

Biodegradable municipal waste management in Europe

Part 2: Strategies and instruments, Appendices

Prepared by:
Matt Crowe, Kirsty Nolan, Caitríona Collins, Gerry Carty, Brian Donlon,
Merete Kristoffersen, European Topic Centre on Waste

January 2002

Project Manager:
Dimitrios Tsotsos
European Environment Agency



Layout: Brandenburg a/s

Legal notice

The contents of this report do not necessarily reflect the official opinion of the European Commission or other European Communities institutions. Neither the European Environment Agency nor any person or company acting on behalf of the Agency is responsible for the use that may be made of the information contained in this report.

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server (<http://europa.eu.int>)

©EEA, Copenhagen, 2002

Reproduction is authorised provided the source is acknowledged

European Environment Agency
Kongens Nytorv 6
DK-1050 Copenhagen K
Tel. (45) 33 36 71 00
Fax (45) 33 36 71 99
E-mail: eea@eea.eu.int
Internet: <http://www.eea.eu.int>

Appendices

Appendix 1: BMW summary flow sheets 4

Appendix 2: BMW management status sheets 24

Appendix 1:

BMW summary flow sheets

Table A1.1		Summary BMW waste flow for Austria						
All quantities in tonnes per annum			Management route					
			Landfill	Incineration with Energy Recovery	Composting	Recycling	Mechanical-biological pretreatment before landfill	Unspecified
1995								
Municipal waste produced = 2 644 000	Biodegradable municipal waste produced = 1 495 000	Biodegradable municipal waste collected as bagged waste = 600 000	298 000	203 900			92 500	5,600
		Separately collected FOOD AND GARDEN waste = 346 000			346 000			
		Separately collected PAPER waste = 406 000				406 000		
		Separately collected TEXTILE waste = 17 000	4 000			13 000		
		Separately collected WOOD waste = 20 000		6 100	600	13 300		
		Other (unspecified) biodegradable waste = 106 000 (Note 1)						106,000
TOTAL		1 495 000	302 000	210 000	346 000	432 300	92 500	111 600
Percentage			20.2 %	14.0 %	23.1 %	28.9 %	6.2 %	7.5 %
Latest year for which data is available (1996)								
Municipal waste produced = 2 775 000	Biodegradable municipal waste produced = 1 575 000	Biodegradable municipal waste collected as bagged waste = 625 000	317 500	203 300			94 000	10,200
		Separately collected FOOD AND GARDEN waste = 360 000			360 000			
		Separately collected PAPER waste = 439 000				439 000		
		Separately collected TEXTILE waste = 18 000	4 500			13 500		
		Separately collected WOOD waste = 22 000		6 700	700	14 600		
		Other (Unspecified) biodegradable waste = 111 000 (Note 1)						111,000
TOTAL		1 575 000	322 000	210 000	360 000	467 100	94 000	121 200
Percentage			20.4 %	13.3 %	22.9 %	29.7 %	6.0 %	7.7 %

Note 1: This is thought to consist mainly of bulky biodegradable waste.

Summary BMW waste flow for Baden-Württemberg, Germany

Table A1.2

All quantities in tonnes per annum (Note 1)			Management route				
			Landfill	Incineration with Energy Recovery	Biological Treatment	Recycling	Unspecified
1995							
Municipal waste produced = 18 300 000	Biodegradable municipal waste produced (Municipal waste containing organics) = 5 858 595	Biodegradable municipal waste collected as bagged waste = 4 101 155	2 486 399	690 222	135 873	773 011	15 650
		Separately collected FOOD AND GARDEN waste = 894 744	15 650		792 430		86 664
		Separately collected PAPER waste = 733 446				733 446	
		Separately collected TEXTILE AND SHOES waste = 12 600				12 600	
		Separately collected WOOD incl. CORK waste = 120 200				120 200	
		Separately collected composite PACKAGING (Tetrapak) = 11 600				11 600	
		Separately collected waste FATS = 500				500	
TOTAL	5 858 595	2 502 049	690 222	928 303	1 651 357	102 314	
Percentage		42.7 %	11.8 %	15.8 %	28.2 %	1.7 %	
Latest year for which data is available (1998)							
Municipal waste produced = 14 400 000	Biodegradable municipal waste produced (Municipal waste containing organics) = 5 649 284	Biodegradable municipal waste collected as bagged waste = 3 509 303	1 683 473	690 567	968	1 128 295	6 000
		Separately collected FOOD AND GARDEN waste = 1 172 619	21 203	2 091	1 008 069		141 256
		Separately collected PAPER waste = 811 062				811 062	
		Separately collected TEXTILE AND SHOES waste = 11 700				11 700	
		Separately collected WOOD incl. CORK waste = 120 300				120 300	
		Separately collected composite PACKAGING (Tetrapak) = 23 900				23 900	
		Separately collected waste FATS = 400				400	
TOTAL	5 649 284	1 704 676	692 658	1 009 037	2 095 657	147 256	
Percentage		30.2 %	12.3 %	17.9 %	37.1 %	2.6 %	

Note 1: Quantities for BMW produced and quantities originating from the bagged waste fraction relate to all waste handed over to municipalities the biodegradable fraction of which is estimated to be between 31 % and 55 %.

Table A1.3 Summary BMW waste flow for Belgium (Flanders)

All quantities in tonnes per annum			Management route						
			Landfill	Incineration with Energy Recovery (Note 1)	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Reuse
1995									
Municipal waste produced = 2 890 221 Biodegradable municipal waste produced = 1 671 108	Biodegradable municipal waste produced = 1 671 108	Biodegradable municipal waste collected as BAGGED waste = 1 022 723 (Note 2)	528 907	493 815					
		Separately collected FOOD and GARDEN waste TOTAL = 318 393 Separately collected FOOD waste = 87 279	6 740	269		87 279			
		Separately collected GARDEN waste = 231 114 Not separately collected BULKY GARDEN waste = 17 016 (Note 3)	12 983	4 033					46 572
		Separately collected PAPER AND PAPERBOARD waste = 196 741	179				196 562		
		Separately collected TEXTILE waste = 3 399					2 287		1 112
		Separately collected WOOD waste = 19 442	2 450	1 601		6 825	8 352		214
		BULKY Biodegradable Waste (other than garden waste) = 93 394 (Note 3)	71 260	22 135					
TOTAL	1 671 108	622 519	521 853		271 637	207 201		47 898	
Percentage		37.3 %	31.2 %		16.3 %	12.4 %		2.9 %	
Latest year for which data is available (1998)									
Municipal waste produced = 3 146 648 Biodegradable municipal waste produced = 1 924 304	Biodegradable municipal waste produced = 1 924 304	Biodegradable municipal waste collected as BAGGED waste = 619 294 (Note 2)	237 666	381 627					
		Separately collected FOOD waste and GARDEN waste TOTAL = 722 016 Separately collected FOOD (Note 4) waste = 334 038	826			333 211			
		Separately collected GARDEN (Note 5) waste = 387 978 Not separately collected BULKY GARDEN waste = 18 620 (Note 3)	1 920 11 934			318 391	829		66 838
		Separately collected PAPER AND PAPERBOARD waste = 386 340					386 340		
		Separately collected TEXTILE waste = 17 449					4 931		12 519
		Separately collected WOOD waste = 58 382	3 812	74		8 321	45 938		237
		BULKY Biodegradable Waste (other than garden waste) = 102 203 (Note 3)	65 503	36 700					
TOTAL	1 924 304	321 661	425 087		659 923	438 038		79 594	
Percentage		16.7 %	22.1 %		34.3 %	22.8 %		4.1 %	

Note 1: It is not known which amount of the waste is incinerated with or without energy recovery in 1995.

Note 2: This is counted on percentages based on a report of a sorting analysis of municipal waste of households of 1995-1996.

Note 3: This is counted on percentages based on a report of a sorting analysis of bulky waste of 1998-1999.

Note 4: Food waste in this instance is actually biowaste (VFG – vegetable fruit and (non-woody) garden waste).

Note 5: Garden waste in this instance is vegetational waste – compostable organic waste generated by gardening and maintenance activities in public and private gardens woody materials included.

Summary BMW waste flow for Catalonia SPAIN

Table A1.4

All quantities in tonnes per annum			Management Route					
			Landfill	Incineration with Energy Recovery	Composting	Mass Composting (Note 1)	Recycling	Unspecified
1995								
Municipal waste produced = 2 833 945	Biodegradable municipal waste produced = 1 984 912	Biodegradable municipal waste collected as bagged waste = 1 961 524	1 480 609	417 608		62 157		1 150
		Separately collected PAPER waste = 23 388					23 388	
TOTAL		1 984 912	1 480 609	417 608		62 157	23 388	
Percentage			74.6 %	21.0 %		3.1 %	1.2 %	0.1 %
Latest year for which data is available (1998)								
Municipal waste produced = 2 996 391	Biodegradable municipal waste produced = 2 092 812	Biodegradable municipal waste collected as bagged waste = 1 987 774	1 536 340	433 326		18 108		
		Separately collected FOOD and GARDEN waste = 9 096			9 096			
		Separately collected PAPER waste = 95 942					95 942	
TOTAL		2 092 812	1 536 340	433 326	9 096	18 108	95 942	
Percentage			73.4 %	20.7 %	0.4 %	0.9 %	4.6 %	

Note 1: Mass composting refers to the practice of composting biodegradable waste recovered from bagged waste as opposed to composting of biodegradable waste separately collected at source.

Table A1.5 Summary BMW waste flow for Denmark

All quantities in tonnes per annum			Management route					
			Landfill	Incineration with Energy Recovery	Composting	Anaerobic Digestion	Recycling	Unspecified
1995								
Municipal waste produced = 2 787 467	Biodegradable municipal waste produced = 1 813 283 (Note 1)	Biodegradable municipal waste collected as bagged waste = 1 184 771	178 745	1 006 026				
		Separately collected FOOD waste = 39 000			34 000	5 000		
		Separately collected GARDEN waste = 416 182	25 839	11 606	378 736			
		Separately collected PAPER waste = 173 330					173 330	
TOTAL		1 813 283	204 584	1 017 632	412 736	5 000	173 330	
Percentage			11.3 %	56.1 %	22.8 %	0.3 %	9.6 %	
Latest year for which data is available (1998)								
Municipal waste produced = 2 934 747	Biodegradable municipal waste produced = 2 007 213 (Note 1)	Biodegradable municipal waste collected as bagged waste = 1 162 192	81 846	1 080 346				
		Separately collected FOOD waste = 51 000			42 000	9 000		
		Separately collected GARDEN waste = 585 535	23 869	9 120	552 546			
		Separately collected PAPER waste = 208 486					208 486	
TOTAL		2 007 213	105 715	1 089 466	594 546	9 000	208 486	
Percentage			5.3 %	54.3 %	29.6 %	0.4 %	10.4 %	

Note 1: This figure does not include bulky biodegradable waste.

Summary BMW waste flow for Finland

Table A1.6

All quantities in tonnes per annum			Management route						
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
1994									
Municipal waste produced = 2 100 000	Biodegradable Municipal waste produced = 1 664 000	Biodegradable municipal waste collected as BAGGED waste = 978 000	928 000	50 000					
		Separately collected FOOD waste and GARDEN waste TOTAL = 70 000 Separately collected FOOD waste = Separately collected GARDEN waste =				70 000			
		Separately collected PAPER AND PAPERBOARD waste = 392 000					392 000		
		BULKY Biodegradable Waste (other than garden waste) = 224 000	156 800				67 200		
TOTAL		1 664 000	1 084 800	50 000		70 000	459 200		
Percentage			65.2 %	3.0 %		4.2 %	27.6 %		
Latest year for which data is available (1997)									
Municipal waste produced = 2 510 000	Biodegradable municipal waste produced = 1 780 745	Biodegradable municipal waste collected as BAGGED waste = 1 258 400	1 153 400	80 000				25 000	
		Separately collected FOOD waste and GARDEN waste TOTAL = 93 376 Separately collected FOOD waste = Separately collected GARDEN waste =				93 376			
		Separately collected PAPER AND CARDBOARD waste = 350 591	382	385			349 824		
		Separately collected PACKAGING waste = 52 116	1 391	17 996			23 316	9 413 (R13 Storage)	
		Separately collected WOOD waste = 26 262	245	5 790			19 320	907 (R13 Storage)	
		BULKY Biodegradable Waste (other than garden waste) (Note 1)							
TOTAL		1 780 745	1 155 418	104 171		93 376	392 460	25 000	
Percentage			64.9 %	5.8 %		5.2 %	22.0 %	1.4 %	

Note 1: Method of classification changes between 1994 and 1997: the term 'bulky waste' is no longer used in Finland.

