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SUSTAINABILITY OF THE EUROPEAN ALUMINIUM INDUSTRY

27 November 2013
- Data for the year 2012 -

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I. INTRODUCTION

The aluminium industry – a sustainable industry for future generations

The European Aluminium Association (EAA) and its member companies launched, in 2002, a pioneering exercise: a list of 34 measurable Sustainable Development Indicators (SDIs) was identified in collaboration with the UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (CSCP), the University of Versailles and an additional peer group of internal and external stakeholders, with the clear intention to monitor their evolution over time and to report it publicly.
The reason for this choice is simple: aluminium is one of the best performing and most sustainable materials, thanks to its unique properties including recyclability and the industry is ready to support this statement with quantitative and qualitative evidence.
This pragmatic and transparent approach has encouraged the entire European aluminium industry, from large integrated companies to small and medium sized ones, to participate in the survey and to track its progress in the field of sustainability.

The data published in 2004 (*referring to 1997 and 2002 data*), 2006 (*referring to 2005 data*), 2010 (*referring to 2008 and 2009 data*) and in the present report clearly show a committed industry making improvements in many areas, such as reduction of environmentally damaging emissions and natural resource use, workers safety and training, recycling rates and more. This set of results shows important positive trends, despite the economic crisis which had a severe impact on our industry.

Decoupling growth from environmental and social impact is the driving principle behind a successful sustainable development strategy. Progress needs to be benchmarked and interpreted within the context of internal and external business opportunities and constraints. Reliable measurement is essential to guarantee continued monitoring, careful evaluation, committed implementation and tangible results. These are the cornerstone principles behind the European aluminium industry's SDIs report.

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II. METHODOLOGY

a) The list of indicators

In order to improve the reporting, the list of indicators presented here has been improved. Some flexibility is necessary to keep the reporting dynamic and always in line with the evolution of the industry and the overall context in which it operates.
More in detail:

- The fresh water consumption has been evaluated in the context of scarcity. EAA will continue to look further into this aspect in the future sustainability reports to provide more relevant indicators.
- The indicators related to health and safety don't take in account the new EAA members resulting from the integration of the Organisation of the European Aluminium Recycling Industry (OEA) in 2013.
  In order to keep the same reporting methodology, these data will be integrated only in the next report with a new database corresponding to this new scope.
- Renewable energy electric for primary industry: This indicator was reflecting the number of bilateral agreements signed by primary smelters for the dedicated supply of renewable energy. However, as it's more and more difficult for smelters to get long term contracts, in the future this indicator will simply reflects the evolution of the local energy grid mix. Therefore, this parameter will not be monitored in the future for primary as it was already the case for the other sectors.
- Resource use at global level: Due to the global nature of the resource, these indicators were collected at global level by the International Aluminium Institute (IAI). In fact, the bauxite used in Europe is mainly imported. Therefore, all the available information on resource use at global level are published on IAI website.

b) Geographic coverage of the indicators

In order to improve the comparability of the indicators over time, and to take into account the enlargement of the European Union, all the figures in the production phase section of the report refer to EU27 + EFTA (i.e. Norway, Iceland, Switzerland and Liechtenstein), unless otherwise stated.

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c) Vocabulary

It is understood throughout this report that:

a. **Alumina and metal production** = alumina, primary and recycling

b. **Semi-fabrication** = rolling and extrusion

c. **Aluminium industry** = alumina, primary, recycling, rolling and extrusion

The green area in the flow-chart below indicates the boundaries of this exercise.

