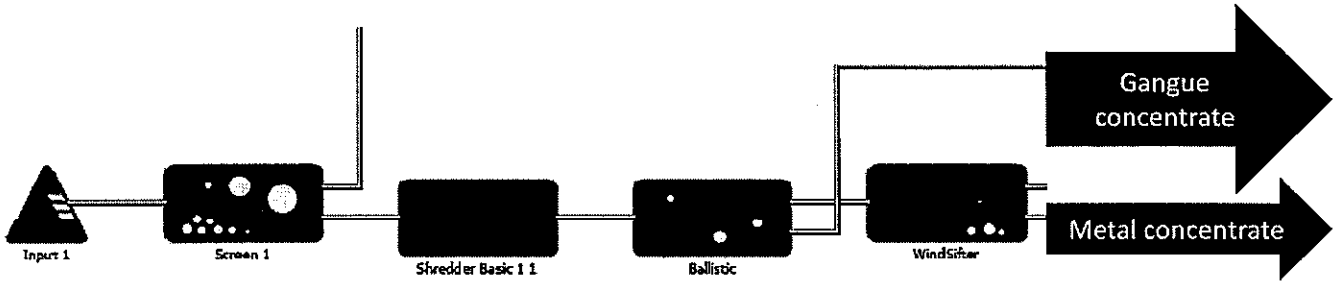
It does not help each other

a. Difference in moisture content: 15% vs 3% moisture
b. Difference in PSD 50% vs 25% < 4 mm
c. Difference in 'gangue' materials: mineral vs organic

Would identical pre-treatment be a solution: Simple "scoop-off" large amounts

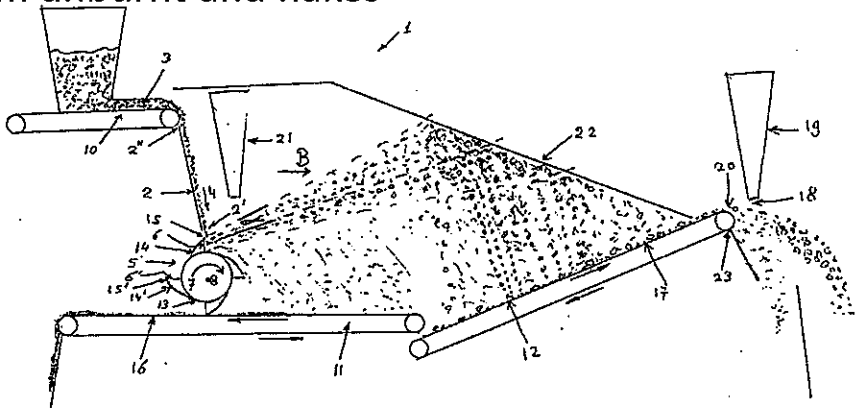
Logical probably:

- Screening off the coarse;
- the combination of liberation, ballistic separation, wind sifting scoops off the major amount of 'gangue' for fines.



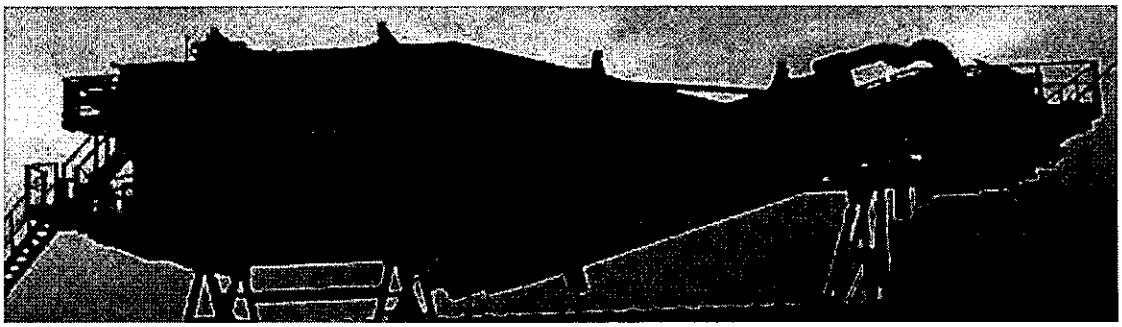
These three unit operations are for < 12 mm IBA combined in Inashco's ADR

- Liberating moisture bindings
- Removal of <1 mm minerals
- Removal of <2 mm unburnt and flakes



With different settings this combination works too for <35 mm ASR

- Liberating some organic/metal bindings
- Removal of <1 mm minerals
- Removal of light organics



After removal of easy NF metals with Eddy current separators: Further treatment:
~ 25% of input with ~ 10% NF-grade:
Scoop out the non ferrous and Precious metals

Various possibilities and various sequences.

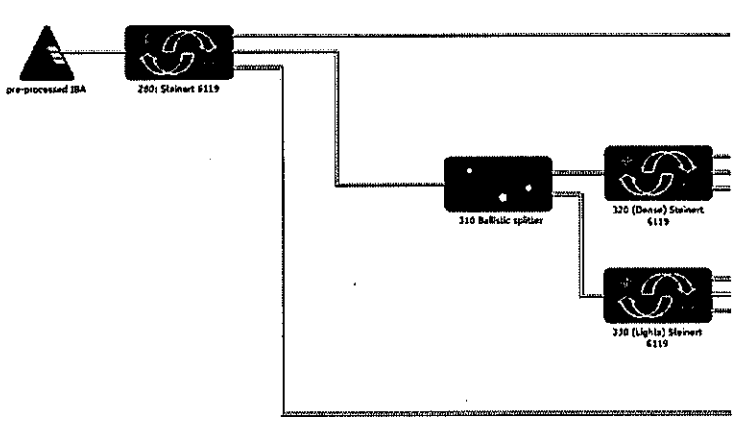
- Issue for IBA (magnetic) joint slag ~ 10%
- Issue for ASR: ICB and ICW containing Copper and Precious Metals

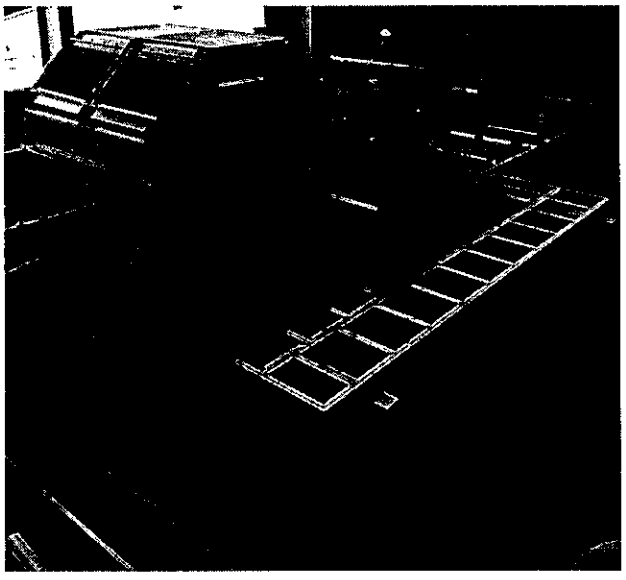
A controversial liberation options for ASR: "Thermal organics removal": feed it to an incinerator. The output becomes part of the IBA

Further treatment:
"scooping out" non ferrous and Precious metals

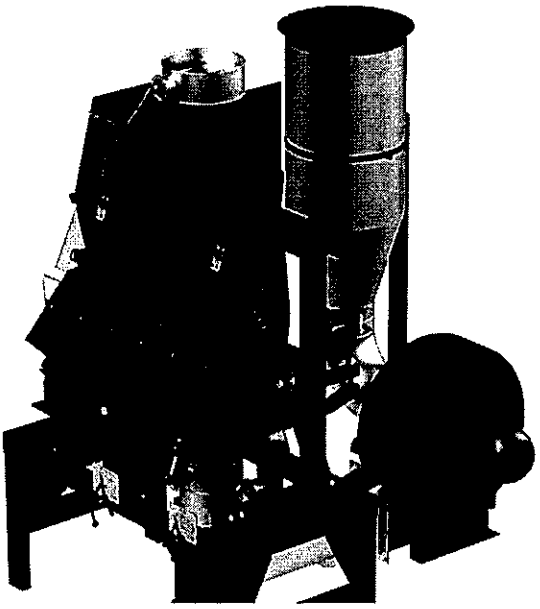
1. Further eddy current separation, combined with detailed ballistics;
2. Dry gravity separation, after crushing: relative material density;
3. Wet gravity separation, after screening: relative material density;
4. Heavy medium separation, after screening. (NOT Flexible enough);
5. Magnetic density Separation of fines;
6. Selective leaching of Copper and Zinc.

