Half is enough An introduction to Cleaner Production



Johannes Fresner Ali Yaacoub

Table of contents

1	Half i	s enough	7
	1.1 I	ndustrial sustainability	7
	1.2 0	leaner Production as strategy	12
	1.2.1	The TNO/IPTS study	13
	1.2.2	The AK Wien study	14
	1.2.3	European Foundation for Living and Working Conditions study	15
	1.3 I	ssues to be addressed	16
	1.4 C	leaner production examples	17
	1.5 T	he implementation of Cleaner Production	31
	1.5.1	A shared vision	31
	1.5.2	Input/Output	38
	1.5.3	Energy analysis	41
	1.5.5	Data collection and measuring	56
	1.6 C	Option identification principles	58
	1.6.1	Creative problem solving	58
	1.6.2	11 ways to option generation	63
	1.6.3	Indicators and Controlling	66
2	Clean	er Production Assessment Report	77
3	Clean	er Production in sectors	98
	3.1 C	Dairy industry	98
	3.1.1	Introduction to dairy processes	98
	3.1.2	CP options and examples for the dairy sector	108
	3.2 0	anning	120
	3.2.1	Introduction to canning processes	120
	3.2.2	CP options and examples for the vegetable processing industries	125
	3.3 F	aper	129
	3.3.1	CP ontions and examples for the paper sector	129 134
	3.3.3	End-of-pipe technologies in paper production	140
	34 0		142
	3.4.1	Introduction to galvanizing	142
	3.4.2	Case studies from the galvanizing industry	150
	3.5 T	extile industry	159
	3.5.1	Introduction to the textile industry	159
	3.5.2	Case study of an interlining fabrics mill	159
	3.6 0	Other sectors	169

4	Cle	eaner Production and Integrated Management Systems	170
5	Cle	eaner Production as policy instrument	183
6	Cle	eaner Production information sources	189
7	Lite	erature	202
8	Indices		204
1	8.1	Tables	204
;	8.2	Figures	205

"Half is enough" is a brief guide to Cleaner Production. Cleaner Production is a preventive, company specific approach to optimize the organisation and technology of manufacturing processes in a broader sense. The goal is to minimize waste, reduce emissions, reduce the consumption of water and energy to improve the efficiency of these processes.

The strategies used are good housekeeping, improved product design, change of raw materials, improved technologies, recycling. This approach guarantees minimisation of waste and emissions and at the same time economical savings.

"Half is enough" illustrates the logic behind Cleaner Production and shows steps how to implement it on a company level. "Half is enough" is also a workbook: it includes a set of forms to guide through the analytical steps of a Cleaner Production project and the option finding process and references and links to international benchmarks and information on best available technology.

From the broad experience of the authors in consulting enterprises and establishing Cleaner Production programmes, a number of examples are demonstrated, which illustrate, that a significant reduction of waste, emissions, waste water and energy consumption can be implemented improving at the same time the quality of products, the productivity, and the profitability of an enterprise.

Cleaner Production at the same time is recognized as the basic of best practice for sustainable management to reduce emissions from manufacturing processes by renowned international institutions like the United Nations, and the European Union.