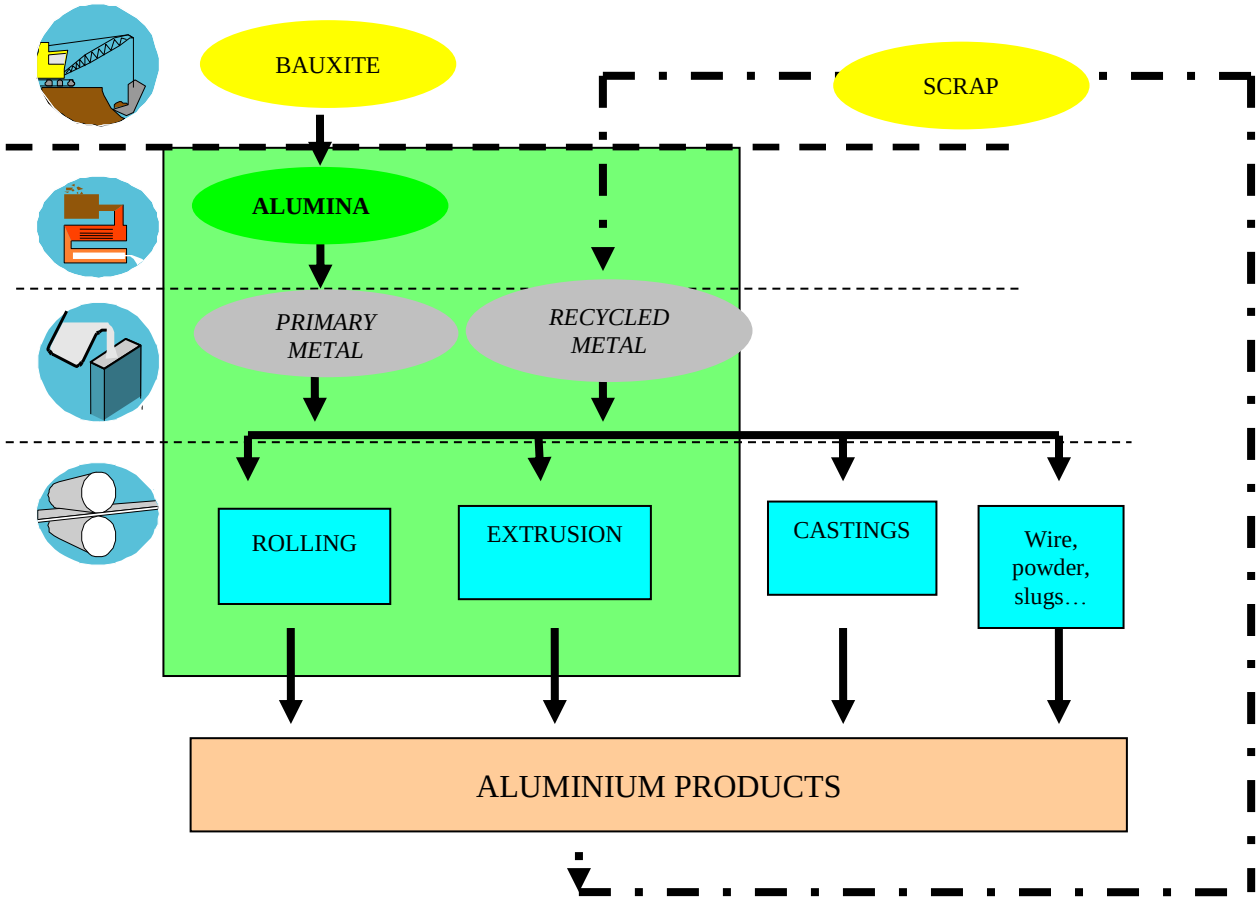

Figure 1 : Scope of the SDI report

- For the cases in which the available data were not sufficient to calculate an indicator, figures are replaced by L.D. = Limited Data. The threshold used for the response rate was one third.
- Furthermore, wherever an indicator was not calculated for a specific year, the figures are replaced by n.a. = not available.

d) Response rate

The response rate *(% resp.*) is the percentage of production generated by companies which answered the questionnaire. This is calculated for each industry sector and for each indicator in comparison to the total production in EU27+EFTA.

e) Scaling up

Wherever relevant, the information on the economic and social data submitted by the companies through the EAA questionnaire has been scaled up to represent the industry total in EU27+EFTA.
The scaling up factor, for each indicator, was the ratio of the total production in EU27+EFTA for the concerned production process, divided by the cumulated production of the companies which provided information on the specific indicator.

This calculation was possible thanks to the annual collection of the total aluminium production data in Europe which EAA performs annually.

f) Precautions

The data in the tables should be read keeping in **mind the response rate to each question**.

In any case, the environmental SDIs provided in this document are not intended for LCA purposes. More detailed numbers and guidance on LCA can be found in the Environmental Profile Report published by EAA and publicly available on its website.

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III. TOTAL PRODUCTION

The companies organised in the European Aluminium Association contribute to regular monthly and quarterly reporting systems. As the EAA membership represents around 75% of all production in Europe, it is possible to generate a complete production overview of the aluminium sectors in a statistically sound way. The data shown in the tables on production cover thus the entire European aluminium processing industry before finishing.

		Production (in kt)
Alumina and Metal production	1997	12.635
	2002	15.071
	2005	17.167
	2008	16.883
	2009	12.359
	2012	13.989
Semi-fabrication	1997	6.004
	2002	6.681
	2005	7.332
	2008	7.374
	2009	5.908
	2012	7.313
Aluminium industry	1997	18.639
	2002	21.752
	2005	24.499
	2008	24.257
	2009	18.267
	2012	21.301

The next table gives more details by dividing metal supply into primary and recycled production. Recycling is defined here as refiners production and scrap intake of remelters, excluding inhouse remelting. The geographic coverage is EU25 + EFTA until 2002 and EU27 + EFTA for the following years.

		Production (in kt)
Alumina	1997	6.096
	2002	6.756
	2005	7.626
	2008	6.997
	2009	4.748
	2012	5.786
Primary	1997	3.732
	2002	4.426
	2005	4.941
	2008	5.186
	2009	4.091
	2012	4.046
Rolling	1997	3.770
	2002	4.036
	2005	4.327
	2008	4.294
	2009	3.514
	2012	4.482
Extrusion	1997	2.234
	2002	2.645
	2005	3.005
	2008	3.080
	2009	2.394
	2012	2.830
Recycling	1997	2.807
	2002	3.889
	2005	4.600
	2008	4.700
	2009	3.520
	2012	4.157

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IV. PLANT CERTIFICATION

In order to demonstrate its commitment to quality and transparency, the aluminium industry is adhering to international certification systems.
For the purpose of this report, the ISO 14000 standard on environmental management systems and the international OHSAS - Occupational Health & Safety Assessment System - were selected.

