

# Sustainable Value Creation of European Industry

An integrated monetary analysis of eco-efficiency of European companies

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**ADVANCE**

ADVANCE has been co-funded by  
the EU LIFE Environment  
programme under grant number  
LIFE04 ENV/UK/000815.



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## What's this presentation all about?

- Introduction of the Sustainable Value approach.
- Presentation of the ADVANCE-Project.
- Presentation of the results on the creation of Sustainable Value by European companies.
- Implications and discussion.



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## How do we assess corporate performance?

- In general, value is created whenever the return exceeds costs:

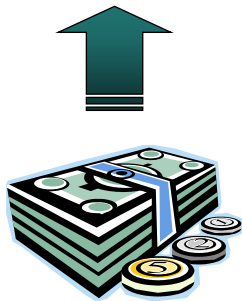
$$\text{Value} = \text{Return} - \text{Costs}$$

- This rule is fundamental to any economic assessment of corporate performance.
- How can this be extended to cover also environmental and social aspects?



## Company performance and resource use.

- Companies create a return



More preferred to less.

- Companies need resources



Less preferred to more.



# The Value-Oriented Approach



- How much value is created?
  - How much € return is created per ton of CO<sub>2</sub>?
  - How much € return is created per ton of VOC?
- Compare the return of alternative uses (opportunity costs)
  - When used in another place – how much more return is created (opportunity cost)?
  - Value is created only if the return exceeds the opportunity costs.
- It's
  - Focused on how much value is created.
  - Easy to do.
  - Using the logic of the financial markets.
  - Compatible with managerial thinking.



# The assessment logic behind Sustainable Value

	Return	-	Cost	=	Value
		Amount of CO <sub>2</sub> -emissions used			
		1,370,613 t			
	Company		Benchmark EU15		
Efficiency	1,478 € / ton of CO <sub>2</sub>	-	2,701 € / ton of CO <sub>2</sub>	=	-1,223 € / ton of CO <sub>2</sub>
Absolute terms	2,026,000,000 €	-	3,702,623,890 €	=	-1,676,623,890 €



## What is Sustainable Value?

- Sustainable Value applies the logic of investment performance assessment to environmental resources.
- To create value the return on environmental resources must cover the costs of the resources.
- Sustainable Value compares the resource use of a company to a benchmark and thus defines the cost of a resource via opportunity costs.
- A company creates Sustainable Value whenever it uses its environmental resources more eco-efficiently than a benchmark.
- As a result, Sustainable Value expresses corporate environmental performance in monetary terms.



## What is ADVANCE?

- ADVANCE is an EU-funded survey that calculates the Sustainable Value of 65 listed companies from the manufacturing sector...
  - ... coming from 16 different European countries...
  - ... and 18 different sectors.
- Data mining is based on publicly available sources (company reports and websites, EU statistics).
- Sustainable Value can be used for a triple bottom line assessment, however, in ADVANCE we use the approach for a purely environmental assessment.
- We use the EU15 as the benchmark.



## Scope of ADVANCE

- ADVANCE covers the use of seven different environmental resources by companies:
  - CO<sub>2</sub>-emissions,
  - NO<sub>x</sub>-emissions,
  - SO<sub>x</sub>-emissions,
  - CH<sub>4</sub>-emissions,
  - VOC-emission,
  - Water use,
  - Waste generation
- Return is measured as:
  - Gross value added on the corporate level
  - Gross domestic product on the benchmark (EU15) level



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## Calculating Sustainable Value: The example of Pirelli

	Step 1	Step 2	Step 3	Step 4
	Amount of resources used in 2003	Return of Pirelli	Return of the EU15 = Opportunity cost	Value contribution
CO <sub>2</sub> -emissions [t]	1,370,613	2,026,000,000 €	- 3,702,623,890 €	= -1,676,623,890 €
NO <sub>x</sub> -emissions [t]	772	2,026,000,000 €	- 774,896,587 €	= 1,251,103,413 €
SO <sub>x</sub> -emissions [t]	0	2,026,000,000 €	- 0 €	= 2,026,000,000 €
Waste generated [t]	171,867	2,026,000,000 €	- 1,077,583,797 €	= 948,416,203 €
Water used [m <sup>3</sup> ]	29,960,663	2,026,000,000 €	- 1,242,562,830 €	= 783,437,170 €
VOC-emissions [t]	4,111	2,026,000,000 €	- 3,990,450,456 €	= -1,964,450,456 €
CH <sub>4</sub> -emissions [t]	0	2,026,000,000 €	- 0 €	= 2,026,000,000 €
<b>Sustainable Value of Pirelli in 2003</b>		<b>2,026,000,000 €</b>	<b>- 1,541,159,651 €</b>	<b>= 484,840,349 €</b>
<b>Return to Cost Ratio</b>		1.3	1	<b>Step 5</b>
		1.3 : 1		



