Perform Achieve and Trade

A Low carbon Strategy for inclusive growth in India

Marrakech

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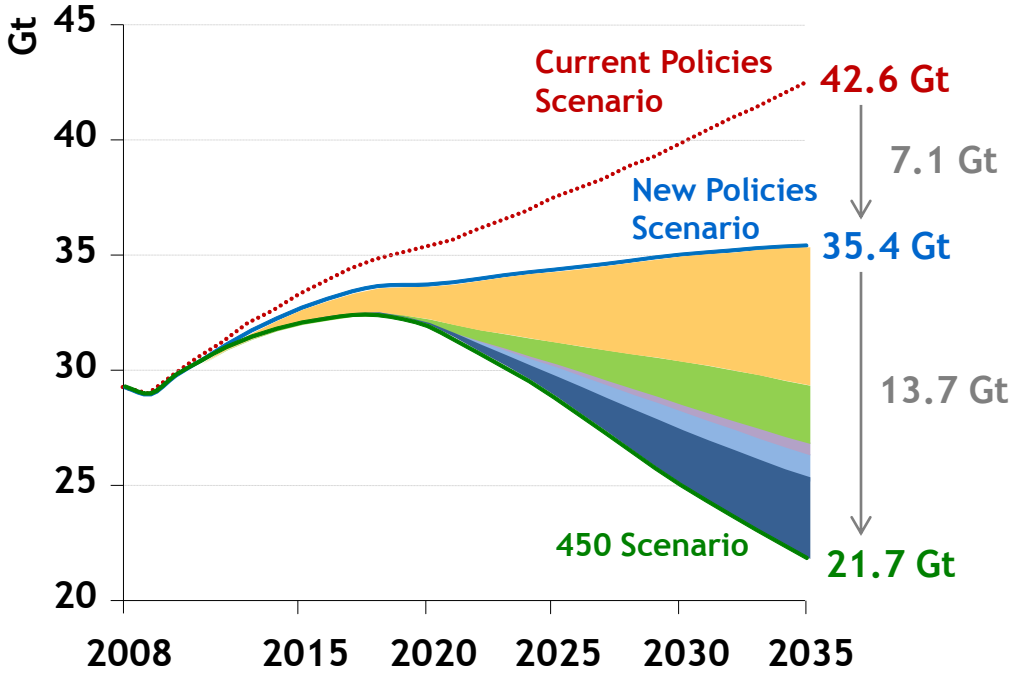
World CO_2 Emission Savings



Share of cumulative abatement between 2010-2035	
Efficiency	50%
Renewables	18%
Biofuels	4%
Nuclear	9%
CCS	20%