		Plant certification		
		ISO	OSHAS	% resp.
Alumina and Metal Production	1997	15%	4%	73%
	2002	60%	5%	82%
	2005	83%	41%	81%
	2008	94%	67%	81%
	2009	96%	68%	81%
	2012	94%	70%	60%
Semi-fabrication	1997	14%	0%	56%
	2002	62%	5%	69%
	2005	79%	31%	71%
	2008	85%	82%	73%
	2009	88%	84%	73%
	2012	98%	71%	65%
Aluminium industry	1997	15%	2%	68%
	2002	61%	5%	78%
	2005	80%	35%	78%
	2008	88%	76%	79%
	2009	91%	78%	79%
	2012	96%	70%	61%

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V. REVENUES AND INVESTMENTS

V.1 *Revenues*

This indicator shows the total revenue for companies in the selected year, expressed in million Euro per year. The revenue is calculated here as the total revenue for all plants in all sectors considered in the survey, without any subtractions of adjustments between sectors (i.e. no consolidation).

		Revenue	
		In M €	% resp.
Alumina and Metal Production	1997	12.265,1	37%
	2002	15.463,8	71%
	2005	15.972,9	77%
	2008	17.378,9	78%
	2009	10.538,9	79%
	2012	15.459,9	56%
Semi-fabrication	1997	16.687,5	36%
	2002	19.731,2	66%
	2005	19.676,3	71%
	2008	22.572,9	65%
	2009	15.658,9	64%
	2012	21.321,6	52%
Aluminium industry	1997	28.952,6	37%
	2002	35.195,1	68%
	2005	35.649,2	73%
	2008	39.951,8	70%
	2009	26.197,8	70%
	2012	36.781,5	54%

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V.2 *Value added*

The value added is calculated as the difference between the total revenue of a company or a plant and the cost of energy and raw materials – expressed in million Euro per year.

		Value added	
		In M €	% resp.
Alumina and Metal Production	1997	L.D.	24%
	2002	3.670,8	70%
	2005	4.477,8	73%
	2008	4.676,5	79%
	2009	2.288,8	76%
	2012	2.957,3	49%
Semi-fabrication	1997	L.D	29%
	2002	5.219,4	58%
	2005	6.746,1	71%
	2008	8.414,7	64%
	2009	6.242,5	65%
	2012	6.783,5	49%
Aluminium industry	1997	L.D	27%
	2002	8.890,2	63%
	2005	11.223,9	72%
	2008	13.091,2	69%
	2009	8.531,2	68%
	2012	9.740,8	49%

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V.3 *Capital investments*

As indicated in the previous report capital investments (excluding investments for acquisitions) were used as indicator for the first time for the 2005 figures in place of taxes, due to the variability of the latter on a country to country basis.

		Capital investments	
		In M €	% resp.
Alumina and Metal Production	1997	n.a.	n.a.
	2002	n.a.	n.a.
	2005	589,4	76%
	2008	708,4	76%
	2009	328,9	76%
	2012	625,7	53%
Semi-fabrication	1997	n.a.	n.a.
	2002	n.a.	n.a.
	2005	693,1	71%
	2008	926,4	70%
	2009	549,0	66%
	2012	642,0	52%
Aluminium industry	1997	n.a.	n.a.
	2002	n.a.	n.a.
	2005	1.282,4	73%
	2008	1.634,9	73%
	2009	877,8	70%
	2012	1.267,7	53%

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V.4 *R&D Expenditure*

This indicator represents the total spent annually by European aluminium industry for both in-house and externally funded R&D, expressed in millions of Euro per year.

		R&D expenditure	
		In M €	%resp.
Alumina and Metal Production	1997	L.D.	22%
	2002	107,1	78%
	2005	148,7	69%
	2008	147,1	63%
	2009	142,7	68%
	2012	71,1	53%
Semi-fabrication	1997	L.D.	24%
	2002	159,3	61%
	2005	98,3	71%
	2008	102,7	64%
	2009	104,0	62%
	2012	80,6	52%
Aluminium industry	1997	L.D.	23%
	2002	266,4	68%
	2005	247,0	70%
	2008	249,8	63%
	2009	246,7	65%
	2012	151,6	52%

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V.5 *R&D People Employed*

This indicator represents the total number of persons directly employed in R&D by the European aluminium industry.

		R&D People Employed	
		Persons	%resp.
Alumina and Metal Production	1997	L.D.	27%
	2002	622	76%
	2005	959	58%
	2008	741	47%
	2009	688	55%
	2012	652	41%
Semi-fabrication	1997	L.D.	26%
	2002	974	55%
	2005	678	71%
	2008	679	67%
	2009	645	66%
	2012	569	53%
Aluminium industry	1997	L.D.	27%
	2002	1.595	63%
	2005	1.637	63%
	2008	1.420	56%
	2009	1.334	61%
	2012	1.222	47%

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VI. EMPLOYEE DEVELOPMENT AND RELATIONS

VI.1 Total Number of Employees

This indicator reports the total number of people directly employed in the industry, excluding contract workers.