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## Absolute Sustainable Value (i)

Company	Sustainable Value 2003	Sustainable Value 2002	Sustainable Value 2001
1 DaimlerChrysler	29,876,257,351 €	31,896,158,886 €	30,077,701,600 €
2 Robert Bosch GmbH	9,831,338,053 €	9,848,159,729 €	8,781,223,889 €
3 BMW	9,510,633,231 €	9,229,109,374 €	8,936,911,302 €
4 Volkswagen	8,059,197,491 €	9,524,622,621 €	9,476,251,319 €
5 Philips	7,598,054,795 €	7,819,713,882 €	7,062,910,654 €
6 PSA	6,768,651,026 €	7,354,519,022 €	6,369,181,491 €
7 Airbus	4,979,414,025 €	4,946,677,601 €	4,919,428,944 €
8 ABB	4,864,578,563 €	4,629,687,169 €	5,351,681,013 €
9 AstraZeneca	4,751,779,963 €	5,234,319,758 €	5,157,364,953 €
10 Renault	4,033,665,898 €	3,994,028,068 €	3,342,565,031 €
11 Unilever	3,936,173,454 €	4,099,071,601 €	3,741,605,198 €
12 Volvo	3,396,583,146 €	3,341,355,994 €	3,163,639,310 €
13 MAN	2,911,193,152 €	2,999,267,056 €	N/A
14 STMicroelectronics	1,864,722,805 €	2,151,281,043 €	1,983,089,745 €
15 Schering	1,856,454,221 €	2,000,508,333 €	1,932,729,530 €
16 Novonordisk	1,803,753,359 €	1,662,704,380 €	1,454,469,452 €
17 Henkel	1,727,305,657 €	1,808,526,836 €	1,979,307,081 €
18 Agfa-Gevaert	1,414,583,745 €	1,375,236,353 €	979,533,009 €
19 Electrolux	1,344,258,783 €	1,602,891,149 €	1,299,950,346 €
20 Heidelberg Druck	1,045,327,850 €	1,269,945,673 €	1,602,529,592 €
21 Heineken	945,376,403 €	1,075,800,503 €	904,335,303 €
22 Scania	918,892,898 €	814,196,290 €	659,556,811 €



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## Absolute Sustainable Value (ii)

Company	Sustainable Value 2003	Sustainable Value 2002	Sustainable Value 2001
23 Atlas Copco	764,760,925 €	833,335,269 €	886,664,786 €
24 Pirelli	484,840,349 €	565,728,852 €	628,655,253 €
25 SKF	462,421,338 €	444,516,507 €	486,362,570 €
26 NedCar	332,640,428 €	373,256,227 €	377,900,637 €
27 Novozymes	188,204,358 €	181,084,299 €	141,987,196 €
28 Gorenje	173,345,874 €	153,711,847 €	130,261,422 €
29 Richter	65,527,374 €	59,266,260 €	44,893,450 €
30 Acea	-92,371,263 €	-369,997,290 €	-173,807,935 €
31 Crown van Gelder	-155,668,471 €	-168,012,961 €	-156,963,500 €
32 AEM Torino	-454,372,273 €	-575,779,231 €	-450,622,442 €
33 Holmen	-686,700,910 €	-616,926,138 €	-485,243,089 €
34 ICI	-1,179,280,321 €	-387,434,350 €	-541,029,421 €
35 ASM	-1,627,498,489 €	-1,649,438,188 €	-1,629,457,399 €
36 SCA	-2,053,526,721 €	-1,473,676,237 €	-1,180,348,962 €
37 Royal DSM	-2,362,906,433 €	-2,217,345,664 €	-3,776,538,401 €
38 M-Real	-3,484,338,448 €	-3,095,686,977 €	-3,116,670,554 €
39 Pilkington	-4,271,035,368 €	-4,708,240,192 €	-4,814,993,723 €
40 BG Group	-4,664,900,505 €	-6,694,706,346 €	-5,349,553,626 €
41 FIAT	-5,167,821,763 €	-8,213,636,833 €	-5,142,150,044 €
42 Slovnaft	-5,612,746,855 €	-5,211,931,865 €	-5,382,274,790 €
43 UPM-Kymmene	-5,896,828,632 €	-5,604,587,018 €	-4,062,897,272 €
44 Kemira	-6,383,372,500 €	-6,167,231,721 €	-6,221,841,861 €



