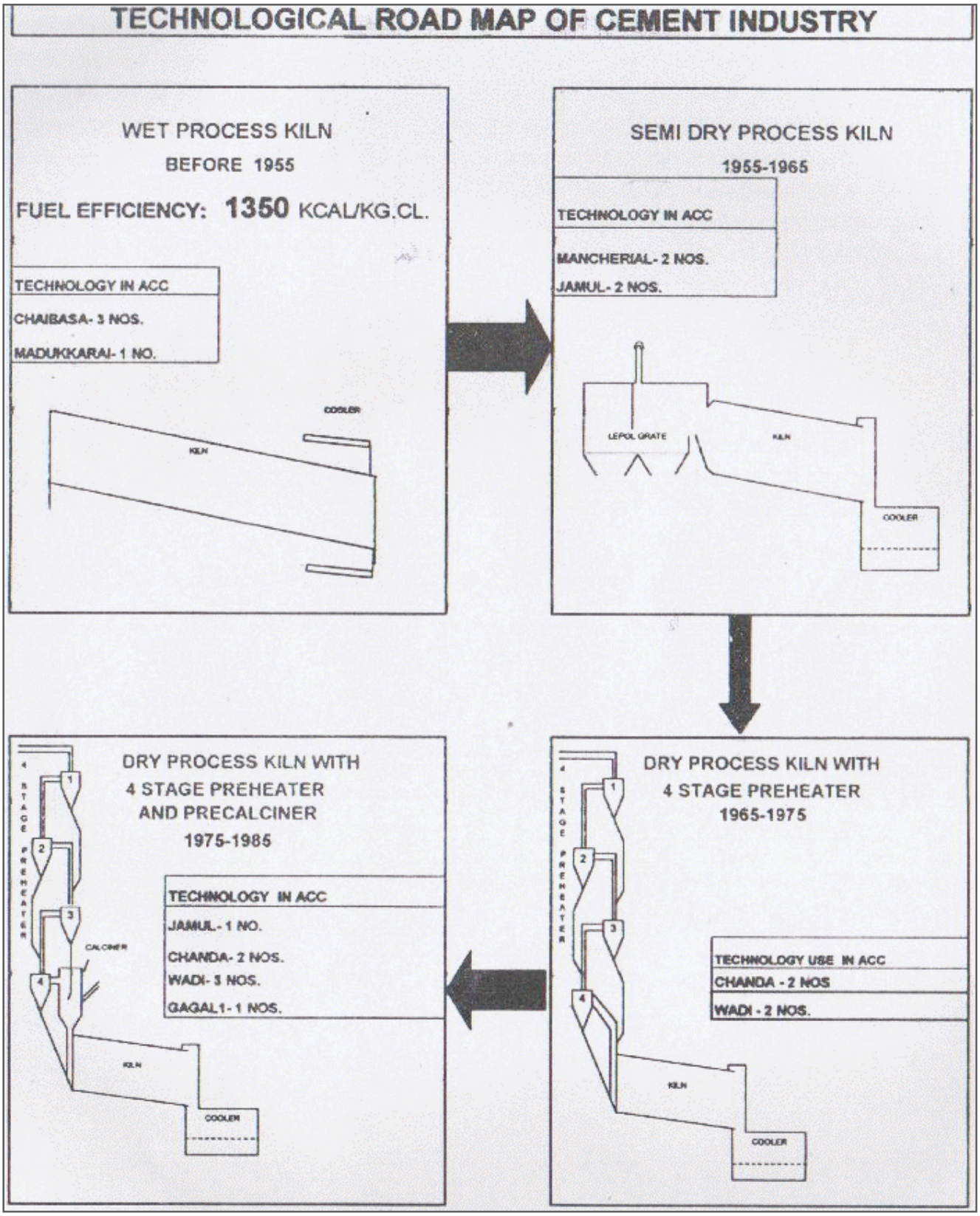
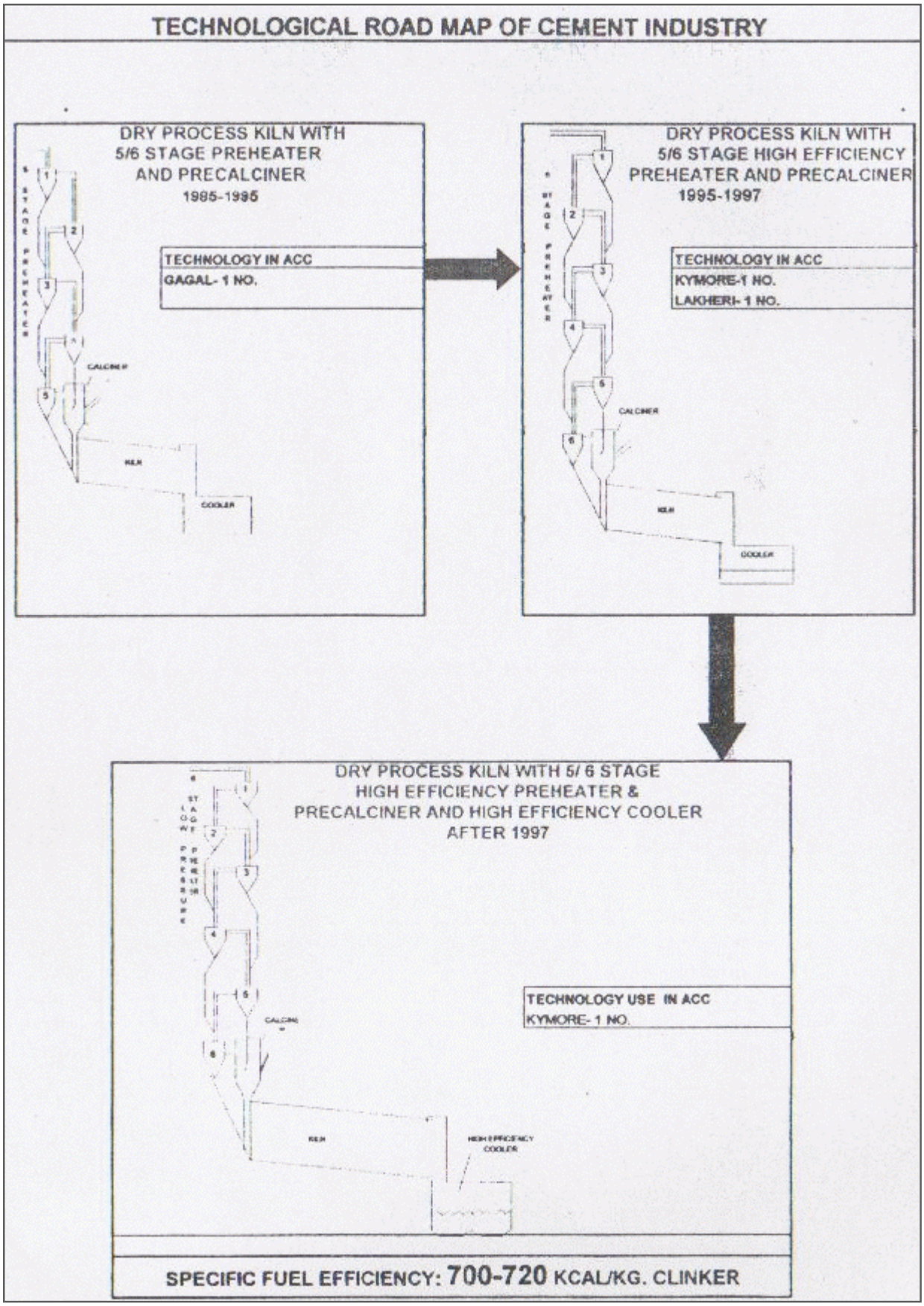
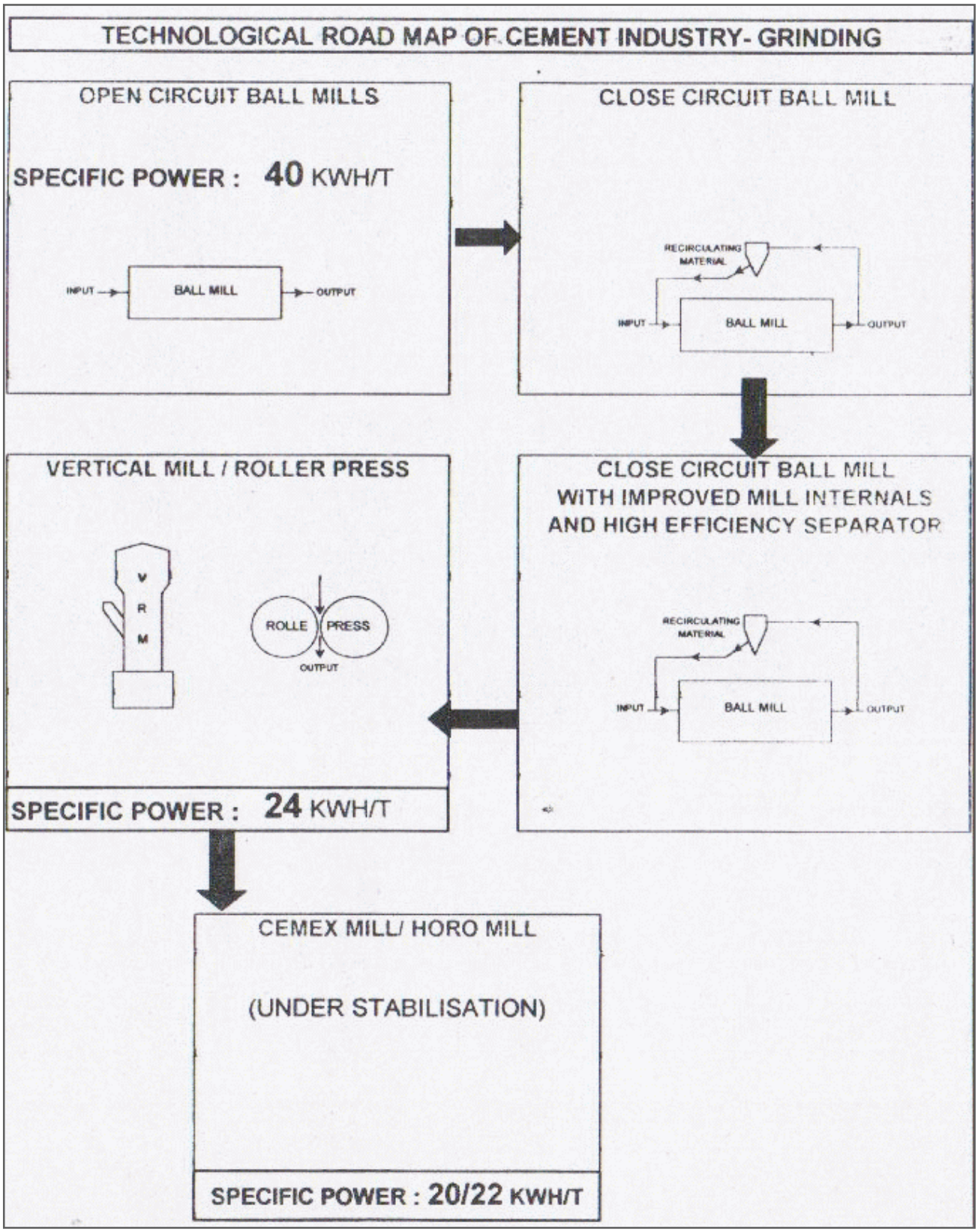