		Total number of employees	
		Number	%resp.
Alumina and Metal Production	1997	32.450	70%
	2002	31.051	79%
	2005	29.614	81%
	2008	28.235	77%
	2009	25.932	77%
	2012	19.928	59%
Semi-fabrication	1997	57.101	48%
	2002	60.901	58%
	2005	57.960	70%
	2008	67.367	72%
	2009	62.534	73%
	2012	59.947	64%
Aluminium industry	1997	89.551	56%
	2002	91.952	65%
	2005	87.574	74%
	2008	95.602	74%
	2009	88.466	74%
	2012	79.875	63%

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VI.2 Training Performance

This indicator is calculated as the average number of hours for job-related training per person and per year.

		Training performance	
		hours per year per person	%resp.
Alumina and Metal Production	1997	19,9	34%
	2002	35,9	73%
	2005	31,7	66%
	2008	28,5	75%
	2009	28,7	75%
	2012	28,4	61%
Semi-fabrication	1997	13,5	40%
	2002	19,3	55%
	2005	28,0	57%
	2008	33,4	37%
	2009	29,4	36%
	2012	23,0	35%
Aluminium industry	1997	15,8	38%
	2002	24,9	61%
	2005	29,2	60%
	2008	32,0	48%
	2009	29,2	47%
	2012	24,4	41%

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VI.3 Wage Level

This indicator shows the average aluminium industry wages compared to national average for workers (blue collar in manufacturing industries, excluding managerial and technical/commercial staff).

Value is expressed in % of average calculated at the national level in manufacturing industries and aggregated to European level according to the number of employees at each plant.

		Wage Level	
		% of EU average	%resp.
Alumina and Metal Production	1997	L.D.	20%
	2002	L.D.	27%
	2005	112,8%	49%
	2008	108,1%	49%
	2009	106,4%	46%
	2012	106,6%	43%
Semi-fabrication	1997	L.D.	22%
	2002	109,9%	49%
	2005	109,3%	54%
	2008	L.D.	32%
	2009	L.D.	23%
	2012	108,2%	37%
Aluminium industry	1997	L.D.	21%
	2002	L.D.	33%
	2005	111,8%	50%
	2008	L.D.	45%
	2009	L.D.	40%
	2012	107,1%	41%

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VII. HEALTH AND SAFETY

In order to keep the same scope / reporting methodology, the TRI, LTI, fatalities data don't take in account the former OEA refiners. These data will be integrated only in the next report with a new database corresponding to a new scope.

VII.1 Total Recordable Incident Rate

Total Recordable Incident rate (TRI) is the total number of fatalities, lost time incidents, restricted work cases and medical treatment cases[1] per million hours worked.

		TRI	
		Rate	%resp.
Alumina and Metal Production	1997	33,4	60%
	2002	27,4	81%
	2005	9,4	81%
	2008	9,0	74%
	2009	8,3	77%
	2012	7,7	82%
Semi-fabrication	1997	34,1	44%
	2002	18,9	59%
	2005	12,4	59%
	2008	6,0	54%
	2009	5,0	51%
	2012	6,0	52%
Aluminium industry	1997	33,8	49%
	2002	22,0	65%
	2005	11,3	65%
	2008	7,2	61%
	2009	6,2	58%
	2012	6,6	59%

[1] A lost time incident is an accident which causes the employee to be away from his/her normal workstation for one working day or more following the accident. A medical treatment case is an incident following which the employee can go back to the regular workplace after treatment.

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VII.2 Lost Time Incident Rate

Lost Time Incident (LTI) rate is the number of lost time accidents, including fatalities, in the industry per million hours worked.

		LTI	
		Rate	%resp.
Alumina and Metal Production	1997	11,7	60%
	2002	12,4	81%
	2005	3,1	81%
	2008	4,6	74%
	2009	3,9	77%
	2012	3,7	82%
Semi-fabrication	1997	18,3	44%
	2002	10,7	59%
	2005	5,7	59%
	2008	2,8	54%
	2009	2,4	51%
	2012	2,9	52%
Aluminium industry	1997	15,4	49%
	2002	11,3	65%
	2005	4,8	65%
	2008	3,5	61%
	2009	3,0	58%
	2012	3,2	59%

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VII.3 Fatalities

This indicator represents the total number of fatalities incurred each year in the European aluminium industry. In 2012, a dramatic accident caused two fatalities outside the reporting perimeter of the EAA membership. However, in order to be consistent in the applied methodology, theses fatalities were not integrated in the table below.

		Fatalities	
		#	%resp.
Alumina and Metal Production	1997	n.a.	n.a.
	2002	0	81%
	2005	1	81%
	2008	3	74%
	2009	2	77%
	2012	0	82%
Semi-fabrication	1997	n.a.	n.a.
	2002	1	59%
	2005	2	59%
	2008	0	54%
	2009	1	51%
	2012	0	52%
Aluminium industry	1997	n.a.	n.a.
	2002	1	65%
	2005	3	65%
	2008	3	61%
	2009	3	58%
	2012	0	59%

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VII.4 Employee Exposure and Health Assessment

Since the 2002 SDI results, because of their similarity, the employee exposure assessment indicator and the employee health assessment indicator have been combined to generate the employee exposure and health assessment indicator.