1. Further detailed EC-separation and ballistics

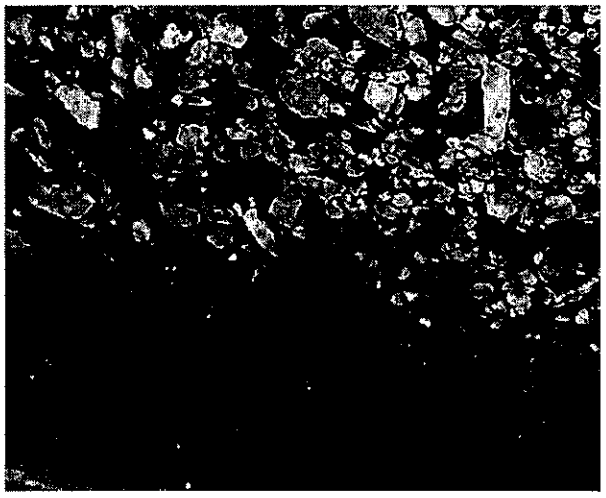




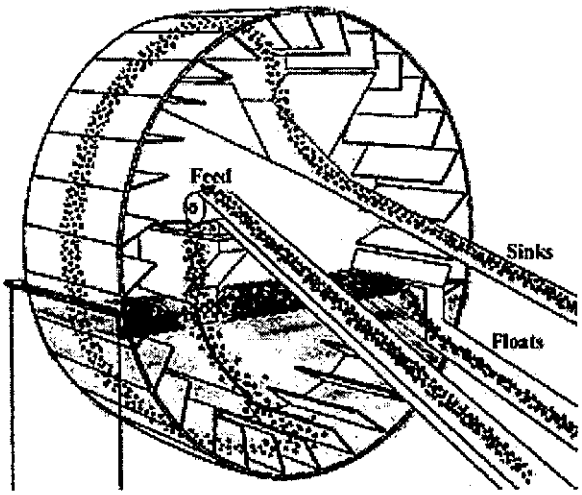
2. Dry gravity separation

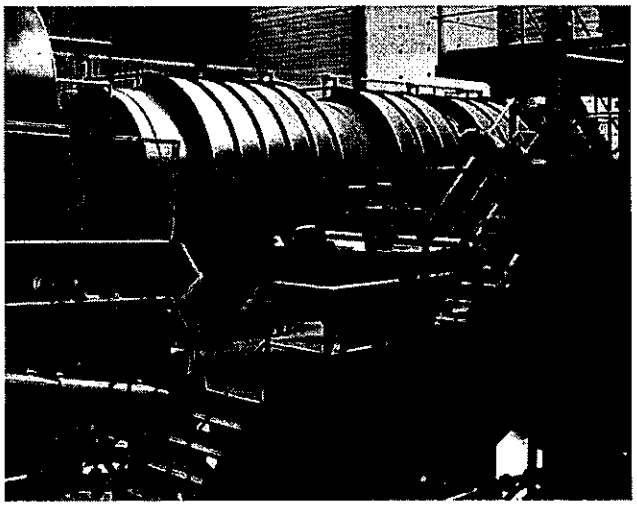


3. wet gravity separation: jig

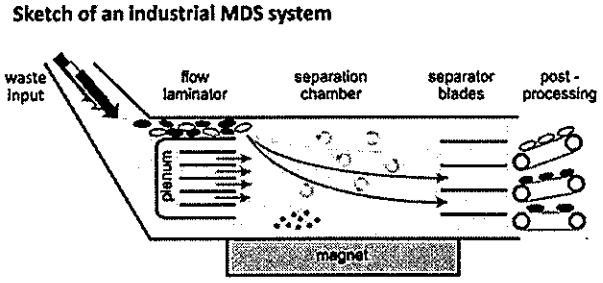


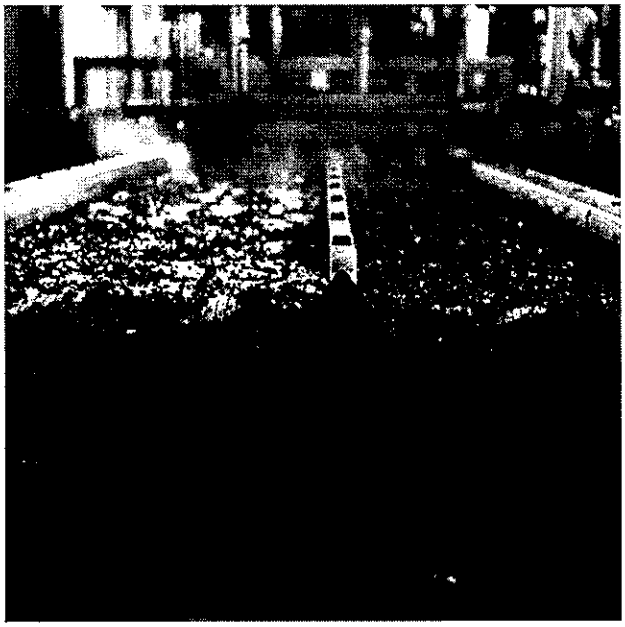
4. Heavy media separation



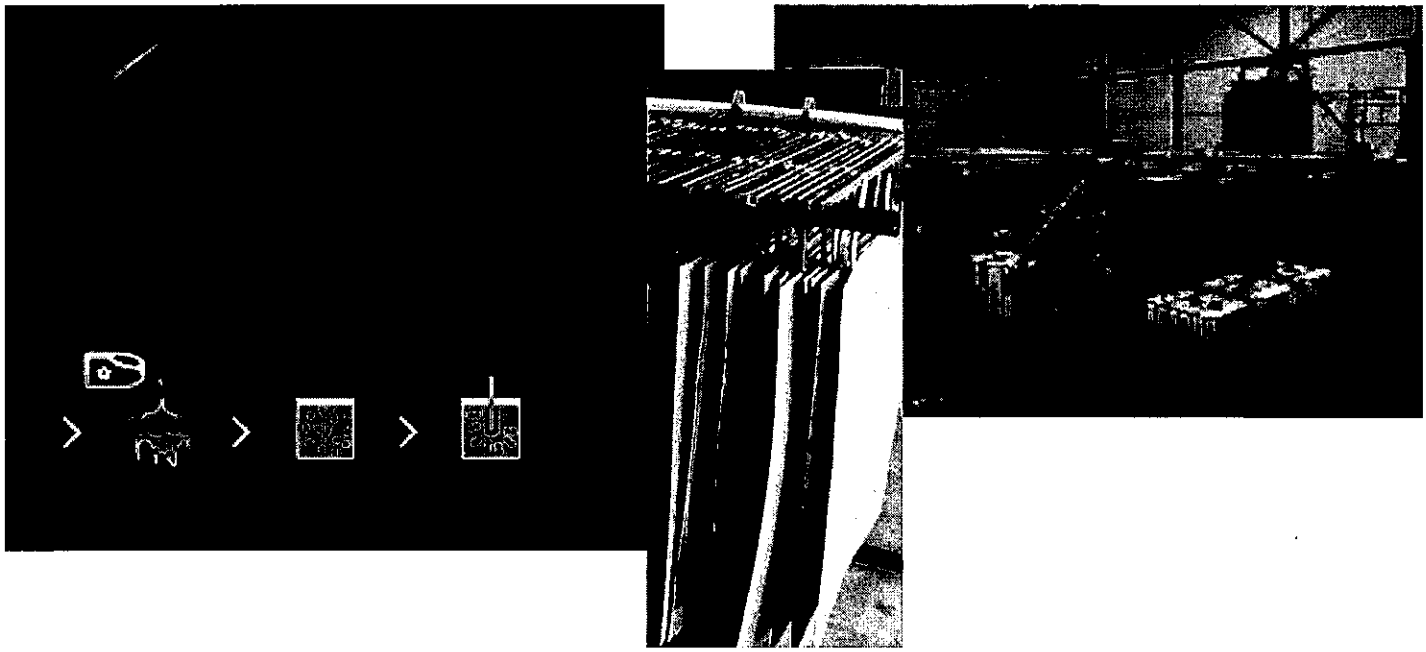


5. Magnetic density separation (MDS)





6. Selective leaching & electro winning

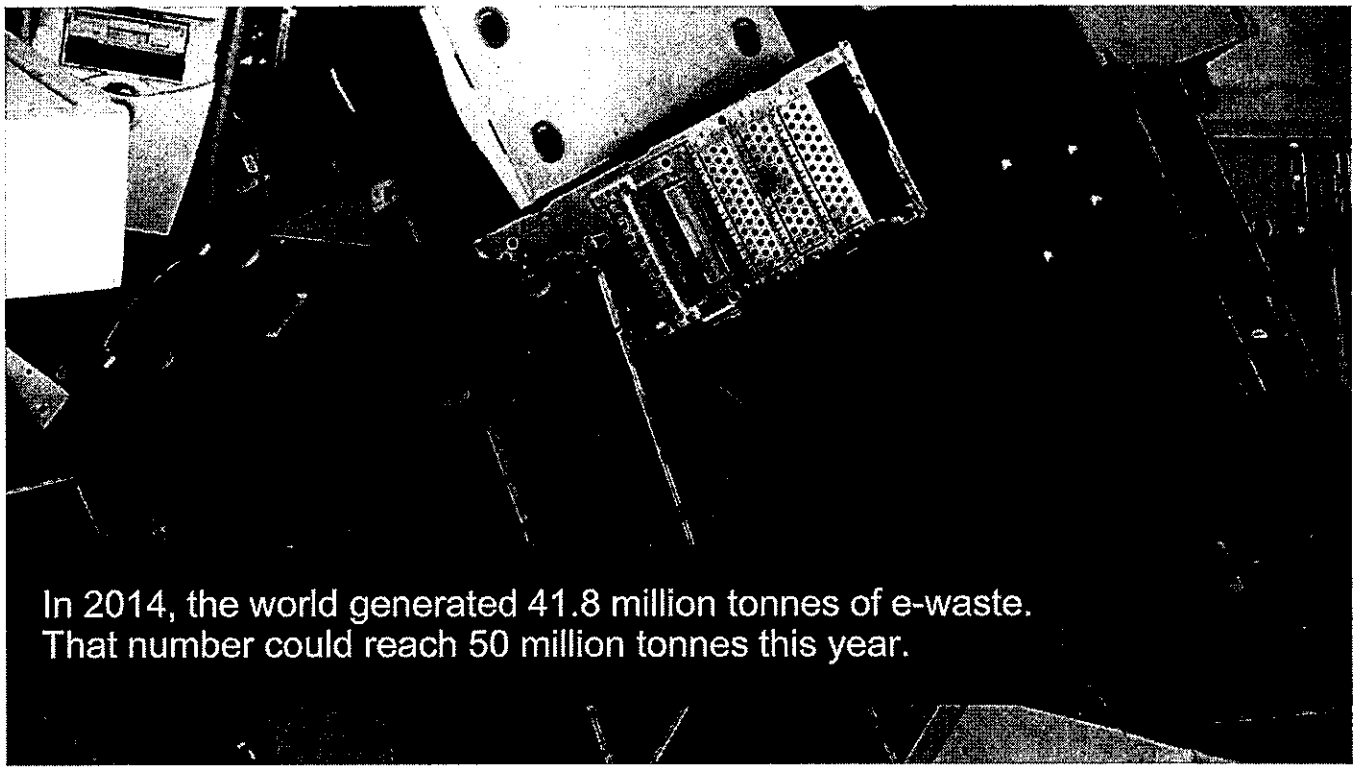


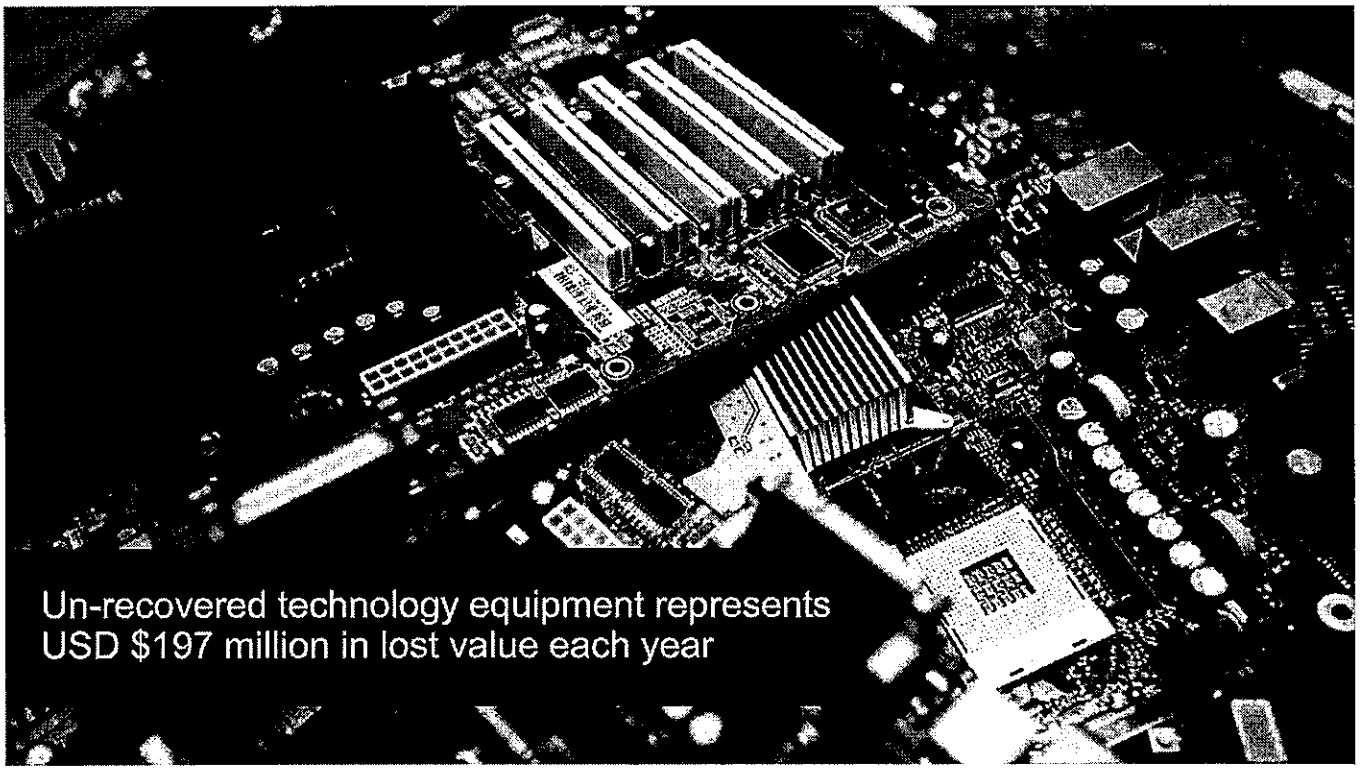
Comparison: typical numbers

Technology	Particle size (mm)	Feed rate (t/h)
1 EC's	2 - 50	10 - 40
2 Dry gravity	2 - 12	1 - 10
3 wet gravity (jig)	2 - 30	5 - 30
4 heavy media	10 - 50	10 - 30
5 MDS	2 - 12	2 - 10
6 selective leaching	0 - 40	2 - 10

DESIGNING IN THE CIRCULAR ECONOMY

Vivian Tai, Head of APJC Region
Global Environmental Affairs & Producer Responsibilities

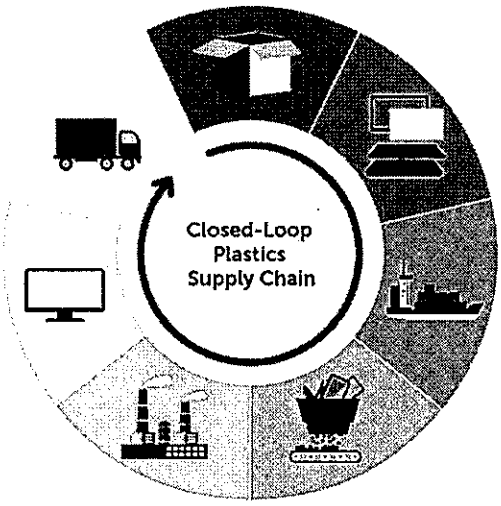




Running the world's largest electronics recycling program

With operations in 83 countries/territories · 1.76B lbs. recovered since 2007 · Functional products resold or donated to charity · Full traceability of materials

Results of closed-loop plastics supply chain efforts



11M lbs.

Of plastic parts created through closed-loop process since 2014

91

Products using closed-loop plastics, incl. monitors and OptiPlex desktops

11% smaller

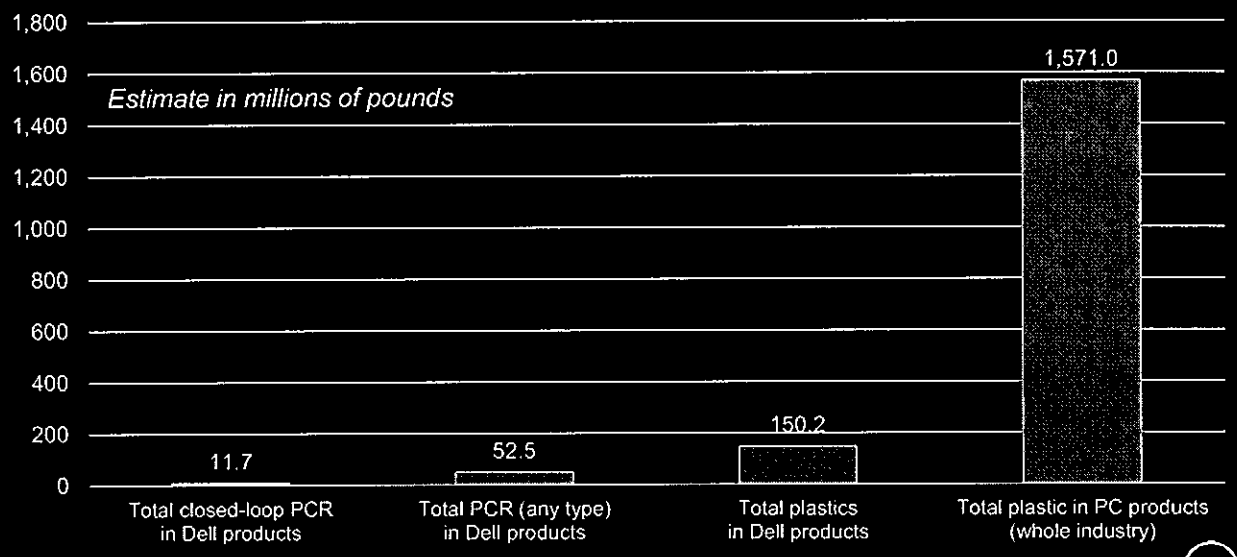
Carbon footprint for these parts compared to using virgin plastics

$1 million

Saved in costs

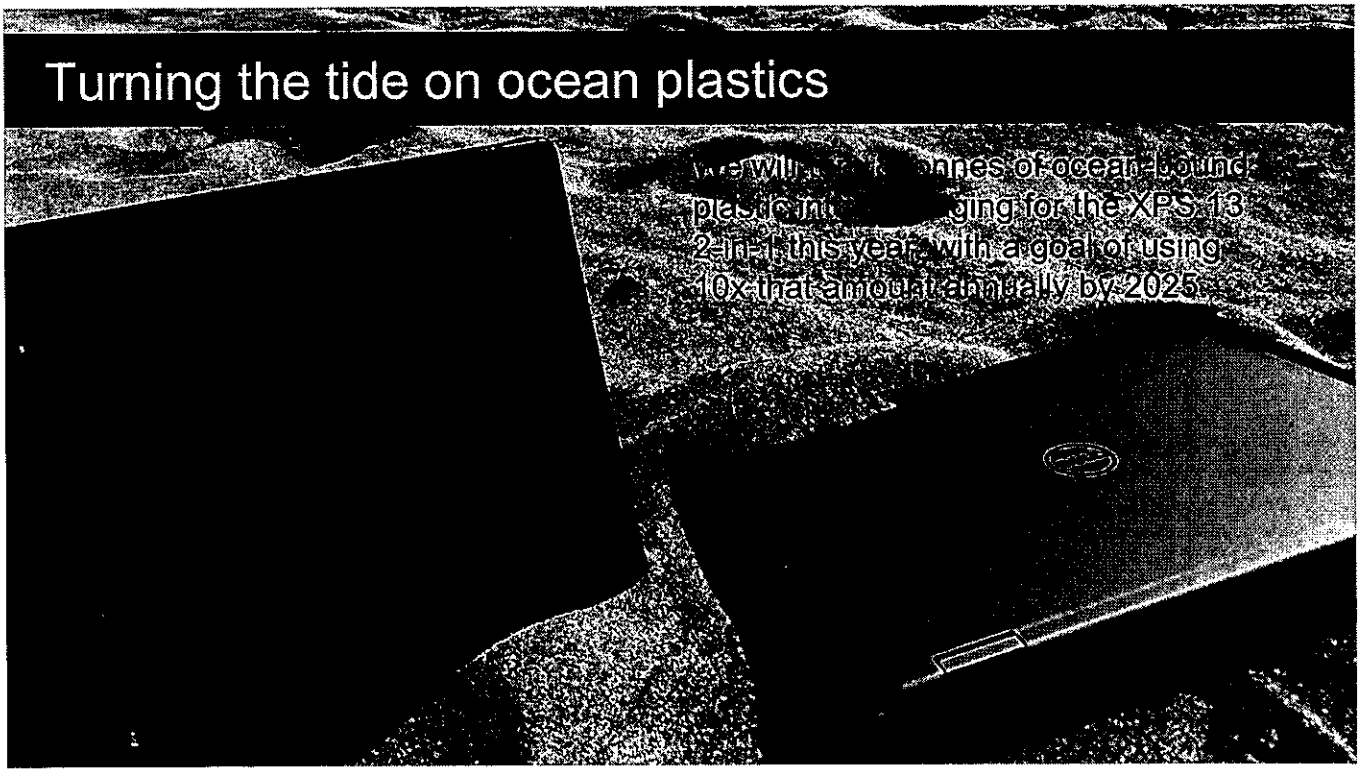
5 of Y

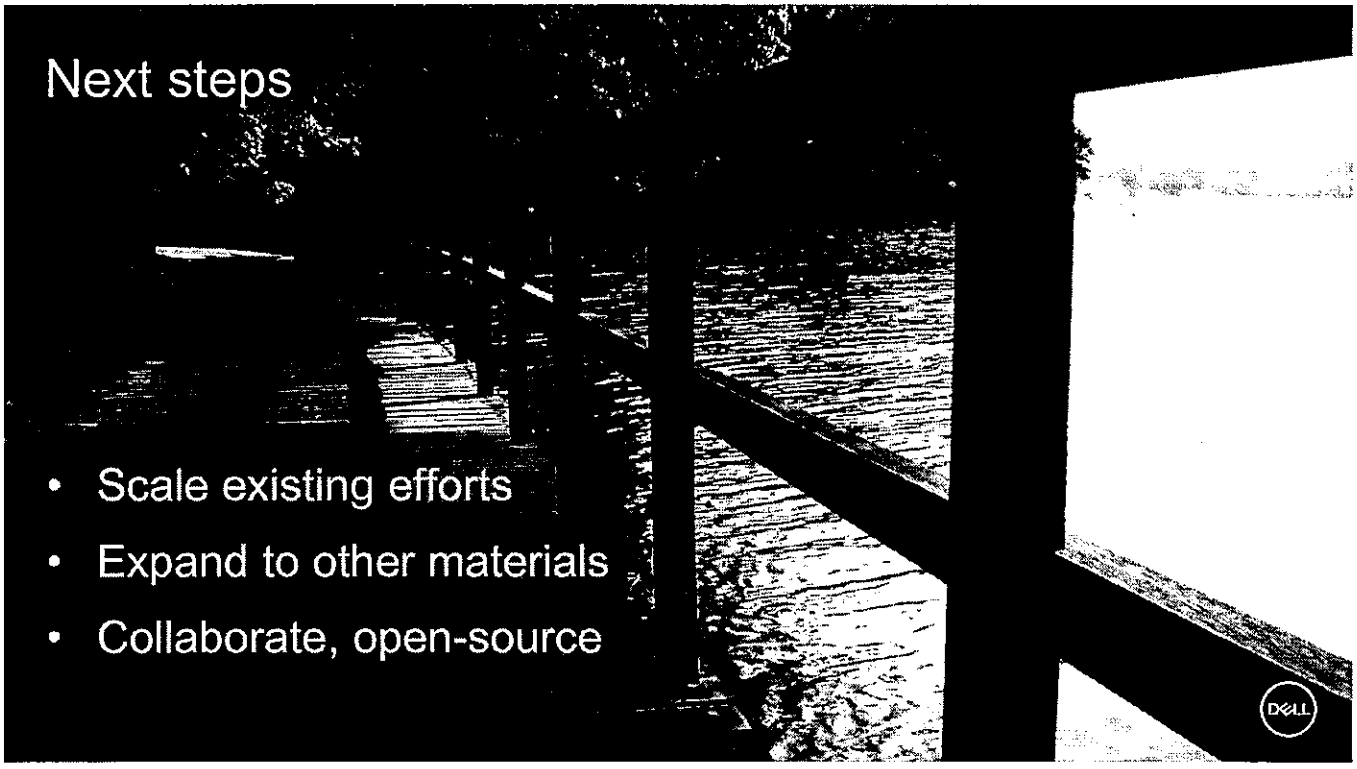
Scaling closed-loop: opportunities to do much more



35% of all plastics used for Dell products is PCR

Turning the tide on ocean plastics




Next steps
• Scale existing efforts
• Expand to other materials
• Collaborate, open-source


JOIN US IN BUILDING
A LEGACY OF GOOD
Visit Dell.com/CSR
Follow us on Twitter: @Dell4Good

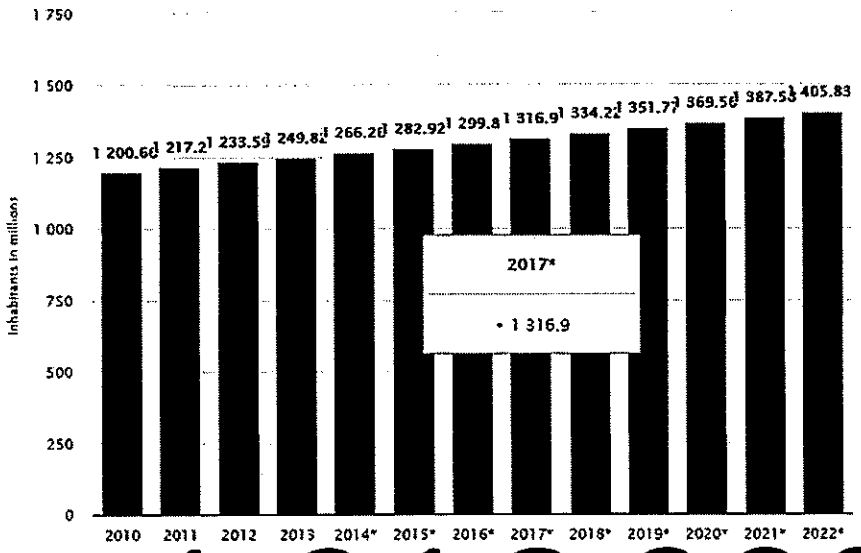
E-waste in India

By: Vijay Mandora
CMD, ECS Environment Pvt. Ltd.
Ahmedabad, INDIA.