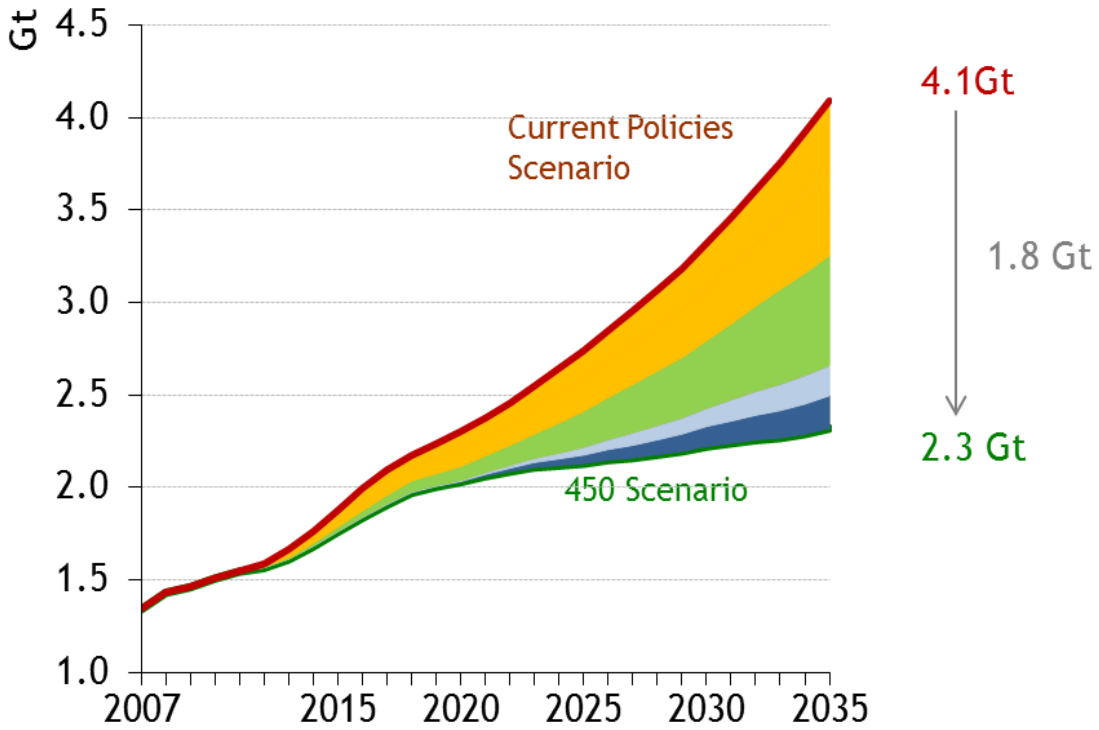
Source: WEO 2010

New Policies Scenario is the central scenario in WEO-2010

- **Assumes cautious implementation of recently announced commitments & plans**

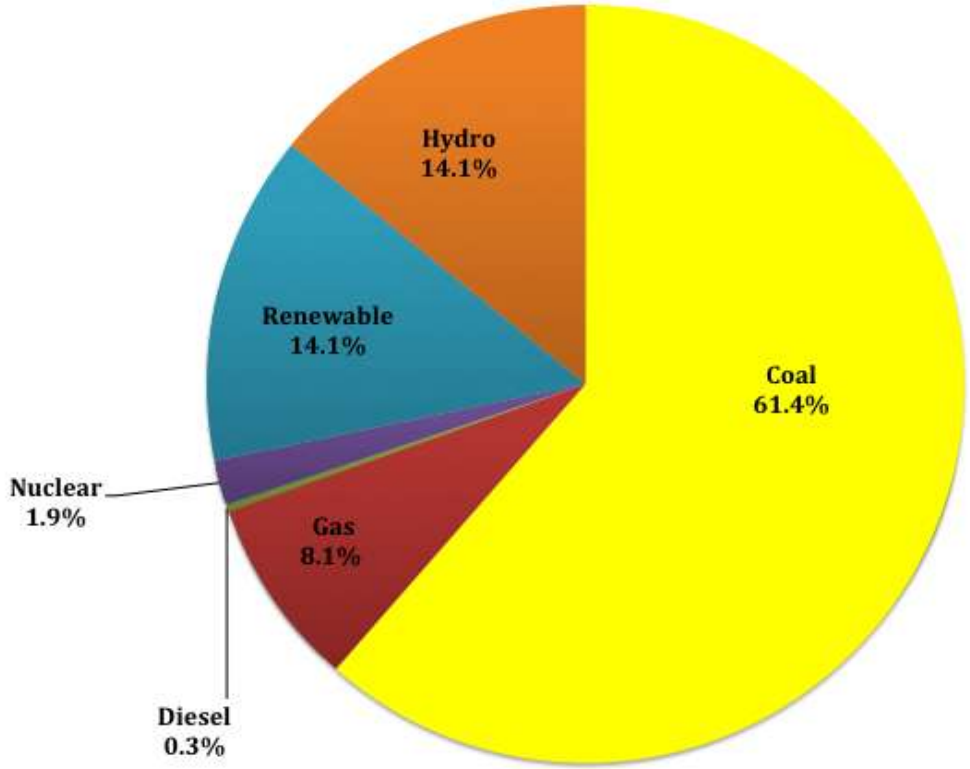
The 450 Scenario sets out an energy pathway consistent with the goal of limiting increase in average temperature to 2°C