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## Absolute Sustainable Value (iii)

Company	Sustainable Value 2003	Sustainable Value 2002	Sustainable Value 2001
45 Centrica	-6,484,312,051 €	-12,834,638,423 €	-5,430,386,355 €
46 AEM	-7,142,337,483 €	-6,510,858,118 €	-8,614,154,252 €
47 OMV	-7,462,535,912 €	-3,553,659,898 €	-3,069,629,435 €
48 Celanese	-7,553,743,315 €	-8,793,888,967 €	-8,614,673,206 €
49 Degussa	-8,294,523,146 €	-8,360,879,211 €	-7,326,879,643 €
50 Unipetrol	-9,494,288,327 €	-9,440,175,071 €	-7,623,798,440 €
51 Scottish & Southern Energy	-12,309,698,069 €	-11,081,817,768 €	-10,309,334,324 €
52 BASF	-13,872,669,586 €	-13,800,774,004 €	-11,914,484,411 €
53 ERG	-13,934,166,613 €	-5,645,405,911 €	-5,403,881,658 €
54 Stora Enso	-14,082,317,266 €	-12,631,904,344 €	-12,041,859,643 €
55 Edison	-22,242,425,384 €	-21,589,281,668 €	-17,387,026,298 €
56 Fortum	-40,000,506,604 €	-33,187,790,518 €	-28,988,448,020 €
57 Energias de Portugal	-47,855,870,740 €	-42,134,764,406 €	-44,333,288,178 €
58 MVM	-49,084,322,299 €	-47,474,419,831 €	-45,101,727,657 €
59 ENEL	-53,148,520,028 €	-83,332,940,631 €	-98,816,528,577 €
60 Repsol YPF	-55,854,211,710 €	-54,537,662,628 €	-50,291,816,234 €
61 Union Fenosa	-56,413,585,743 €	-57,593,090,048 €	-51,017,351,104 €
62 ENI	-76,763,875,489 €	-79,336,466,007 €	-71,445,300,635 €
63 Suez	-110,625,047,824 €	-103,839,466,449 €	-115,264,987,660 €
64 BP	-134,132,952,397 €	-146,524,592,820 €	-154,568,271,662 €
65 Shell	-180,917,018,746 €	-176,538,205,610 €	-169,296,409,283 €



## Interpretation

- Overall, 29 of the 65 companies under analysis create a positive Sustainable Value between 2001 and 2003.
- DaimlerChrysler achieves the biggest positive Sustainable Value in our survey.
- With its environmental resources DaimlerChrysler creates about € 29.9 billion more return than the EU15 on average.
- This represents the monetary value of DaimlerChrysler using its environmental resources more eco-efficiently than the EU15 on average.
- Shell yields the lowest absolute Sustainable Value of about € -180.9 billion in 2003.