World Beyond Tomorrow

INDIA

India: Total population from 2010 to 2022 (in millions)



ABOUT THIS STATISTIC

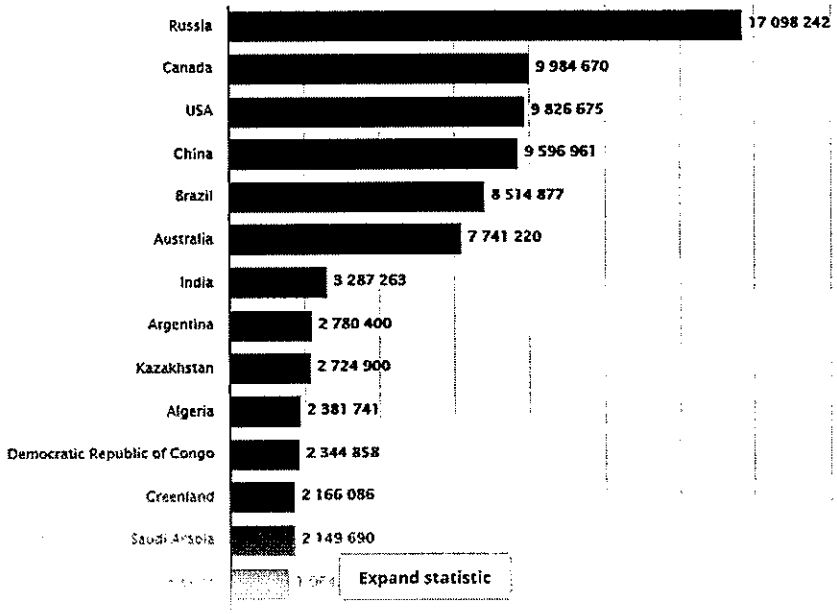
The statistic shows the total population of India from 2010 to 2013, with a forecast through 2022. In 2017, the estimated total population in India amounted to approximately 1.32 billion people.

Total population in India

India currently has the second-largest population in the world and is projected to overtake top-ranking China within forty years. Its residents comprise more than one-seventh of the entire world's population, and despite a slowly decreasing fertility rate (which still exceeds the replacement rate and keeps the median age of the population relatively low), an increasing life expectancy adds to an expanding population. In comparison with other countries whose populations are decreasing, such as Japan, India has a relatively small share of aged population, which indicates the probability of lower death rates and higher potential of the active population

1,316,900,000

The 30 largest countries in the world by total area (in square kilometers)



ABOUT THIS STATISTIC

The statistic shows the 30 largest countries in the world by area. Russia is the largest country by far with a total area of about 17 million square kilometers.

7th

© Statista 2017

India: Gross domestic product (GDP) in current prices from 2010 to 2020 (in billion U.S. dollars)

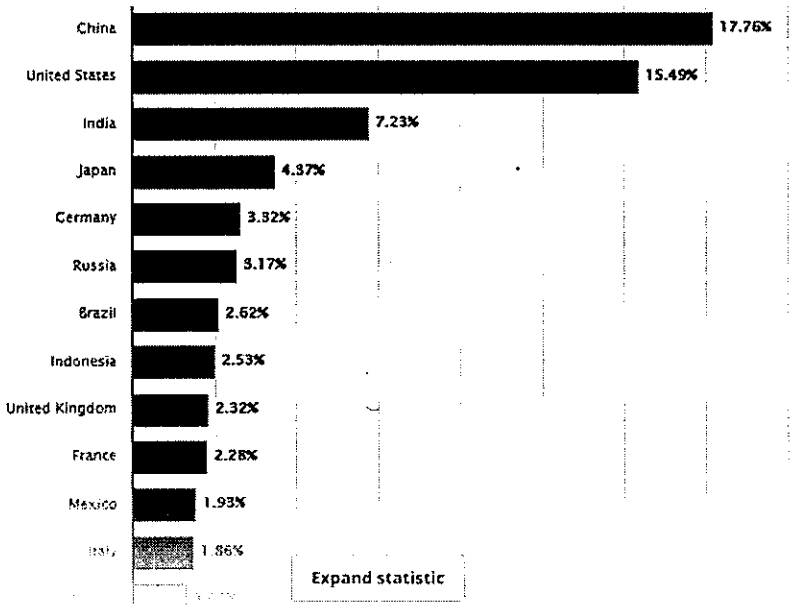
ABOUT THIS STATISTIC

The statistic shows GDP in India from 2010 to 2017, with projections up until 2020. In 2017, GDP in India was at around 2.45 trillion US dollars. See figures on India's economic growth here, and the Russian GDP for comparison.

Show more

2454,460,000,000$

The 20 countries with the largest proportion of the global gross domestic product (GDP) based on Purchasing Power Parity (PPP) in 2016

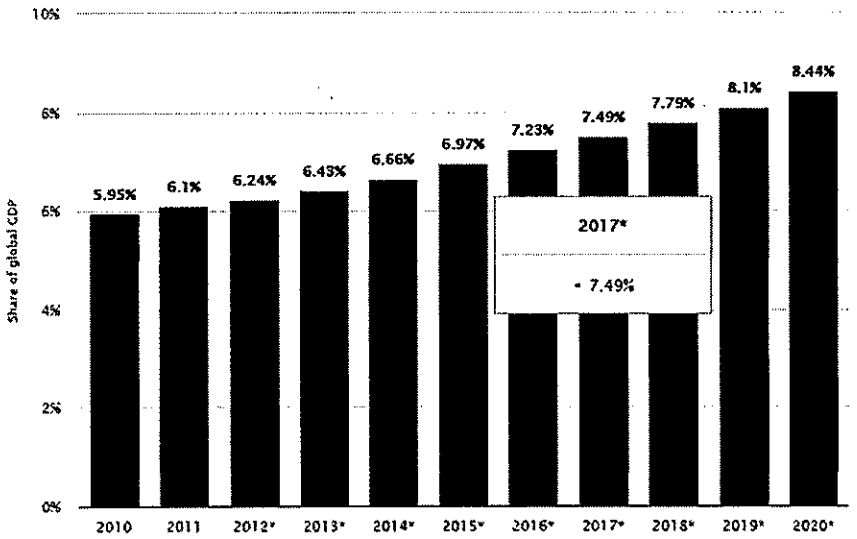


ABOUT THIS STATISTIC

The statistic shows the 20 countries with the largest proportion of the global gross domestic product (GDP) based on Purchasing Power Parity (PPP) in 2016. In 2016, Germany had an estimated share of about 3.32 percent of the global GDP.

3rd

India: Share of global gross domestic product (GDP) adjusted for Purchasing Power Parity (PPP) from 2010 to 2020



ABOUT THIS STATISTIC

The statistic shows India's share of the global gross domestic product (GDP) adjusted for Purchasing Power Parity (PPP) from 2010 to 2011, with projections up until 2020. In 2016, India's share of global GDP (in relation to PPP dollars) was estimated at about 7.23 percent. See GDP of India and India's economic growth for additional information.

7.5%

Space for
Multiple Slides' Animation
on
India & e-waste.

Animated slides will run here.

e-waste in India

By: Vijay Mandora
CMD, ECS Environment Pvt. Ltd.
Ahmedabad, INDIA.

ECS

Space for
HD video on e-waste in India.

Video will run here.

INDIA

THE 5TH LARGEST eWASTE GENERATOR

Overview of e-waste related information

Subject	Unit	Year	Amount	Source
Population	(total inhabitants in million)	2012	1,223.17	IMF WEO
Purchasing Power*				
EEE Put on Market*	(kg per inhabitant)	2012	2.5	UNU-IAS SCYCLE (2015)*
E-waste Generated*	(kg per inhabitant)	2014	1.3	UNU-IAS SCYCLE (2015)*

E-waste Generation of India:

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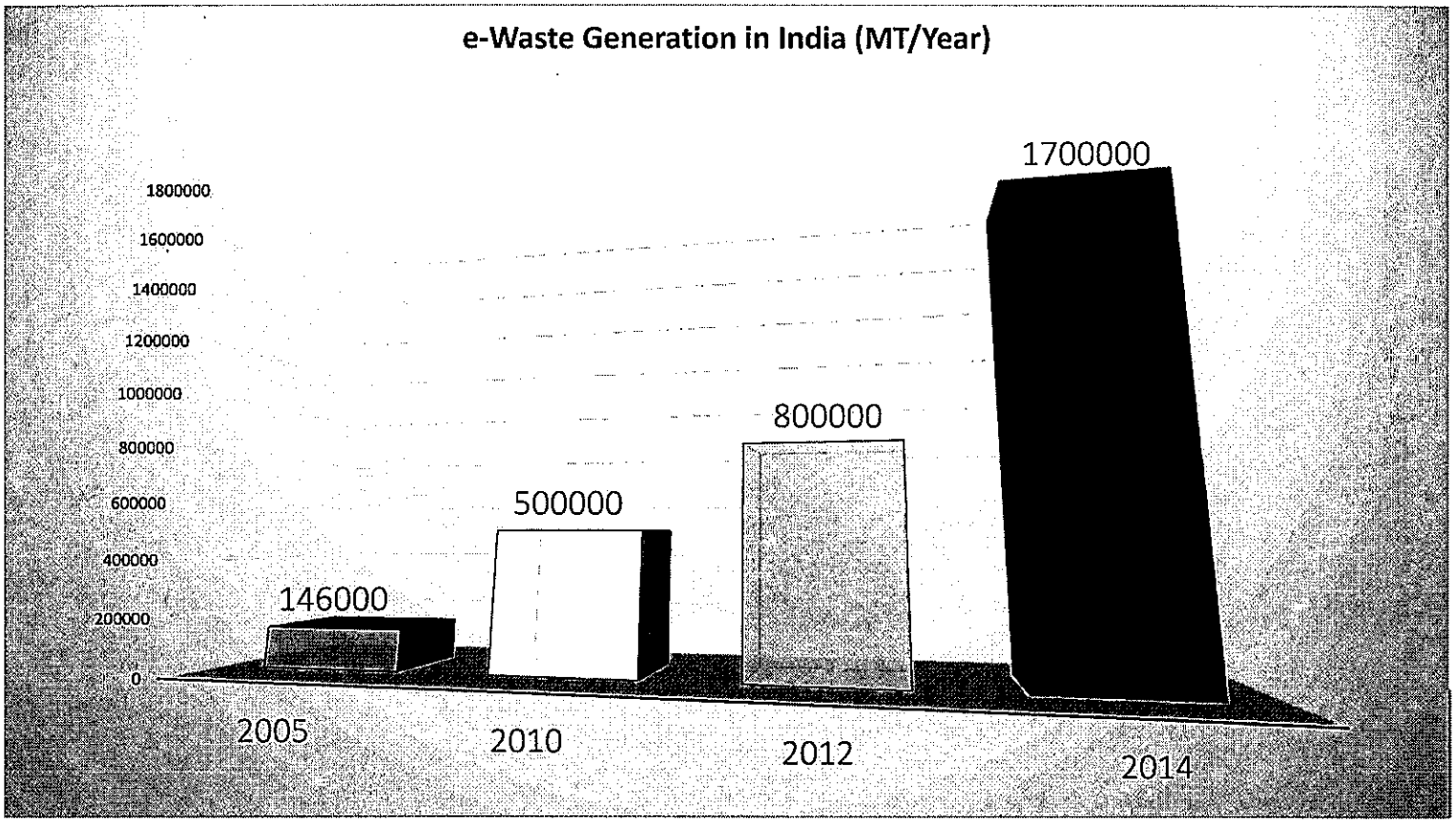
1,700,000

MTA in 2014*

** UN Study*



Assumption for 2017:

ECS

2,500,000

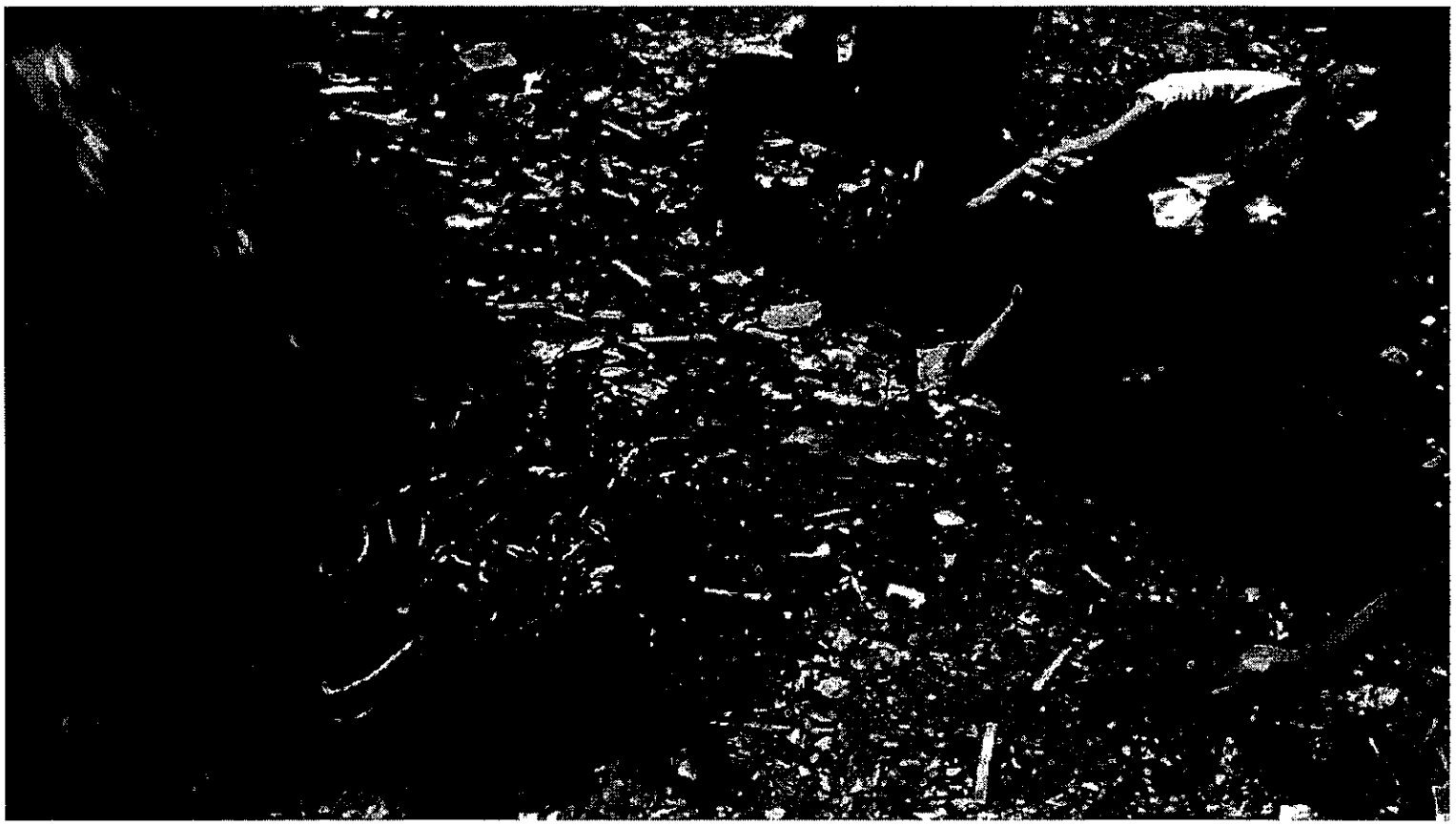
MTA in 2017*

** Assumption made based on UN Study*

Factors behind increase in e-waste

- Large Population
- Growing Population
- Increasing Nuclear families
- Growing rate of education and hence awareness
- Increased affordability
- Improving Lifestyle
- Shorter Product life

Conventional Disposal Process



Conventional Disposal Process

ECS

- Unskilled Manpower
- Mostly under-aged/children and women labor
- No PPEs
- No Training
- No Pollution Control measures
- Mostly located in residential and commercial areas.
- Use of highly Toxic/Poisonous chemicals
- Discard of fumes in open air
- Discard of liquids in drains and open land
- Discard of solid wastes in open land

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Government Initiatives

EPR (Extended Producer's Responsibility)

ECS

[PUBLISHED IN THE GAZETTE OF INDIA, EXTRAORDINARY PART-II, SECTION-3, SUB-SECTION (i)]

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 23rd March , 2016

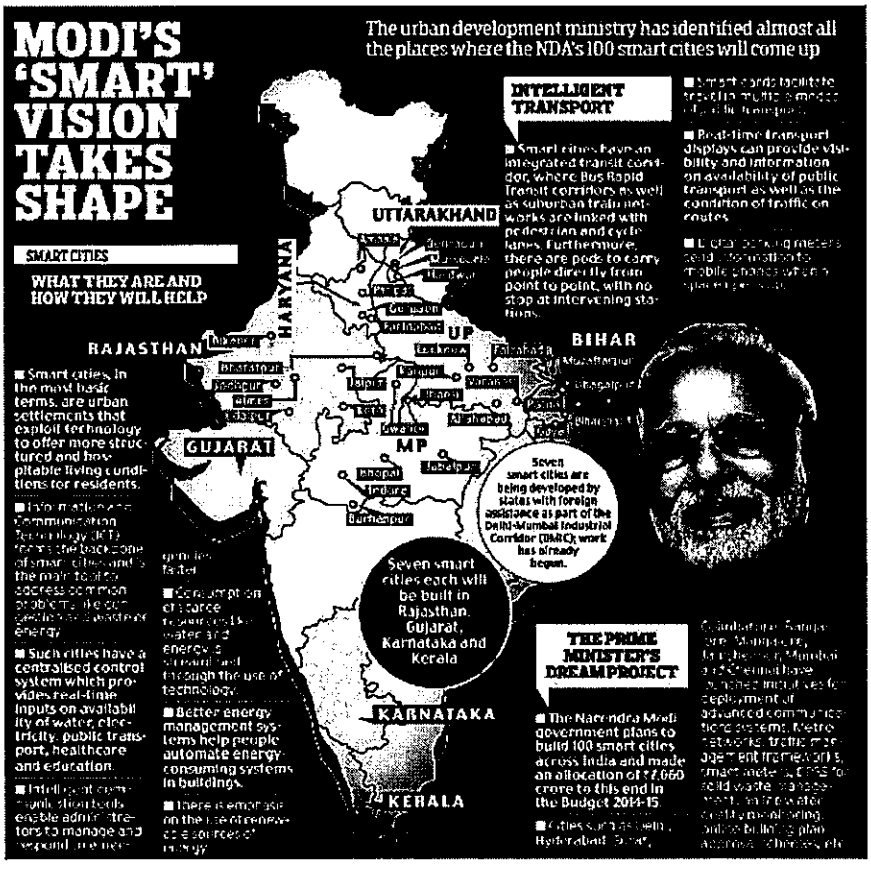
G.S.R 338(E). - *Whereas* the draft rules, namely the e-waste (Management) Rules, *2015, were published by the* Government of India in the Ministry of Environment, *Forest and Climate Change vide* number G.S.R. 472(E), dated the 10th June, 2015 in *the Gazette of India, Extraordinary* Part II, section 3, sub-section (ii) inviting objections *and suggestions from all persons* likely to be affected thereby, before the expiry of the *period of sixty days from the date* on which copies of the Gazette containing the said *notification were made available* to the public;

AND WHEREAS the copies of the Gazette containing the said notification were made *available to the public on the* 10th day of June, 2015;


CLEAN INDIA CAMPAIGN


GMC

Digital India



Smart City

Vadodara: e-waste Project for Smart city

ECS

India's First...

e-waste project for entire city...