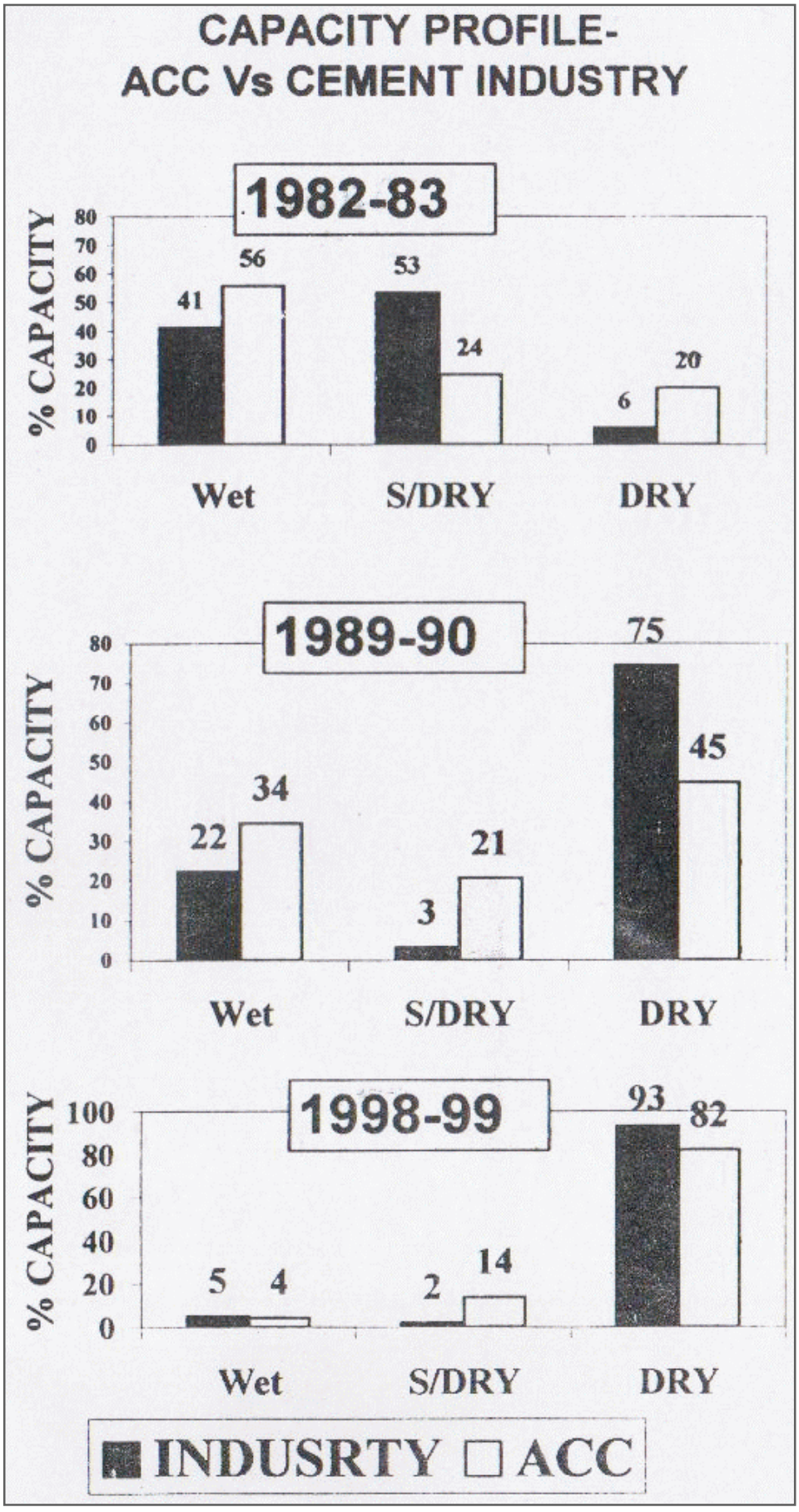
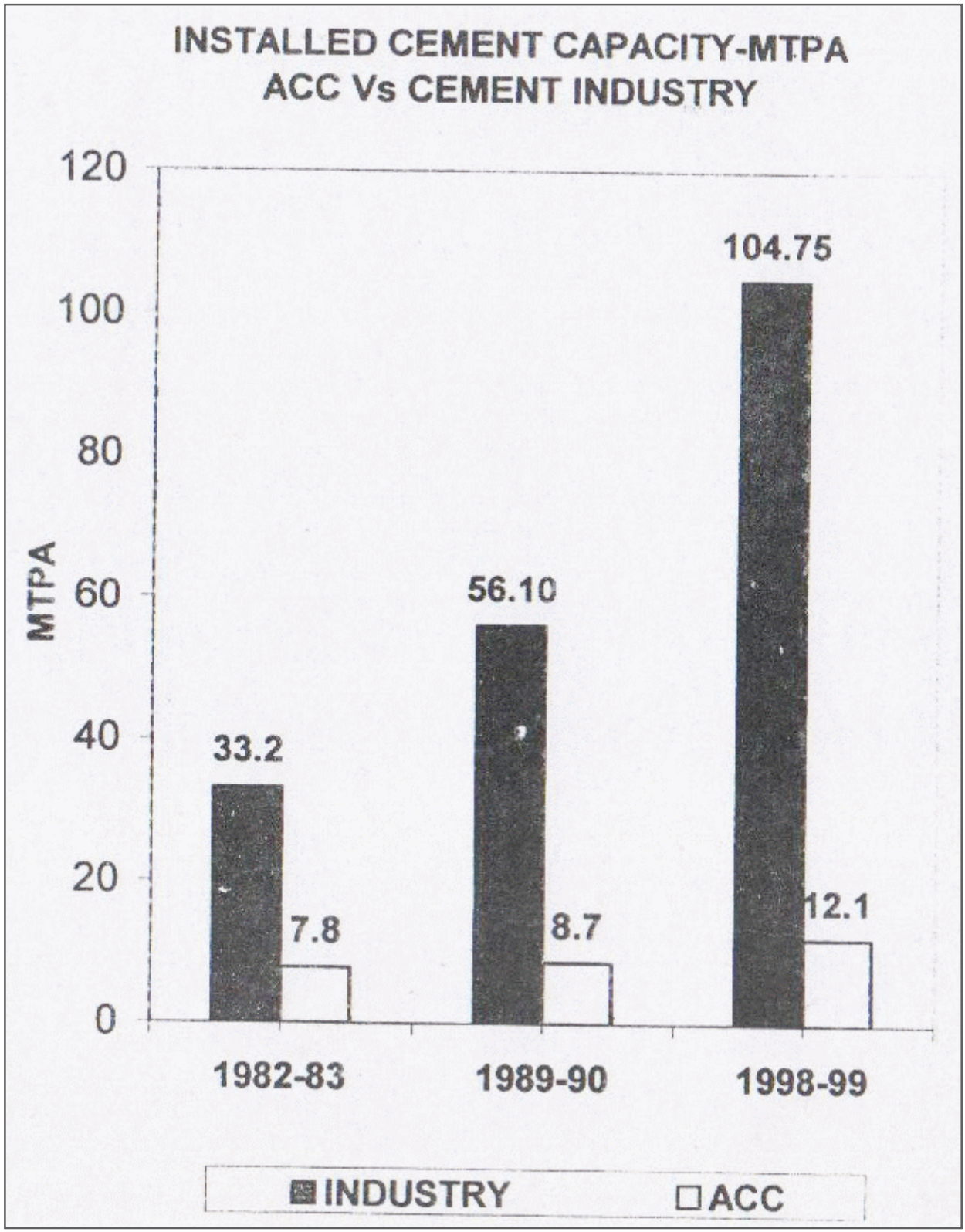
Slides:

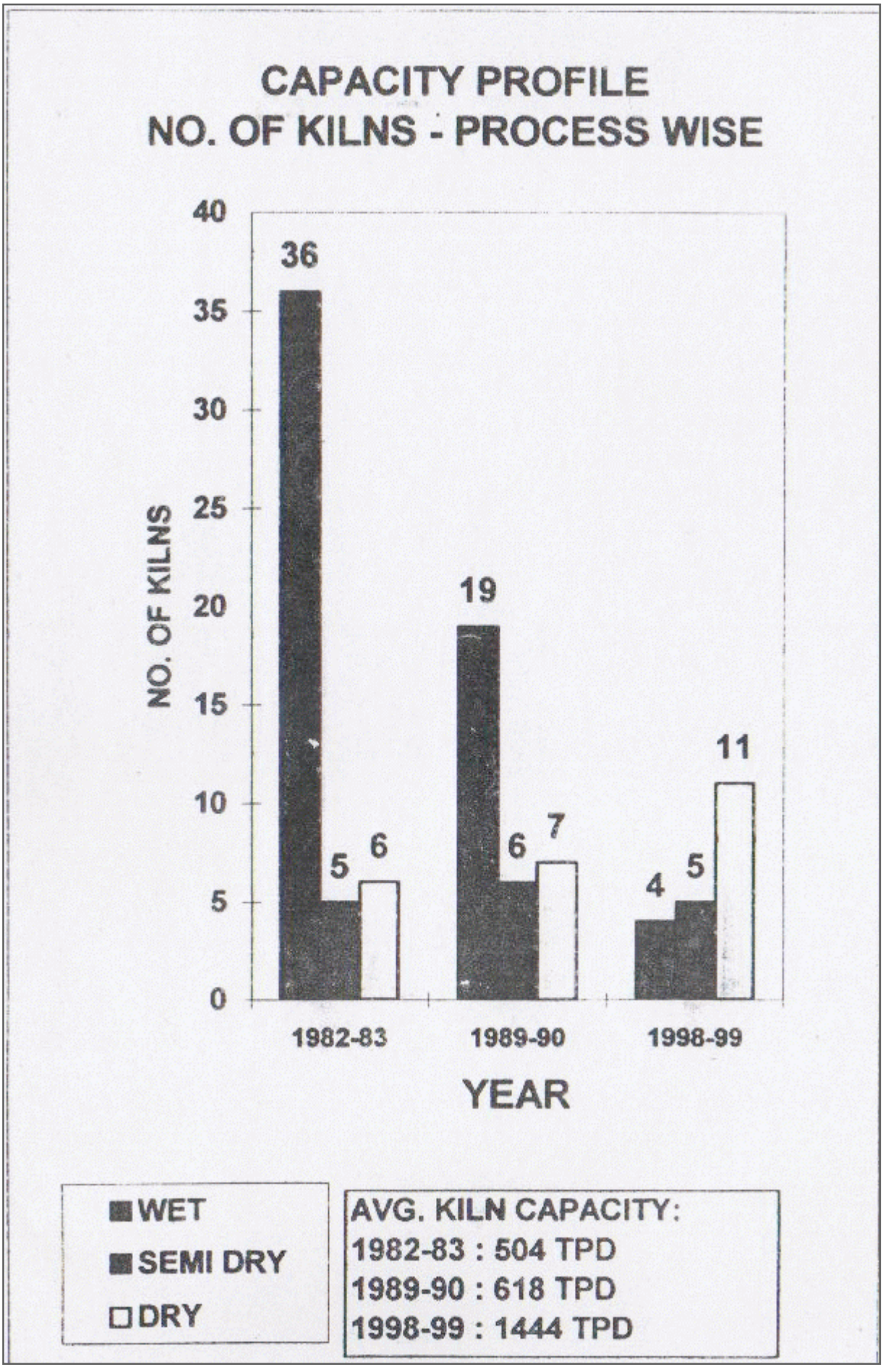

TECHNOLOGICAL ROAD MAP OF CEMENT INDUSTRY
WET PROCESS KILN
BEFORE 1955
FUEL EFFICIENCY: 1350 KCAL/KG.CL.
TECHNOLOGY IN ACC
CHAIBASA- 3 NOS.
MADUKKARAI- 1 NO.
KILN
COOLER
SEMI DRY PROCESS KILN
1955-1965
TECHNOLOGY IN ACC
MANCHERIAL- 2 NOS.
JAMUL- 2 NOS.
LEPOL GRATE
KILN
COOLER
DRY PROCESS KILN WITH
4 STAGE PREHEATER
1965-1975
4 STAGE PREHEATER
1
2
3
4
TECHNOLOGY USE IN ACC
CHANDA - 2 NOS
WADI - 2 NOS.
KILN
COOLER
DRY PROCESS KILN WITH
4 STAGE PREHEATER
AND PRECALCINER
1975-1985
4 STAGE PREHEATER
CALCINER
TECHNOLOGY IN ACC
JAMUL- 1 NO.
CHANDA- 2 NOS.
WADI- 3 NOS.
GAGAL1- 1 NOS.
KILN
COOLER

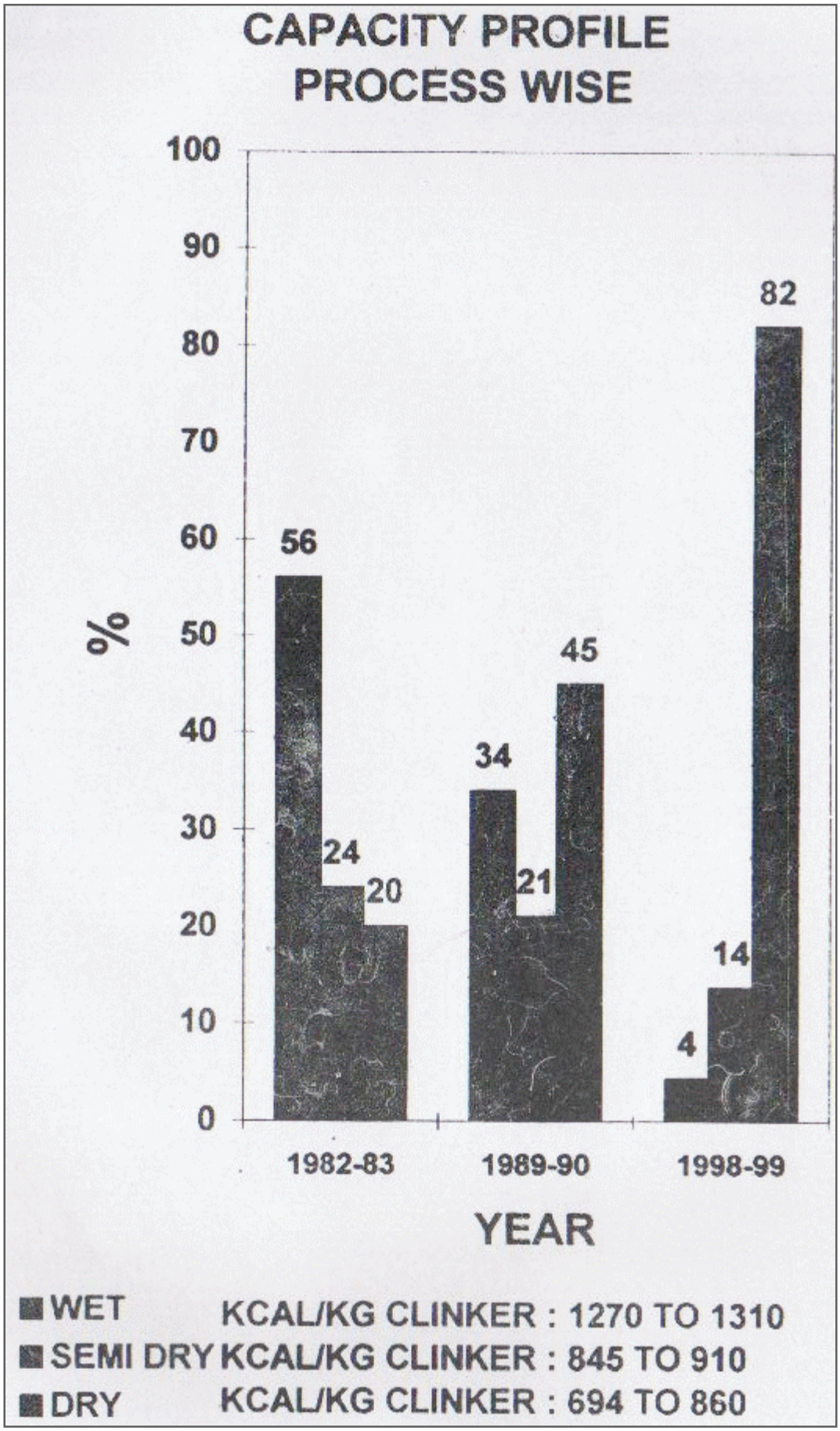

TECHNOLOGICAL ROAD MAP OF CEMENT INDUSTRY
DRY PROCESS KILN WITH
5/6 STAGE PREHEATER
AND PRECALCINER
1985-1995
TECHNOLOGY IN ACC
GAGAL- 1 NO.
DRY PROCESS KILN WITH
5/6 STAGE HIGH EFFICIENCY
PREHEATER AND PRECALCINER
1995-1997
TECHNOLOGY IN ACC
KYMORE-1 NO.
LAKHERI- 1 NO.
DRY PROCESS KILN WITH 5/ 6 STAGE
HIGH EFFICIENCY PREHEATER &
PRECALCINER AND HIGH EFFICIENCY COOLER
AFTER 1997
TECHNOLOGY USE IN ACC
KYMORE- 1 NO.
SPECIFIC FUEL EFFICIENCY: 700-720 KCAL/KG. CLINKER


TECHNOLOGICAL ROAD MAP OF CEMENT INDUSTRY- GRINDING
OPEN CIRCUIT BALL MILLS
SPECIFIC POWER : 40 KWH/T
INPUT
BALL MILL
OUTPUT
CLOSE CIRCUIT BALL MILL
RECIRCULATING MATERIAL
INPUT
BALL MILL
OUTPUT
VERTICAL MILL / ROLLER PRESS
V
R
M
ROLLE
PRESS
OUTPUT
SPECIFIC POWER : 24 KWH/T
CLOSE CIRCUIT BALL MILL
WITH IMPROVED MILL INTERNALS
AND HIGH EFFICIENCY SEPARATOR
RECIRCULATING MATERIAL
INPUT
BALL MILL
OUTPUT
CEMEX MILL/ HORO MILL
(UNDER STABILISATION)
SPECIFIC POWER : 20/22 KWH/T


CAPACITY PROFILE-
ACC Vs CEMENT INDUSTRY
1982-83
% CAPACITY
80
70
60
50
40
30
20
10
0
41
56
53
24
6
20
Wet
S/DRY
DRY
1989-90
% CAPACITY
80
70
60
50
40
30
20
10
0
22
34
3
21
75
45
Wet
S/DRY
DRY
1998-99
% CAPACITY
100
80
60
40
20
0
5
4
2
14
93
82
Wet
S/DRY
DRY
INDUSRTY
ACC


INSTALLED CEMENT CAPACITY-MTPA
ACC Vs CEMENT INDUSTRY
120
100
80
60
40
20
0
MTPA
33.2
7.8
56.10
8.7
104.75
12.1
1982-83
1989-90
1998-99
INDUSTRY
ACC