## Return to Cost Ratio

- To compare companies we take into account company size.  
→ Return to Cost Ratio
- Return to Cost Ratio = Ratio between the return of the company (gross value added) and the opportunity costs, i.e. the return that the benchmark *would have* achieved with the company's resources.
- Return to Cost Ratio > 1  
→ Company is more eco-efficient than the benchmark (EU15)
- Return to Cost Ratio < 1  
→ Company is more eco-efficient than the benchmark (EU15)
- Return to Cost Ratio 2 : 1  
→ Company is twice as eco-efficient as the benchmark (EU15)



## Ranking Return to Cost Ratio (i)

Rank 2003	Company	RCR 2003	RCR 2002	Rank 2002	RCR 2001	Rank 2001
1	Airbus	4.5 : 1	4.7 : 1	1	4.6 : 1	1
2	Novonordisk	4.4 : 1	4.4 : 1	2	4.3 : 1	4
3	Gorenje	4.3 : 1	4.1 : 1	4	3.8 : 1	6
4	BMW	3.9 : 1	4.1 : 1	5	4.3 : 1	3
5	Schering	3.8 : 1	4.2 : 1	3	4.4 : 1	2
6	Philips	3.6 : 1	3.2 : 1	8	3.2 : 1	8
7	DaimlerChrysler	3.6 : 1	3.7 : 1	6	3.6 : 1	7
8	Heidelberger Druckmaschinen	3.4 : 1	3.7 : 1	7	3.9 : 1	5
9	Agfa-Gevaert	3.1 : 1	2.8 : 1	12	2.5 : 1	14
10	PSA	3 : 1	3.2 : 1	9	2.9 : 1	10
11	NedCar	2.9 : 1	3 : 1	10	3 : 1	9
12	ABB	2.8 : 1	2.6 : 1	13	2.8 : 1	12
13	Robert Bosch GmbH	2.7 : 1	2.9 : 1	11	2.8 : 1	11
14	MAN	2.5 : 1	2.5 : 1	15	N/A	N/A
15	Volvo	2.5 : 1	2.5 : 1	16	2.5 : 1	15
16	Henkel	2.5 : 1	2.6 : 1	14	2.8 : 1	13
17	STMicroelectronics	2.2 : 1	2.3 : 1	17	2.3 : 1	16
18	AstraZeneca	2.1 : 1	2.1 : 1	18	2.1 : 1	17
19	Scania	2 : 1	1.9 : 1	19	1.8 : 1	19
20	Renault	1.9 : 1	1.9 : 1	20	1.9 : 1	18
21	Novozymes	1.7 : 1	1.7 : 1	21	1.6 : 1	22
22	Electrolux	1.6 : 1	1.6 : 1	22	1.5 : 1	23





## Ranking Return to Cost Ratio (ii)

Rank 2003	Company	RCR 2003	RCR 2002	Rank 2002	RCR 2001	Rank 2001
23	Atlas Copco	1.6 : 1	1.6 : 1	24	1.6 : 1	21
24	Richter	1.5 : 1	1.4 : 1	26	1.4 : 1	25
25	Volkswagen	1.5 : 1	1.6 : 1	23	1.6 : 1	20
26	Unilever	1.4 : 1	1.4 : 1	27	1.4 : 1	27
27	Heineken	1.3 : 1	1.5 : 1	25	1.4 : 1	24
28	Pirelli	1.3 : 1	1.4 : 1	28	1.4 : 1	26
29	SKF	1.3 : 1	1.3 : 1	29	1.3 : 1	28
30	Acea	1 : 1.2	1 : 2.1	33	1 : 1.3	30
31	Imperial Chemical Industries	1 : 1.4	1 : 1.1	30	1 : 1.2	29
32	SCA	1 : 1.6	1 : 1.4	31	1 : 1.3	31
33	FIAT Group	1 : 1.8	1 : 3.3	39	1 : 1.6	32
34	Holmen	1 : 2.1	1 : 1.9	32	1 : 1.8	33
35	BASF	1 : 2.2	1 : 2.2	35	1 : 2.1	35
36	Royal DSM	1 : 2.2	1 : 2.1	34	1 : 2.9	39
37	Centrica	1 : 2.6	1 : 4.4	45	1 : 2.9	38
38	Degussa	1 : 2.7	1 : 2.7	38	1 : 2.4	36
39	BG Group	1 : 2.7	1 : 3.9	43	1 : 3.3	41
40	UPM-Kymmene	1 : 2.7	1 : 2.5	36	1 : 2	34
41	AEM Torino	1 : 3.2	1 : 3.8	41	1 : 4.2	44
42	M-Real Corporation	1 : 3.2	1 : 2.7	37	1 : 2.6	37
43	Pilkington	1 : 3.9	1 : 4	44	1 : 3.9	43
44	Stora Enso	1 : 4.6	1 : 3.9	42	1 : 3.4	42