Table A1.7 Summary BMW waste flow for France

All quantities in tonnes per annum			Management route						
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
1995									
Municipal waste produced = 36 200 000	Biodegradable Municipal waste produced = 15 746 376	Biodegradable municipal waste collected as BAGGED waste = 12 996 376	5 854 855	4 273 331	1 628 866	1 030 361	165 844	43 119	
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste = 0	133 500	5 000	5 300	516 000			1 870 200
		Separately collected GARDEN waste = 2 530 000							
		Separately collected PAPER AND PAPERBOARD waste = 220 000					220 000		
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL		15 746 376	5 988 355	4 278 331	1 634 166	1 546 361	385 844	43 119	1 870 200
Percentage			38.0 %	27.1 %	10.4 %	9.8 %	2.4 %	0.3 %	11.9 %
Latest year for which data is available (1998)									
Municipal waste produced = 38 000 000	Biodegradable municipal waste produced = 16 724 000	Biodegradable municipal waste collected as BAGGED waste = 13 680 000	6 608 614	4 784 806	1 192 955	973 432	71 625	48 568	
		Separately collected FOOD waste and GARDEN waste TOTAL =					60 000		
		Separately collected FOOD waste = 60 000	133 500	5 000	5 300	516 000			1 870 200
		Separately collected GARDEN waste = 2 530 000							
		Separately collected PAPER AND PAPERBOARD waste = 454 000					454 000		
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL		16 724 000	6 742 114	4 789 806	1 198 255	1 489 432	585 625	48 568	1 870 200
Percentage			40.3 %	28.6 %	7.1 %	8.9 %	3.5 %	0.3 %	11.2 %

Summary BMW waste flow for Germany

Table A1.8

All quantities in tonnes per annum			Management route							
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified	
1993										
Municipal waste produced = 43 486 000	Biodegradable municipal waste produced = 12 000 000 (Note 1)	Biodegradable municipal waste collected as BAGGED waste =								
		Separately collected FOOD waste and GARDEN waste TOTAL =								
		Separately collected FOOD waste =								
		Separately collected GARDEN waste =								
		Separately collected PAPER and PAPERBOARD waste = 4 649 000 (Note 2)					4 649 000			
		Separately collected biodegradable waste (Total) = 2 823 000 (Note 3)								
		BULKY Biodegradable Waste (other than garden waste) =								
TOTAL						2 571 000	4 649 000			
Percentage										
Latest year for which data is available (1998)										
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =	27 000 000	8 500 000					1 600 000	
		Separately collected FOOD waste and GARDEN waste TOTAL =								
		Separately collected FOOD waste =								
		Separately collected GARDEN waste =								
		BULKY Biodegradable Waste (other than garden waste) =								
TOTAL						7 500 000				
Percentage										

Note 1: Approximate quantity of biodegradable waste from households only.

Note 2: Management route for separately collected paper and paperboard is not specified.

Note 3: All this quantity is delivered to civic waste facilities but the management route is not specified.

Table A1.9 Summary BMW waste flow for Greece

All quantities in tonnes per annum			Management route						
			Land-fill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									
Latest year for which data is available (1997)									
Municipal waste produced = 3 900 000	Biodegradable municipal waste produced = 2 613 000	Biodegradable municipal waste collected as BAGGED waste = 2 324 100							
		Separately collected FOOD waste and GARDEN waste TOTAL = 31 500				31 500			
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste = 257 400					257 400		
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL						31 500	257 400		
Percentage						1.2 %	9.9 %		

Note 1: 47 % of total municipal waste is organic (780 000 tonnes) of which 1.72 % is composted (31 500 tonnes).

Note 2: 20 % of total municipal waste is paper (1 833 000 tonnes) of which 33 % is recycled (257 000 tonnes).

It must be noted that the above factors are derived from average composition of domestic waste and may not be directly comparable with municipal waste.

Summary BMW waste flow for Iceland (No Information)

Table A1.10

All quantities in tonnes per annum			Management route						
			Land-fill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									
Latest year for which data is available ()									
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									

Table A1.11 Summary BMW waste flow for Ireland

All quantities in tonnes per annum			Management Route		
			Landfill	Composting	Recycling
1995					
Municipal waste produced = 1 503 171	Biodegradable municipal waste produced = 990 242	Biodegradable municipal waste collected as bagged waste = 902 712	902 712		
		Separately collected FOOD waste = 30		30	
		Separately collected PAPER waste = 84 000			84 000
		Separately collected TEXTILE waste = 3 500			3 500
		Separately collected WOOD waste = 0			
TOTAL		990 242	902 712	30	87 500
Percentage			91.2 %	0.0 %	8.8 %
Latest year for which data is available (1998)					
Municipal waste produced = 1 852 450	Biodegradable municipal waste produced = 1 162 218	Biodegradable municipal waste collected as bagged waste = 1 049 005	1 049 005		
		Separately collected FOOD waste = 5 664		5 664	
		Separately collected PAPER waste = 94 302			94 302
		Separately collected TEXTILE waste = 3 247			3 247
		Separately collected WOOD waste = 10 000			10 000
TOTAL		1 162 218	1 049 005	5 664	107 549
Percentage			90.3 %	0.5 %	9.3 %

Summary BMW waste flow for Italy

Table A1.12

All quantities in tonnes per annum			Management route				
			Landfill	Incineration with/without Energy Recovery	Composting	Anaerobic Digestion	Recycling
1996							
Municipal waste produced = 25 959 990	Biodegradable municipal waste produced = 9 170 530	Biodegradable municipal waste collected as bagged waste = 8 217 940 (Note 1)	6 820 890	493 076	328 718		575 256
		Separately collected FOOD and GARDEN waste TOTAL = 376 100 Separately collected FOOD waste = Separately collected GARDEN waste =			376 100		
		Separately collected PAPER waste = 576 490					576 490
TOTAL		9 170 530	6 820 890	493 076	704 818		576 490
Percentage			74.4 %	5.4 %	7.7 %		6.3 %
1997							
Municipal waste produced = 26 605 200	Biodegradable municipal waste produced = 9 623 889	Biodegradable municipal waste collected as bagged waste = 8 243 063 (Note 1)	6 586 207	544 042	494 584		618 230
		Separately collected FOOD and GARDEN waste TOTAL = 598 342 Separately collected FOOD waste = Separately collected GARDEN waste =			598 342		
		Separately collected PAPER waste = 782 484					782 484
TOTAL		9 623 889	6 586 207	544 042	1 092 926		782 484
Percentage			68.4 %	5.7 %	11.4 %		8.1 %
Latest year for which data is available (1998)							
Municipal waste produced = 26 845 726	Biodegradable municipal waste produced = 10 092 409	Biodegradable municipal waste collected as bagged waste = 8 200 266 (Note 1)	6 347 005	598 619			
		Separately collected FOOD and GARDEN waste TOTAL = 891 150 Separately collected FOOD waste = Separately collected GARDEN waste =			891 150		
		Separately collected PAPER waste = 1 000 993					1 000 993
TOTAL		10 092 409	6 347 005	598 619	891 150		1 000 993
Percentage			62.9 %	5.9 %	8.8 %		9.9

Note 1: Estimation made considering an average percentage of BMW equal to 50 % of bagged MW (paper waste included).

Table A1.13 Summary BMW waste flow for Luxembourg (No Information)

All quantities in tonnes per annum			Management route						
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									
Latest year for which data is available ()									
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		OTHERS (PLEASE SPECIFY) Separately collected waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									

Summary BMW waste flow for Norway

Table A1.14

All quantities in tons per annum			Management route						
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
1995									
Municipal waste produced = 2 722 000	Biodegradable municipal waste produced = 1 571 607	Biodegradable municipal waste collected as BAGGED waste = 1 285 437							
		Separately collected FOOD waste and GARDEN waste TOTAL = 67 479 Separately collected FOOD waste = 34 399							
		Separately collected GARDEN waste = 33 080							
		Separately collected PAPER AND PAPERBOARD waste = 169 700							
		Separately collected TEXTILE waste = 4 101							
		BULKY Biodegradable Waste (other than garden waste) WOOD waste = 44 890							
TOTAL		1 571 607	1 068 693	282 889		15 716	204 309		
Percentage			68.0 %	18.0 %		1.0 %	13.0 %		
Latest year for which data is available (1997) (Note 1)									
Municipal waste produced = 2 720 740	Biodegradable Municipal waste produced = 1 550 000	Biodegradable municipal waste collected as BAGGED waste = 1 064 577							
		Separately collected FOOD waste and GARDEN waste TOTAL = 121 123 Separately collected FOOD waste = 79 900							
		Separately collected GARDEN waste = 73 000							
		Separately collected PAPER AND PAPERBOARD waste = 279 600							
		Separately collected TEXTILE waste = 7 400							
		BULKY Biodegradable Waste (other than garden waste) WOOD waste = 77 300							
TOTAL		1 550 000	914 500	263 500		77 500	310 000		
Percentage			59.0 %	17.0 %		5.0 %	20.0 %		

Note 1: Norsas can provide total figures for 1998 but the figures from 1997 are more detailed. The change of amounts from 1997-1998 is of no significance.

Tabel A1.15 Summary BMW waste flow for Portugal

All quantities in tonnes per annum			Management route						
			Land fill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Reuse
1995									
Municipal waste produced = 3 340 000	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =					3 116		
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									
Latest year for which data is available (1998)									
Municipal waste produced = 4 173 252	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =				183 761			
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =					14 314		
		Separately collected GARDEN waste = 14 314							
		Separately collected PAPER AND PAPERBOARD waste =						433 000	
		Separately collected TEXTILE waste = 134							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									

Summary BMW waste flow for Spain

Table A1.16

All quantities in tonnes per annum			Management route					Anaerobic Digestion	Recovery
			Land-fill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling		
1995									
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									
Latest year for which data is available (1996) (Note 1)									
Municipal waste produced = 17 175 186	Biodegradable municipal waste produced = 12 196 099	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER waste =					950 000		
		Separately collected PAPER and CARDBOARD PACKAGING waste =					1 175 000		
		Separately collected WOOD PACKAGING waste =					34 200		
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									

Note 1: Source: Plan Nacional De Residuos Urbanos (2000-2006)

Table A1.17 Summary BMW waste flow for Sweden

All quantities in tonnes per annum			Management route						
			Land-fill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
1995									
Municipal waste produced =	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =							
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									
Latest year for which data is available (1998)									
Municipal waste produced = 4 000 000 (Note 1)	Biodegradable municipal waste produced =	Biodegradable municipal waste collected as BAGGED waste =							
		Separately collected FOOD waste and GARDEN waste TOTAL =							
		Separately collected FOOD waste =							
		Separately collected GARDEN waste =							
		Separately collected PAPER AND PAPERBOARD waste =					435 000 (Note 2)		
		BULKY Biodegradable Waste (other than garden waste) =							
TOTAL									
Percentage									

Summary BMW waste flow for The Netherlands

Table A1.18

All quantities in tonnes per annum			Management route						
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
1995									
Waste from households (household waste + bulky household waste) = 7 105 000	Biodegradable municipal waste produced from households = 4 830 000 only garden/food waste and paper waste have been considered	Biodegradable waste from households collected as mixed waste = 2 520 000	1 265 000	1 255 000					
		Separately collected household FOOD waste and GARDEN waste TOTAL = 1 575 000	110 000			1 450 000			
		Separately collected small FOOD + garden waste = 1 450 000				125 000			
		Separately collected bulky GARDEN waste = 125 000							
		Separately collected household PAPER AND PAPERBOARD waste = 735 000					735 000		
BULKY Biodegradable Waste (other than garden waste) =									
TOTAL		4 830 000	1 365 000	1 255 000		1 575 000	735		
Percentage (Note 1)			28.3 %	26 %		33.3 %	15.2 %		
Latest year for which data is available (1998)									
Waste from households (household waste + bulky household waste) = 8 060 000	Biodegradable municipal waste produced from households = 5 340 000 only garden/food waste and paper waste have been considered	Biodegradable waste from households collected as mixed waste = 2 545 000	605 000	1 940 000					
		Separately collected household FOOD waste and GARDEN waste TOTAL = 1 780 000	95 000	10 000		1 490 000			
		Separately collected small FOOD + garden waste = 1 490 000					290 000		
		Separately collected bulky GARDEN waste = 290 000							
		Separately collected household PAPER AND PAPERBOARD waste = 1 015 000					1 015 000		
BULKY Biodegradable Waste (other than garden waste) =									
TOTAL		5 340 000	700 000	1 950 000		1 780 000	1 015 000		
Percentage (Note 1)			13.1 %	36.5 %		33.3 %	19.0 %		

Note 1: From the residue of composting of small food and garden waste (105 000 tonnes in 1998) 95 000 tonnes was landfilled and 10 000 tonnes incinerated. This also causes the adding up to 102 %. The same is for 1995

Supplementary information

Wood (1.3 % of total household waste and a much higher but not exactly known percentage of bulky household waste) has not been taken in consideration. Besides household waste and bulky household waste there is one more waste stream that can be considered to be completely 'municipal'. This is public cleansing waste (sweeping waste market waste public garden waste etc.) a stream completely collected by the municipalities. In 1995 the total amount was 965 000 tonnes. Of this amount 480 000 tonnes of public garden and other green waste was collected separately. 360 000 tonnes of this was composted 100 000 tonnes landfilled and the rest directly recycled. In 1998 the total amount was 1 010 000 tonnes. Of this amount 540 000 tonnes of public garden and other green waste was collected separately. 500 000 tonnes of this was composted 15 000 tonnes landfilled and the rest incinerated or directly recycled.