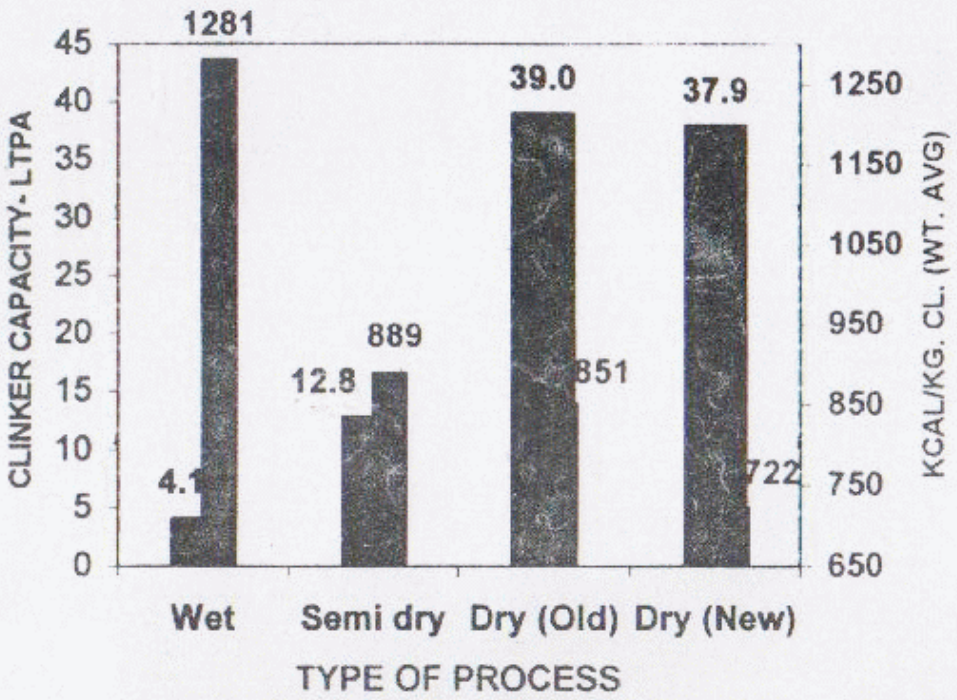

CAPACITY PROFILE
NO. OF KILNS - PROCESS WISE
NO. OF KILNS
40
35
30
25
20
15
10
5
0
36
5
6
19
6
7
4
5
11
1982-83
1989-90
1998-99
YEAR
WET
SEMI DRY
DRY
AVG. KILN CAPACITY:
1982-83 : 504 TPD
1989-90 : 618 TPD
1998-99 : 1444 TPD


CAPACITY PROFILE
PROCESS WISE
100
90
80
70
60
50
40
30
20
10
0
%
56
24
20
34
21
45
4
14
82
1982-83
1989-90
1998-99
YEAR
WET KCAL/KG CLINKER : 1270 TO 1310
SEMI DRY KCAL/KG CLINKER : 845 TO 910
DRY KCAL/KG CLINKER : 694 TO 860