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## Ranking Return to Cost Ratio (iii)

Rank 2003	Company	RCR 2003	RCR 2002	Rank 2002	RCR 2001	Rank 2001
45	ENEL	1 : 5	1 : 8.3	54	1 : 9.1	54
46	Crown van Gelder	1 : 5	1 : 5	46	1 : 5.3	45
47	BP	1 : 5.4	1 : 6.1	48	1 : 5.5	46
48	OMV	1 : 5.8	1 : 3.7	40	1 : 3.1	40
49	Shell	1 : 5.9	1 : 6	47	1 : 6.1	48
50	ASM	1 : 6	1 : 7.2	49	1 : 6	47
51	ENI	1 : 7.1	1 : 7.8	52	1 : 6.4	50
52	Celanese	1 : 7.8	1 : 7.7	51	1 : 7.2	52
53	Repsol YPF	1 : 8.7	1 : 8.7	55	1 : 6.2	49
54	Suez	1 : 8.9	1 : 7.5	50	1 : 8.4	53
55	Scottish & Southern Energy	1 : 9	1 : 8	53	1 : 7.2	51
56	Kemira	1 : 9.2	1 : 8.9	56	1 : 9.4	55
57	AEM	1 : 14.2	1 : 17	58	1 : 23.5	60
58	Fortum	1 : 16.3	1 : 13.1	57	1 : 14.1	56
59	Edison	1 : 18.8	1 : 19.5	59	1 : 15.6	57
60	Energias de Portugal	1 : 21	1 : 21.9	60	1 : 24	61
61	Slovnaft	1 : 26.1	1 : 25.6	61	1 : 19.6	59
62	ERG	1 : 27.9	1 : 32.8	63	1 : 19.1	58
63	Union Fenosa	1 : 29.7	1 : 28.9	62	1 : 26.7	62
64	Unipetrol	1 : 40	1 : 42.3	64	1 : 27.6	63
65	MVM	1 : 188.3	1 : 341.5	65	1 : 150.4	64



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## Interpretation

- The leading companies use their environmental resources more than 4 times more eco-efficiently than the EU15 on average.
- Top performing companies in 2003 are Airbus, Novonordisk, Gorenje, BMW and Schering.
- The laggards among the companies use their environmental resources at least 30 times less eco-efficient than the EU15 on average.
- Slovnaft, ERG, Union Fenosa, Unipetrol, and MVM bring up the rear of the ranking.

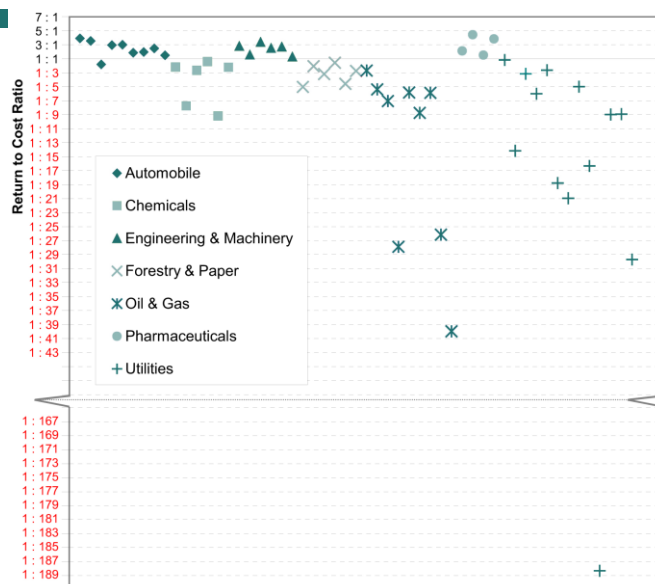


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## Value to Cost Ratio – Seven Different Sectors in 2003



## Sector results - Automobile

- BMW is the most eco-efficient car manufacturer in Europe and uses its environmental resources 7 times more eco-efficiently than FIAT the sector laggard.
- As the only car manufacturer, FIAT does not achieve a positive Sustainable Value.