India – CO2 Emission Reduction



Share of cumulative abatement between 2010-2035	
Efficiency	51%
Renewables	32%
Biofuels	1%
Nuclear	8%
CCS	8%

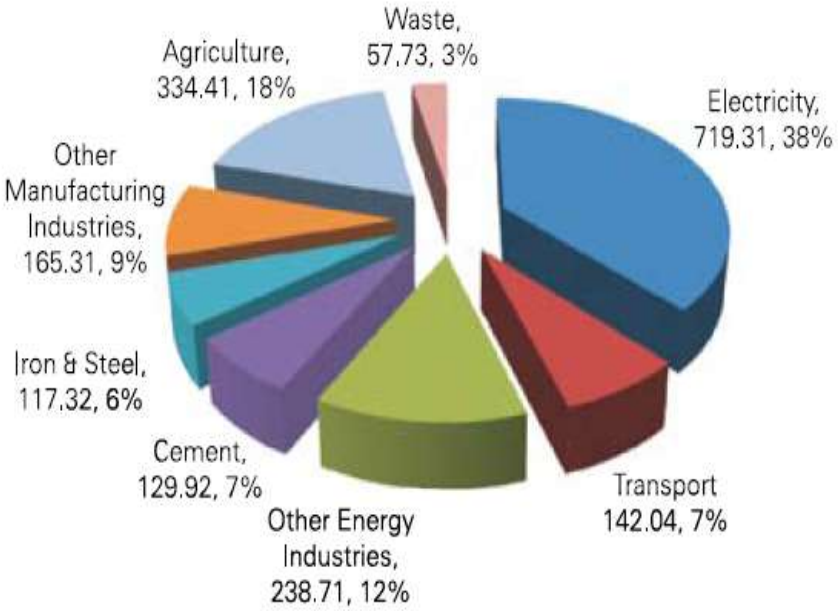
India's Installed Power Generation Capacity