The total amount of waste from the commercial and service sector (in the Netherlands we are talking about the waste stream: 'office shop and services waste'; it does not include any industrial businesses) in 1998 was estimated at 3 370 000 tonnes. Please note: only a small part of this amount is collected by or on behalf of the municipalities and can be considered as municipal waste. It was estimated that this waste stream contains about 1 330 000 tonnes of waste paper and cardboard 830 000 tonnes of which was separately collected and recycled. Of the remaining 500 000 tonnes about 200 000 tonnes has been incinerated and 300 000 tonnes landfilled. The total amount of biodegradable organic waste (food garden and the like) in this waste stream is not well known but a rough estimate would be 600 000–800 000 tonnes of which 100 000–200 000 tonnes will be composted.

Summary BMW waste flow for the United Kingdom (England and Wales)

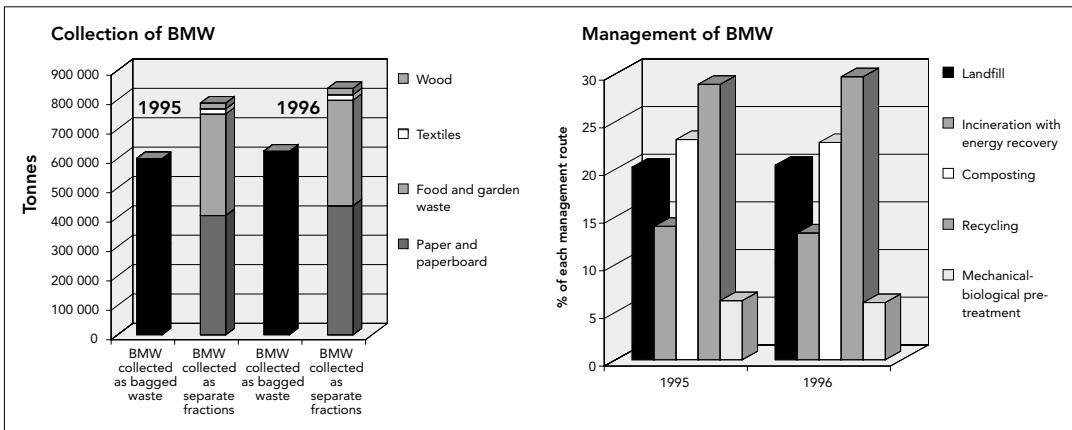
Table A1.19

All quantities in tonnes per annum			Management route						
			Landfill	Incineration with Energy Recovery	Incineration without Energy Recovery	Composting	Recycling	Anaerobic Digestion	Unspecified
1996/97									
Municipal waste produced = 25 980 000	Biodegradable municipal waste produced = 16 366 000 No official UK data; calculated from composition of dustbin and civic amenity waste. Bagged waste figure calculated from composition of dustbin waste minus amounts recycled or composted.	Biodegradable municipal waste collected as BAGGED waste = 12 300 000	11 550 000	750 000					
		Separately collected FOOD waste and GARDEN waste TOTAL = 282 000			21 000				
		Separately collected FOOD waste = 21 000			261 000				
		Separately collected GARDEN waste = 261 000							
		Separately collected PAPER AND PAPERBOARD waste = 625 000				625 000			
		Separately collected TEXTILE waste = 34 000				34 000			
		OTHER garden waste not separated for composting at civic amenity sites = 2 225 000	2 225 000						
	BULKY Biodegradable Waste (not garden waste not separated at CA sites = 900 000	900 000							
TOTAL	16 366 000	14 675 000	750 000		282 000	659 000			
Percentage		89.7 %	4.6 %		1.7 %	4.0 %			
Latest year for which data is available (1998/99)									
Municipal waste produced = 27 990 000	Biodegradable municipal waste produced = 17 682 000 No official UK data; calculated from composition of dustbin and civic amenity waste. Bagged waste figure calculated from composition of dustbin waste minus amounts recycled or composted.	Biodegradable municipal waste collected as BAGGED waste = 12 750 000	11 750 000	1 000 000					
		Separately collected FOOD waste and GARDEN waste TOTAL = 525 000			33 000				
		Separately collected FOOD waste = 33 000			492 000				
		Separately collected GARDEN waste = 492 000							
		Separately collected PAPER AND PAPERBOARD waste = 864 000				864 000			
		OTHER garden waste not separated for composting at civic amenity sites = 2 500 000	2 500 000						
		Separately collected TEXTILE waste = 43 000				43 000			
	Other bulky Biodegradable Waste (not garden waste) not separated at CA sites = 1 000 000	1 000 000							
TOTAL	17 682 000	15 250 000	1 000 000		525 000	907 000			
Percentage		86.2 %	5.7 %		3.0 %	5.1 %			

Appendix 2: BMW management status sheets

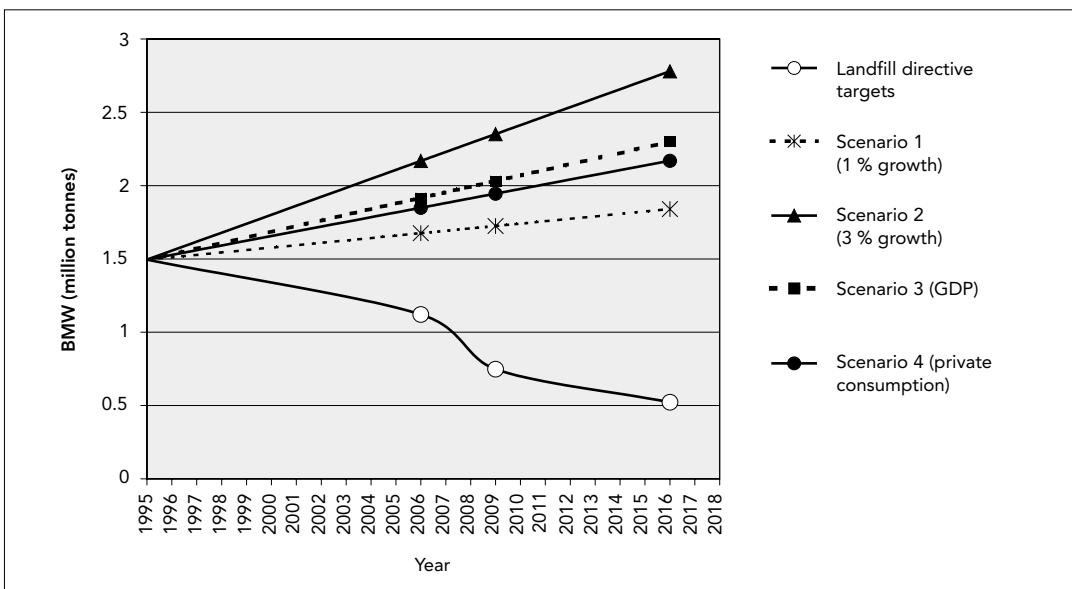
Existing collection and management of BMW in Austria

A2.1



Future projections

A2.2



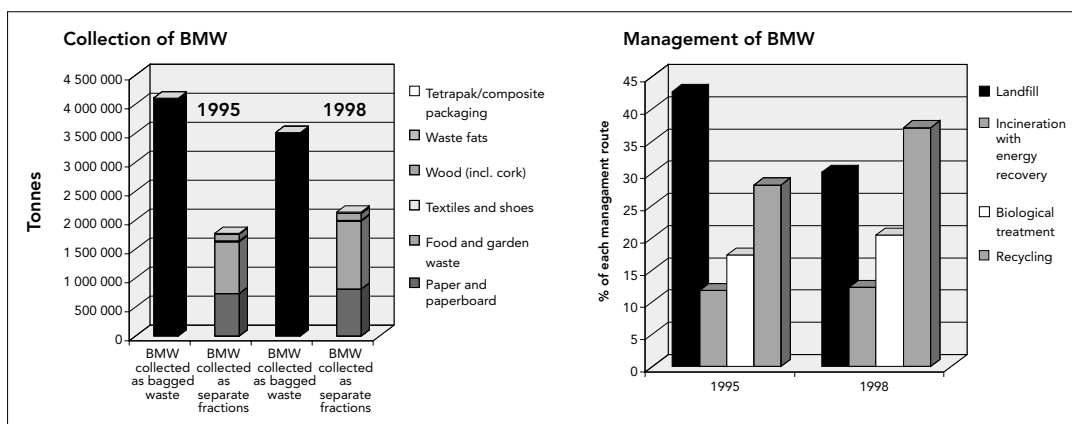
Landfill directive targets and capacity requirements

A2.3

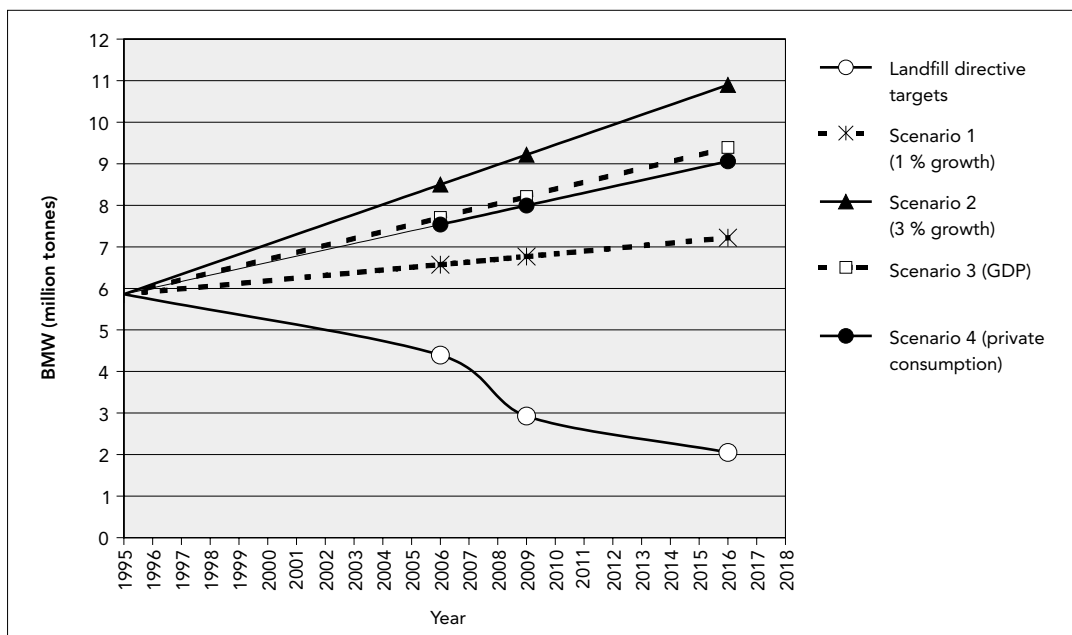
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	1.495		
1996	1.575		
GDP			
2006	1.87	1.121	0.749
2009	1.99	0.748	1.242
2016	2.3	0.523	1.777
Private consumption			
2006	1.82	1.121	0.699
2009	1.92	0.748	1.172
2016	2.17	0.523	1.647