Company	RCR 2003	Rank RCR 2003	Sustainable Value 2003
BMW	3.9:1	4	9,510,633,231€
DaimlerChrysler	3.6:1	7	29,876,257,351€
PSA	3:1	10	6,768,651,026€
NedCar	2.9:1	11	332,640,428€
Volvo	2.5:1	15	3,396,583,146€
Scania	2:1	19	918,892,898€
Renault	1.9:1	20	4,033,665,898€
Volkswagen	1.5:1	25	8,059,197,491€
FIAT Group	1:1.8	33	-5,167,821,763€



## Sector results – Engineering & Machinery

- Heidelberger Druckmaschinen AG is the sector leader among the engineering & machinery companies. Its eco-efficiency is about 2.5 times higher than the Swedish SKF.
- All engineering & machinery companies achieve a positive Sustainable Value.

Engineering & Machinery	RCR 2003	Rank RCR 2003	Sustainable Value 2003
Heidelberger Druckmaschinen	3.4:1	8	1,045,327,850€
ABB	2.8:1	12	4,864,578,563€
Robert Bosch	2.7:1	13	9,831,338,053€
MAN	2.5:1	14	2,911,193,152€
Atlas Copco	1.6:1	23	764,760,925€
SKF	1.3:1	29	462,421,338€



## Sector results - Chemicals

- The chemicals sector is very resource intensive and thus yields negative Sustainable Value results.
- ICI almost achieves the benchmark level, the performance spread within the sector is rather large.
- BASF is only about half as eco-efficient as the EU15 und achieves a negative Sustainable Value of € –13.9 billion.

Chemicals	RCR 2003	Rank RCR 2003	Sustainable Value 2003
Imperial Chemical Industries	1 : 1.4	31	-1,179,280,321 €
BASF	1 : 2.2	35	-13,872,669,586 €
Royal DSM	1 : 2.2	36	-2,362,906,433 €
Degussa	1 : 2.7	38	-8,294,523,146 €
Celanese	1 : 7.8	52	-7,553,743,315 €
Kemira	1 : 9.2	56	-6,383,372,500 €



## Conclusions

- Sustainable Value expresses corporate eco-efficiency in monetary terms for the first time.
- Sustainable Value allows meaningful quantitative comparisons of the environmental performance of companies.
- Sustainable Value translates eco-efficiency into the logic and language of managers and investors.
- Sustainable Value applies opportunity cost thinking to corporate sustainability assessment.
- The analysis is based on publicly available data.
- The results show which companies use their environmental resources in a value-creating way.



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Sustainable Value: Sustainable Value (2001-2003) Sustainable Value (2010)

## Sustainable Value (2001-2003)

This table shows the Sustainable Value that companies have created in the years 2001, 2002 and 2003. Companies are ranked according to Sustainable Value created in 2003.

Rank	Company	Sustainable Value 2003	Sustainable Value 2002	Sustainable Value 2001
1	DaimlerChrysler	29,876,257,351 €	31,886,159,886 €	30,077,701,600 €
2	Robert Bosch GmbH	9,831,338,053 €	9,848,159,729 €	8,781,223,889 €
3	BMW	9,510,633,231 €	9,228,109,374 €	8,936,911,302 €
4	Volkswagen	8,059,197,491 €	9,524,622,621 €	9,476,251,319 €
5	Philips	7,598,054,795 €	7,819,713,822 €	7,062,910,654 €
6	PSA	6,768,651,026 €	7,354,519,022 €	6,369,181,491 €
7	Airbus	4,979,414,025 €	4,946,677,601 €	4,919,428,944 €
8	ABB	4,864,578,563 €	4,629,687,169 €	5,261,681,013 €
9	AstraZeneca	4,751,779,963 €	5,234,319,758 €	5,157,364,953 €
10	Renault	4,033,665,898 €	3,994,028,068 €	3,342,565,031 €



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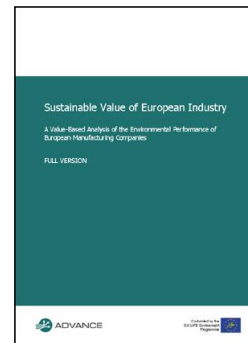
# ADVANCE Publications

- Short version in German



- Short version in English

- Full version in English



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## More publications on Sustainable Value

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Thank you very much!



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