Natural resources, Factor X and the contribution of companies to Sustainable Growth

Sustainable resource management, raw materials security, Factor-X resource productivity – tools for delivering sustainable growth in the European Union December 6-7, 2006 in Bruges/Belgium

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ADVANCE

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Sustainable Development Research Centre (SDRC)

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What is this presentation all about?

- Introduction
- The ADVANCE survey
- Presentation of the Sustainable Value approach to assess companies' contribution to EU performance targets
- Results of the ADVANCE survey's future performance scenario
- Implications and conclusions

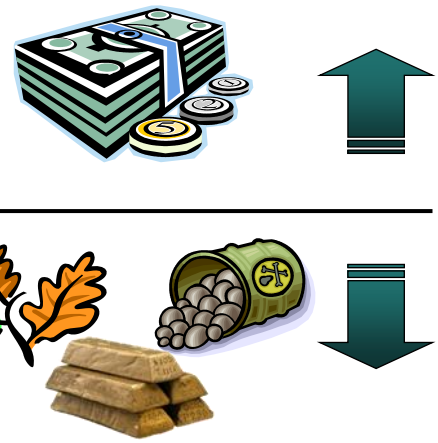
Why do companies use resources?

- Companies create a return.
- Companies need resources.

More return preferred to less return.

Less resource use preferred to more resource use.

The big buzz-word: Eco-efficiency



Conventional management perspective vs. Sustainability perspective

- Financial markets and conventional management only focus on economic capital.
- Objective: above average (risk-adjusted) return on capital.

- This falls short of the sustainability concept!
- Companies not only use economic capital but also environmental and social resources.
- Without environmental and social resources there is no return.
- From the viewpoint of sustainability focusing only on return on capital is insufficient.

➔ How can we determine if a company has created value with its economic, environmental and social resources?

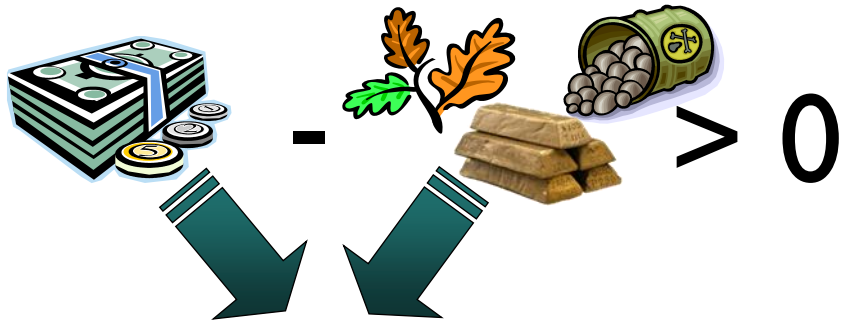
When are resources used in a value-creating way?

- 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.
- Sustainable Value extends this basic rule to environmental and social resources.

Easy in theory – difficult in practice



Challenge: We need to express this in the same unit!

Some things do not add up easily.