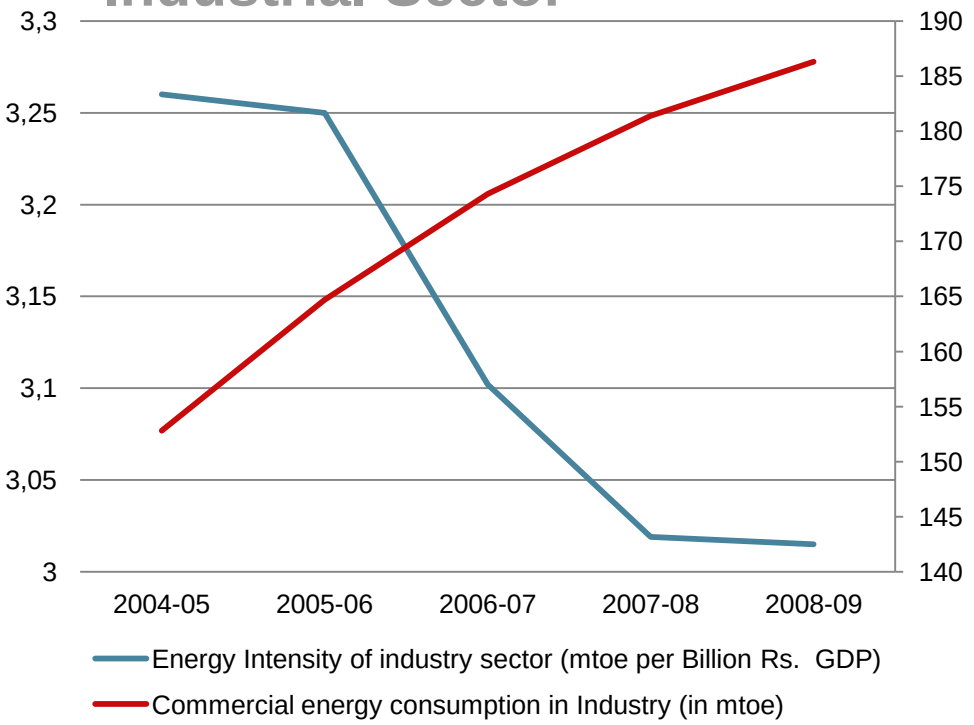
Total Installed Capacity: 303 GW

Energy Profile - India

GHG Emissions Across Sectors



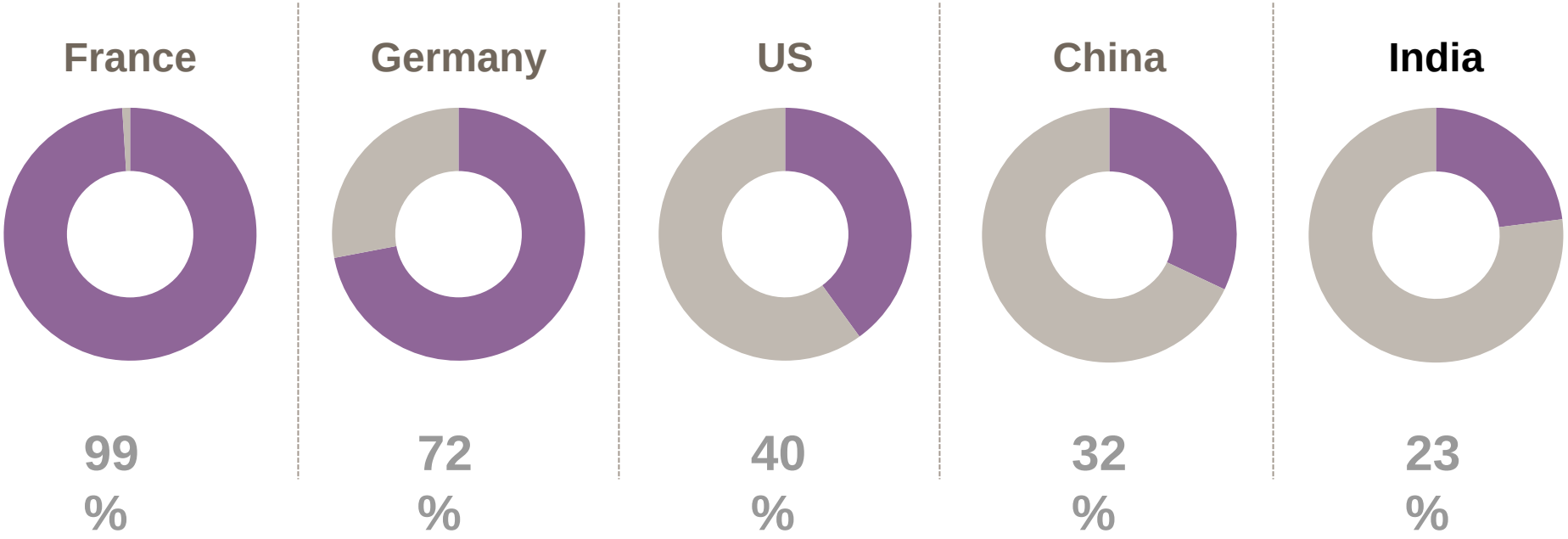
Energy Intensity - Industrial Sector



% Share of Clean Energy

At 23%, share of green energy (including nuclear) in India's total energy is the highest-ever today, but if compared to other countries, its still a long way to go