Recipient of many National awards...

VADODARA MAHANAGAR SEVA SADAN

Launched by Mr. Narendra Modi.

Executed by: ECS

Ahmedabad: e-waste Project for Smart city

ECS

India's First...

PPP (Public-Private Partnership)
e-waste management project ...

AMDAVAD MUNICIPAL CORPORATION
અમદાવાદ મ્યુનિસિપલ કોર્પોરેશન
ઉદ્યોગ સ્વાશ્રય સેવા
અ. મ્યુ. કો.

Executed by: ECS

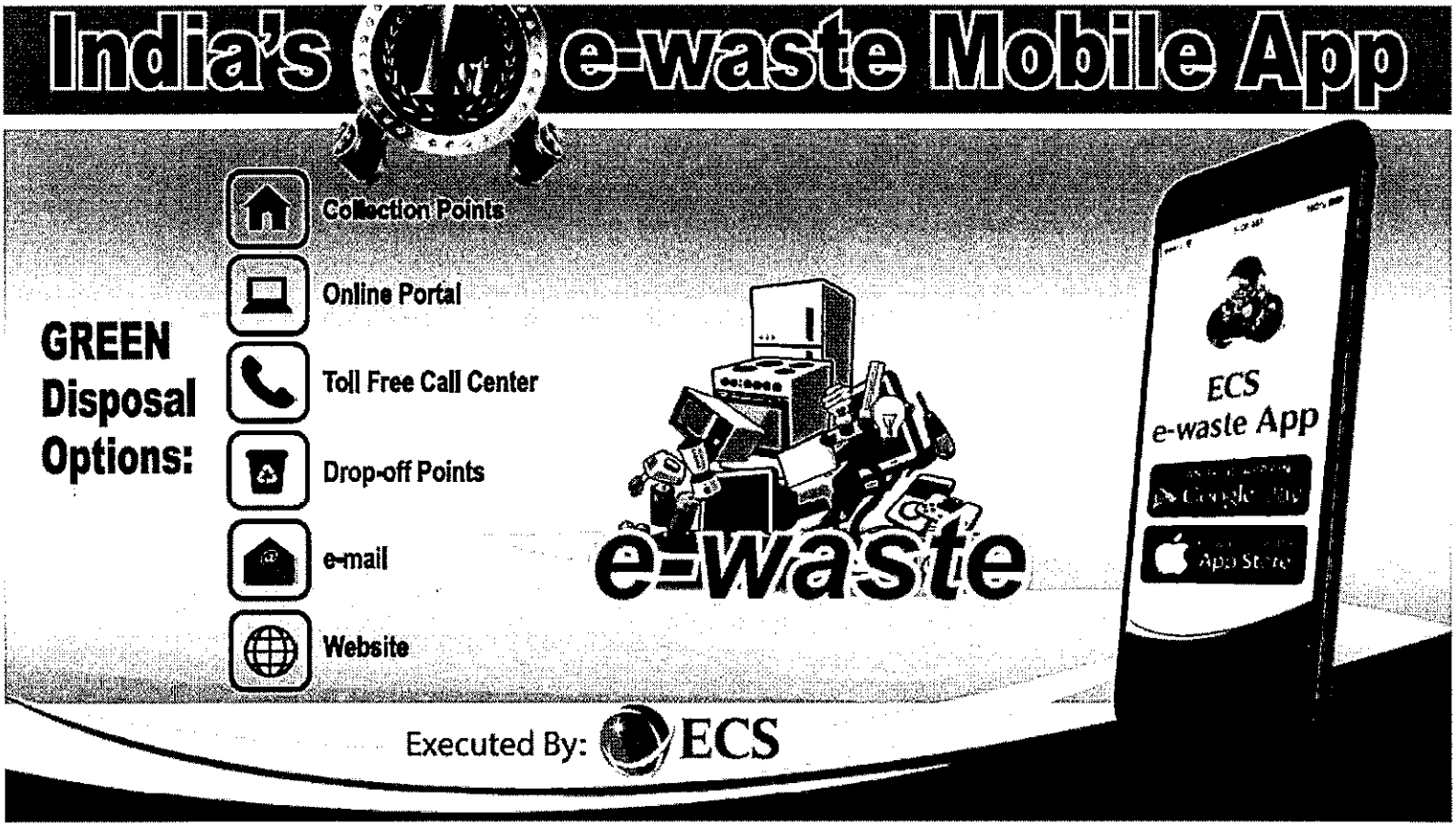
Rajkot: e-waste Project for Smart city

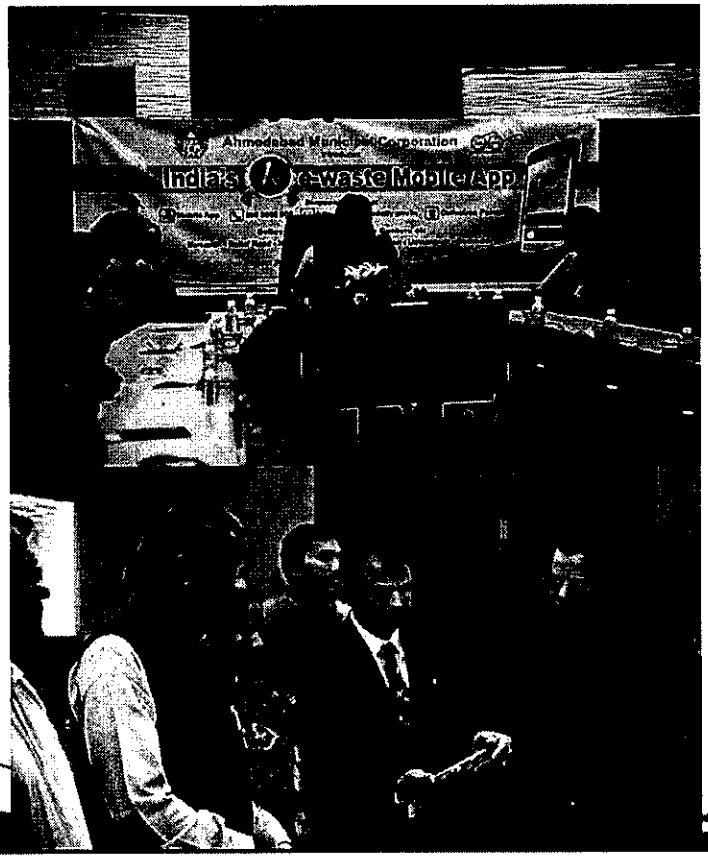
ECS

First...

Long term e-waste project for future ready smart city ...

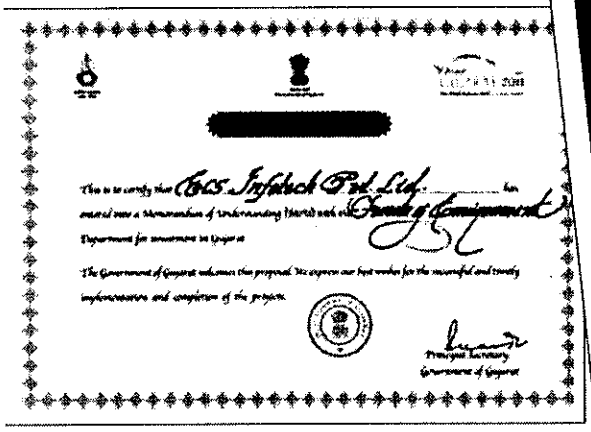
Executed by: ECS

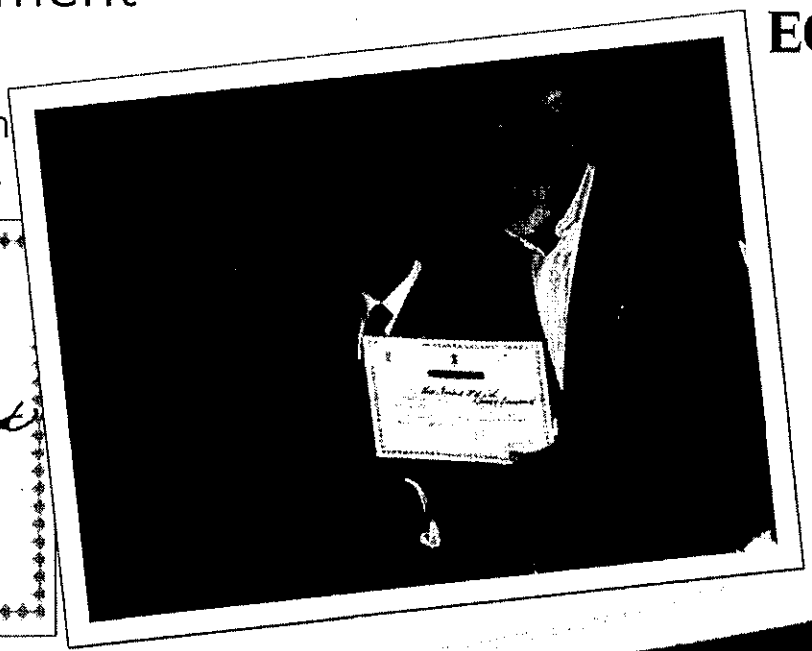




MoU with Government

MoU with Government for investment of Rs. 510 crores in eco-friendly e-waste recycling.





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Space for
HD video on e-waste & ECS.

Video will run here.

ECS® Environment Pvt. Ltd.

One of

India's Leading

Environment Friendly

e-waste Management

Organizations...