The figures gives the percentage of reporting plants with formalised systems to assess risk and/or impact of exposure to chemical, physical, biological and radiation hazards. The indicator is expressed in percentage of plants with either a formal system in place or an occupational health service among the reporting plants.

		Employee exposure and Health Assessment	
		% penetration	%resp.
Alumina and Metal Production	1997	52%	73%
	2002	90%	82%
	2005	97%	81%
	2008	98%	76%
	2009	98%	74%
	2012	89%	60%
Semi-fabrication	1997	75%	56%
	2002	89%	69%
	2005	95%	71%
	2008	89%	73%
	2009	89%	68%
	2012	95%	62%
Aluminium industry	1997	65%	68%
	2002	89%	78%
	2005	96%	78%
	2008	92%	75%
	2009	93%	73%
	2012	92%	60%

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VIII. COMMUNITY DEVELOPMENT AND RELATIONS

VIII.1 Community Expenditure

This indicator represents the total expenditure for social, cultural, sports and other community activities at a local level, including voluntary work organised by the company. The figures are expressed in million Euro.

This indicator can present fluctuations, as special programs of limited duration can take place in one or more installations on a given year, e.g. in correspondence of the start-up of a new plant or a new line, or as a support to one-off local communitiy activities.

		Community expenditure	
		In M €	% resp.
Alumina and Metal Production	1997	L.D	33%
	2002	15,1	52%
	2005	7,8	66%
	2008	7,0	65%
	2009	3,4	67%
	2012	3,5	50%
Semi-fabrication	1997	L.D.	28%
	2002	10,7	43%
	2005	13,0	58%
	2008	6,0	40%
	2009	L.D.	30%
	2012	L.D.	33%
Aluminium industry	1997	L.D.	32%
	2002	25,8	50%
	2005	20,8	64%
	2008	13,0	59%
	2009	L.D.	57%
	2012[2]	6,3	45%

[2] The 2012 data don't include extrusion sector. As information, in 2008 extrusion was representing about 30% of the community expenditure of the whole aluminium sector.

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VIII.2 Community Dialogue

This indicator is defined as a formal structure and process for communication with local communities and authorities, expressed here in percentage of plants that have a structure for community dialogue in place among the reporting plants.

		Community dialogue	
		% penetration	%resp.
Alumina and Metal Production	1997	26%	73%
	2002	53%	82%
	2005	83%	81%
	2008	77%	75%
	2009	78%	67%
	2012	94%	49%
Semi-fabrication	1997	27%	56%
	2002	42%	69%
	2005	76%	71%
	2008	78%	73%
	2009	81%	73%
	2012	95%	45%
Aluminium industry	1997	27%	68%
	2002	46%	78%
	2005	79%	78%
	2008	78%	74%
	2009	80%	69%
	2012	94%	48%

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VIII.3 Community Health Initiatives

This indicator reports the community health programmes, if relevant, or health/fitness programmes for employees and their families which can range from direct health programmes – in areas where official health care is lacking – to programmes such as training, rehabilitation, smoking cessation and others, both for the employees and their families.

The figures below are expressed as a percentage of plants with programmes in place among the reporting plants.

		Community health initiatives	
		% penetration	% resp.
Alumina and Metal Production	1997	19%	73%
	2002	29%	82%
	2005	76%	81%
	2008	72%	72%
	2009	72%	69%
	2012	85%	57%
Semi-fabrication	1997	27%	56%
	2002	41%	69%
	2005	63%	71%
	2008	65%	73%
	2009	66%	73%
	2012	94%	54%
Aluminium industry	1997	23%	68%
	2002	36%	78%
	2005	68%	78%
	2008	68%	72%
	2009	68%	70%
	2012	90%	56%

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IX. EMISSIONS AND SOLID WASTES

The aluminium industry has for a long time been committed to reducing emissions and waste generation, and the downward trend is shown in this section.

The indicators selected represent the most relevant emissions and wastes for the aluminium industry as a whole, although in some cases they refer to specific processes, as explained below:

- **Greenhouse gases (direct emissions)**
  These gases, expressed as tCO_2 equivalents / t of product, are produced either by process-specific chemical reactions (e.g. consumption of the carbon anodes in the electrolytic cells; production of PFCs – PerFluorinatedCompounds – during electrolysis) or from the combustion of fuels (e.g. in the boilers for alumina refining, in the remelting and heating furnaces, rolling and extrusion etc.).

- **Fluorides**
  These emissions are relevant for the primary production, as they are generated in the electrolytic cells from the fluorine present in the cryolite bath where the electrolysis of the alumina takes place.

- **Benzo(a)Pyrene**
  BaP is used as an indicator for the total emissions of PAHs (Polycyclic Aromatic Hydrocarbons), which typically occur in the paste plants, anode baking plants and Søderberg primary smelters.

- **Bauxite residue**
  Bauxite residue, also called red mud, is generated by refining the bauxite through the Bayer process into aluminium hydroxyde, which can be then calcined into alumina. The amount of residue depends on the quality of the bauxite used.