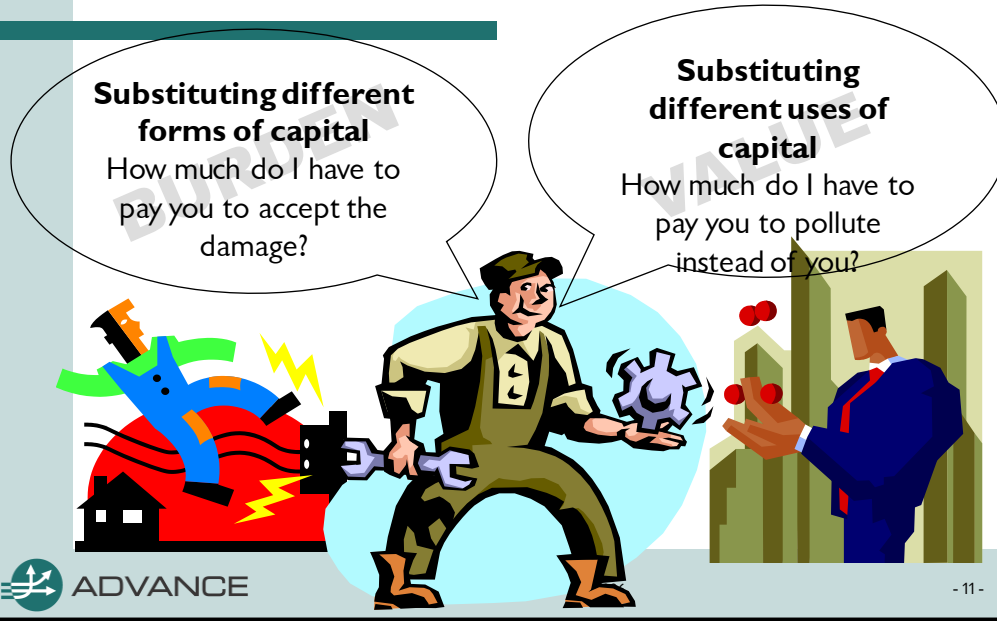
The Burden-Oriented Approach

- Research and practice use a burden-oriented approach to assess and manage environmental and social bads.
- Weigh up different „environmental bads“
  - How bad is more CO_2 in comparison to all the other impacts?
  - What‘s e.g. the trade-off between work accidents and CO_2?
- To be able to subtract «burden» from «return» we need to (in addition to the weighing up) monetarise the burden.

The Value-Oriented Approach

- How much value is created?
  - How much € return is created per ton of CO_2?
  - 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.

How is Sustainable Value different?



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Performance assessment in financial markets…

	Return	-	Cost	=	Value
		Capital employed 1,000 €			
	Stock A		S&P500		
Return on capital	7%	-	4%	=	3%
	70 €	-	40 €	=	30 €

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… and how Sustainable Value works (example of Pirelli in 2003)

	Return	-	Cost	=	Value
		Amount of CO_2-emissions used			
		1,370,613 t			
	Company		Benchmark EU15		
Efficiency	1,478 € / ton of CO_2	–	2,701 € / ton of CO_2	=	-1,223 € / ton of CO_2
Effectiveness	2,026,000,000 €	–	3,702,623,890 €	=	-1,676,623,890 €

The ADVANCE Survey

- 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).
- Scope of the survey
  - 65 European companies
  - Time frame 2001-2003, as well as 2010
  - Seven environmental indicators
- Benchmark: EU15, past and future performance scenario

Calculation of Sustainable Value

1. How much of a resource does a company use?
2. How much return does the company create with its resources?
3. How much return would the benchmark have created with these resources (opportunity costs)?
4. How much more or less return does the company create in comparison to the benchmark with each resource (value contribution)?
5. How much Sustainable Value does the company create with its set of resources used?

The example of Pirelli 2003

	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_2-emissions [t]	1,370,613	2,026,000,000 €	-	3,702,623,890 €	=	-1,676,623,890 €
NO_x-emissions [t]	772	2,026,000,000 €	-	774,896,587 €	=	1,251,103,413 €
SO_x-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 [m³]	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_4-emissions [t]	0	2,026,000,000 €	-	0 €	=	2,026,000,000 €
Sustainable Value of Pirelli in 2003		2,026,000,000 €	-	1,541,159,651 €	=	**484,840,349 €**
						Step 5

Explanatory power of the absolute Sustainable Value

- A company creates Sustainable Value whenever it uses its resources more efficiently than a benchmark.
- In ADVANCE a positive Sustainable Value shows which companies use their environmental resources more efficiently than the EU15 economy on average.
- The absolute Sustainable Value shows the monetary value that is created or lost compared to the benchmark due to the use of the resources by a company.