Compliance

ECS

ISO 9001

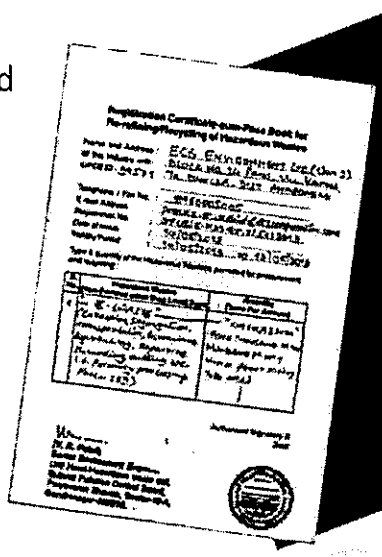
ISO 14001

ISO OHSAS 18001

ISOs and

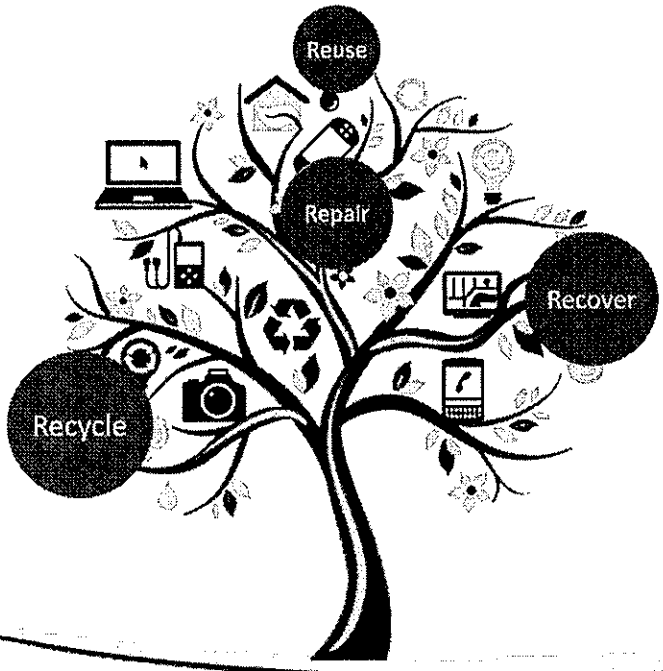
Pollution Control Board

Registration



ECS Business Philosophy

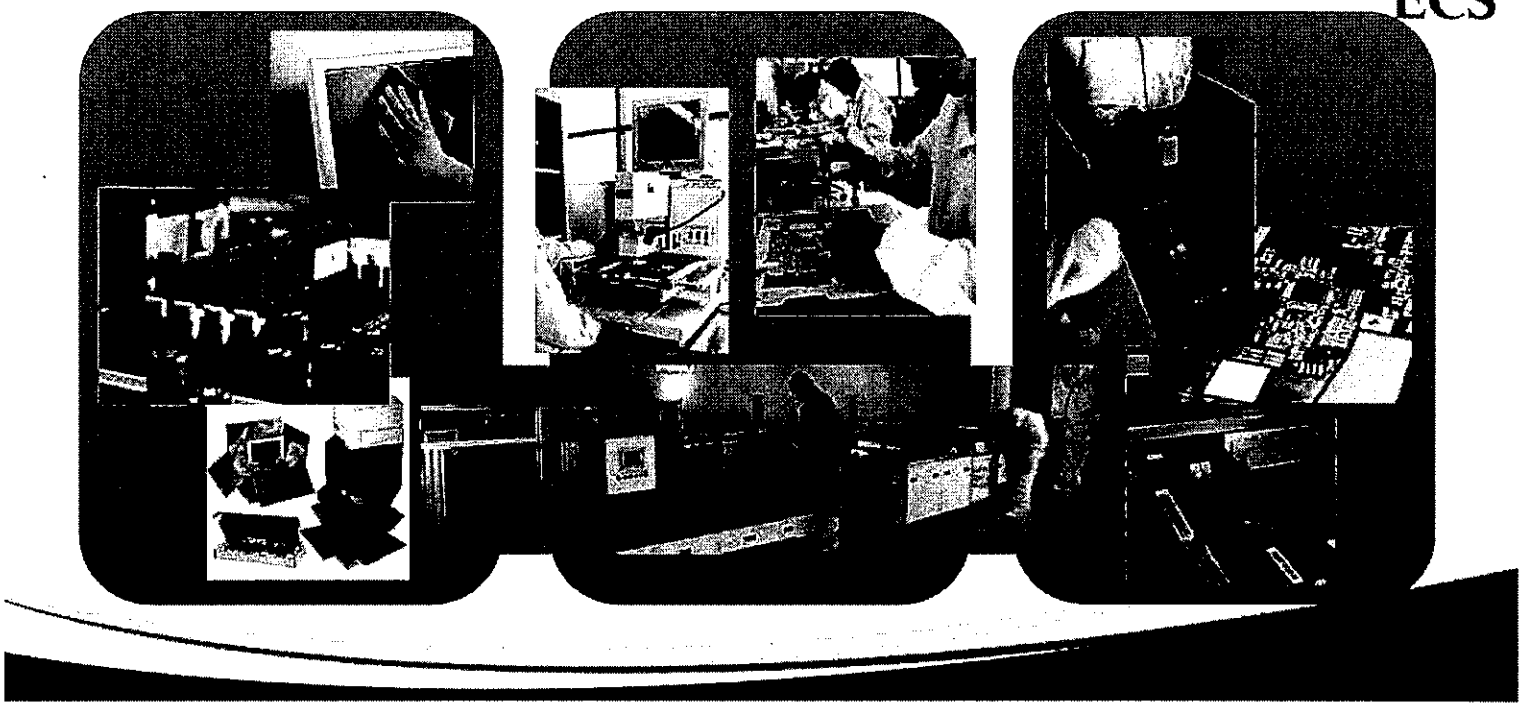
ECS



4R

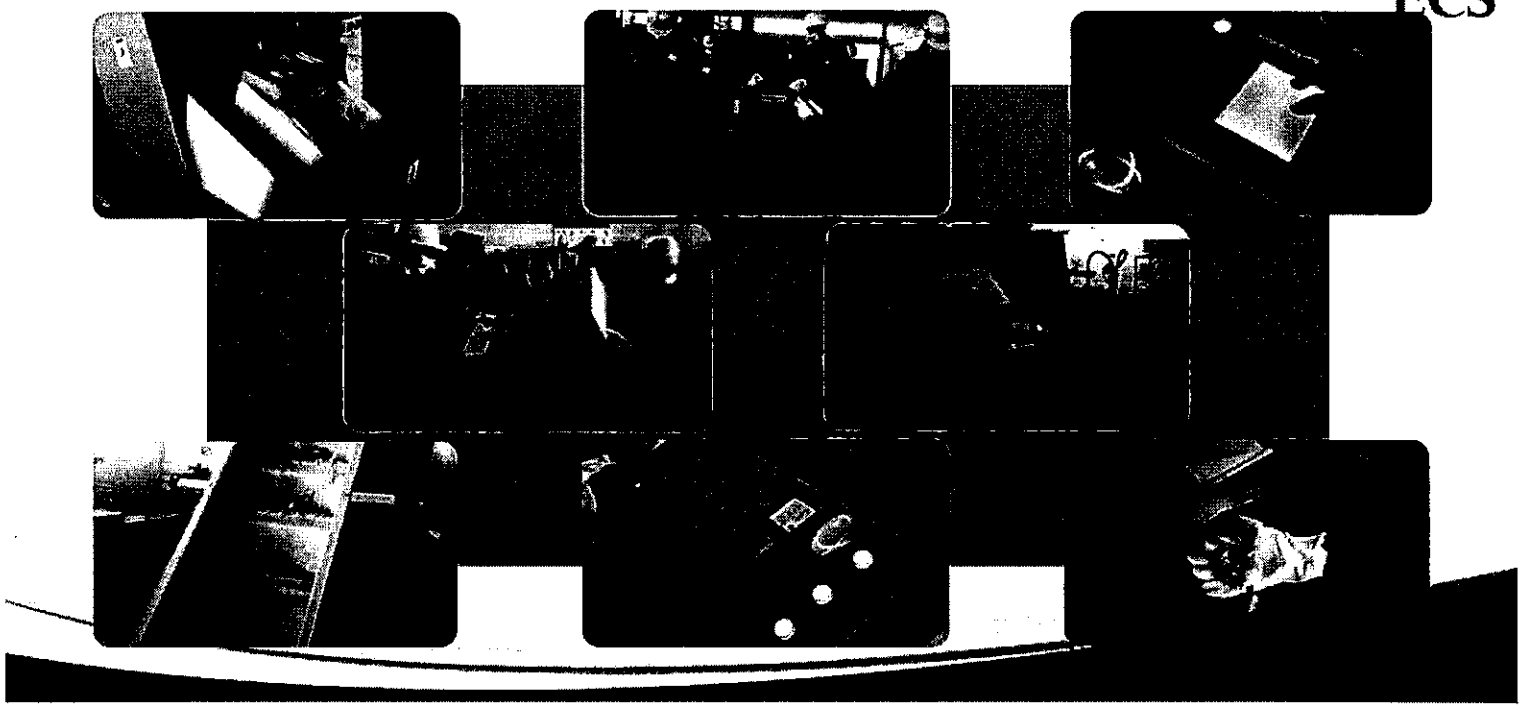
Reuse Repair Recover

ECS

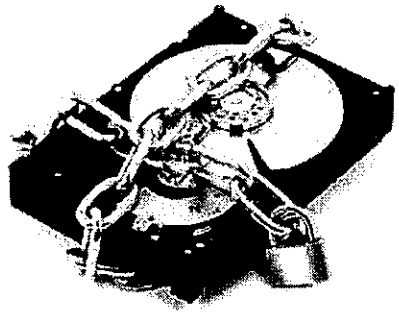


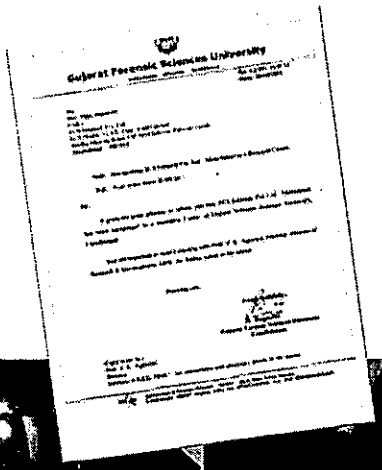
Recycle

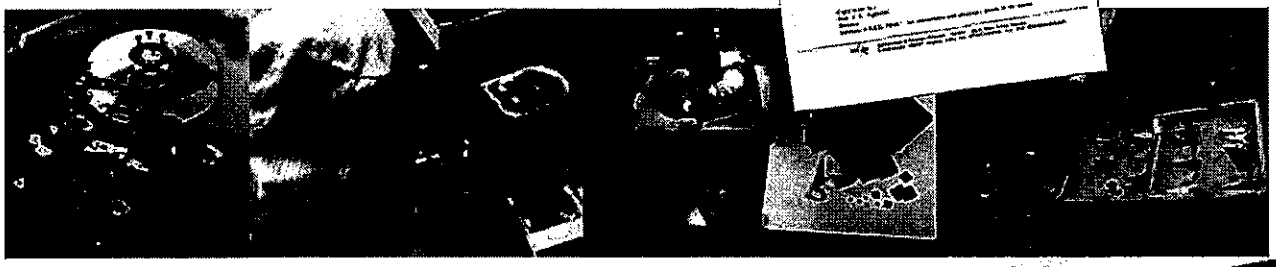
ECS



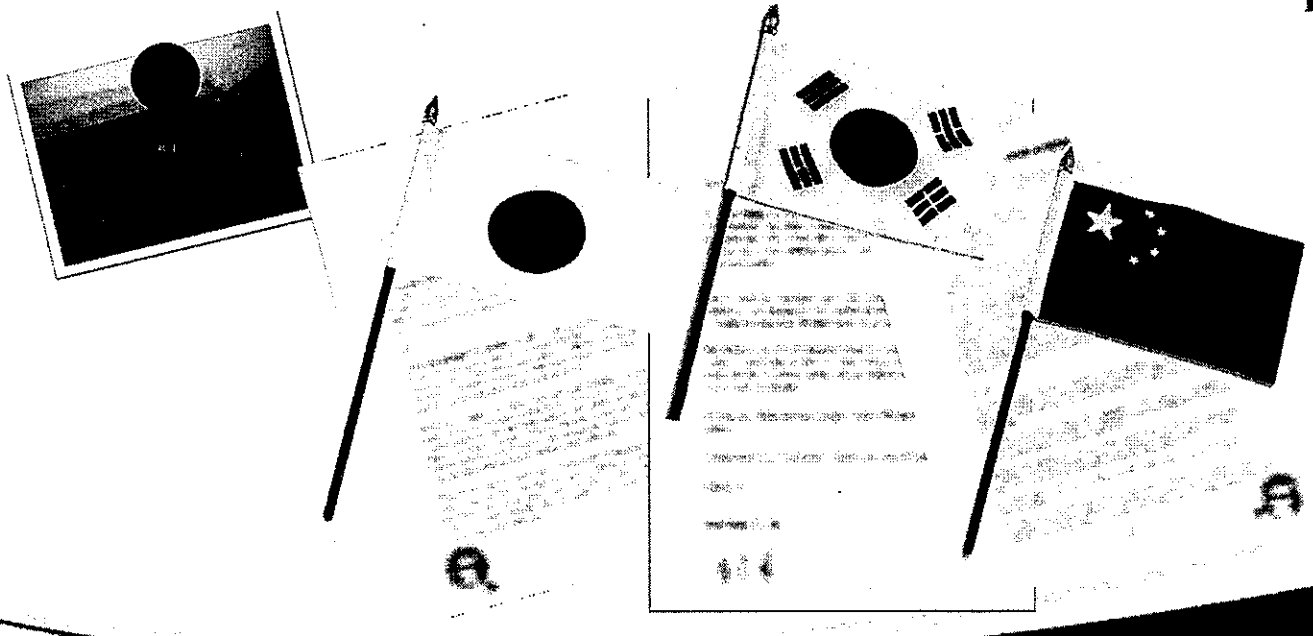
Data Handling and Confidentiality







Association with Global Leaders

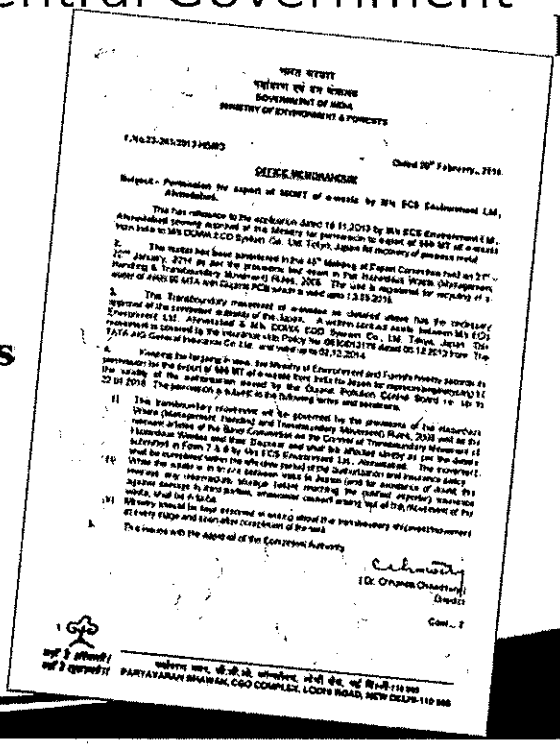


Export Permission from Central Government

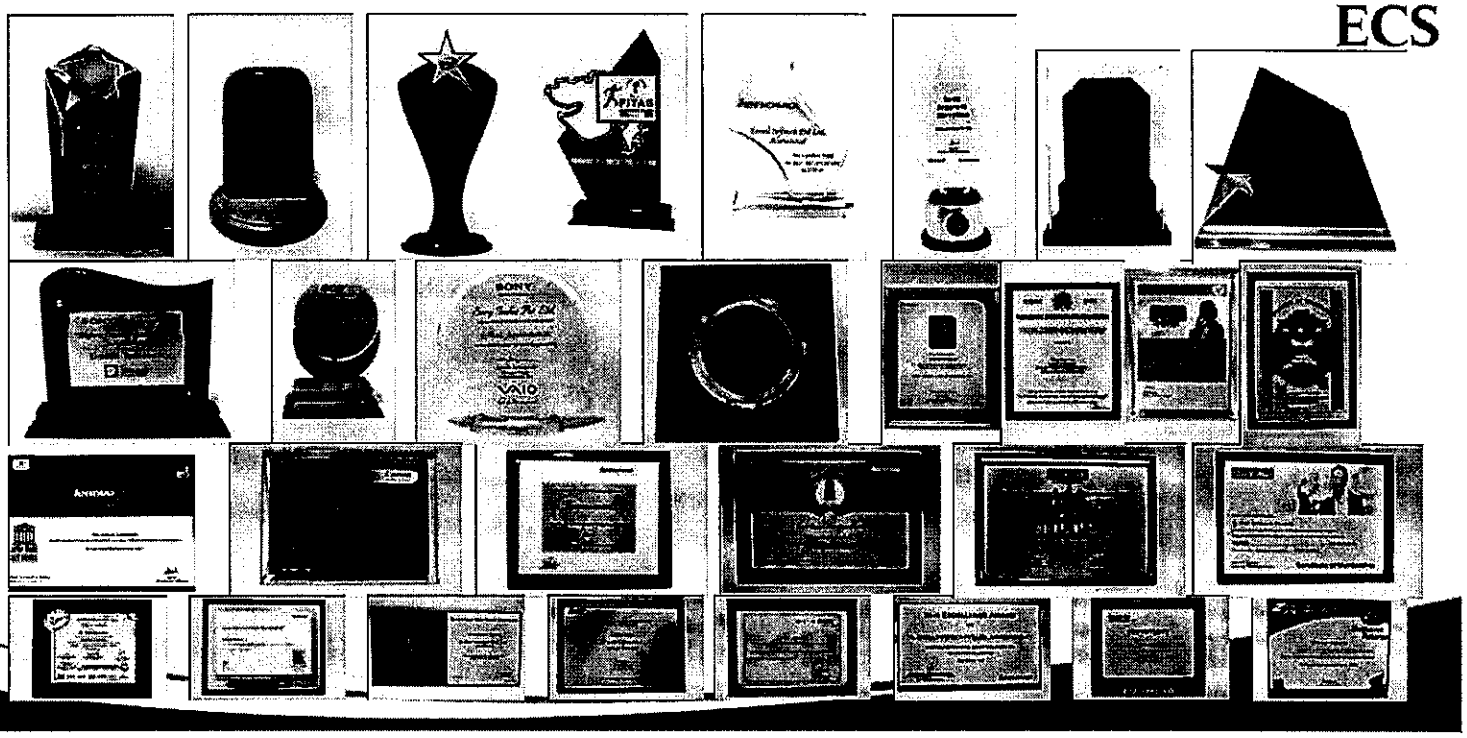
सत्यमेव जयते

Ministry of Environment and Forests

GOVERNMENT OF INDIA



Awards and Certificates



Awareness Activities

Our CSR Activities

In Media

ECS

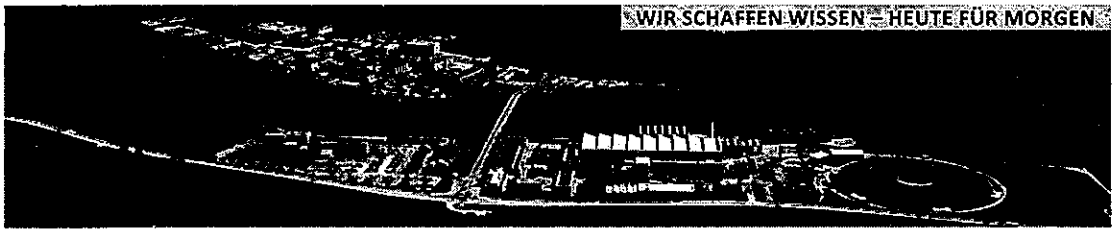
I swear, I care

Do You?

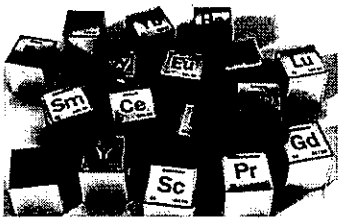

THANK YOU

PAUL SCHERRER INSTITUT

"New Technology to Recover Clean Rare Earth Metals from e-Wastes"

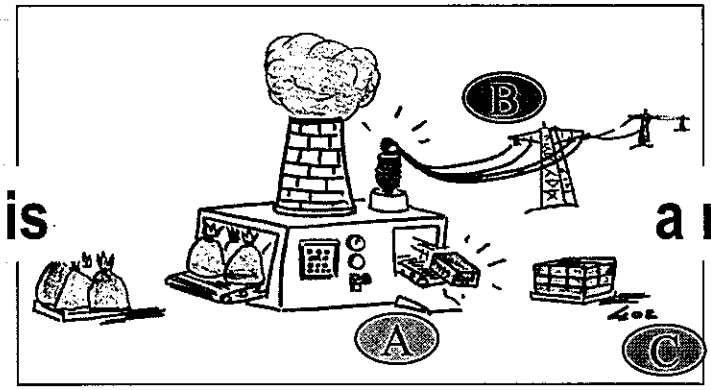


Dr. Ajay B. Patil :: Paul Scherrer Institute, Switzerland



PAUL SCHERRER INSTITUT

Development and optimization of sustainable waste management processes

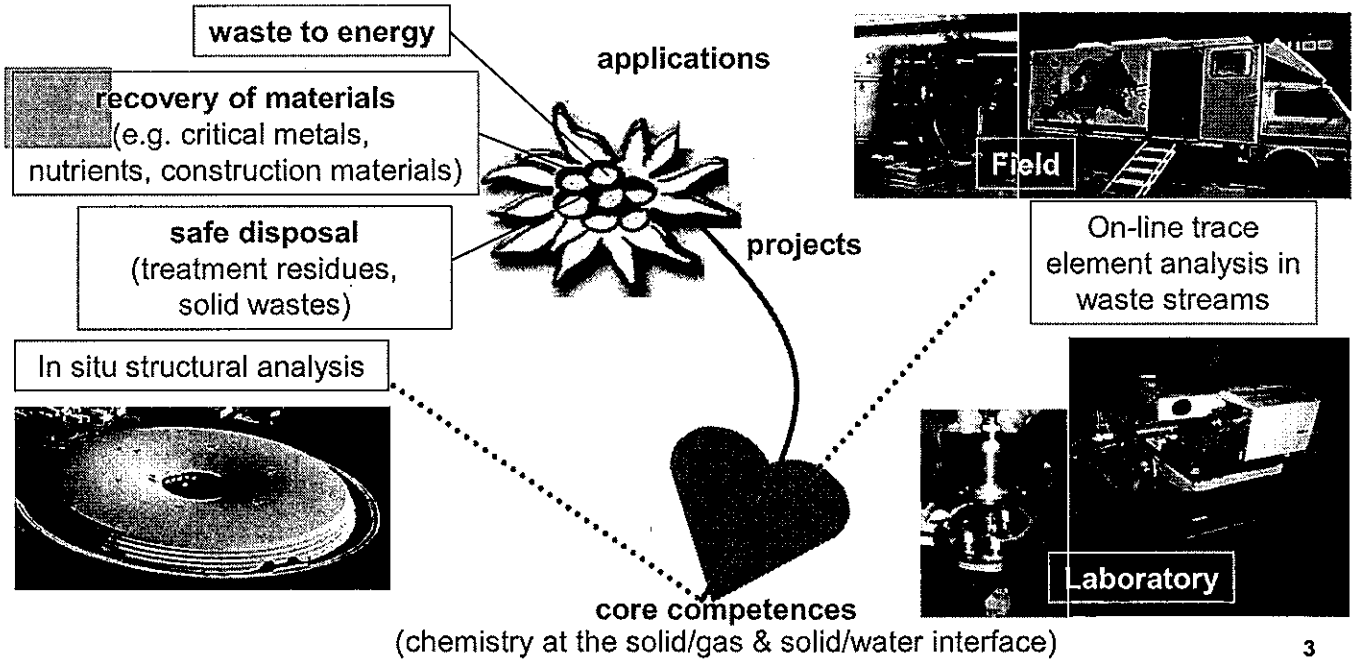


waste is a resource

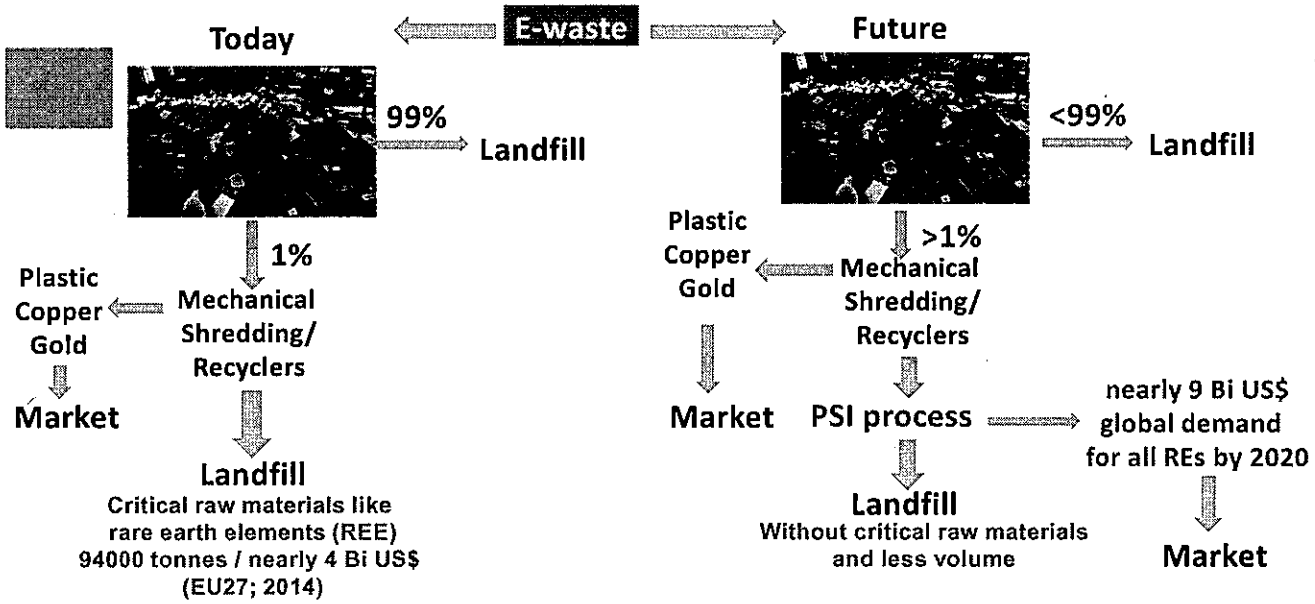
The goal is
- to recover materials (A)
- to substitute fossil energy (B)
- to minimize the dissipation of toxic and valuable materials (C)

https://www.psi.ch/cpm/epfl-psi-joint-professorship-on-solid-waste-treatment

Competences & applications: solid waste treatment group



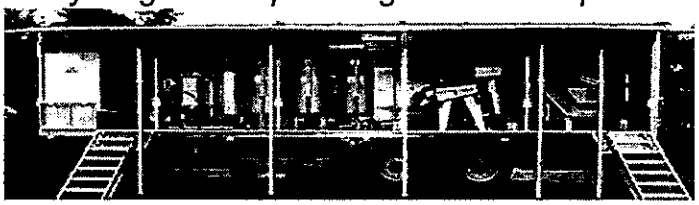
Our long term vision and motivation



Environ. Sci. Technol. 47, 10129 (2013); Hydrometallurgy 165, 27 (2016)