- **Spent Pot Lining and and other hazardous wastes**
  SPL is the residue from used carbon cathodes, which line the bottom of the electrolytic cells. The end-of-life cathode is replaced with a new one, and is currently normally disposed of through landfilling, or increasingly recycled. The “other hazardous wastes” category represents the hazardous residues produced by the semi-fabrication processes, such as the caustic bath/sludges from extrusion, and the etching salts from rolling.

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IX.1 Greenhouse Gas Emissions

This indicator provides data on the anthropogenic emissions of greenhouse gases as defined in the Kyoto Protocol, expressed here as kilogram of CO_2 equivalent per tonne of product. The annual emission of CO_2 and PFC are converted to CO_2 equivalents using 100 year Global Warming Potentials (GWPs). In order to provide detailed information, for this indicator, metal production and the semi-fabrication have been split into their component parts.

			Greenhouse Gas	
			$kgCO_2eq$ / t.	%resp
Alumina and Metal production	**Alumina**	1997	723	89%
		2002	757	89%
		2005	652	86%
		2008	638	96%
		2009	688	95%
		2012	629	87%
	Primary	1997	3.634	87%
		2002	2.703	85%
		2005	2.465	90%
		2008	1.993	96%
		2009	1.941	90%
		2012	1.694	84%
	Recycling	1997	411	40%
		2002	265	71%
		2005	214	67%
		2008	205	60%
		2009	197	63%
		2012	199	67%
Semi-fabrication	**Rolling**	1997	120	78%
		2002	115	85%
		2005	117	81%
		2008	111	93%
		2009	117	93%
		2012	119	83%
	Extrusion	1997	L.D.	27%
		2002	146	38%
		2005	162	34%
		2008	148	38%
		2009	164	35%
		2012	L.D.	32%

		Greenhouse Gas	
		$kgCO_2eq$ / t.	%resp
Aluminium industry*	1997	1.026	69%
	2002	839	79%
	2005	718	75%
	2008	628	78%
	2009	623	78%
	2012	534	74%

*This figure gives an overview of the emissions of the aluminium industry in Europe in $kgCO_2eq$ per tonne of product: this figure is a consolidation of the data per sector weighted by the production.

IX.2 Fluoride Emissions

This indicator provides the total (gaseous and particulate) emissions of fluoride from primary aluminium electrolysis plants. The figures are expressed as annual average of total fluoride emissions in kilogram per tonne of primary aluminium produced.

		Fluoride emissions	
		kg/tonne of aluminium	%resp.
Primary	1997	1,24	87%
	2002	0,98	93%
	2005	0,96	90%
	2008	0,62	86%
	2009	0,56	87%
	2012	0,44	73%

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IX.3 Benzo(a)Pyrene Emissions

Benzo(a)Pyrene emissions are emitted by paste plants, anode plants and Søderberg primary smelters. This indicator provides an average emission expressed in grams per tonne of primary aluminium.

		Benzo(a)Pyrene emissions	
		g/tonne of aluminium	%resp.
Primary	1997	3,20	87%
	2002	1,44	92%
	2005	1,11	69%
	2008	0,65	51%
	2009	0,69	48%
	2012	0,59	38%

IX.4 Bauxite Residue Deposited

This indicator refers to the quantity of residue deposited at designated landfill sites after separation and sand removal at alumina plants. The data is provided as kilograms of bauxite residue, in dry weight, per tonne of alumina produced.

		Bauxite residue deposited	
		kg/tonne of alumina	% resp.
Alumina	1997	673,0	89%
	2002	713,4	89%
	2005	706,0	86%
	2008	667,2	96%
	2009	530,3	95%
	2012	723,8	87%

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IX.5 Spent Pot Lining And Hazardous Waste Deposited

This indicator relates to primary production and expresses the quantity of SPL from electrolysis pot rooms deposited after the removal of materials which can be reused and recycled.
In addition, since 2005 the table also represents the amount of hazardous wastes deposited from semi-fabrication operations, after reuse and recycling.
The indicator is expressed in kilograms per tonne of aluminium produced.

		Spent Pot Lining	
		kg/tonne	% resp.
Primary	1997	22,90	87%
	2002	19,77	93%
	2005	14,78	90%
	2008	17,83	77%
	2009	24,76	79%
	2012	16,77	66%

		Hazardous Waste deposited	
		kg/tonne	% resp.
Semi -fabrication	1997	n.a.	n.a.
	2002	n.a.	n.a.
	2005	3,25	62%
	2008	3,10	68%
	2009	2,82	70%
	2012	1,75	53%

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X. RESOURCE USE AT EUROPEAN LEVEL

In order to provide more detailed information, similar to reporting on greenhouse gas emissions, the indicators in this section are reported for each of the most relevant processes in both the alumina and metal production and the semi-fabrication.

X.1 Electricity Consumption

This indicator represents the energy used expressed in kWh per tonne of product.