Capacity requirements based on GDP and private consumption

A2.4 Existing collection and management of BMW in Baden-Württemberg



A2.5 Future projections



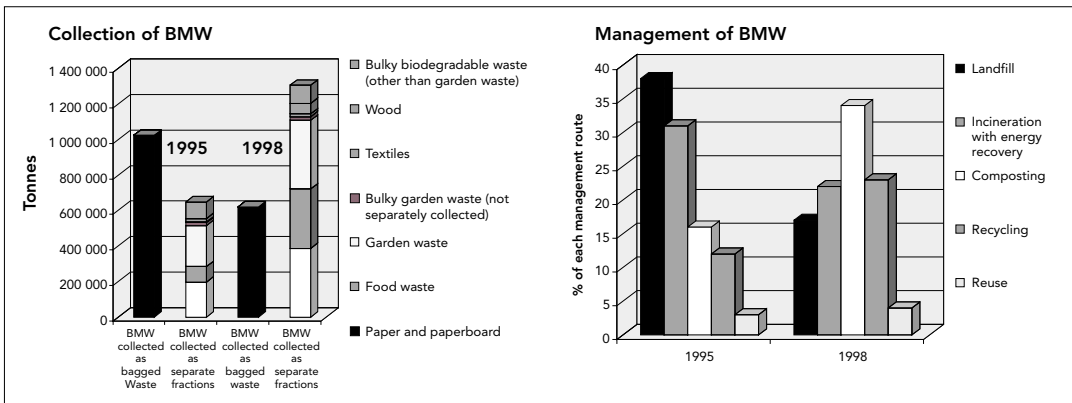
A2.6 Landfill directive targets and capacity requirements

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	5.859		
1998	5.649		
GDP			
2006	7.502	4.39	3.112
2009	8.025	2.93	5.095
2016	9.392	2.05	7.342
Private consumption			
2006	7.362	4.39	2.972
2009	7.835	2.93	4.905
2016	9.060	2.05	7.01

Capacity requirements based on GDP and private consumption

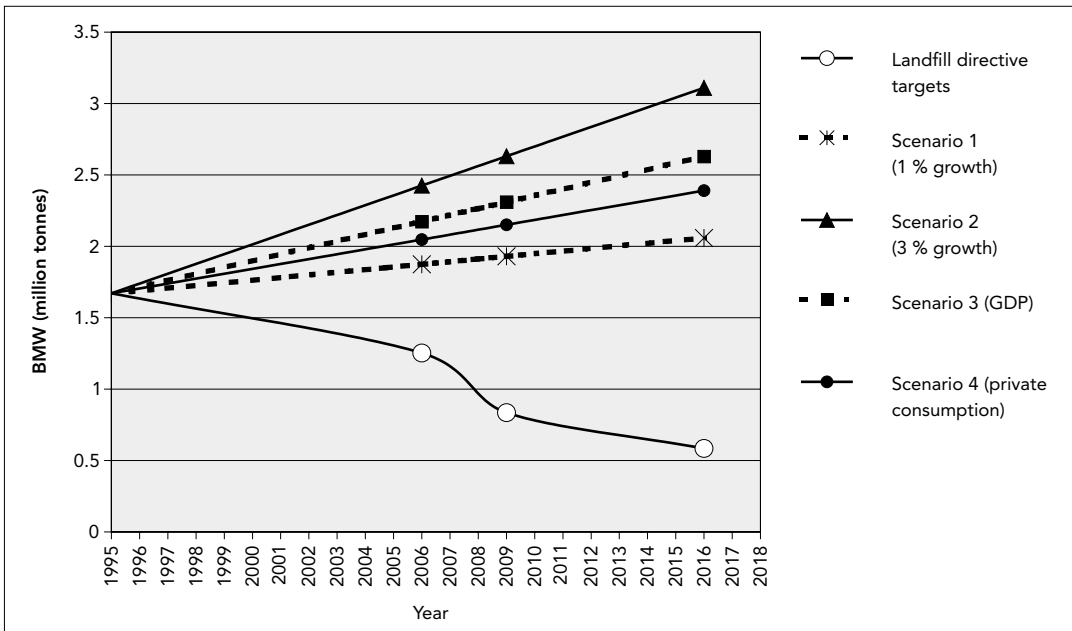
Existing collection and management of BMW in the Flemish Region of Belgium (Flanders)

A2.7



Future projections

A2.8



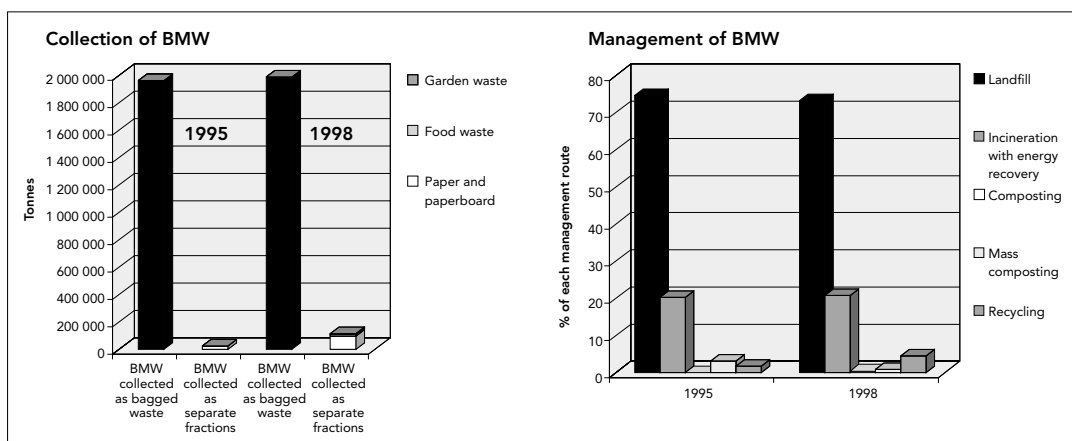
Landfill directive targets and capacity requirements

A2.9

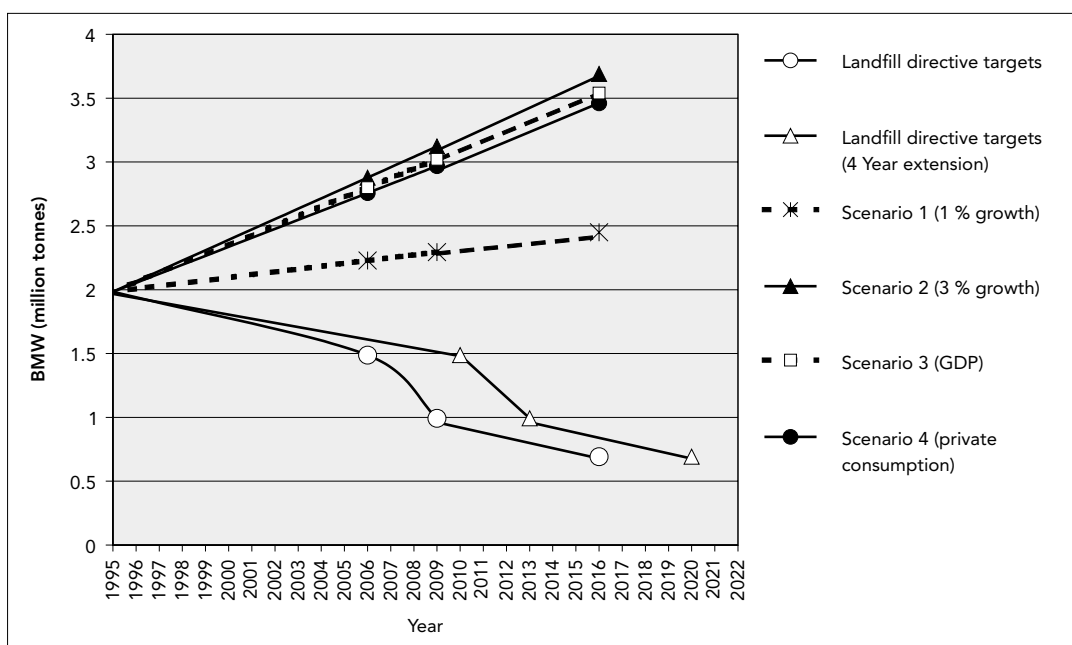
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	1.671		
1998	1.924		
GDP			
2006	2.12	1.253	0.867
2009	2.26	0.836	1.424
2016	2.63	0.585	2.045
Private consumption			
2006	2.02	1.253	0.767
2009	2.12	0.836	1.284
2016	2.39	0.585	1.805

Capacity requirements based on GDP and private consumption

A2.10 Existing collection and management of BMW in Catalonia



A2.11 Future projections



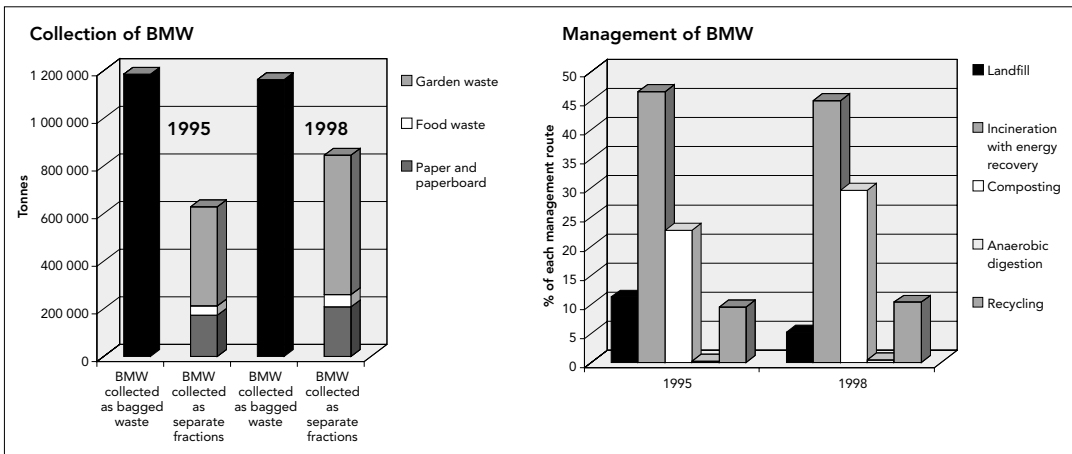
A2.12 Landfill directive targets and capacity requirements

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	1.984		
1998	2.097		
GDP			
2006	2.69	1.488	1.202
2009	2.92	0.992	1.928
2016	3.54	0.692	2.848
Private consumption			
2006	2.66	1.488	1.172
2009	2.88	0.992	1.888
2016	3.46	0.692	2.768

Capacity requirements based on GDP and private consumption

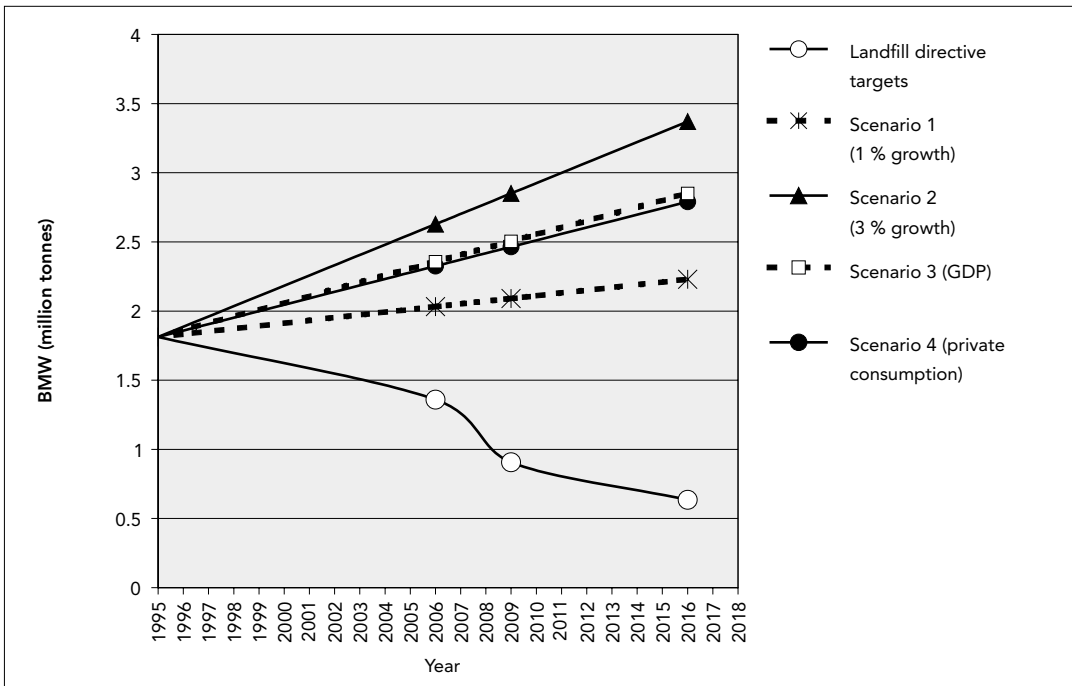
Existing collection and management of BMW in Denmark