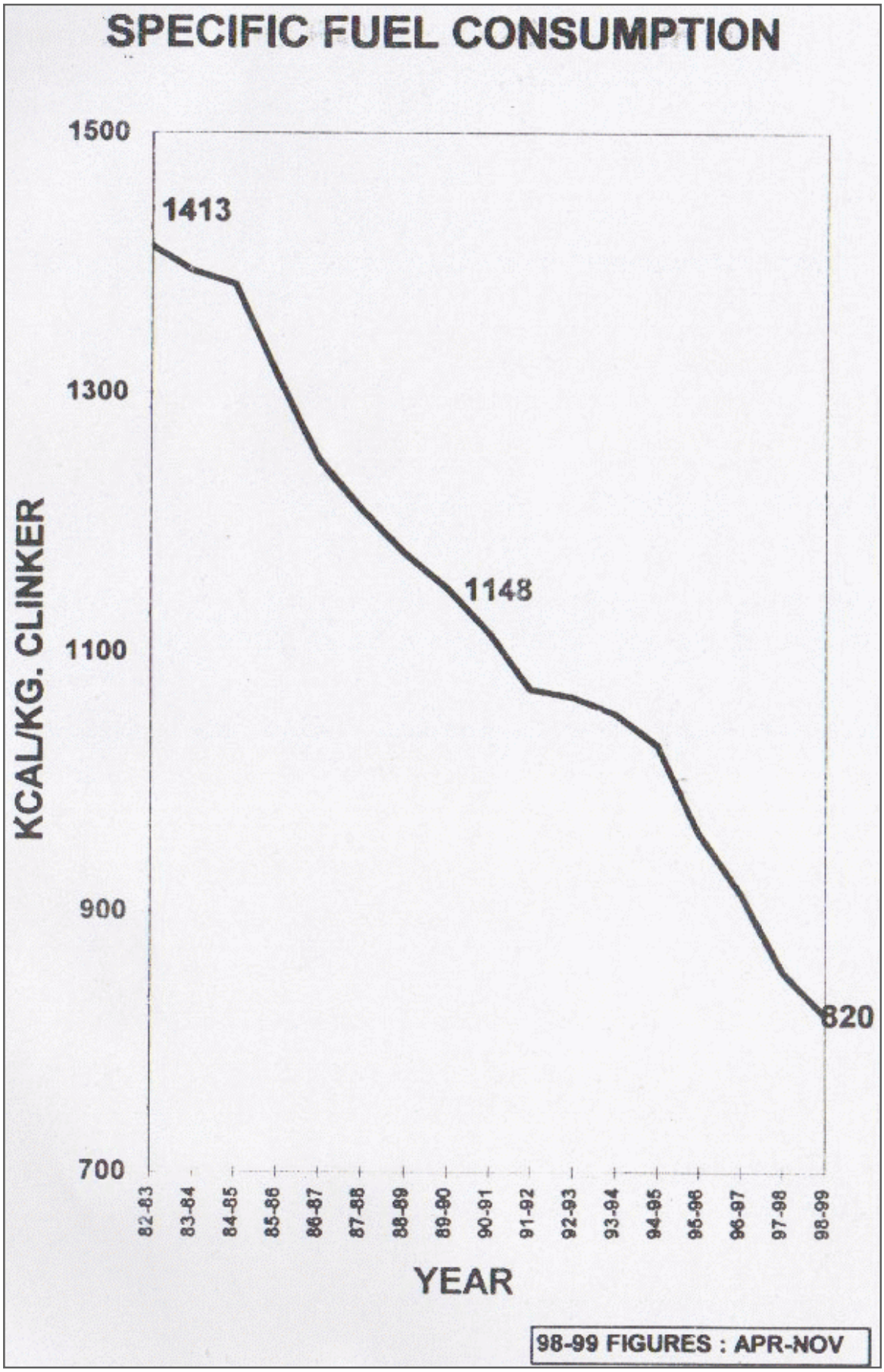
PROFILE OF DRY PROCESS KILNS

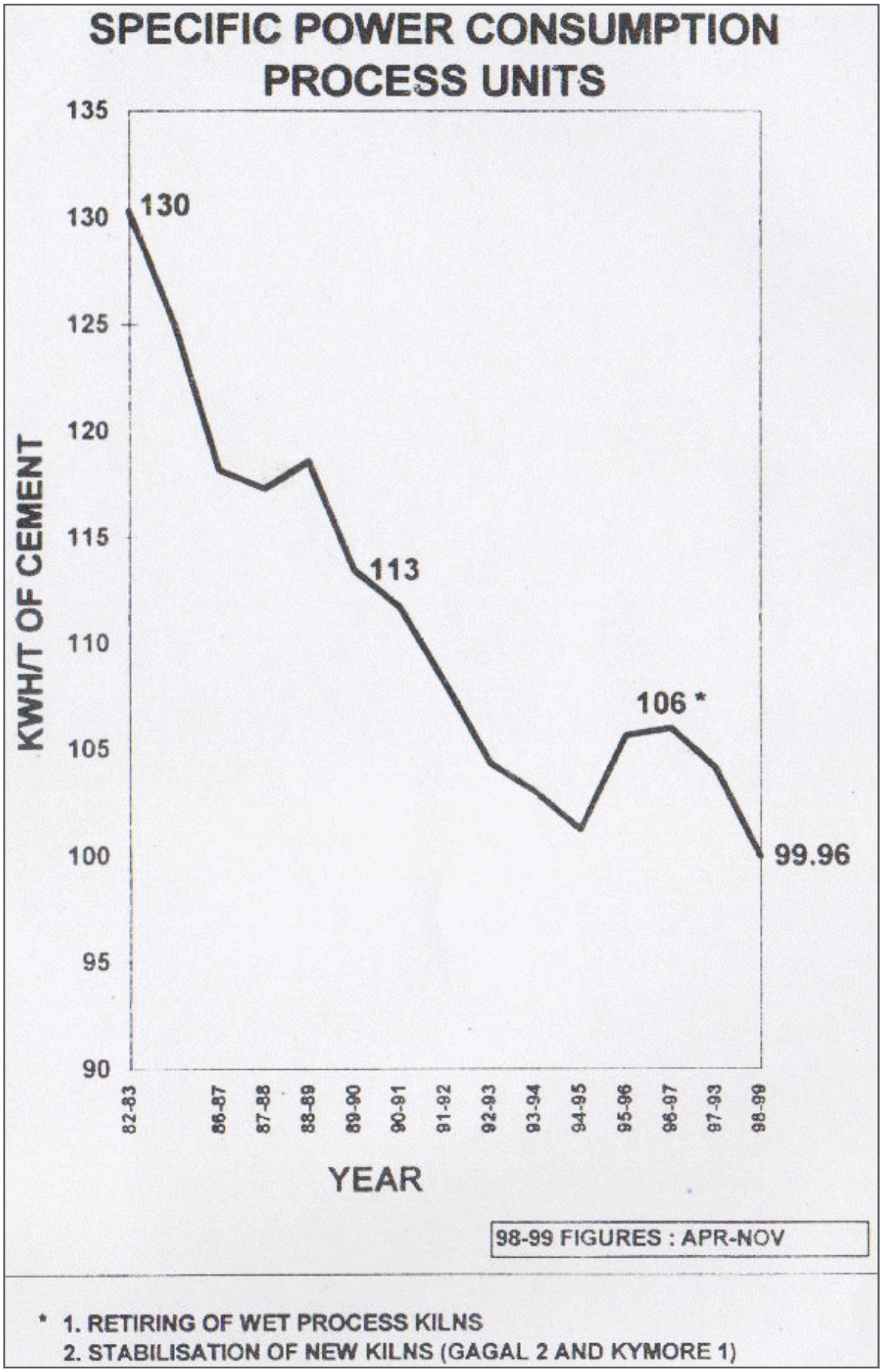
OLD GENERATION (Prior to 1990)	NO. OF KILNS	7
	TOTAL CAPACITY (MTPA)	3.9
	TPD PER KILN (AVG)	1700
	KWH / T OF CLINKER	73-90
	KCAL / KG CL.	845-860
NEW GENERATION (After 1990)	NO. OF KILNS	4
	TOTAL CAPACITY (MTPA)	3.8
	TPD PER KILN (AVG)	2950
	KWH / T OF CLINKER	65-79
	KCAL / KG CL.	695-740