		Electricity consumption	
		kWh/t	% resp
Alumina	1997	230	89%
	2002	237	89%
	2005	214	86%
	2008	176	96%
	2009	177	95%
	2012	161	87%
Primary	1997	15.630	87%
	2002	15.434	85%
	2005	14.869	90%
	2008	14.999	96%
	2009	15.055	90%
	2012	14.757	84%
Rolling	1997	547	78%
	2002	526	85%
	2005	662	81%
	2008	503	93%
	2009	526	93%
	2012	529	85%
Extrusion	1997	L.D.	27%
	2002	792	43%
	2005	736	34%
	2008	737	38%
	2009	795	35%
	2012	L.D.	31%
Recycling	1997	266	40%
	2002	254	70%
	2005	153	63%
	2008	164	61%
	2009	169	63%
	2012	160	67%

		Electricity consumption	
		kWh/t	% resp
Aluminium industry*	1997	3.272	69%
	2002	3.283	78%
	2005	2.950	74%
	2008	3.058	79%
	2009	3.152	77%
	2012	2.791	74%

*This figure gives an overview of the emissions of the aluminium industry in Europe in kgCO_2eq per tonne of product: this figure is a consolidation of the data per sector weighted by the production.

X.2 Other energy consumption

This indicator provides the amount of energy used, other than electric (e.g. fuels, gas) expressed in Mjoule per tonne of product.

		Other energy consumption	
		MJ/t	% resp.
Alumina	1997	10.509	89%
	2002	10.583	89%
	2005	9.227	86%
	2008	9.061	96%
	2009	10.413	95%
	2012	10.025	87%
Primary	1997	16.226	87%
	2002	15.128	85%
	2005	14.672	90%
	2008	14.702	96%
	2009	14.748	90%
	2012	13.726	84%
Rolling	1997	2.153	78%
	2002	2.034	85%
	2005	2.083	81%
	2008	2.020	93%
	2009	2.141	93%
	2012	2.125	83%

		Other energy consumption	
		MJ/t	% resp.
Extrusion	1997	L.D.	27%
	2002	2.491	43%
	2005	2.874	34%
	2008	2.603	38%
	2009	2.926	35%
	2012	L.D	29%
Recycling	1997	6.645	40%
	2002	4.404	71%
	2005	3.715	67%
	2008	3.668	63%
	2009	3.490	61%
	2012	3.752	67%
Aluminium industry*	1997	8.363	69%
	2002	7.650	79%
	2005	6.855	75%
	2008	6.719	79%
	2009	6.901	77%
	2012	6.470	73%

*This figure gives an overview of the emissions of the aluminium industry in Europe in kgCO_2eq per tonne of product: this figure is a consolidation of the data per sector weighted by the production.

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X.3 Renewable Electric Energy

Renewable energy is energy which comes from natural resources such as hydro-electricity, solar energy, wind, tides, and geothermal heat, which are renewable (naturally replenished). The figures below represent the percentage of electrical energy coming from these renewable sources for primary production.
The figures regarding the other processes are not represented here because, being strictly dependent on the local energy grids, they would simply reflect their evolution in time.

		Renewable Electric Energy	
		%	% resp.
Primary	1997	41%	87%
	2002	45%	85%
	2005	46%	90%
	2008	45%	96%
	2009	48%	90%
	2012	55%	80%

X.4 Fresh Water Use

Water is commonly used throughout the aluminium industry for cooling purposes, typically cooling of metal after remelting, or cooling of tools during hot metal fabrication (rolling, extrusion). The cooling water is discharged after use, with constant monitoring of the quality of water effluents.

The water use for a given plant can be very different according to whether it is a single or multiple cooling use through water recycling systems – the latter resulting in a very low net water input.

The system used depends on local water availability, **therefore the use of fresh water has to be evaluated in the context of scarcity.**

2012 data	Fresh water consumption (in million m³)	Share (%)
Alumina and Metal production	129	**79%**
Semi fabrication	35	**21%**
Aluminium industry	**165**	**100%**

The fresh water consumption is related mainly (79%) to the metal supply: smelter (58%), alumina (17%) and recycling (3%). Therefore a focus was made on this sector regarding
Water Scarcity.

Water consumption from Water Stress Index (WSI[3]) for primary and alumina plants:

From:	Share (%)
Low impacts area : WSI ≤ 0,09	**92%**
Moderate impacts area : 0,09 < WSI < 0,5	**5%**
Severe impacts area : WSI ≥ 0,5	**3%**
Total	**100%**

92% of the fresh water consumption of the metal supply (alumina and smelters) industry is coming from geographical area where there is no water scarcity (WSI ≤0.09).

EAA will continue to look further into this aspect in the future sustainability reports to provide more relevant indicators.

[3] http://www.ifu.ethz.ch/ESD/downloads/EI99plus

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XI. Use phase and recycling

Aluminim's unique combination of properties - light weight, flexibility, excellent electrical conductivity, strength, extreme resistance to corrosion and endless recyclability – makes it a material of choice for various applications.