A2.13



Future projections

A2.14



Landfill directive targets and capacity requirements

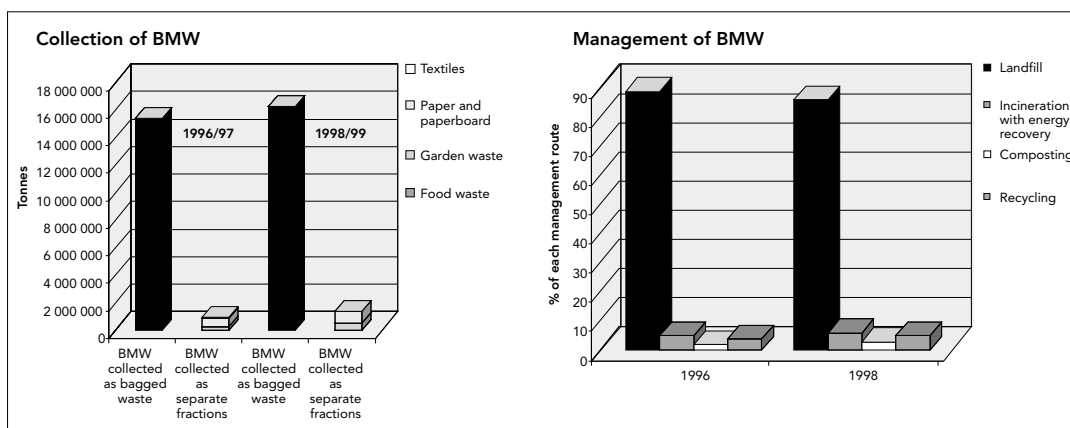
A2.15

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	1.813		
1998	2.007		
GDP			
2006	2.30	1.36	0.94
2009	2.45	0.907	1.543
2016	2.85	0.635	2.215
Private consumption			
2006	2.27	1.36	0.91
2009	2.42	0.907	1.513
2016	2.79	0.635	2.155

Capacity requirements based on GDP and private consumption

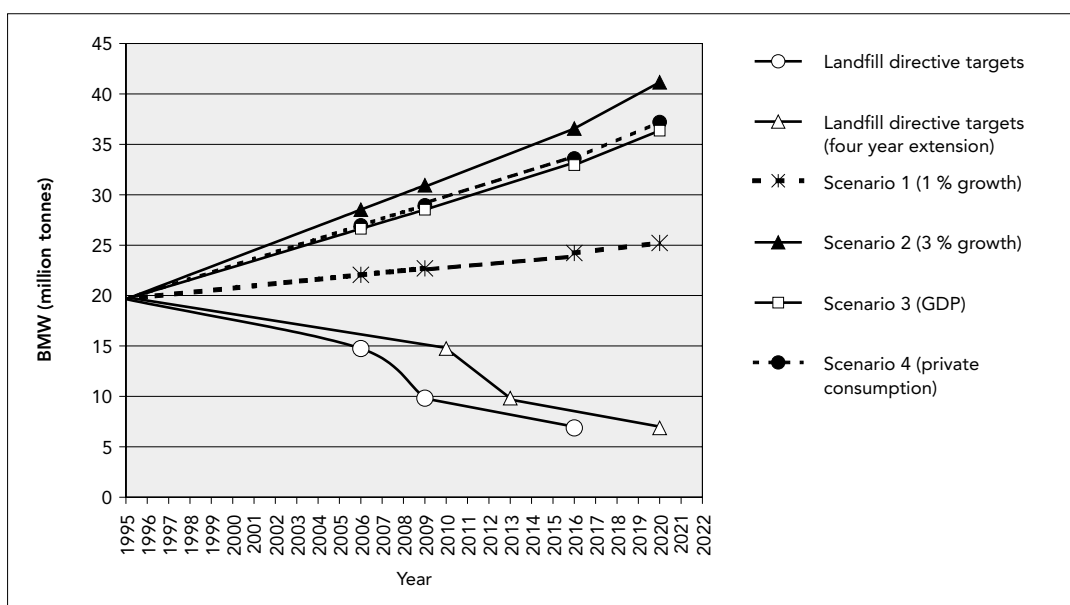
A2.16

Existing collection and management of BMW in England and Wales



A2.17

Future projections



A2.18

Landfill directive targets and capacity requirements

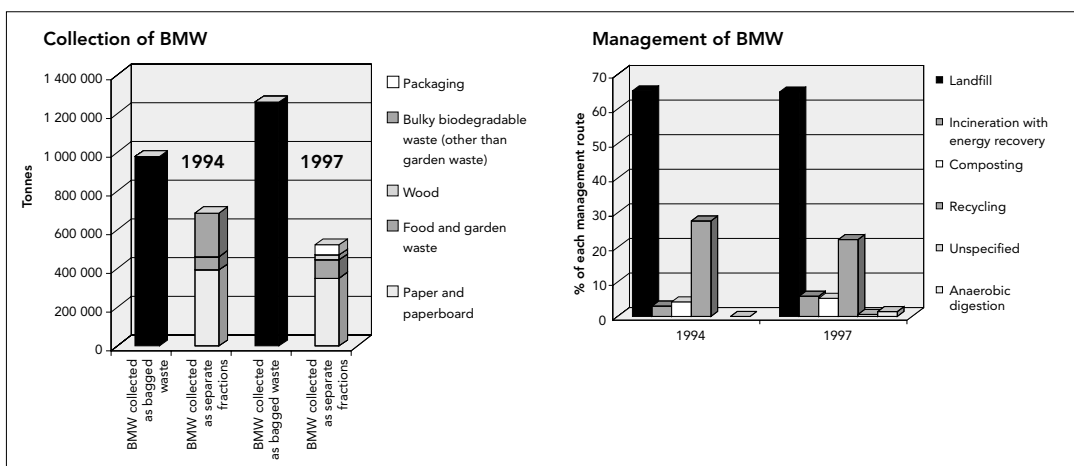
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	19.66 ¹		
1998	17.7		
GDP			
2006	25.77	14.745	11.025
2009	27.74	9.83	17.91
2016	32.95	6.881	26.069
Private consumption			
2006	26.03	14.745	11.285
2009	28.10	9.83	18.27
2016	33.60	6.881	26.719

1 Source: Eurostat

Capacity requirements based on GDP and private consumption

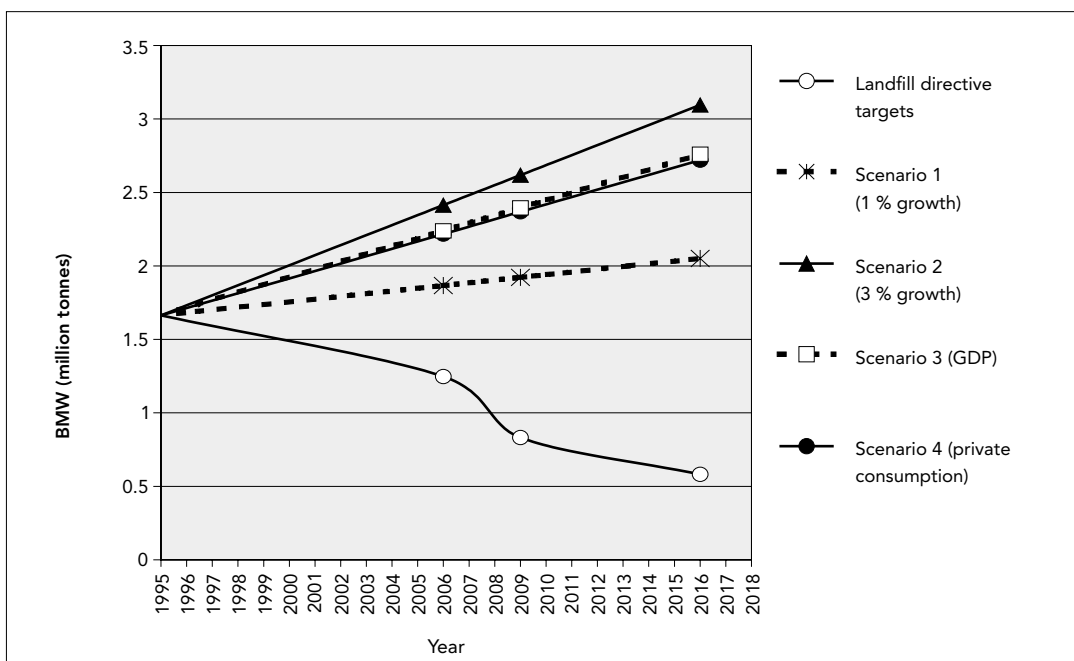
Existing collection and management of BMW in Finland

A2.19



Future projections

A2.20



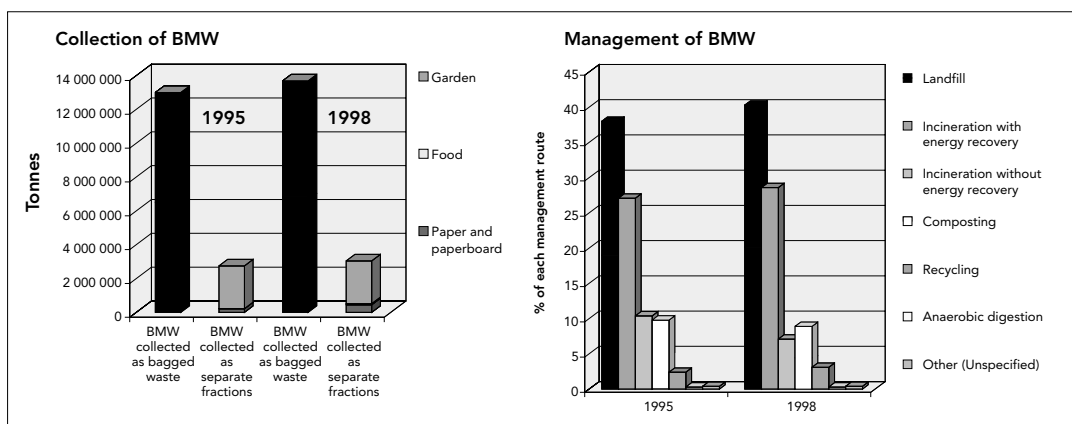
Landfill directive targets and capacity requirements