Technology for sustainability

fleet of recycling units operating in different parts of world



(Schematic representation only; actual unit can differ in arrangements)

Societal benefits

sustainability, resource security,
mature e-waste management,
raw materials for green energy and smart technology

Green energy relevance of rare earths

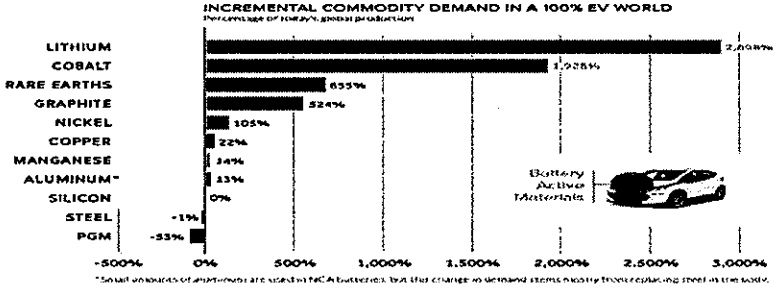
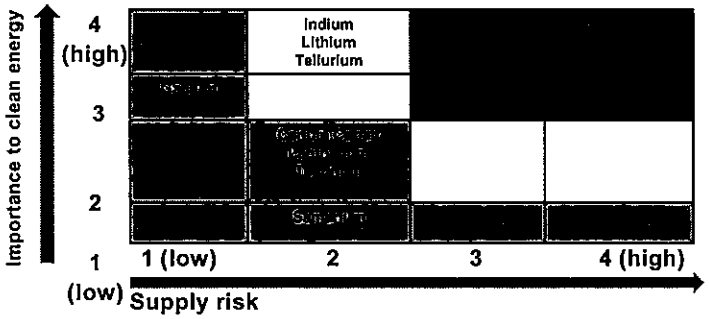


Figure : Global demand of resources in 100% electric vehicle world (Source: visual capitalist.com)



Critical
Near critical
Not critical

Figure : Medium term criticality matrix (5-10 years)

Resources, 3, 614 (2014)

E-waste resource: comparison with existing supply solution

Conventional mining

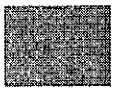
- Negative environmental impact
- Balance problem (dumping of surplus, unwanted metals)
- Economically not viable

E-Waste: in terms of secondary resource

- Important issue with nearly 10% growth each year in municipal wastes
- Nearly 4 Bi US$ estimated REE content in EU-27 countries
- Potential secondary resource if appropriate technology is available

No running recycling plant for individual REE recycling from e-wastes at present: technology vacuum

Our technology: resource security and environmental aspects



Challenges

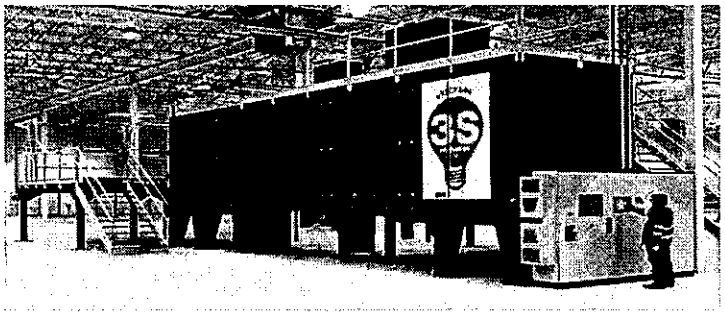
1. Dilute metal content;
2. Economic viability of processes (difficult and expensive analytics)

Solutions

1. Preconcentration of REE content;
2. Steady state process and new sensors developments

A. Patil; J. Membrane Sci. 442 (2013) 48
N. Hippenmeyer; Master's thesis in Environmental Eng. at ETHZ (2016) supervised by Dr. A. Patil

Fluorescent powders as secondary resource

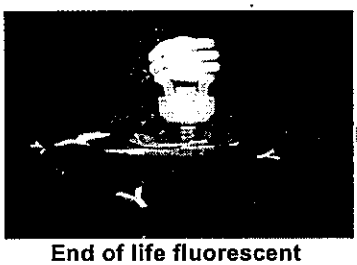


Mechanical shredding technology for lamp recycling: BLUBOX

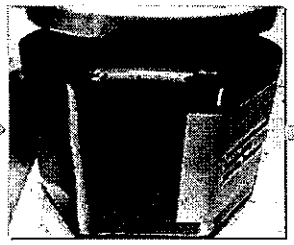
- Efficient removal of hazardous gases and materials
- Easy to operate: plug and recycle
- Container sized with very high throughput
- Equipped with carbon filters to absorb dust
- Produces rare earth containing fluorescent powder as a byproduct

Digestion scheme for the FP e-waste and targeted pure REE products: PSI process

Attained Scale up Goals:
10g →100g →1000g of FP
→ready for process scale



End of life fluorescent lamps as secondary resource



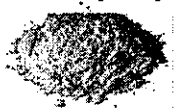
fluorescent powder from industrial partner

Mineral acid for digestion

Glass powder → **Cement industry**

LAP (green) → Tb; La & Ce

YOX (red) → Y; Eu



HALO (white) → **discarded**

- Reproducibility of developed method
- No exotherm and hazards
- Globally one of the first methods: near quantitative Tb from FP waste

Green Chem., 17, 856(2015)

Leaching efficiency of different REEs from the developed digestion process

RE element	Total amount (mg) obtained with 100 g FP after sequential leaching	Maximum amount (mg) from microwave digestion	% Recovery
Ce	735	727	quantitative
Eu	559	521	quantitative
La	1212	1142	quantitative
Tb	419	438	95.6
Y	10030	10426	96.2

(Data obtained from 100g FP (± 5% error range))

Optimized performance

Possibility to recycle acids

Easy to scale up

Easy removal of unwanted contaminants

PSI process for REE recycling : strategy

- Recovered phosphors: hydrometallurgy in selective conditions
- Commercially acceptable purities of single rare earth elements: Y, Eu, Tb, La and Ce
- ICP-OES and ICP-MS as analytical tools
- Mixer Settlers for process trials

Pilot plant trials for REE recycling from fluorescent powder e-waste

- Successful pilot level run for 99% Y separation
- Run performed on multiliter scale
- Process scale up and trials in pilot phase of project

Demonstrations towards implementation

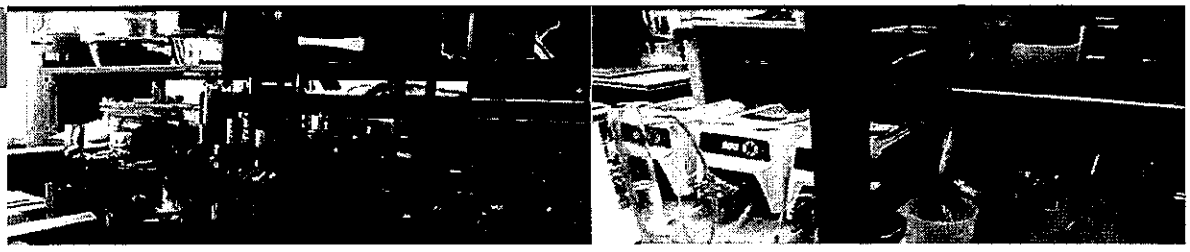
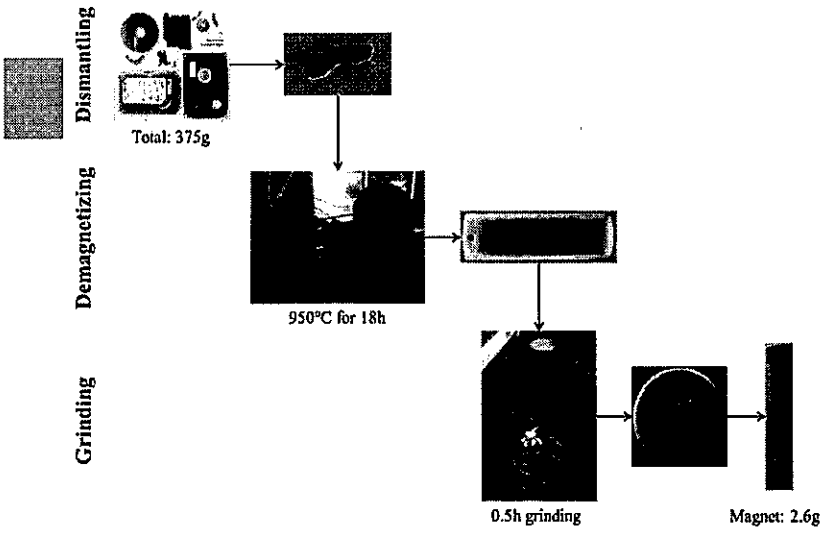


Figure: Bench scale mixer settler extraction pilot plant facility available at CPM group in Energy and Environment research division of PSI

In-house facilities, resources, expertise and contacts with active stakeholders in recycling and metal trading arena

NdFeB - Magnet recycling process



Magnet composition [weight %]	
FeO	58.76
Nd_2O_3	23.75
Pr_2O_3	5.25
NiO	4.27
B_2O_3	3.04
Dy_2O_3	1.54
Al_2O_3	1.35
CoO	0.29
Total	98.25

Figure: magnet composition obtained with microwave digestion at PSI
total amount <100% due to trace elements in magnet

Binnemans and co-workers; RSC Adv., 7, 32100 (2017)

Optimizations for recovery of REEs from magnet e-wastes

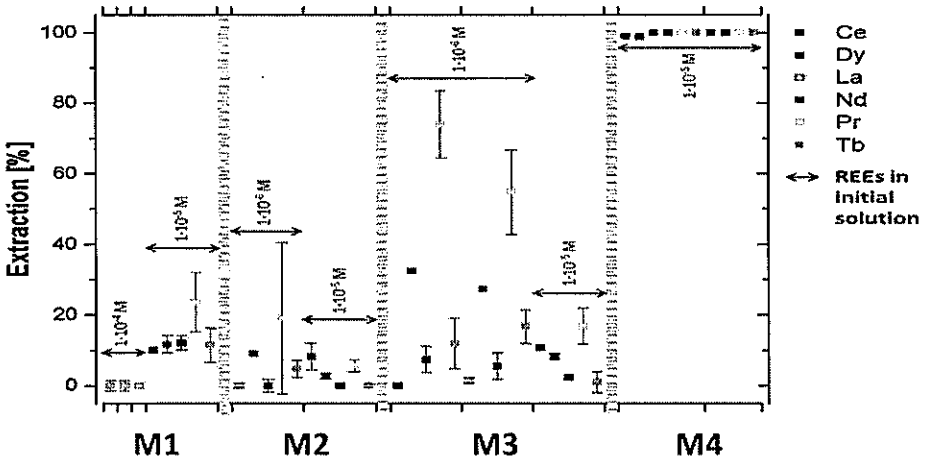


Figure : Extraction systems for the REEs present in e-waste magnets
(M: different methods)

Model system: necessary optimization and understanding

Optimizations for recovery of REEs from magnet e-wastes

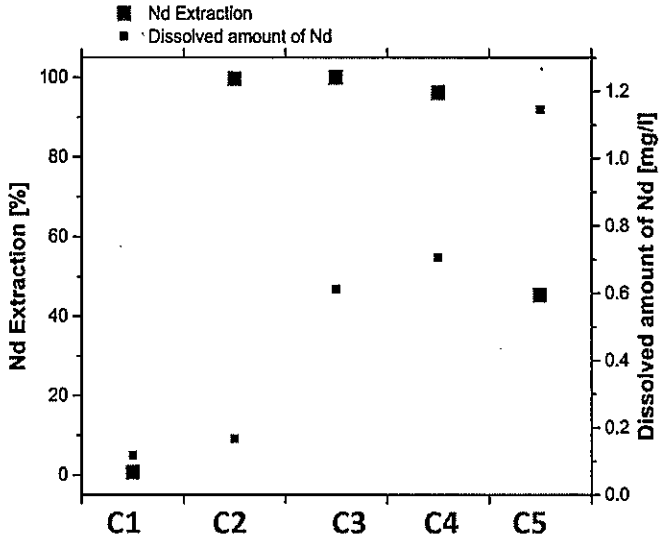


Figure : Dissolution and extraction results for real magnet samples
(C: different physicochemical conditions)

Real waste: balance between dissolution and extraction efficiency :: green method

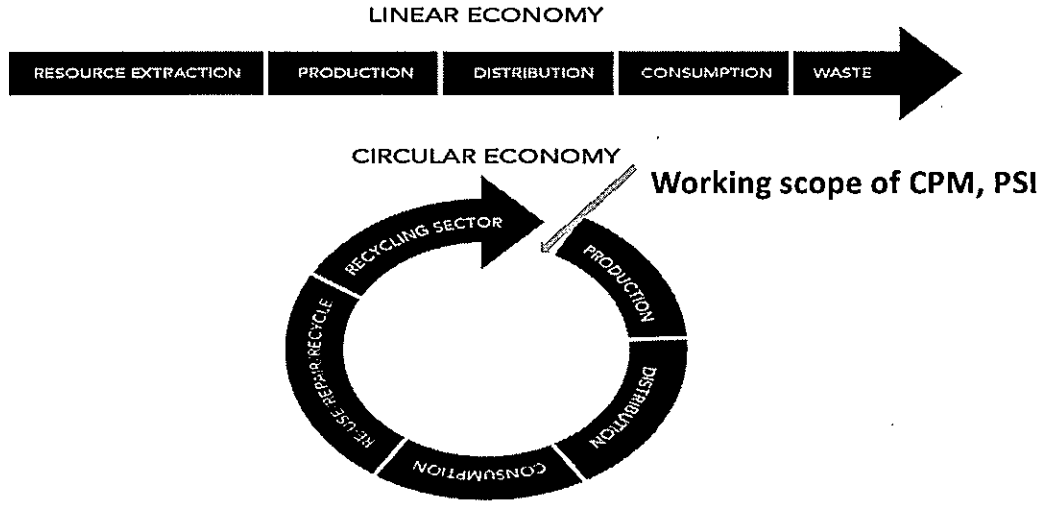
Risks involved in REE recycling from e-waste

- Volatile REE prices
- Complexity of different magnet e-waste streams
- Reverse supply chain of wastes, marketing of REE and recycling units

blu box
PLUG & RECYCLE

Our fluorescent powder recycling project partner

Towards long term sustainability through e-waste recycling



Conclusion and future perspective

- Cost effective and efficient digestion protocol is established for e-waste
- Near quantitative leaching of critical rare earths achieved (verified using control microwave digestion run)
- Process to achieve > 99% individual rare earth purity for Y, Eu and Tb arriving from fluorescent powder e-waste is developed
- PSI process has possibility to scale up and also applicability to individual rare earth separation arriving from other e-waste forms (after modifications)

PAUL SCHERRER INSTITUT PSI

Wir schaffen Wissen – heute für morgen

My thanks go to

CPM, PSI group members

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Office of the Environment (FOEN)

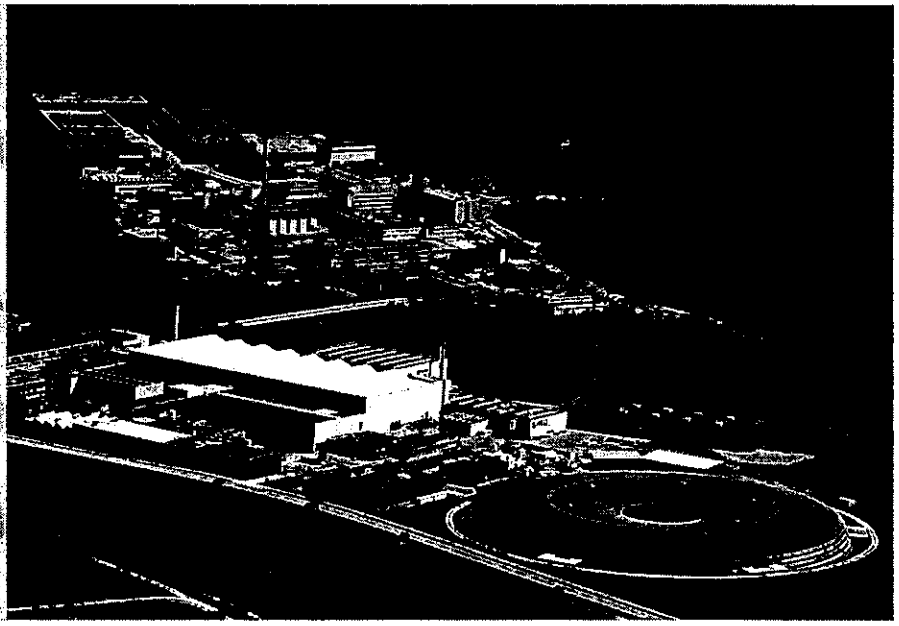
blu box
PLUG & RECYCLE

Contact us

ajay.patil@psi.ch

rudolf.struis@psi.ch

christian.ludwig@psi.ch



RENAS

Norges ledende EE-returselskap

Electronics and Cars Recycling – What's the Difference?