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	Heidelberger 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 €

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 €

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, in ADVANCE 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 (RCR)

- 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 less eco-efficient than the benchmark (EU15)
- Return to Cost Ratio 2 : 1
  → Company is twice as eco-efficient as the benchmark (EU15)

Calculating the Return to Cost Ratio: The example of Pirelli

		Step 1		*Step 2*		*Step 3*
	Amount of resources used in 2003	Return of Pirelli		Return of EU15 = Opportunity cost		Value Contribution
CO_2-emissions [t]	1,370,613	2,026,000,000 €	-	3,702,623,890 €	=	-1,676,623,890 €
NO_x-emissions [t]	772	2,026,000,000 €	-	774,896,587 €	=	1,251,103,413 €
SO_x-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^3]	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_4-emissions [t]	0	2,026,000,000 €	-	0 €	=	2,026,000,000 €
Sustainable Value 2003		2,026,000,000 €	-	1,541,159,651 €	=	**484,840,349 €**
		1.3		1		*Step 4*
Return to Cost Ratio				**1.3 : 1**		

Results 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

Results 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

Results 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

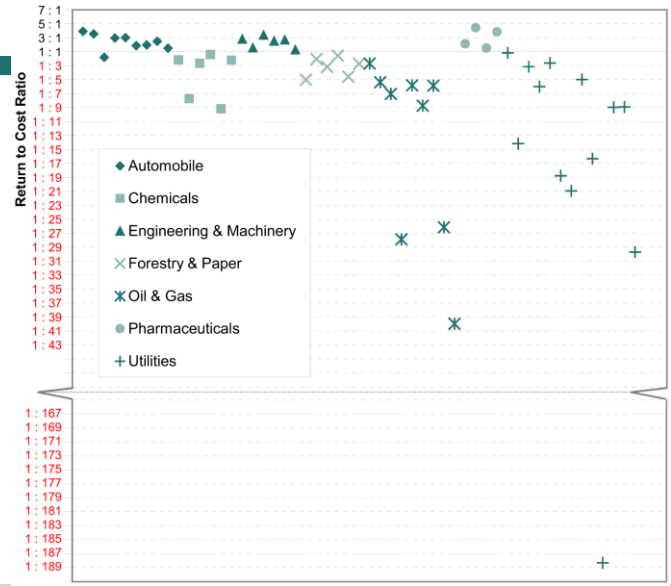
Interpretation

- The leading companies in the ADVANCE survey 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-efficiently than the EU15 on average.
- Slovnaft, ERG, Union Fenosa, Unipetrol, and MVM are the laggards of the ranking.

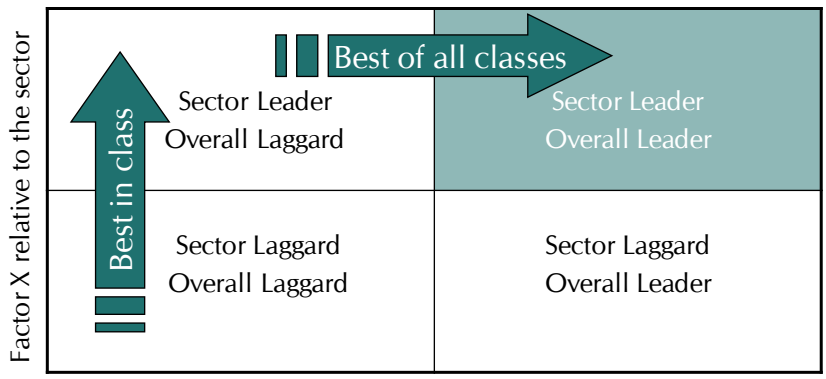
In-depth analysis: Trends in performance between 2001 and 2003

	Change in Performance 2001 - 2003	
Company	Δ RCR	Value Driver / Critical Resource
ENEL	+ 81%	SO_x
AEM	+ 66%	SO_x
(...)	(...)	
UPM-Kymmene	-26%	CO_2, NO_x
Repsol YPF	- 29%	(GVA)
ERG	- 31%	SO_x Water
Unipetrol	- 31%	SO_x Water
OMV	- 46%	CH_4

Return to Cost Ratio – Seven Sectors in 2003



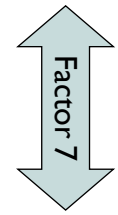
Choice of the benchmark: Best in Class oder Best in Economy?