A2.21

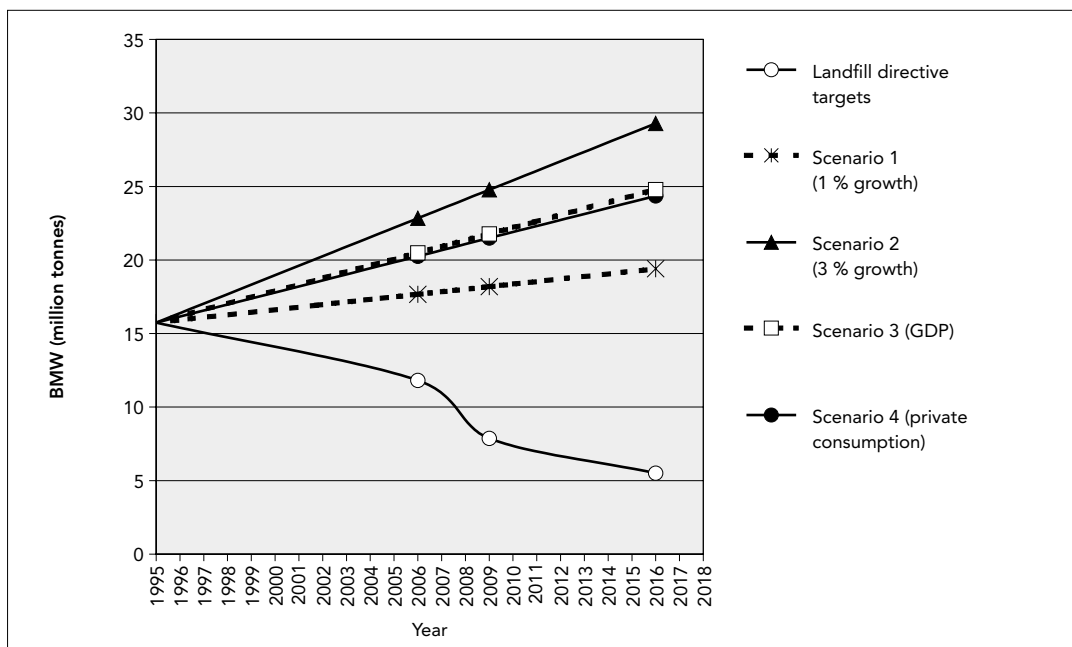
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1994	1.664		
1997	1.781		
GDP			
2006	2.17	1.248	0.922
2009	2.33	0.832	1.498
2016	2.76	0.582	2.178
Private consumption			
2006	2.15	1.248	0.902
2009	2.31	0.832	1.478
2016	2.72	0.582	2.138

Capacity requirements based on GDP and private consumption

A2.22 Existing collection and management of BMW in France



A2.23 Future projections



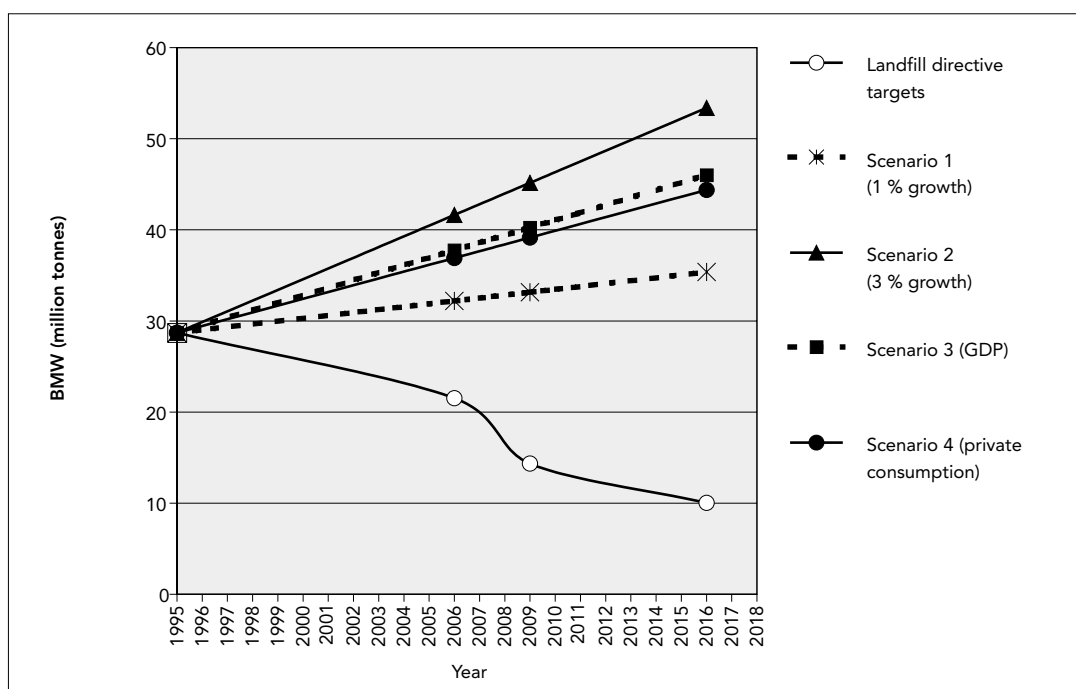
A2.24 Landfill directive targets and capacity requirements

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	15.746		
1998	16.724		
GDP			
2006	19.97	11.810	8.160
2009	21.31	7.873	13.437
2016	24.79	5.520	19.270
Private consumption			
2006	19.79	11.810	8.169
2009	21.06	7.873	13.187
2016	24.36	5.511	18.849

Capacity requirements based on GDP and private consumption

Future projections for BMW production in Germany

A2.25



Landfill directive targets and capacity requirements

A2.26

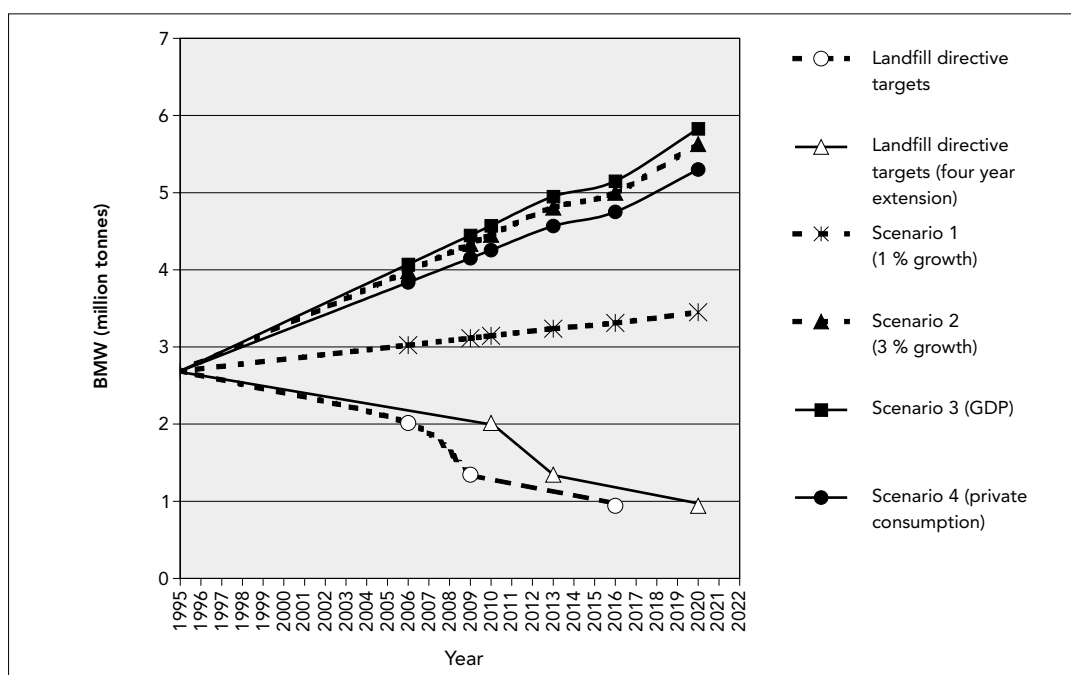
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	28.7 ¹		
1998			
GDP			
2006	36.750	21.525	15.225
2009	39.310	14.350	24.96
2016	46.006	10.045	35.961
Private consumption			
2006	36.062	21.525	14.537
2009	38.379	14.350	24.026
2016	44.381	10.045	34.336

1 Source: Eurostat

Capacity requirements based on GDP and private consumption

A2.27

Future projections for BMW production in Greece



A2.28

Landfill directive targets and capacity requirements

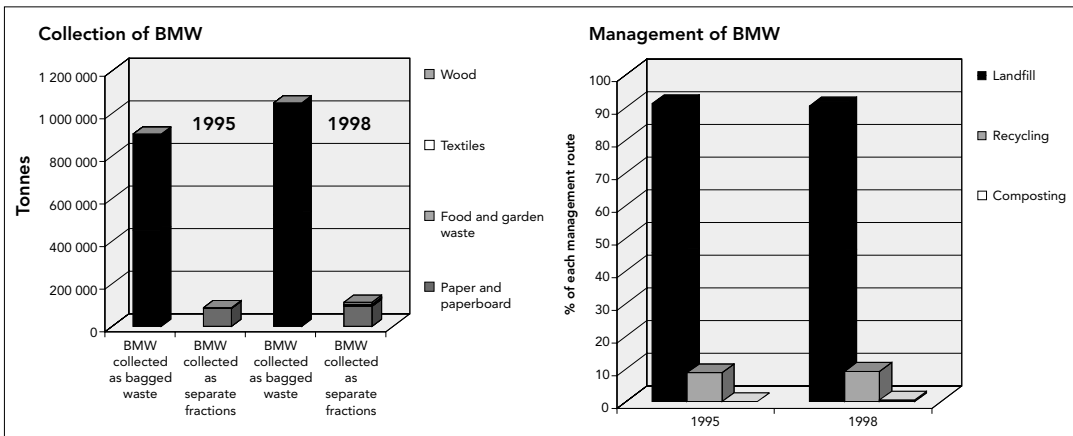
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	2.688 ¹		
1997	2.613		
GDP			
2006	3.779	2.016	1.763
2009	4.147	1.344	2.803
2016	5.150	0.941	4.209
Private consumption			
2006	3.625	2.016	1.609
2009	3.932	1.344	2.588
2016	4.756	0.941	3.815

1 Source: Eurostat

Capacity requirements based on GDP and private consumption

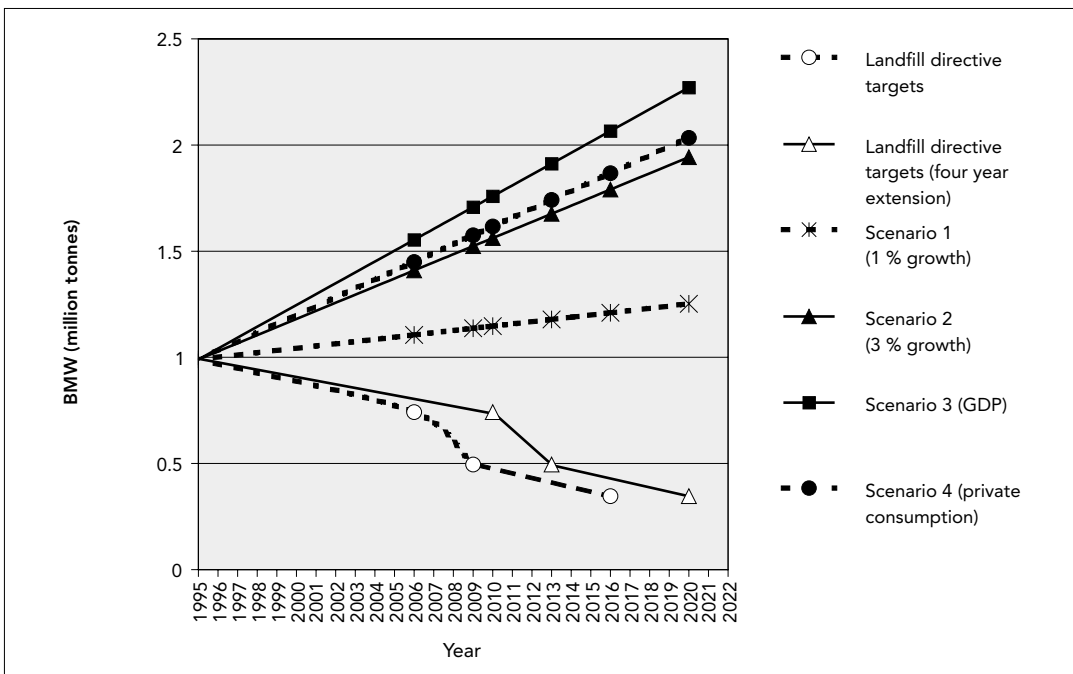
Existing collection and management of BMW in Ireland