What is EEE?

- Electrical and electronic equipment (EEE) means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1 000 volts for alternating current and 1 500 volts for direct current

(WEEE directive 2012/19/eu)

What is a an automobile?

- Passenger vehicle designed for operation on ordinary roads and typically having four wheels and a gasoline or diesel internal-combustion engine

(www.dictionary.com)

Facts about recycling

WEEE

- Worldwide 40-50 million tons (estimated)
  - EU 4 million tons (reported)
- 90 – 95% recycled (Norway)
- 5 – 10% incinerated or landfilled (Norway)
- **Value $ tens of billions**
- Lifespan
  - Small electronics 18 – 24 months average
  - Household appliances 9 – 10 years average
  - Decreasing

ELV

- Worldwide 25 million tons (estimated)
  - EU 9 million tons (reported)
- 80% recycled
- 20% ASR (Auto Shredder Residue) incinerated or landfilled
- **Value $ tens of billions**
- Lifespan
  - 12 - 14 years average

Why are we doing this?

Objectives of WEEE and ELV directives

- Prevent and reduce waste and pollution
- Reuse of parts and components
- Retrieve valuable materials
- Improve the environmental performance of all operators involved in the life cycle of EEE and vehicles
  - particularly those operators directly involved in the collection and treatment

Obviously to make money and extract valuable resources!

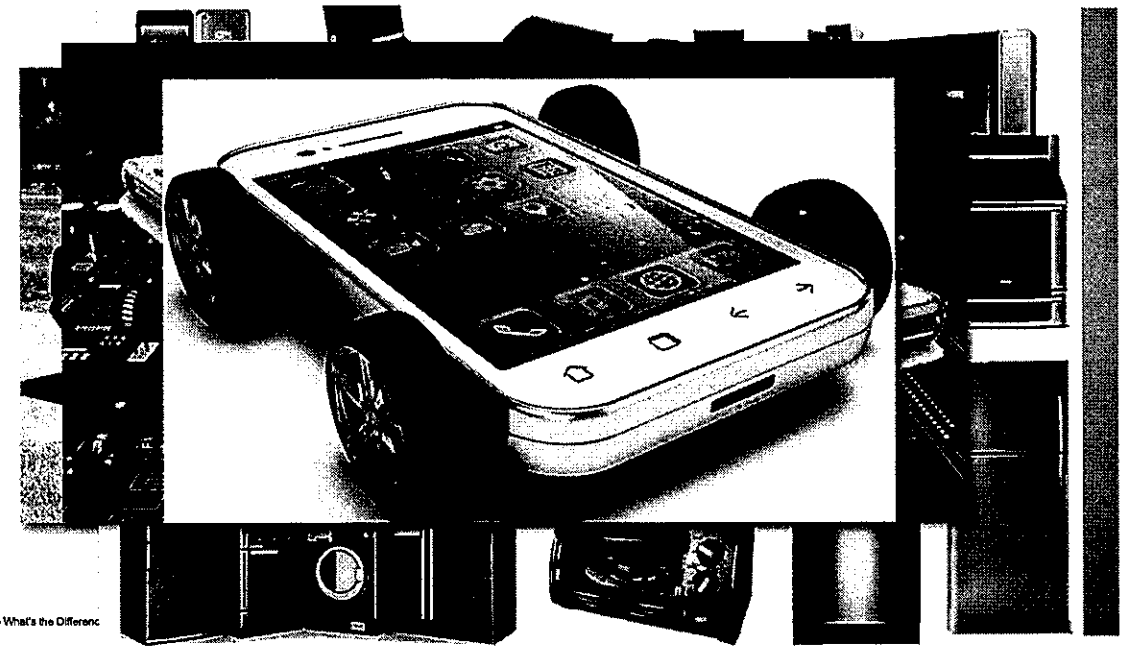
WEEE vs ELV – distinguishing points

- WEEE - developed since the '90s
- Focus on:
  - **Recycling** of WEEE components
- Components generally have:
  - Low / medium **value** and Zero / low **demand**
- PCBs are one of the most valuable components
- Hence PCBs separated early and processed separately for precious metals

- ELV - developed since the '60s
- Focus on:
  - **Remanufacturing** and **reuse** of valuable spare parts (engines, catalysts, radiators, etc)
  - **Recycling** of metals
- Components generally have:
  - High / very high **value** and High / very high **demand**
- PCBs have little or no focus and are shredded with car hulk

What does an automobile look like?

What does EEE look like?



Car pathologists (study 2009)

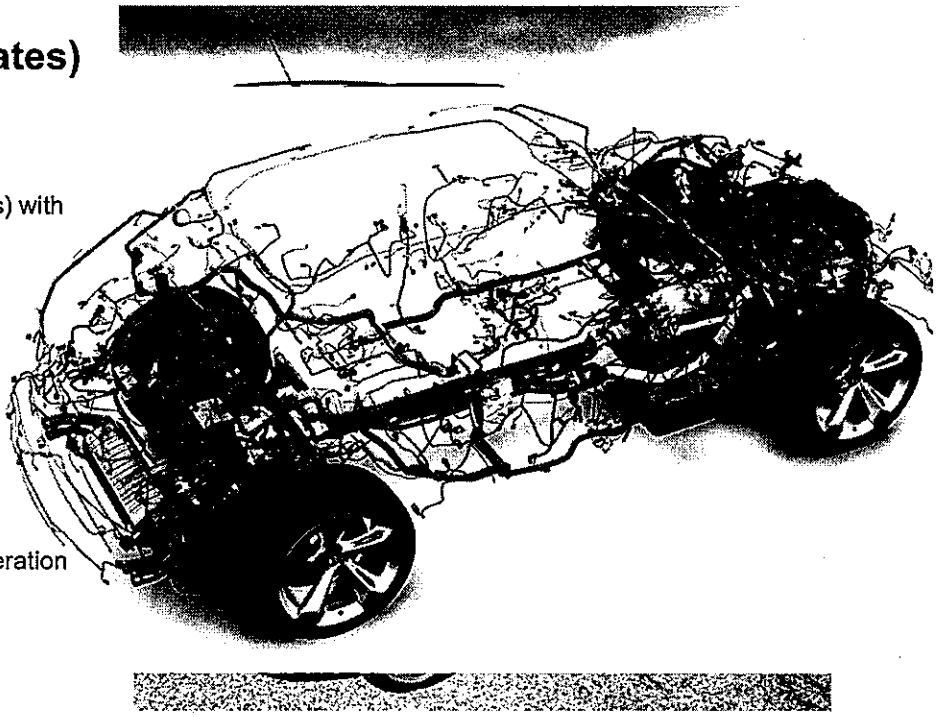
- Dissected two cars
  - 1988 VW Passat diesel
  - 2007 VW Touran diesel

Car pathology - findings

- 1988 VW Passat diesel
  - 2.5% WEEE tot (31.7 kg)
  - 1 PCB (0.3 kg)
  - 10.8 kg wiring
- 2007 VW Touran diesel
  - 4.4% WEEE tot (67.3 kg)
  - 30 PCBs (6.7 kg)
  - 18.9 kg wiring (1500 meters)

Further we know (by estimates)

- Modern cars today
  - Up to 100 ECU (engine control units) with PCBs (0.1 – 0.7% weight)
  - Up to 60 kg wiring (5000 meters)
  - Motors, lights, radars, etc
- Up to 10% of a modern car is EEE
- 20 – 25% is ASR going to landfill and incineration



Business potential - valuables

- Characterization of PCBs from electronics

Material	Cat1 (%)	Cat2 (%)	Cat3 (%)
Silver	0.02	0.17	0.08
Gold	0.002	0.04	0.01
Copper	11.0	20.0	17.25

- Material composition is very similar
- Distinct difference in materials amounts (e.g. precious metals)
- Great impact on profitability of recovery process

- Characterization of PCBs from automotive

Material	Cat1 (%)	Cat2 (%)	Cat3 (%)	Cat4 (%)
Silver	0.09	0	0	0
Gold	0.42	0.20	0.24	0.09
Copper	18.84	24.19	14.52	16.30

- In EU alone (2015 numbers)
  - PCBs from WEEE is about 167 Ktons/year
  - PCBs from ELVs is about 17 Ktons/year

Business potential - values

- Estimates of ***profits*** from European WEEE PCBs

net present values	2015	2020	2025
min value (M€)	2 536	2 939	3 950
max value (M€)	5 013	5 811	7 810
Per year			

- Estimates of ***profits*** from European ELV PCBs

net present values	2015	2020	2025
min value (M€)	891	978	1125
max value (M€)	8 412	9 235	10 628
Per year			

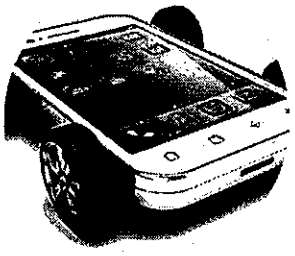
Is there business potential in this?

So, how do we do this?

- We need to stop thinking in boxes
- Focus on optimizing our resources
- Challenge our value chains
- Tear down the barriers
- Cultivate and worship innovation
- Create your markets

The last questions are

- Are there reasons for joining management of WEEE and ELV?
  - About €10 billion reasons
- What's the difference between electronics and car recycling?
  - Pretty much 4 rubber tires and a steering wheel



"The measure of intelligence is the ability to change."
Albert Einstein

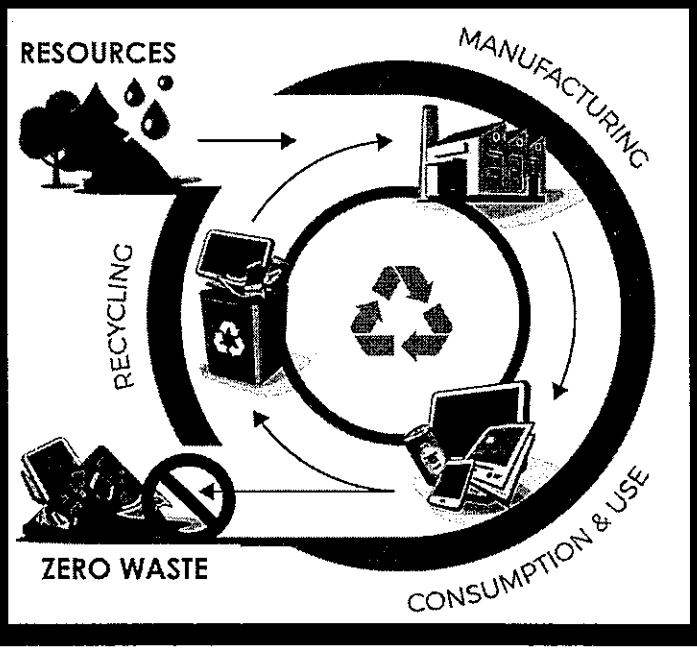
Bjorn Thon
CEO, RENAS AS

Promotion of the Circular Economy

Through Electronics Recycling Certification in China and the Rest of Asia

Global shift towards Circular Economy

- More responsible and advantageous way to manage the products and materials we use.
- More sustainable alternative to *"Take-Make-Throw"* economy.
- Extracts maximum value and use from all products and materials
- Zero waste – closed loop economy.

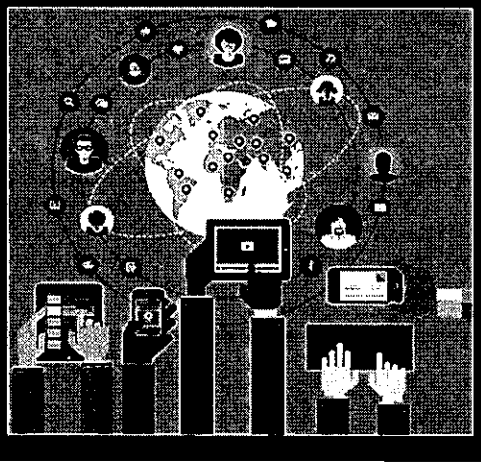


Global shift towards Circular Economy

More sustainable management for electronics increasingly important as electronics use continues to grow – especially in Asia where usage is fueled by growing middle class.

As of June 2017

- Internet Penetration in China:
  53.2% of population (738.5+ million users)
- Internet Penetration in Asia:
  46.7% of population (1,9+ billion users)



Global Economic & Social Benefits

- Recent study by Accenture concluded:
  *"circular economy could unlock **$4.5 trillion** of economic growth"*
- Bridges digital divide – affordable, used electronics have provided hundreds of millions of people worldwide with unprecedented access to information, healthcare, education, banking and financial services.
- Improves health & safety of workers, communities & environment by keeping harmful materials out of the waste stream.

R2 & Circular Economy... REUSE first!

REUSE is most beneficial choice

- 75% of total energy used during life-cycle of a laptop is consumed during manufacturing.
  - *67% Manufacturing*
  - *6% Distribution*
  - *27% Use*
  - *0.37% End of life*

Source - Green Alliance: A circular economy for smart devices

- Extending life of laptop 7 years reduces environmental impacts more than 40%.

R2 & Circular Economy... REUSE first!

REUSE of Parts & Components

- R2's *"REUSE before RECYCLE"* hierarchy can extend to reuse of parts and components.
  - Manufacturers benefit from access to reusable parts that are tested and working.
  - Photo to Right: Hong Kong facility harvests and modifies screens from broken smart phones for reuse in new electronic toys.

Benefits of Reuse vs. Recycling 1000 laptops

(calculated using USEPA carbon footprint calculator)

	Reuse	vs.	Recycling
Energy Savings – U.S. households that could be powered by electricity for a year	80	vs.	3.7
Greenhouse Gas Reduction – Equivalent number of cars that could be removed from the road	35	vs.	1.4
Reduction in air emissions (in metric tons)	3,035	vs.	181
Reduction in water emissions (in metric tons)	8.2	vs.	0.4

R2 & Circular Economy: "Urban Mining" when reuse isn't viable

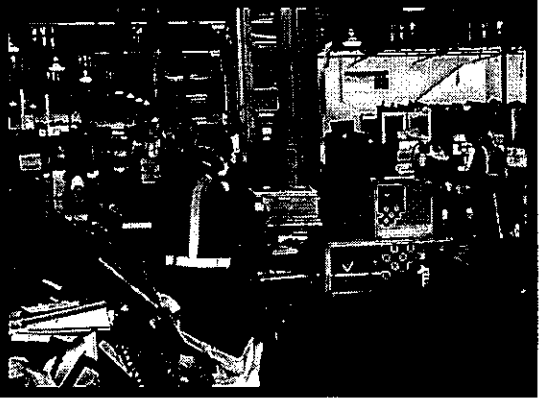
Maximum Materials Recovery for End-of-Life Products

United Nations Study – used electronics are a 40 to 50 times richer source of precious metals than mined ore.

"Urban Mining" preserves resources & reduces environmental impact of mining raw materials.

BENEFITS OF RECYCLING VS. MINING

	Energy Savings	*Carbon Footprint Reduction*
Lead	*98%*	*99%*
Aluminum	*95%*	*92%*
Nickel	*90%*	*90%*
Copper	*63%*	*65%*



The Costs of Inefficient Recycling Methods

- Lost profits from low-tech recycling methods
  - As low as roughly 25% of rare, precious, and other metals in electronics are recovered when low tech methods are used. Advanced technologies can recover 95+% of the metals.
- Contaminated land, air and water.
- Significant harm to workers from exposure to toxic materials in e-waste that has been disposed of improperly.
- More reliance on mining new materials – Depletes limited resources, and increases environmental footprint of electronics.

Comparing Outcomes: R2 & the Circular Economy

Circular Economy	R2 Standard
Zero Waste & emphasis on "Resource" management vs. "Waste" management	Prov. 2 - Reuse/Recover Hierarchy No landfilling or incineration of Focus Materials
Extending life of products and components	Prov. 2 & 6 – Requires testing & repair of reusable electronics & components

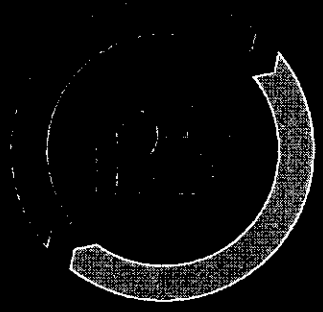
SERI – Home of the R2 Standard

Our Mission:

to create a world where electronic products are reused and recycled in a way that promotes resource preservation; the well-being of the natural environment; and the health and safety of workers and communities.

