



Assessment and selection of waste management technologies



SP Technical Research Institute of Sweden



A sustainable waste management - the key to a sustainable future!

- >70% increase of waste
- Limited resources
- 200 000 people per day!

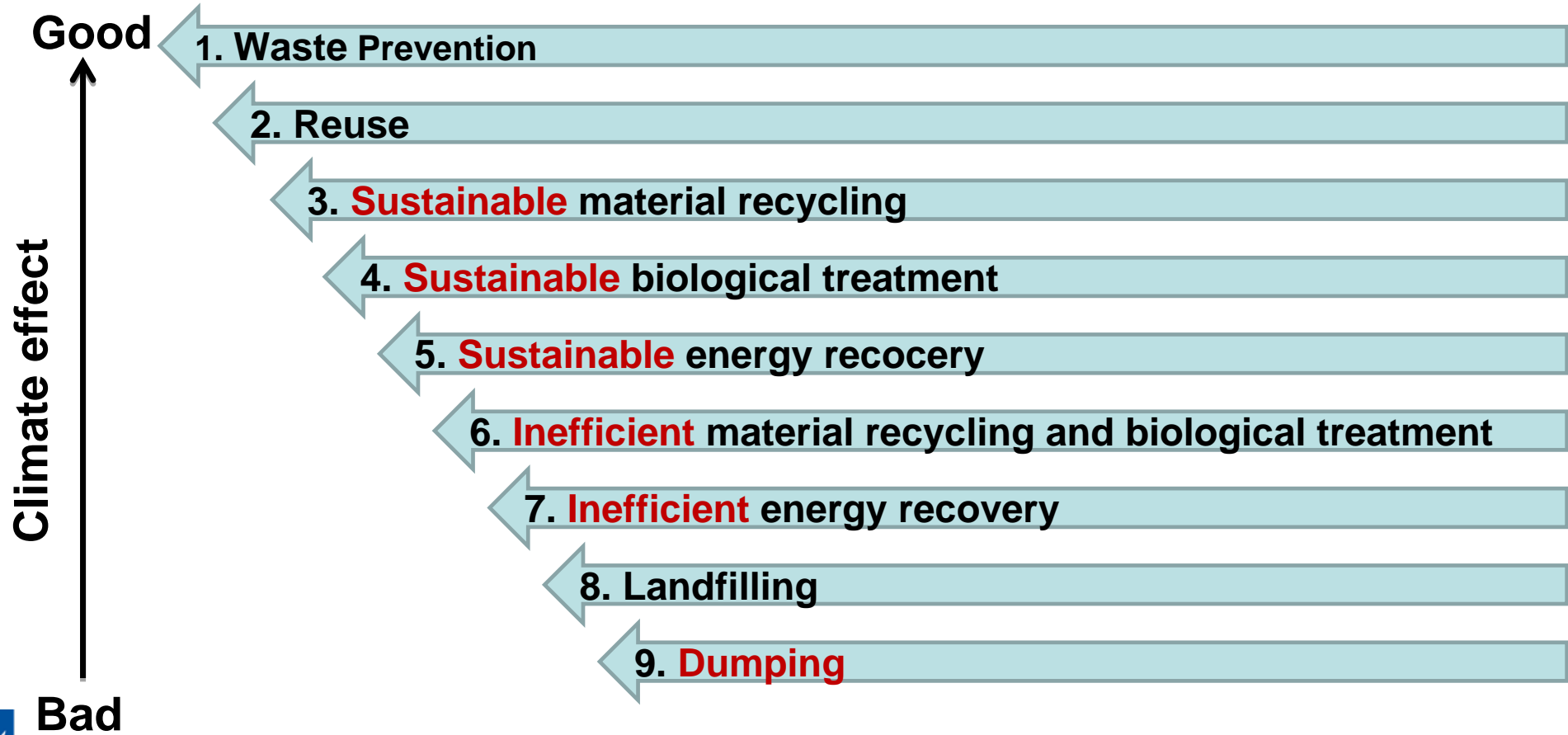
=> Sustainable waste management!