A2.29



Future projections

A2.30



Landfill directive targets and capacity requirements

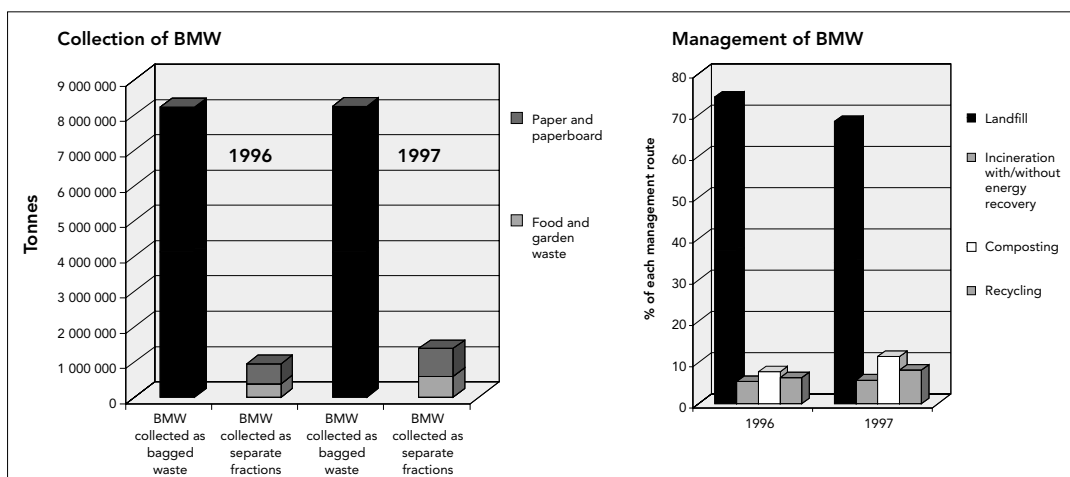
A2.31

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	0.990	0.902	0.088
1998	1.16	1.05	0.113
GDP			
2006	1.455	0.742	0.713
2009	1.617	0.495	1.122
2016	2.066	0.346	1.72
Private consumption			
2006	1.38	0.742	0.638
2009	1.51	0.495	1.015
2016	1.87	0.346	1.524

Capacity requirements based on GDP and private consumption

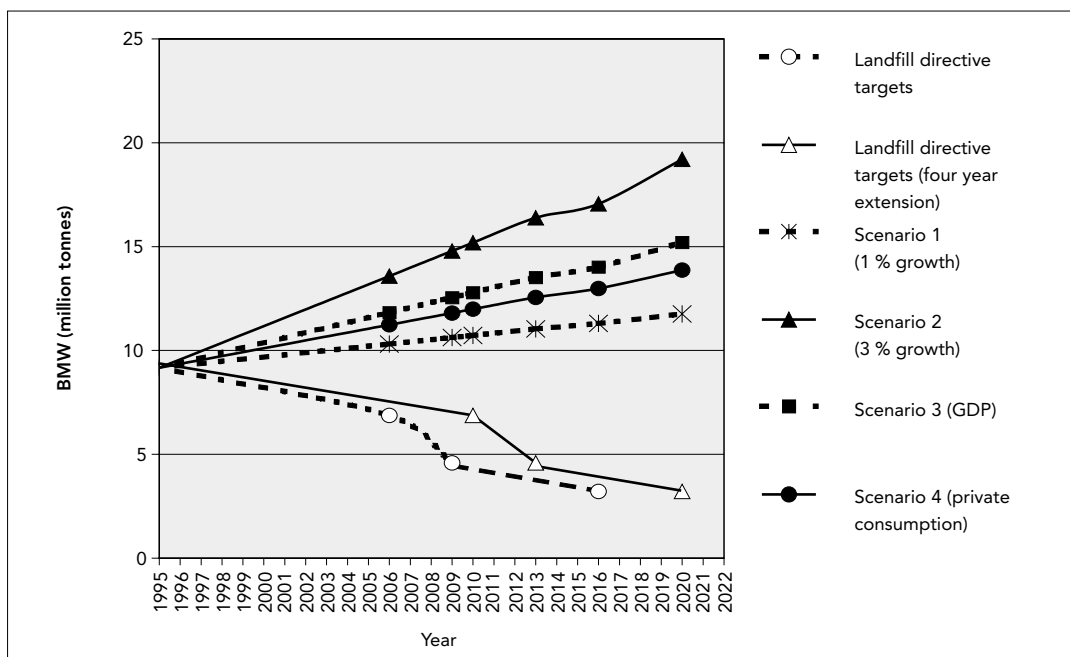
A2.32

Existing collection and management of BMW in Italy



A2.33

Future projections



A2.34

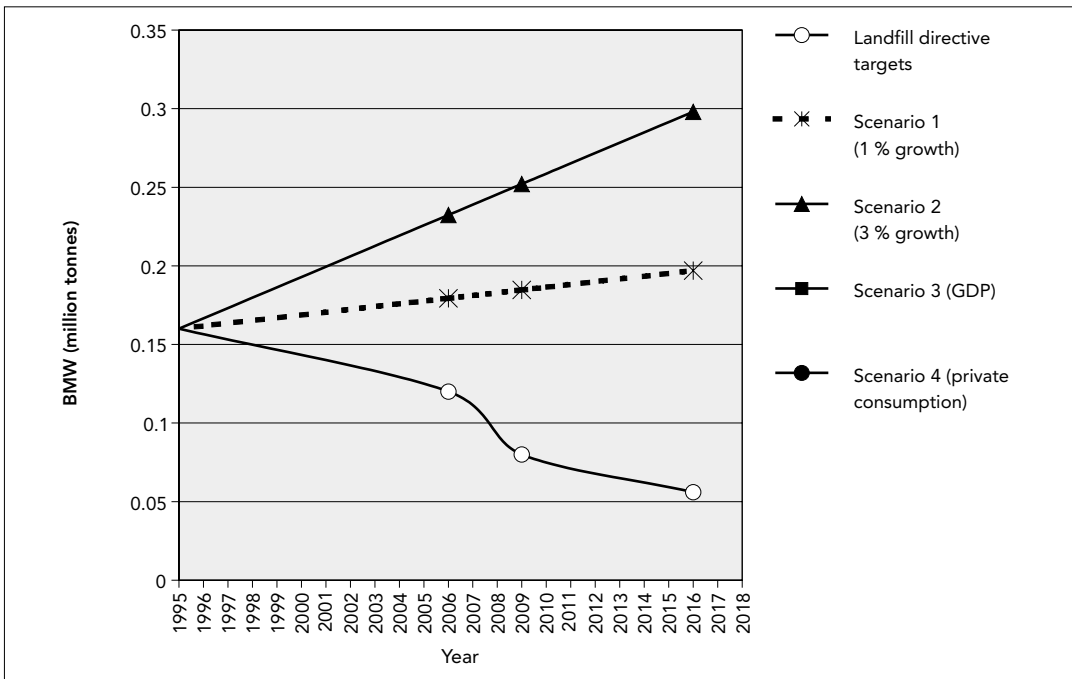
Landfill directive targets and capacity requirements

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	9.170 ¹		
1998	10.092		
GDP			
2006	11.454	6.877	4.577
2009	12.170	4.585	7.585
2016	14.020	3.209	10.811
Private consumption			
2006	11.002	6.877	4.125
2009	11.563	4.585	6.978
2016	13.874	3.209	10.665

1 Figure relates to information from 1996. Latest year for information before 1995 is 1985. Capacity requirements based on GDP and private consumption

Future projections for BMW production in Luxembourg

A2.35



Landfill directive targets and capacity requirements

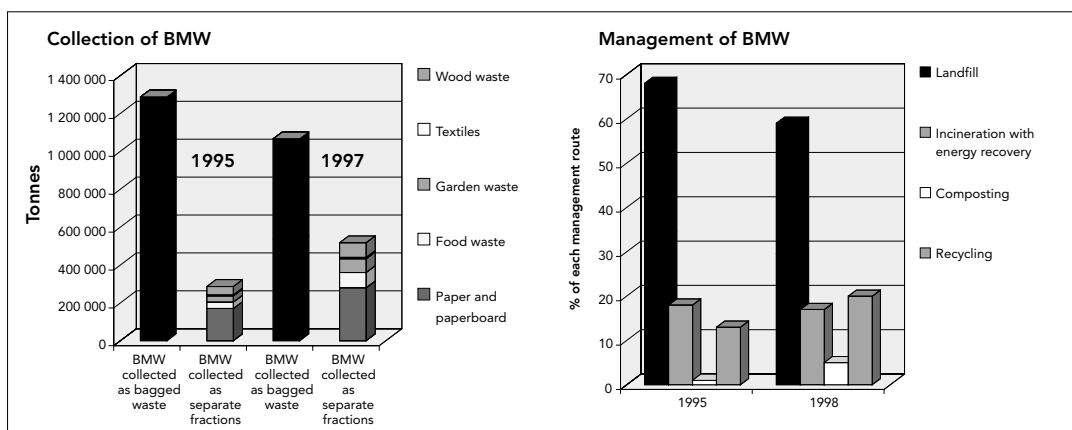
A2.36

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	0.16 ¹		
1998			
GDP			
2006		0.12	
2009		0.08	
2016		0.056	
Private consumption			
2006		0.12	
2009		0.08	
2016		0.056	

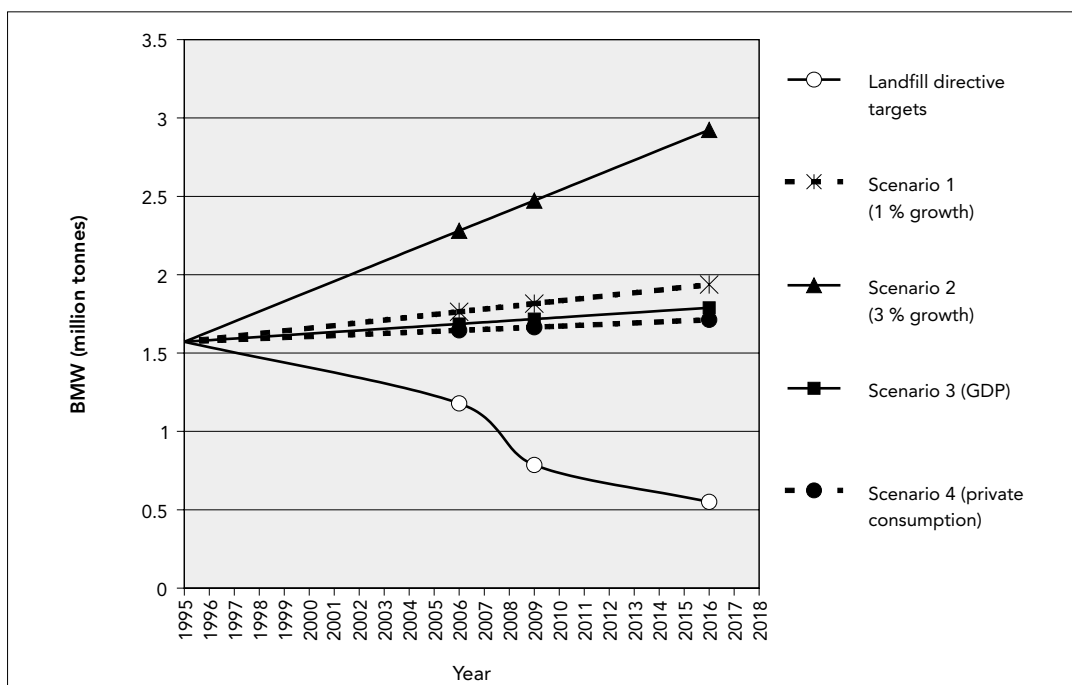
1 Source: Eurostat

Capacity requirements based on GDP and private consumption

A2.37 Existing collection and management of BMW in Norway



A2.38 Future projections



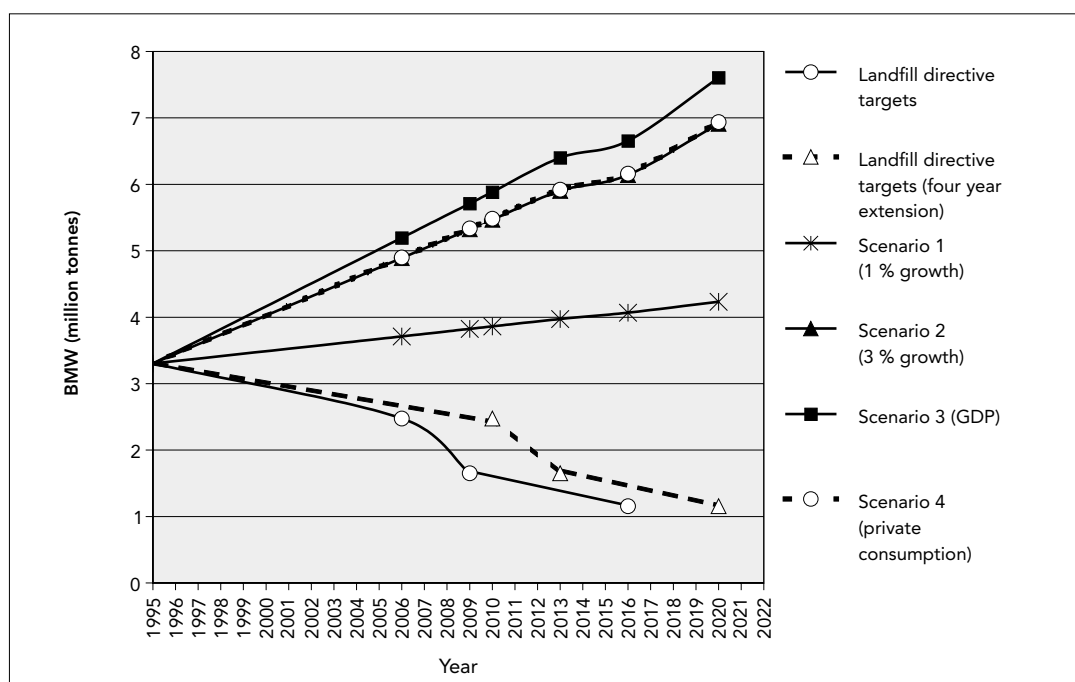
A2.39 Landfill directive targets and capacity requirements