More than 700 facilities operating in 30 countries

SERI – Home of the R2 Standard



THANK YOU

John Lingelbach
SERI
[redacted]
WRF 2017

Custom-tailored Plant Concepts for the Disposal of Cooling Device Plants in Asia

Peter Heßler

URT Umwelt- und Recyclingtechnik GmbH

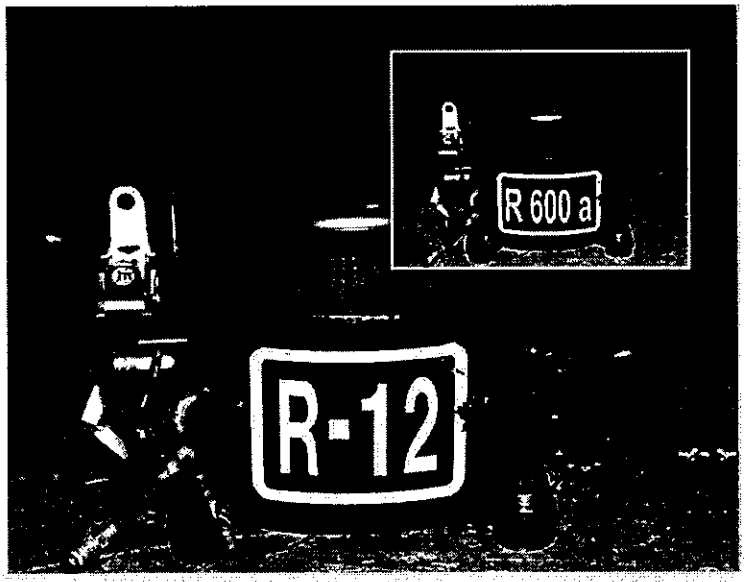
1) Compressor Treatment

1.1) Selective treatment and filling of refrigerants:

R 12	(CCL_2F_2)	full freon	no reuse in Europe
R 600a	(C_4H_{10})	isobutan	reuse in Europe
R 134a	(CF_3CH_2F)	HCF	reuse in Europe

1) Compressor Treatment

1.2) Oil degassing to reduce the CFC (freon) content < 0.2%.
This is a requirement from the oil reuse industry.



2) Corpus Treatment

2.1) Recovery and liquifying of blowing agents VFC and VHC.
State of the art in Europe and some Asien countries is the recovery and liquifying of the blowing agents.

If the recovery of blowing agents is not required URT is able to offer disposal concepts without blowing agents liquifying.
Blowing agents will be emitted to the atmosphere.

The explosion safety will be secured by a controlled air dilution.

2) Corpus Treatment

2.2) Polyurethane isolation foams are containing VHCs or VFCs.

In Europe it is necessary to degass the foam until reaching a VHC and VFC content below 0.2%.

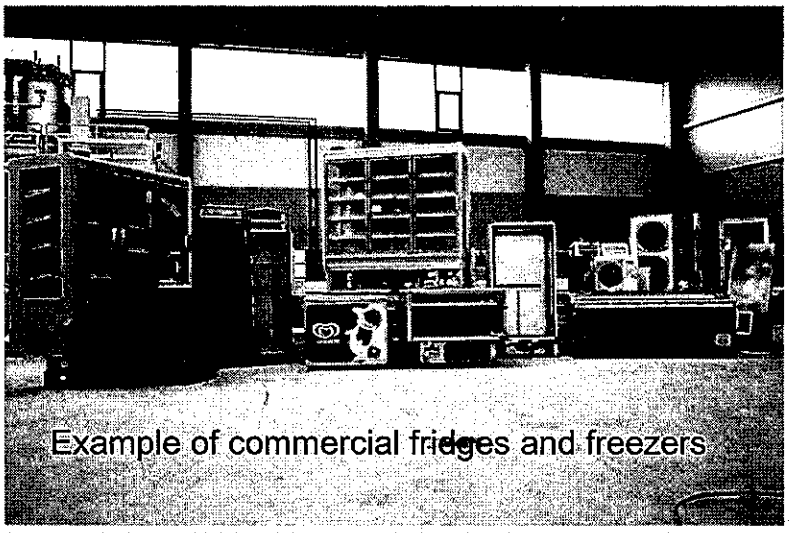
This is normally done by grinding and heating the polyurethane foam.

For instance this is not required in China and the URT plants are simply compacting (volume reduction) the foam.

2) Corpus Treatment

2.3) Different throughput concepts are available at URT:

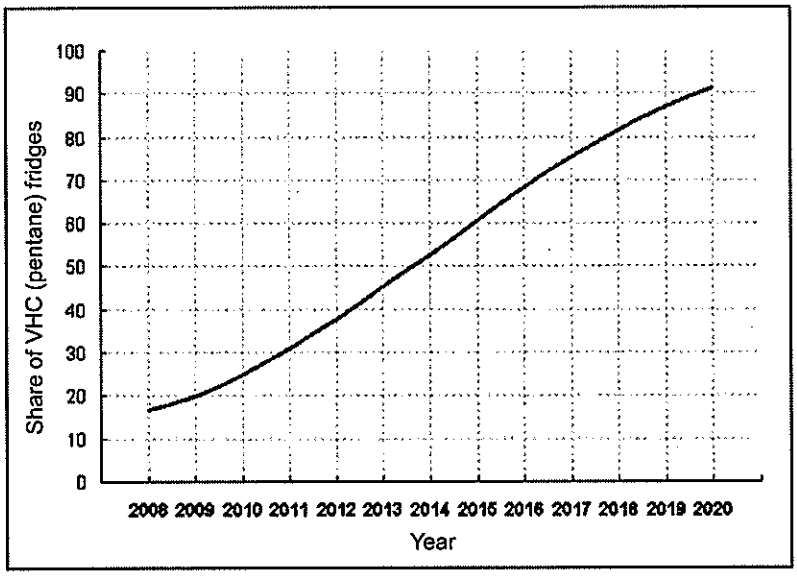
Starting from	2 to/h	correspond to 40 fridges/h
up to	5 to/h	correspond to 100 fridges/h



Example of commercial fridges and freezers

3) Newest Development

3.1) Increasing share of alternative blowing agents (VHC) during recycling



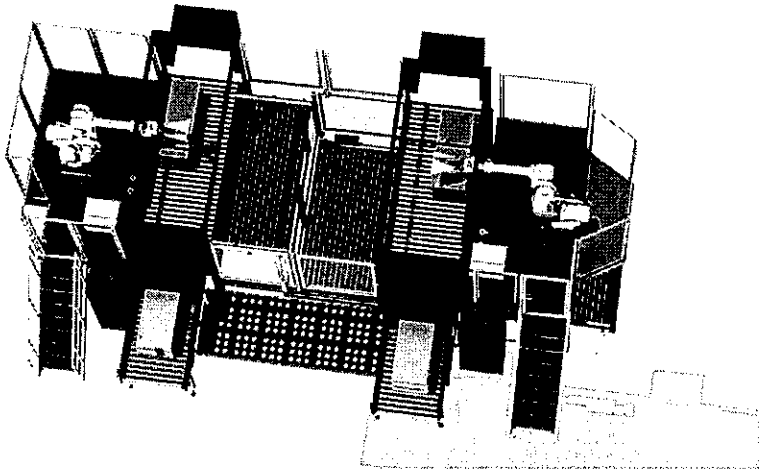
3) Newest Development

3.2) A selective treatment of VHC (pentane) fridges only

- Shredding in ambient air atmosphere (no nitrogen atmosphere)
- Eliminating the explosion risk by controlled air dilution
- Onsite direct combustion of the exhausted gases (pentane)
- Negligible emissions fulfilling highest European emission standards

3) Newest Development

3.3) Selection between VHC and VFC through an analytic evidence



3) Newest Development

3.4) Advantage of low operational costs:

- No need of nitrogen neither liquid nor gaseous
- No disposal costs for blowing agents by onsite combustion
- Creating a polyurethane fraction without any VFC (CFC)


thank you
danke
謝謝
ngiyabonga
teşekkür ederim
спасибо
dank je
gracias
tapadh leat
dziękuję
hvala
mauruuru
obrigado
sukriya
kop khun krap
go raibh maith agat
arigatô
dakujem
grazie
merci
감사합니다
ευχαριστώ
мерси

World Recycling Forum 2017

in Macau, China

"Challenge for Social Business towards future Circular Economy in Asia"

Japanese Auto-recyclers as Social Venture

Minoru Goko, Vice President

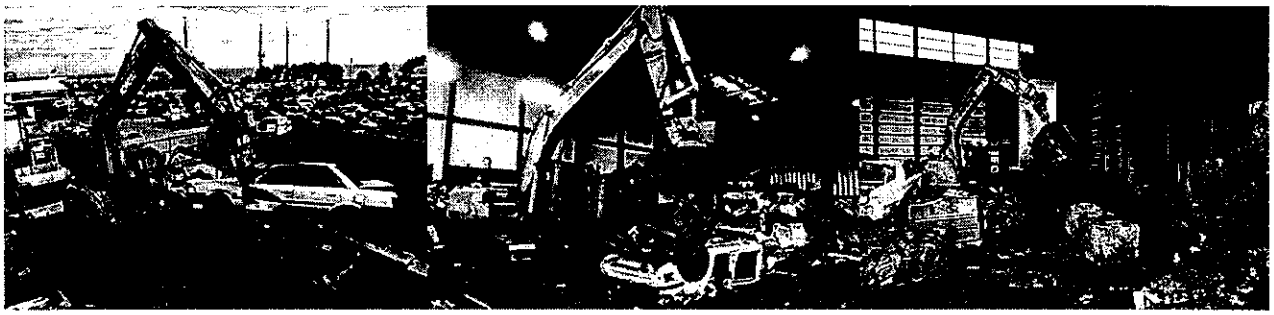
NPO-Japan Automotive Recyclers Association

www.npo-jara.org

General Information, Automotive Industry in Japan by JAMA & JARA

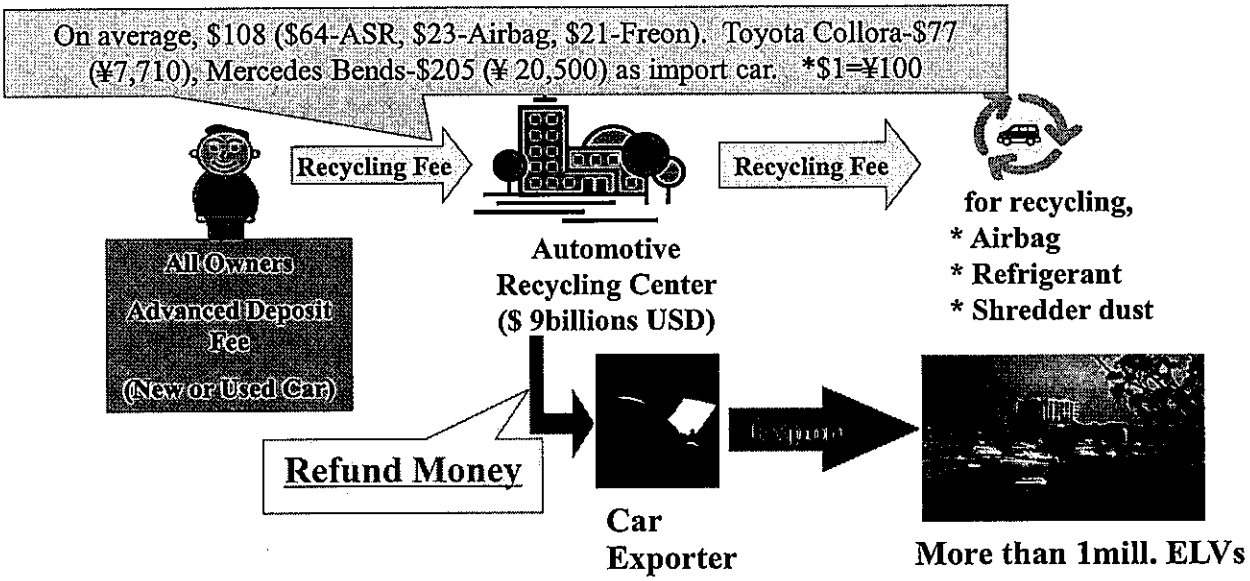
-77 million vehicles are running in Japan.

- Registration of 5 million new vehicles & 7 million used vehicles a year in Japan.
- 7 million new vehicle export from Japan a year.
- 1.5 mil. registration of HV, PHV, EV, FCV & Clean Diesel cars a year in Japan.
- Japan brand car production in the world is 19 mil. (All car production is 95 mil.)
- 3 million ELVs a year & 4,000 automotive recyclers in Japan.
- ASR recycling rate is more than 95% in Japan.
- Avarage vehicle usage is 12 years.
- Domestically operated Kobelco MDM is 542 units (70% market share), increasing sales number both Japan & overseas.



Review of the Automobile Recycling Law in Japan by MITI

- According to the survey results of the municipalities in Japan, about 1,000 illegal dumping ELVs are newly generated annually.
- The municipalities still remove 400 unmanned & illegal dumping ELVs annually. are injected public expenses of 10,000 USD for unmanned & illegal dumping ELVs removal
- It's difficult to teach foreigners who can not understand Japanese.
- For illegal dumping ELVs whose chassis numbers have been cut out, municipal governments are responsible for Recycling Fees.
- The aged islanders are difficult to progress ELVs individually & financially.



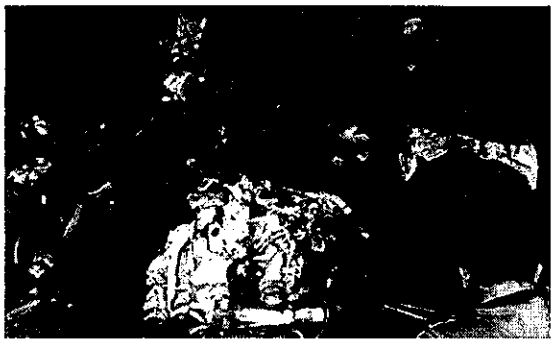
How to support Global Industrial Waste issues.

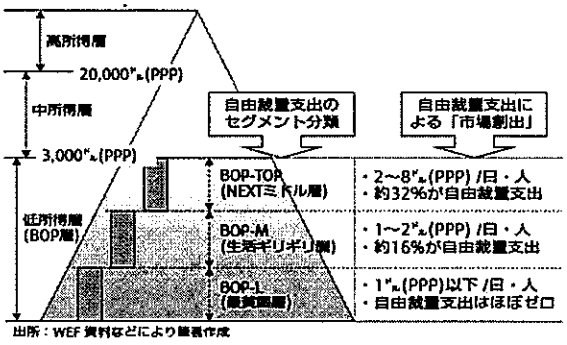
The Ministry of the Environment reports,

- The amount of Industrial waste generated has increased worldwide, and it's expected to increase to twice the current level in 2050.
- In emerging & developing countries, there are concerns about environmental pollution due to insufficient response in terms of both system & technology for increasing industrial waste.
- In Japan, the legal system for Industrial waste disposal / recycling has been developed.
- In Japan, there is a technology of excellent vein industry, but the growth of domestic vein industry is limited.
- Meanwhile, emerging & developing countries have huge potential markets of the vein industry.
- Japanese government promotes development of these target countries as a package of excellent waste disposal / recycling technologies & systems.
- It contributes future Circular Economy of these countries & also the Japan's Economy activation, Securing rare metals & Resource strategy.

BOP (Base Of the economic Pyramid) Business

- 1 billion (15%) people in the world live on less than 1 dollar a day.
- 2.5 billion people (38%) live on less than 2 dollars a day.
- Annual income is less than 3,000 dollars, called BOP.
- The population is said to be 4 bill. people, accounting for 70% of the world population.
- BOP market size is reported to be over 5 trillion dollars.
- Large amount of used cars are exported from Japan to the countries in which the BOP layer exists.
- Therefore, Japanese auto-recyclers are in the most appropriate position to deal with environmental & resource issues related to ELV recycling in countries to establish Circular Economy with Japanese Auto-makers.





Auto-recycling business for BOP layer, fostering new entrepreneurs

- Asian countries with fast economic growth, the BOP layers in Asia will halve in a few years.
- In the future, Asia is expected to intensify competition as a global market, today's BOP layer probably contains the potential to become a middle class tomorrow.
- After consumers become middle class, capturing of our business will miss business opportunities.
- Therefore, it's "Social Business" through automotive recycling, taking advantage of Japan's excellent auto-recycling technology, knowledge & experience while working in cooperation with auto-makers.
- By being the first approach in those countries, you can involve the development of national policies & basic concepts related to the auto-recycling.

Key point for successful Social Business

* Law for prohibiting illegal ELV dumping,
* Appropriate ELV recycling system,
* Securing an appropriate ELV amount for recycling,
* Introduction of appropriate recycling technology,
* Appropriate education system,

Circular Economy

- Circular Economy is a new business method to maximize the value of products & materials in economic activities.
- and to sustainably pursue profits and consequently to realize a sustainable low carbon society as well.
- In other words, companies are profitable by the Circular Economy, which is a business method that makes it more suitable for the global environment, such as reduction of CO2 emissions.
- In the Circular Economy, there are five elements that lead to the competitive advantage, such as,

- **" Circulation of raw materials "**
- **" Resource rebuilding "**
- **" Extension of product life "**
- **" Product service "**
- **" From ownership to share Conversion "**

Social Business towards Future Circular Economy

- " Raw material recycling" can be called " scrap material recycling ", a way to change the raw materials used for product production from waste to reusable materials, lowering the burden of raw material procurement and risk.
- " Resource rebuilding " is a method of retrieving and reusing recycled parts that can be utilized from used products that have finished their roles.
- " Extension of product life " is a method of extending the period during which products (parts) can be used by Rebuilt/Remanufactured.
- Therefore, Auto-recyclers need to approach first as social business for auto-recycling to emerging & developing countries with a package of excellent waste disposal / recycling technologies & systems being supported by government & Auto-makers.
- It contributes future Circular Economy of these countries & also the Japan's Economy activation, Securing rare metals & Resource strategy.

Toyota Global 100 Dismantlers Project

- According to the principle of Circular Economy,
- France's Renault has established a new closed loop with Suez Environment/ SITA, named INDRA in France.
- As well as closed loop construction, named ENCORY in Germany, the joint venture between the BMW Group and ALBA Group.
- On the other hand, the Toyota starts new challenge, "Toyota Global 100 Dismantlers Project" to contribute to the realization of a sustainable society.
- Toyota aims to construct a social system that enables proper treatment of ELV towards proper treatment with Japanese auto-recycling technologies & systems.
- Toyota is going to promote globally Auto-recycling technologies & systems that have cultivated in Japan for production of Auto-recycled parts & scrap materials with earth friendly method including global hybrid battery recycling.
- I am truly proud that the first Dismantler of "Toyota Global 100 Dismantlers Project" who established a joint venture of Auto- recycling company with local partners in Beijing, China is JARA member companies.

"Thank you for your attention"

Minoru Goko, Vice President

NPO-Japan Automotive Recyclers Association

www.npo-jara.org