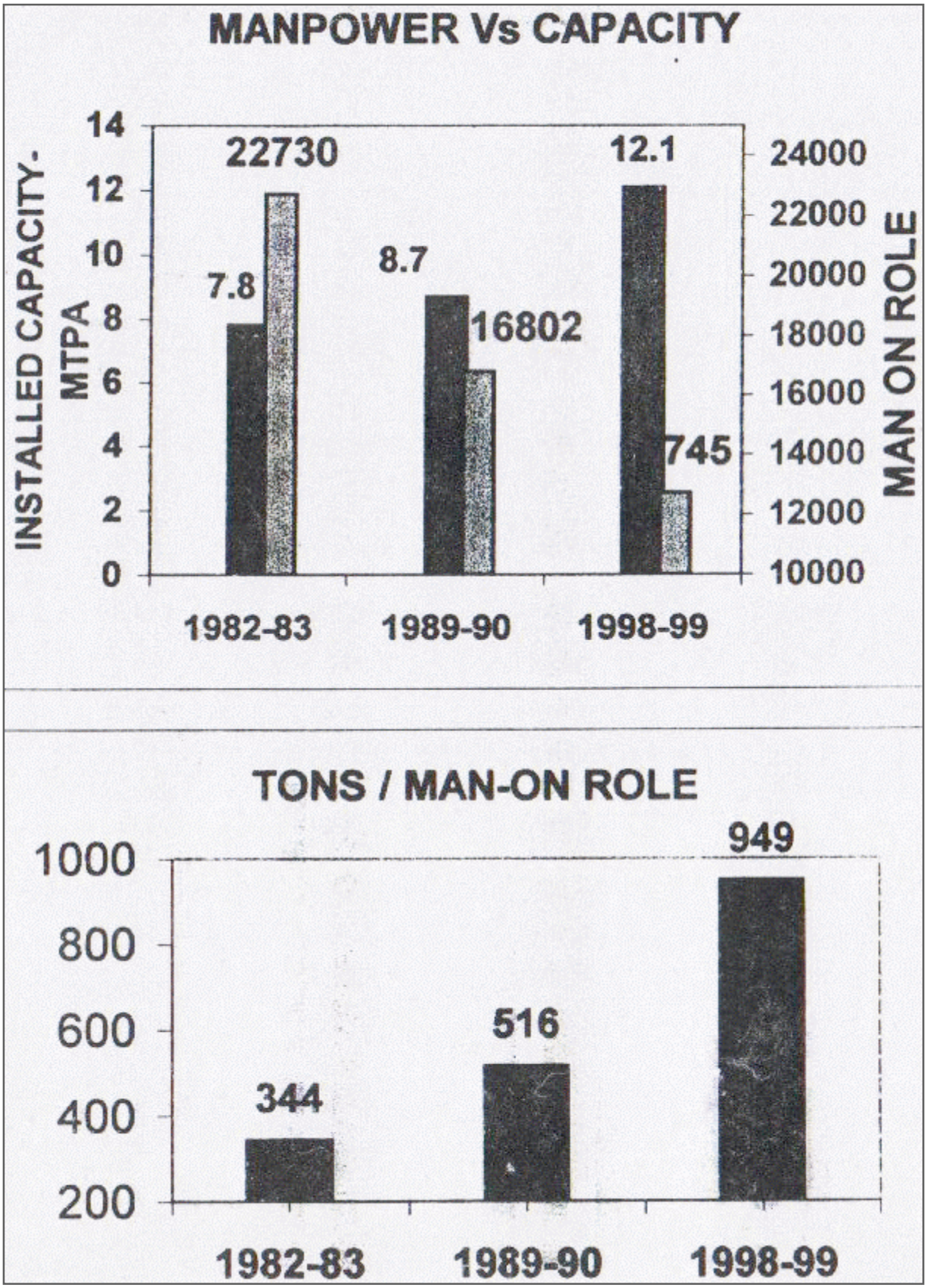
ACC-CAPACITY V/S FUEL EFFICIENCY

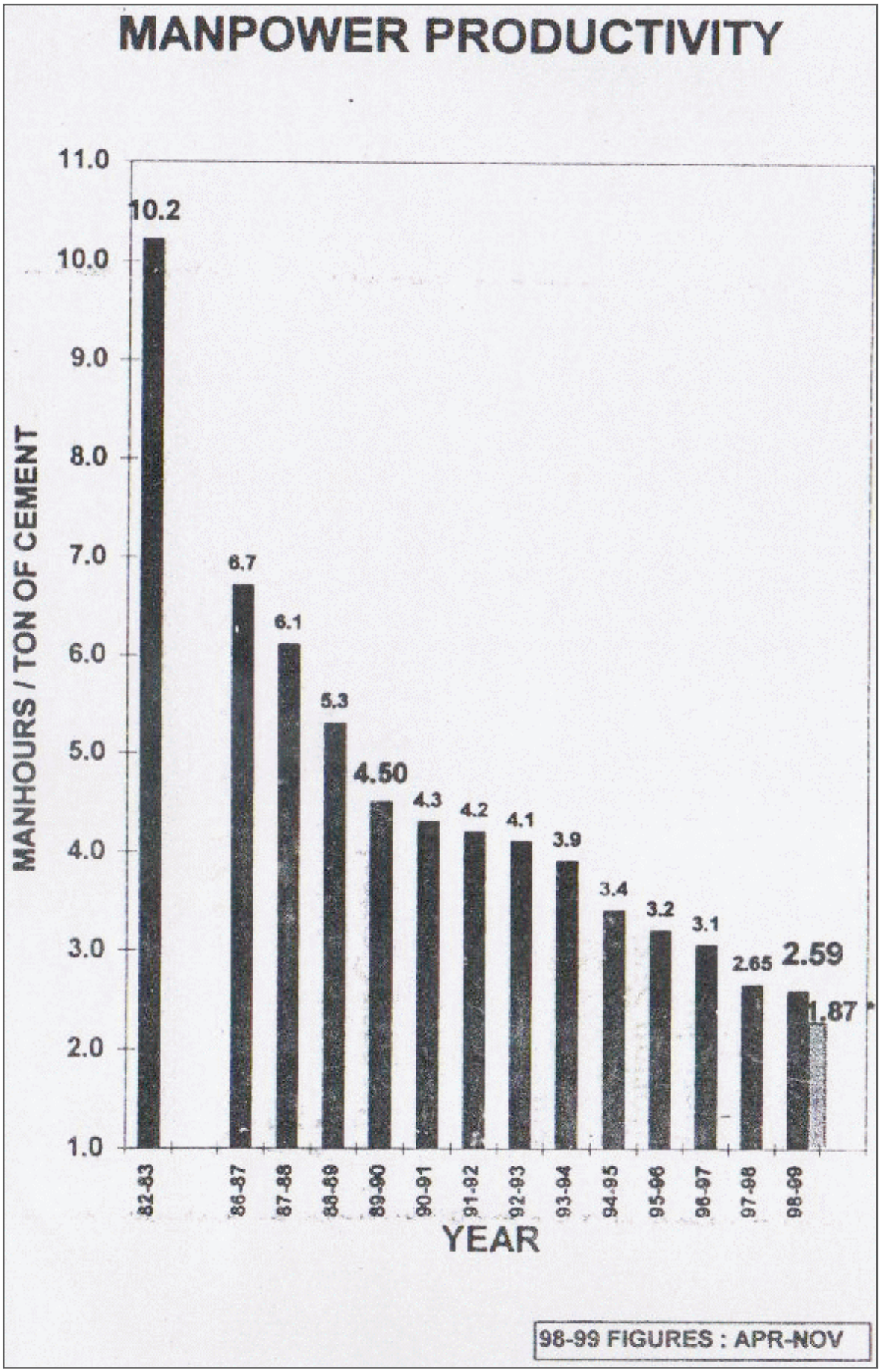


BASIS : ACTUAL PERFORMANCE APR-NOV'98


SPECIFIC FUEL CONSUMPTION
KCAL/KG. CLINKER
1500
1300
1100
900
700
1413
1148
820
82-83
83-84
84-85
85-86
86-87
87-88
88-89
89-90
90-91
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
YEAR
98-99 FIGURES : APR-NOV


SPECIFIC POWER CONSUMPTION
PROCESS UNITS
KWH/T OF CEMENT
135
130
125
120
115
110
105
100
95
90
130
113
106 *
99.96
82-83