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	1.572		
1998			
GDP			
2006	1.450	1.172	0.278
2009	1.545	0.786	0.759
2016	1.789	0.5502	1.239
Private consumption			
2006	1.418	1.172	0.246
2009	1.500	0.786	0.714
2016	1.712	0.5502	1.162

Capacity requirements based on GDP and private consumption

Future projections for BMW production in Portugal

A2.40



Landfill directive targets and capacity requirements

A2.41

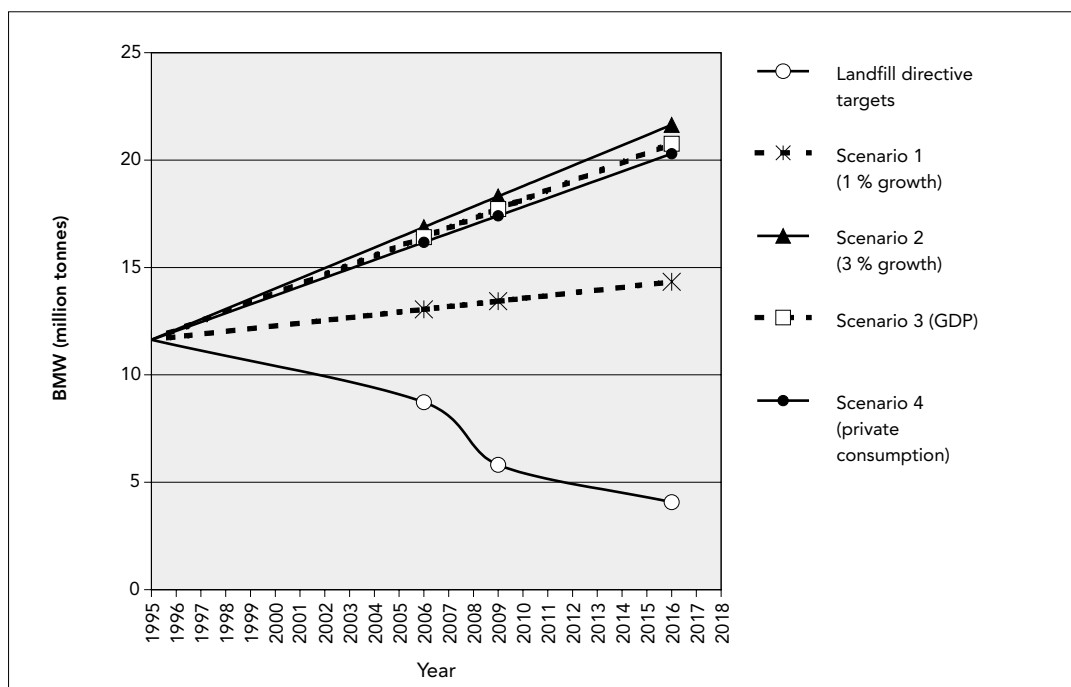
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	3.301 ¹		
1998			
GDP			
2006	4.766	2.476	2.290
2009	5.268	1.650	3.618
2016	6.655	1.155	5.500
Private consumption			
2006	4.577	2.476	2.101
2009	5.000	1.650	3.350
2016	6.160	1.155	5.005

¹ Source: Eurostat

Capacity requirements based on GDP and private consumption

A2.42

Future projections for BMW production in Spain



A2.43

Landfill directive targets and capacity requirements

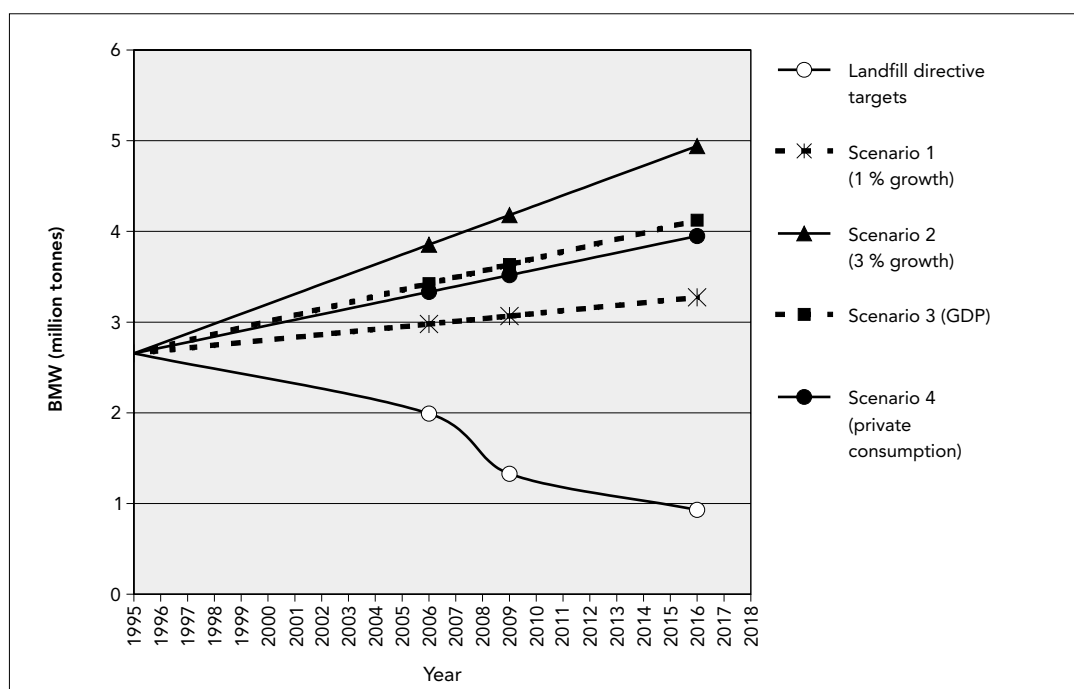
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	11.633 ¹		
1998			
GDP			
2006	15.757	8.725	7.032
2009	17.117	5.816	11.301
2016	20.762	4.071	16.691
Private consumption			
2006	15.570	8.725	6.845
2009	16.857	5.816	11.041
2016	20.293	4.071	16.222

1 Source: Eurostat

Capacity requirements based on GDP and private consumption

Future projections for BMW production in Sweden

A2.44



Landfill directive targets and capacity requirements

A2.45

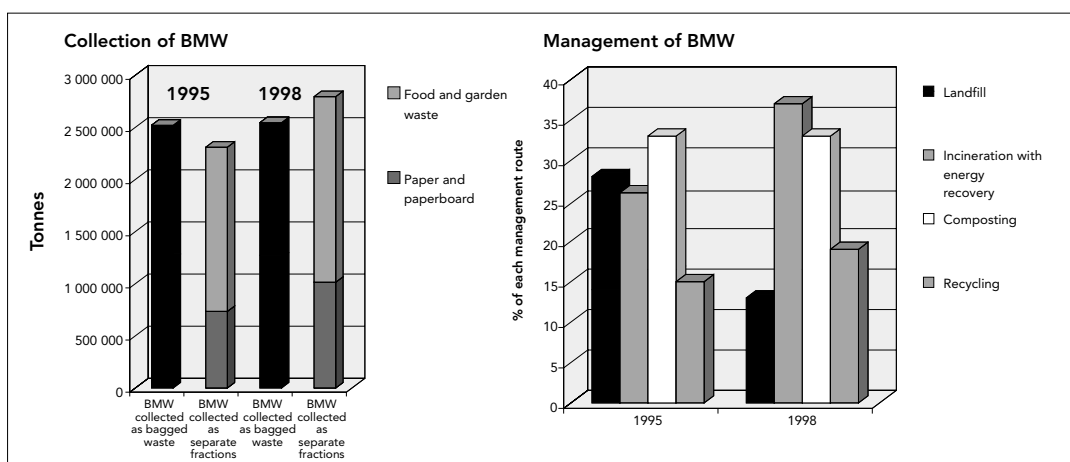
Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1994	2.656 ¹		
1998			
GDP			
2006	3.344	1.992	1.352
2009	3.561	1.328	2.233
2016	4.124	0.9296	3.1944
Private consumption			
2006	3.369	1.992	1.377
2009	3.459	1.328	2.131
2016	3.948	0.9296	3.0184

¹ Source: Eurostat

Capacity requirements based on GDP and private consumption

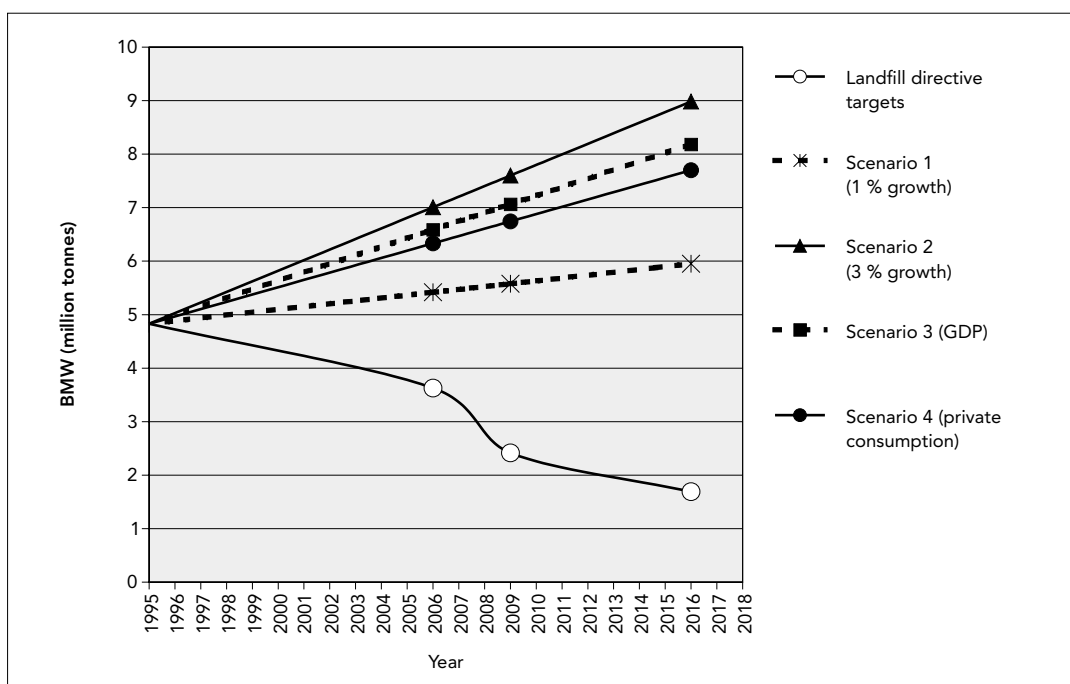
A2.46

Existing collection and management of BMW in The Netherlands (1)



A2.47

Future projections



A2.48

Landfill directive targets and capacity requirements

Year	BMW produced (million tonnes)	Maximum permitted quantity of BMW to landfill (million tonnes)	Quantity of BMW to be diverted (million tonnes)
1995	4.830		
1998	5.340		
GDP			
2006	6.366	3.623	2.743
2009	6.864	2.415	4.449
2016	8.813	1.691	7.122
Private consumption			
2006	6.166	3.623	2.543
2009	6.591	2.415	4.176
2016	7.699	1.691	6.008

Capacity requirements based on GDP and private consumption

(1) All figures relate to biodegradable waste from households