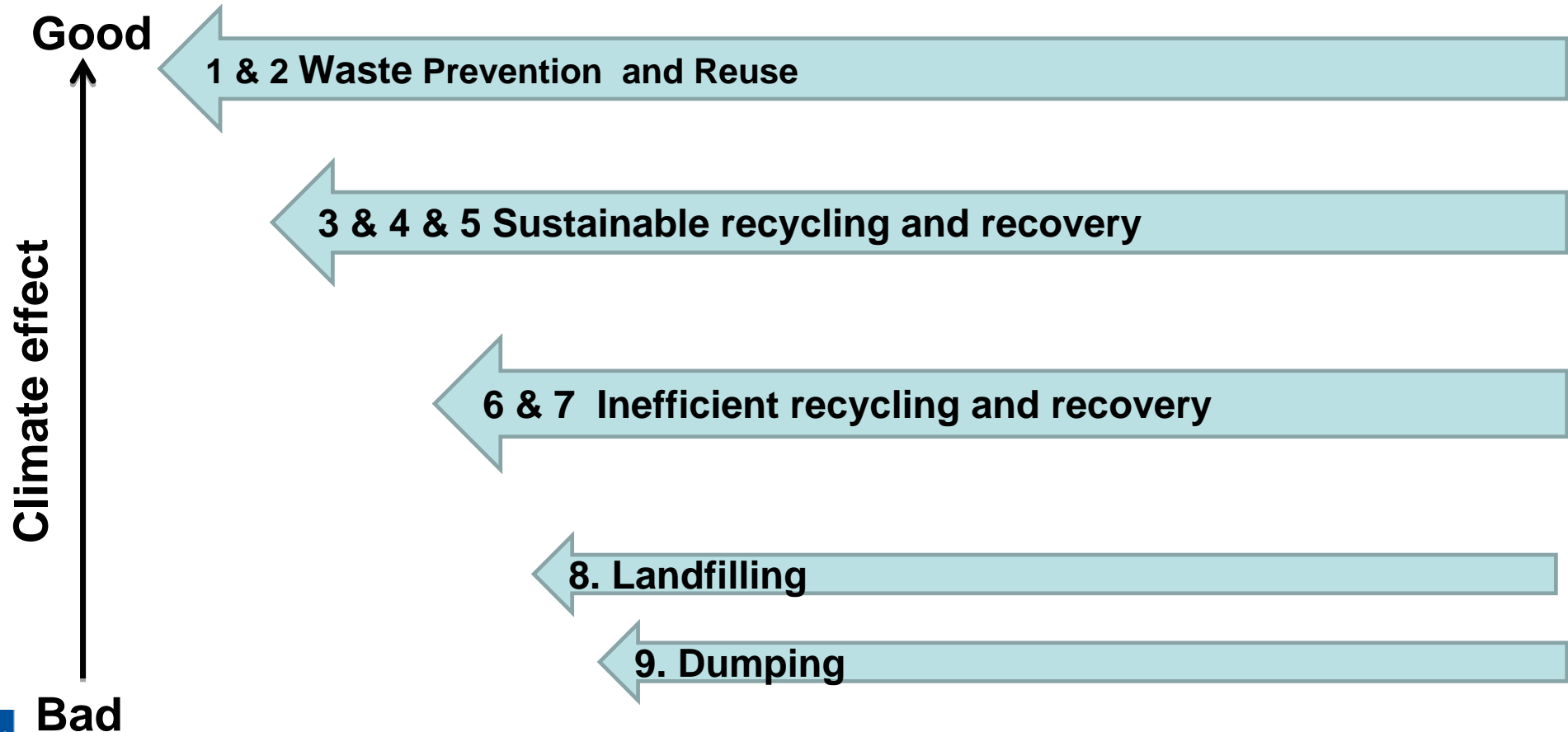
Waste Hierarchy – five steps for strategic development