86-87
87-88
88-89
89-90
90-91
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
YEAR
98-99 FIGURES : APR-NOV
* 1. RETIRING OF WET PROCESS KILNS
2. STABILISATION OF NEW KILNS (GAGAL 2 AND KYMORE 1)

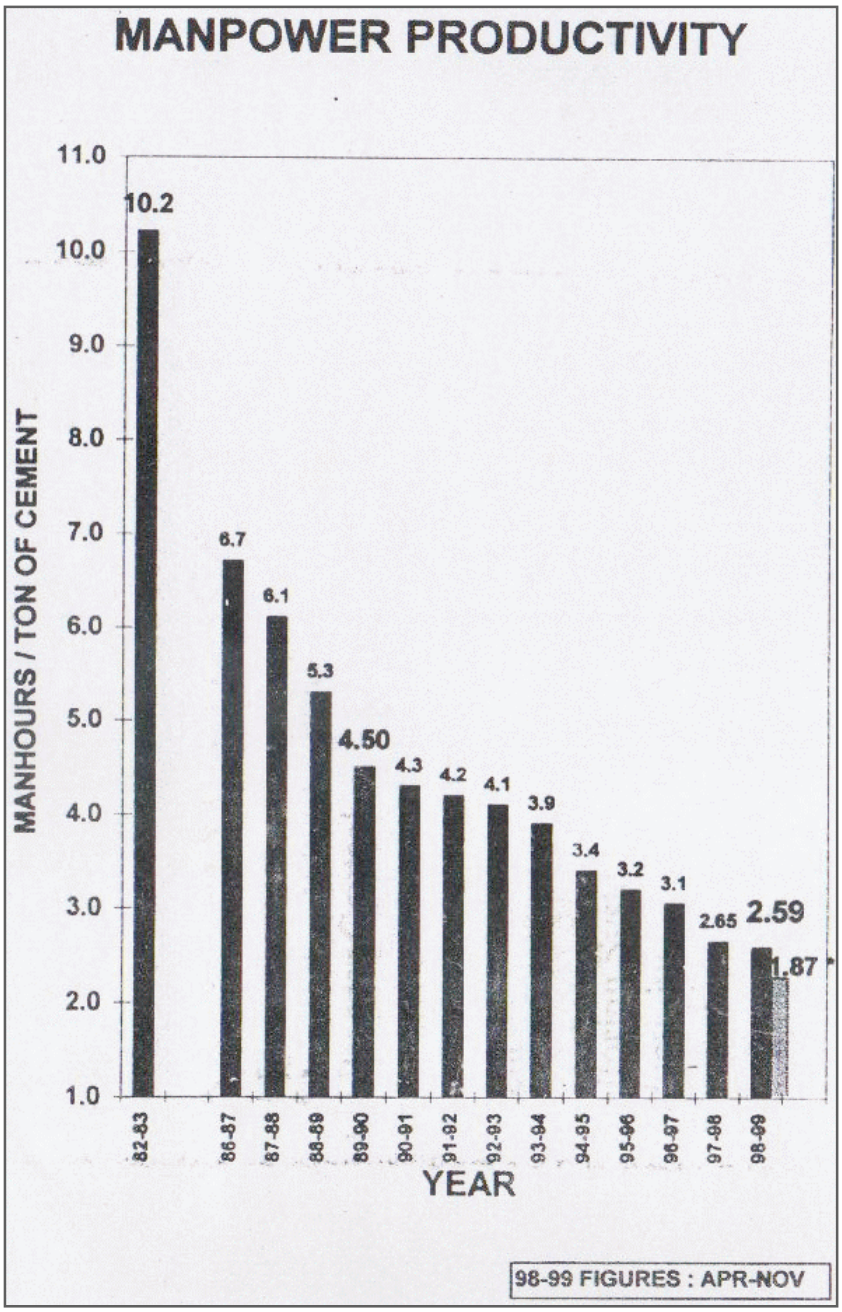

MANPOWER Vs CAPACITY
INSTALLED CAPACITY- MTPA
MAN ON ROLE
14
12
10
8
6
4
2
0
24000
22000
20000
18000
16000
14000
12000
10000
22730
12.1
7.8
8.7
16802
745
1982-83
1989-90
1998-99
TONS / MAN-ON ROLE
1000
800
600
400
200
949
516
344
1982-83
1989-90
1998-99