Sector results - Automobile

- BMW is the most eco-efficient car manufacturer in Europe and uses its environmental resources *7* times more 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 €



Companies and EU performance targets

- The EU has agreed on range of different economic and environmental performance targets.
  - Lisbon strategy
  - Kyoto protocol and EU burden sharing agreement
  - Gothenburg protocol and NEC directive
  - EC Environment Action Programme
- The EU emphasises the need to integrate different policy areas and targets.
- Companies play an important role in the achievement of both economic and environmental performance targets.

➔ Challenge to measure corporate contributions to the achievement of EU targets

EU economic and environmental performance targets for 2010

	2010 Target relative	absolute	Policy background	Sources
Economic goals				
GDP growth	3% p.a.	11,454 billion €	Lisbon declaration	[1]
Environmental goals				
CO_2-emissions	8% reduction compared to 1990	3,067,902,427 t	EU burden sharing agreement	[2]
NO_x-emissions	-	5,923,000 t	NEC Directive, Annex II	[3]
SO_x-emissions	-	3,634,000 t	NEC Directive, Annex II	[3]
Waste generation	20% reduction compared to 2000	1,168,475,530 t	No EU targets available for overall waste reduction. In a preliminary version of Decision 1600/2002/EC there is a 20% reduction target for municipal waste that is applied to overall waste here.	based on [19]
Water use	extrapolation of downward trend	218,074,000,000 m³	No EU targets for water use available. Therefore, the existing downward trend of water use has been extrapolated to the year 2010.	based on [20]
VOC-emissions	-	5,581,000 t	NEC Directive, Annex II	[3]
CH_4-emissions	8% reduction compared to 1990	19,757,629 t	EU burden sharing agreement	[2, 21]

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A different benchmark: EU target efficiencies for 2010

- Target efficiencies are calculated in the following way:

  Target efficiency = targeted GDP / targeted emission level

	Target efficiency of the EU15 for 2010	Efficiency of EU15 in 2003	Targeted improvement
CO_2-emissions	3,733 €/t	2,701 €/t	38.2 %
NO_x-emissions	1,933,747 €/t	1,004,300 €/t	92.6 %
SO_x-emissions	3,151,784 €/t	1,779,304 €/t	77.1 %
Waste generated	9,802 €/t	6,270 €/t	56.3 %
Water used	53 €/m³	41 €/m³	26.6 %
VOC-emissions	2,052,246 €/t	970,676 €/t	111.4 %
CH_4-emissions	579,704 €/t	586,083 €/t	-

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Pirelli's performance vis-à-vis the EU performance targets

	Step 1	*Step 2*		*Step 3*		*Step 4*
	Amount of resources used in 2003	Return of Pirelli		2010 target return EU15 = Opportunity cost		Value Contribution
CO_2-emissions [t]	1,370,613	2,026,000,000 €	-	5,116,989,610 €	=	-3,090,989,610 €
NO_x-emissions [t]	772	2,026,000,000 €	-	1,492,038,346 €	=	533,961,654 €
SO_x-emissions [t]	0	2,026,000,000 €	-	0 €	=	2,026,000,000 €
Waste generated [t]	171,867	2,026,000,000 €	-	1,684,671,208 €	=	341,328,792 €
Water used [m³]	29,960,663	2,026,000,000 €	-	1,573,580,193 €	=	452,419,807 €
VOC-emissions [t]	4,111	2,026,000,000 €	-	8,436,781,514 €	=	-6,410,781,514 €
CH_4-emissions [t]	0	2,026,000,000 €	-	0 €	=	2,026,000,000 €
Sustainable Value 2003 > 2010		2,026,000,000 €	-	2,614,865,839 €	=	**-588,865,839 €**
		1		1.3		*Step 5*
Return to Cost Ratio		**1 : 1.3**				