Waste Hierarchy – things are not always that simple



Waste Hierarchy – five step for a sustainable development



Recycling and treatment



The treatment method depends on the character of the waste



Materials



New products



Organic waste



Biogas



Biofertilizer



Combustible waste



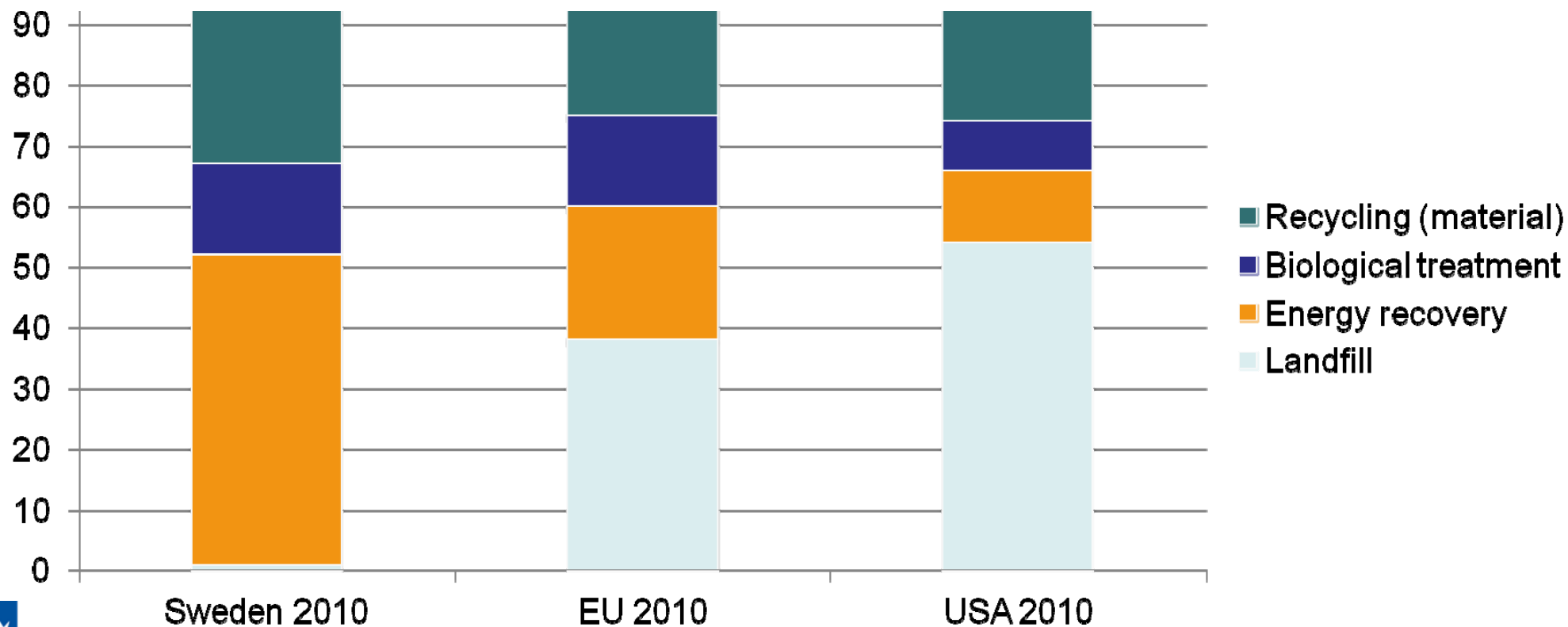
District heating



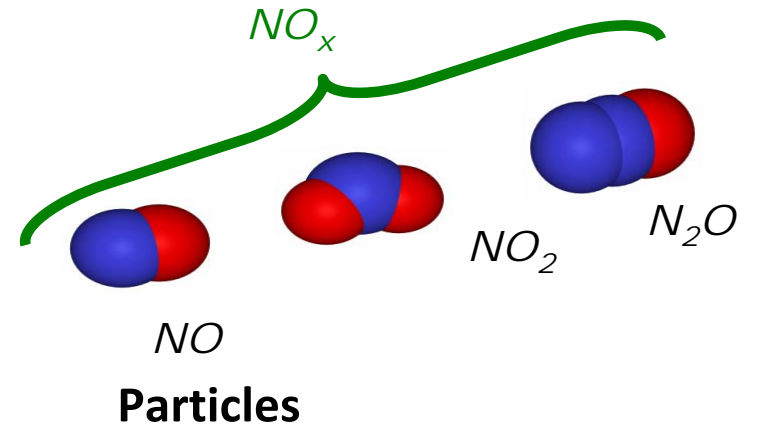
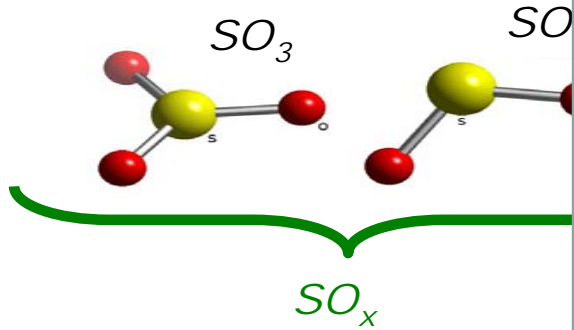
Electricity

Sweden – No 1 in the world in waste management

However, we have the toughest development in front of us



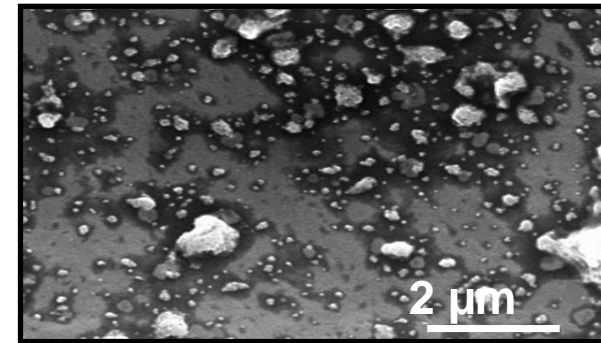
Low emissions



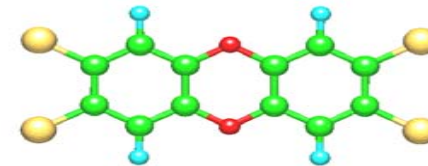
Heavy metals

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A
1 H 1.008																4
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 18.99
11 Na 22.99	12 Mg 24.30											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45
19 K 39.1	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.84	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 73.61	33 As 74.92	34 Se 78.96	35 Br 79.90