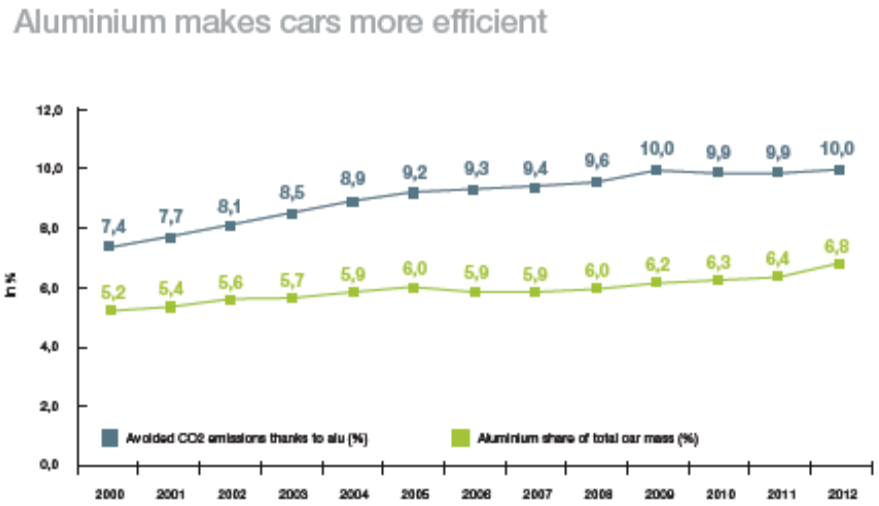
Aluminium is **100% recyclable**

75% of all aluminium ever produced is **still in use**

Recycling saves **95%** of the enregy required to produce primary aluminium

Aluminium products in Europe enjoys high end-of-life recycling rates ranging from above **90%** in the automotive (cars and trucks) and building sectors to about **60%** of all aluminium in packaging .

Aluminium in transport can save on average up to **50% weight** over competing materials and helps **reducing CO_2 emissions**.



Actual weight savings lead to an average annual fuel saving of **65 litres per car.** The amount of aluminium used per car produced in Europe almost tripled since 1990 reaching 140 kg.

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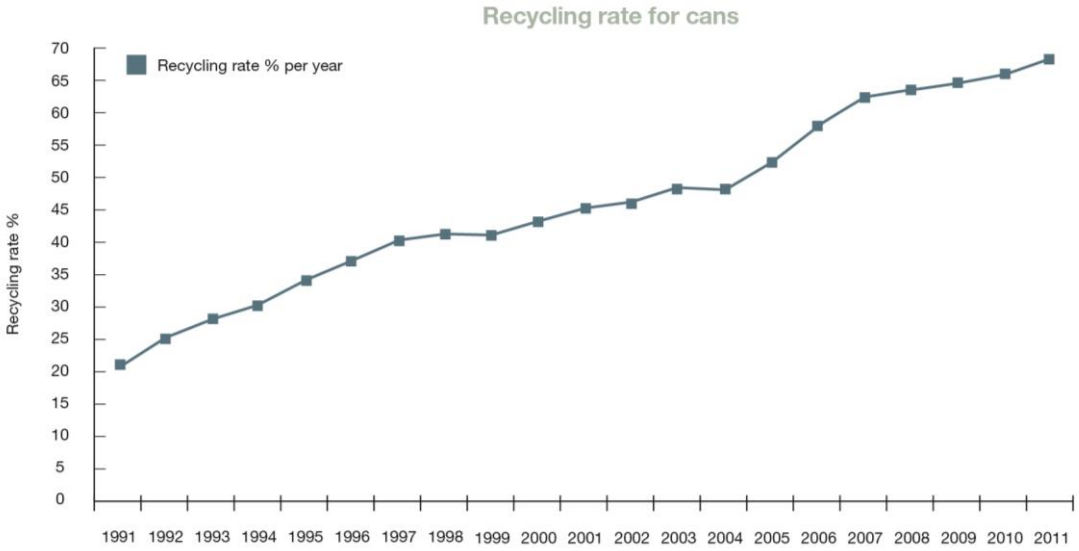
Aluminium improves buildings's energy-efficiency and it allows for lightweight and innovative construction. Intelligent façades incorporating aluminium systems can **decrease energy consumption by up to 50%**. It can also upgrade the energy performance of existing buildings with a **CO_2 payback periods between one to five years[4].**

Due to its unique properties as an efficient barrier for air and light, a minimal amount of aluminium is sufficient to package valuable foodstuffs and drinks and helps to avoid food spoilage. Aluminium beverage cans, foil containers, closures and blister packs offer many benefits, e.g. preserving taste and quality, sustainability and recycling, consumer convenience, cost efficiency and attractive design.

As an example, in Europe, more than **two-thirds of aluminium beverage cans were recycled in 2011**, representing at least **25 billion cans**, three times moreas many than 20 years ago. The aluminium beverage can is the world's most recycled beverage container because it is easily collected, crushed, and recycled back into the same can or into other valuable end-use products such as a bicycle, an engine block or a cladding of a building.

[4] To illustrate how energy performance of existing buildings can be upgraded, EAA compiled three renovation case studies and performed simplified life-cycle-assessments focusing on greenhouse gas emissions.



The aluminium industry is firmly committed to improve recycling rates, to support better collection and sorting schemes through the development of EU-wide network of national recycling and promotional initiatives, close partnerships with local authorities, customers, the waste management sector and NGOs.