Interpretation of Pirelli's results

- The negative Sustainable Value of Pirelli shows that Pirelli has to create about € 590 million more gross value added out of the same amount of environmental resources in order to meet the EU performance targets.
- With its RCR of 1 : 1.3 in 2003, Pirelli missed the economic and environmental performance targets of the EU15 for 2010 by a factor of 1.3.
- Pirelli will only contribute to the achievement of the EU performance targets if they succeed to improve their overall eco-efficiency by a factor of 1.3.

The top 20 companies

	Company	RCR 2003 > 2010	Sustainable Value 2003 > 2010
1	Novonordisk	3.6 : 1	1,675,499,967 €
2	Gorenje	3.5 : 1	162,107,899 €
3	Airbus	3.4 : 1	4,523,246,485 €
4	Schering	3 : 1	1,677,996,126 €
5	BMW	3 : 1	8,514,813,453 €
6	Philips	2.7 : 1	6,660,947,431 €
7	NedCar	2.7 : 1	318,600,391 €
8	DaimlerChrysler	2.7 : 1	26,133,559,478 €
9	ABB	2.5 : 1	4,564,400,666 €
10	Heidelberger Druckmaschinen	2.5 : 1	896,414,327 €
11	Robert Bosch GmbH	2.4 : 1	9,127,352,912 €
12	MAN	2.2 : 1	2,630,188,140 €
13	Agfa-Gevaert	2.2 : 1	1,126,670,350 €
14	AstraZeneca	2 : 1	4,570,525,310 €
15	Volvo	2 : 1	2,882,359,807 €
16	STMicroelectronics	1.9 : 1	1,612,847,924 €
17	Henkel	1.8 : 1	1,280,626,186 €
18	Scania	1.8 : 1	818,437,840 €
19	PSA	1.6 : 1	3,665,294,761 €
20	Atlas Copco	1.5 : 1	697,900,393 €

The 20 worst performing companies

	Company	RCR 2003 > 2010	Sustainable Value 2003 > 2010
46	OMV	1 : 7.9	-10,660,067,507 €
47	ENEL	1 : 8	-92,696,195,508 €
48	BP	1 : 9.1	-248,473,202,187 €
49	ASM	1 : 9.7	-2,823,001,775 €
50	Shell	1 : 9.9	-331,423,483,150 €
51	ENI	1 : 11.3	-130,652,388,317 €
52	Celanese	1 : 13.1	-13,559,572,503 €
53	Suez	1 : 13.6	-175,345,711,302 €
54	Kemira	1 : 13.8	-9,979,144,884 €
55	Scottish & Southern Energy	1 : 14.3	-20,507,824,481 €
56	Repsol YPF	1 : 15.2	-102,177,853,981 €
57	AEM	1 : 18.1	-9,297,562,895 €
58	Fortum	1 : 24.7	-61,912,703,062 €
59	Edison	1 : 26.2	-31,542,932,659 €
60	Energias de Portugal	1 : 35.8	-83,343,912,554 €
61	ERG	1 : 44.5	-22,544,233,829 €
62	Slovnaft	1 : 45.1	-9,852,893,473 €
63	Union Fenosa	1 : 51.5	-99,263,349,894 €
64	Unipetrol	1 : 65.8	-15,800,783,469 €
65	MVM	1 : 303	-79,145,245,744 €

Interpretation

- The best performing companies surpass the hurdle of the European target efficiencies by a factor of 3 or more.
- The Danish pharmaceutical company Novonordisk is the top performing company with regard to the EU performance targets with a RCR of 3.6 : 1.
- Numerous oil & gas companies and utilities produce Return to Cost Ratios between 1 : 35 and 1 : 65.
- This means that these companies are far from contributing the achievement of the 2010 EU performance targets.
- Even if we turn away from the absolute extreme, there is a considerable performance factor of 135 between the top performing companies and the laggards.