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc 99	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9
55 Cs 132.9	56 Ba 137.3	57 La 138.9	58 Ce 140.1	59 Pr 141	60 Nd 144	61 Pm 145	62 Sm 150	63 Eu 152.0	64 Gd 157	65 Tb 158.9	66 Dy 163	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
87 Fr 223	88 Ra 226	89 Ac 227	104 Rf 261	105 Db 262	106 Sg 263	107 Bh 262	108 Hs 265	109 Mt 266	110	111	112	113	114	115	116	117
			6 Ce 140.1	6 Pr 141	6 Nd 144	6 Pm 145	6 Sm 150	6 Eu 152.0	6 Gd 157	6 Tb 158.9	6 Dy 163	6 Ho 164.9	6 Er 167.3	6 Tm 168.9	6 Yb 173.0	6 Lu 175.0
			7 90 Pa 232	7 91 Th 231.0	7 92 U 238.0	7 93 Np 237	7 94 Pu 244	7 95 Am 243	7 96 Cm 247	7 97 Bk 247	7 98 Cf 251	7 99 Es 252	7 100 Fm 257	7 101 Md 258	7 102 No 259	7 103 Lr 262

Legend:
 nonmetal
 metal
 transition metal
 metalloid



Dioxins



(2,3,7,8-TCDD)

From landfills to modern recycling facilities



(Illustrator: Per Josefsson)

Thank you!



Waste  Refinery
Download:
www.wasterefinery.se



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