MANPOWER PRODUCTIVITY
MANHOURS / TON OF CEMENT
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
10.2
6.7
6.1
5.3
4.50
4.3
4.2
4.1
3.9
3.4
3.2
3.1
2.65
2.59
1.87
82-83
86-87
87-88
88-89
89-90
90-91
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
YEAR
98-99 FIGURES : APR-NOV

Energy Saving through Advanced Automation and Process Control Techniques

- Expert System, Fuzzy Logic, Adaptive Predictive, and Neural Network based Control System for Process Control
- Expert System for Electrical and Thermal Energy Management and Electrical Demand Management
- Computerized Monitoring Systems for reducing idle running of equipment and improving productivity

At relatively low investments, these schemes have yielded reduction in energy consumption as high as 10%



Energy Saving through Advanced Automation and Process Control Techniques

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- Expert System for Electrical and Thermal Energy Management and Electrical Demand Management
- Computerized Monitoring Systems for reducing idle running of equipment and improving productivity

At relatively low investments, these schemes have yielded reduction in energy consumption as high as 100%

Plant Conversion for Energy Conservation

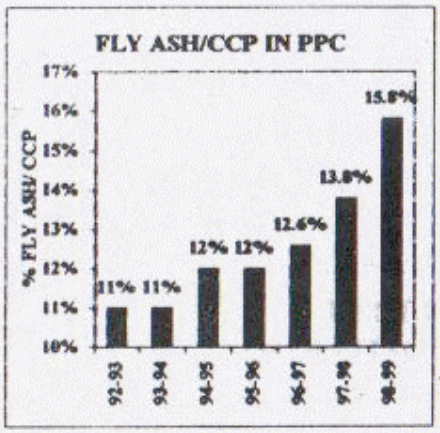
Project Description	Location	Energy Saving	
		Thermal	Electrical
Conversion from wet process to semi-wet process with slurry filtrated and preheater	Madukkarai, T.N.	30%	10%
Additional 5 stage preheater, clinker pregrinder, cement mill close circuiting	Gagal, H.P.	15%	
Replacement of wet process kilns by 5 stage preheater kiln	Kymore, M.P.	50%	15%
Separate finish grinding of slag and blending	Sindri, Bihar		20%
Replacement of wet process kilns by 6 stage preheater kiln	Lakheri, Rajasthan	45%	

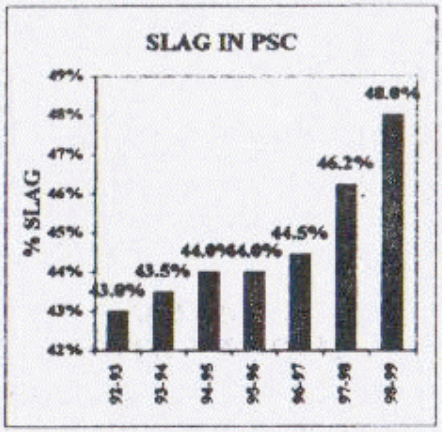
Other Important Electrical Conservation Initiatives

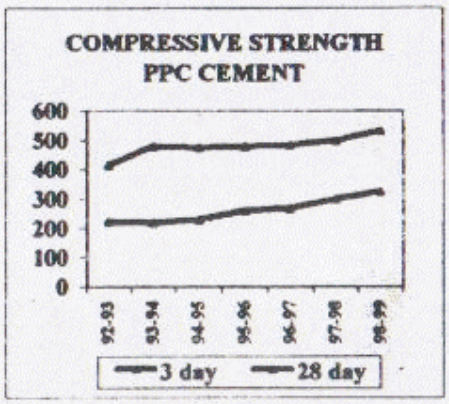
- Annual Energy Audit of each plant
- Installation of Slip Power Recovery System
- Installation of variable speed drive
- Installation of load sensor to avoid idle running of belts
- Change of pneumatic conveying system to mechanical conveying system
- Replacement of existing equipment – such as Fans, Pumps, Burner, Separator, and conveying system – with higher overall efficiency
- Providing more efficient support equipment such as Clinker Breaker, Speed Controller, and Capacitor Bank etc.

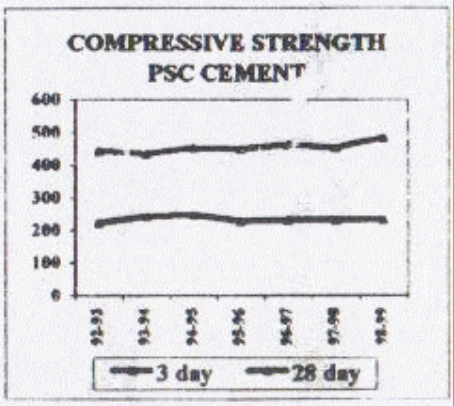
PROCESS CAPABILITIES OF ACC

INCREASING ADDITIVES IN BLENDED CEMENT , WHILE IMPROVING QUALITY

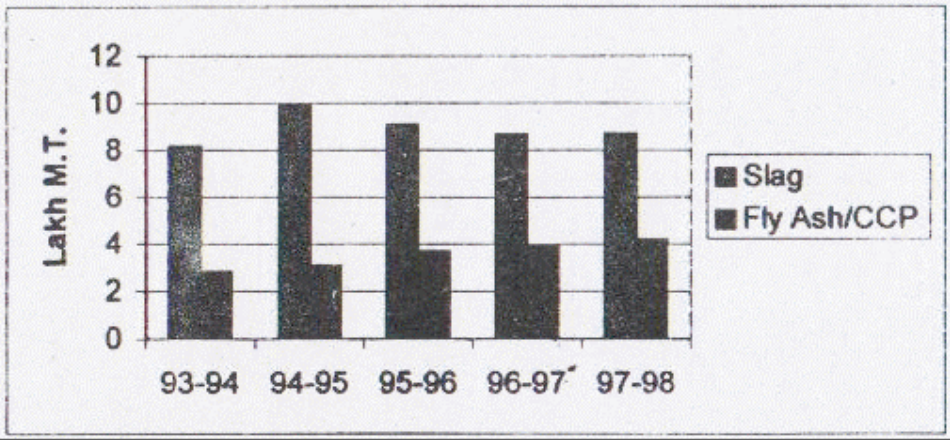








UTILISATION OF FLY ASH, CCP AND SLAG



ENVIRONMENT PROTECTION

OUR INTERNAL NORMS ARE MORE STRINGENT THAN THE PCB NORMS. FOLLOWING GRAPH INDIATES THE MARGINS BY WHICH OUR EMISSION LEVELS ARE BETTER THAN THE PCB NORMS.