In-depth analysis (i)

- Four companies turn from a positive assessment in 2003 to a negative result when assessed against the 2010 performance targets:
  Heineken, SKF, Richter and Pirelli
- These companies used their environmental resources more efficiently than the EU15 on average in 2003.
- They did not use their resources efficiently enough to surpass the hurdle that is defined by the EU15 economic and environmental performance targets for 2010.
- Pirelli has to improve their overall eco-efficiency by about 70% in order to preserve their performance level of 2003 in the future.

In-depth analysis (ii)

- The VOC efficiency target is the most ambitious as it calls for an improvement in efficiency by 111% from 2003 to 2010.
- Companies with a poor VOC-performance are affected particularly hard by the target efficiency.
- The French car manufacturer PSA Peugeot-Citroën looses more than 90% in efficiency compared to its 2003 performance when assessed against the 2010 performance targets.
- VOC represent a weakness in Pirelli's performance.

Vulnerability of an entire sector: Car manufacturing

- On average: Return to Cost Ratio for VOC in 2003 of 1.2 : 1 but 1 : 1.7 when assessed against performance targets.
- On average the car manufacturing sector has to improve its VOC-efficiency by 70% until 2010 to meet the EU targets.
- Some of the car manufacturers are already above the EU15 target efficiency for VOC-emissions while other car manufacturers fail to meet this target.
- BMW and DaimlerChrysler surpass the VOC target by a factor of 1.9 and 1.7, PSA, Volkswagen and FIAT fall short of the target by factors of 3.2, 1.7 and 8.9, respectively.
- VOC is a problem that can be addressed – as demonstrated by some companies – but is not addressed across the entire sector.

Leader and laggards within one sector: The chemicals sector

- None of the chemicals companies achieves a positive result when assessed against the EU15 performance targets for 2010.
- Imperial Chemical Industries (ICI) as the leader among the chemicals companies we have analysed achieves a future Return to Cost Ratio of 1 : 2.3.
- The sector laggard, the Finnish Kemira Oyj achieves only Return to Cost Ratio of 1 : 13.8 when assessed against the EU15 targets.
- ICI performs 6 times better than Kemira in the light of the stringent conditions of the EU targets.

Wrap up

- 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 resources more efficiently than a benchmark.
- As a result, Sustainable Value expresses corporate environmental or sustainable performance in monetary terms.
- The Return to Cost Ratio expresses corporate eco-efficiency in a Factor X style.
- Sustainable Value can cover economic, environmental and social resources in a fully integrated way.

What have we learnt so far? (ii)

- Sustainable Value can cover the use of economic, environmental and social resources.
  → Integrated triple bottom line assessment
- Sustainable Value can be used with different benchmarks.
- The Return to Cost Ratio provides a comparative measure of corporate eco- and sustainable efficiency.
- Sustainable Value assessments can be used in different contexts as well as for in-depth analyses of corporate environmental and sustainable performance.

Sustainable Value and Sustainable Growth?

- Sustainable Value can take into account normative targets.
- Sustainable Value allows a meaningful comparison of the contribution of companies to performance and policy targets.
- The choice of the benchmark determines the level of resource use that should be achieved.
  → What is a sustainable level of resource use?
- Sustainable Value links consumption targets on the macro level (e.g. national economy) to performance on the micro level (company level).
  → It measures corporate contributions to the achievement of a normative hurdle which represents the benchmark.

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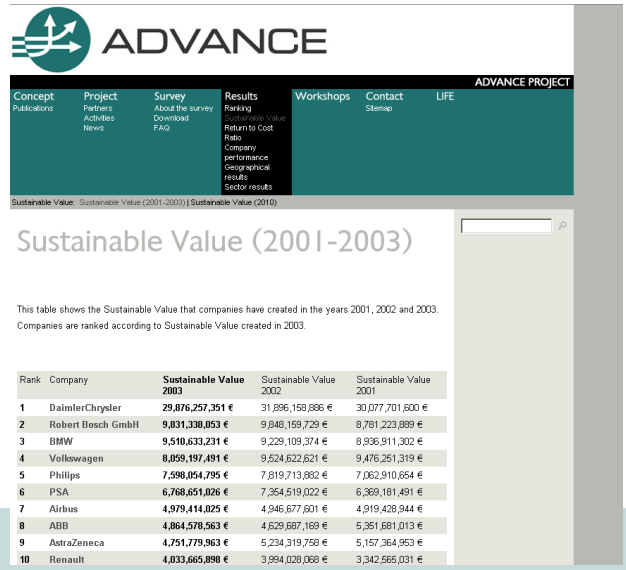

Rank	Company	Sustainable Value 2003	Sustainable Value 2002	Sustainable Value 2001
1	DaimlerChrysler	29,876,257,351 €	31,896,168,886 €	30,077,701,600 €
2	Robert Bosch GmbH	9,831,338,053 €	9,848,159,729 €	8,781,223,889 €
3	BMW	9,510,633,231 €	9,229,109,374 €	8,936,911,302 €
4	Volkswagen	8,059,197,491 €	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 €

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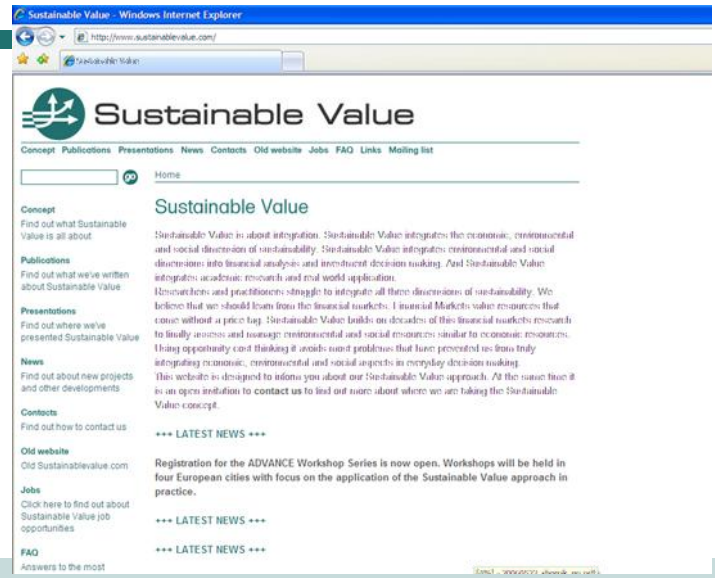

ADVANCE Publications

- Short version in German

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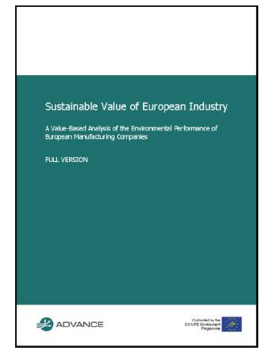

- Full version in English

More publications on Sustainable Value

- Figge, F. Hahn, T. (2005): "The Cost of Sustainability Capital and the Creation of Sustainable Value by Companies", Journal of Industrial Ecology, 9(4), 47-58.
- Figge, F. & Hahn, T, (2005): "Sustainable Value - Ein wertorientierter Ansatz zur Ermittlung der Nachhaltigkeitseffizienz und der nachhaltigen Wertschöpfung von Unternehmen", in: Busch, T. & Liedke, C. (Hrsg.): Materialeffizienz: Potenziale bewerten, Innovationen fördern, Beschäftigung sichern. München: ökom, 203-216.
- Figge, F. & Hahn, T. (2004): "Sustainable Value Added. Measuring Corporate Contributions to Sustainability Beyond Eco-Efficiency", Ecological Economics, 48(2), 173-187.
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Thank you very much!