% SHARE OF CLEAN ENERGY IN TOTAL POWER GENERATION

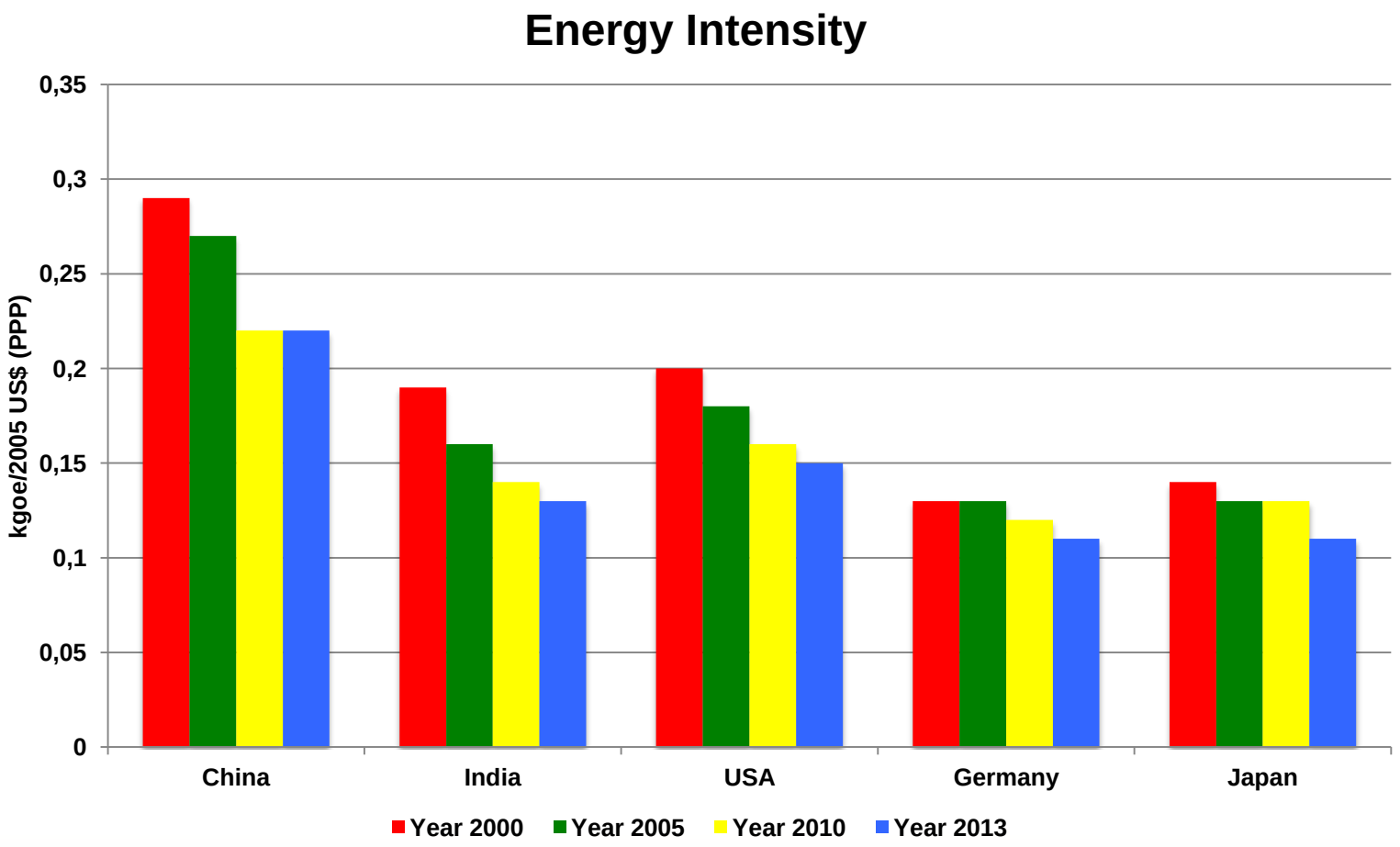


Source: BP Statistical Review of World Energy 2016, * data is for 2010 for solar energy

Macro indicators for future needs of India

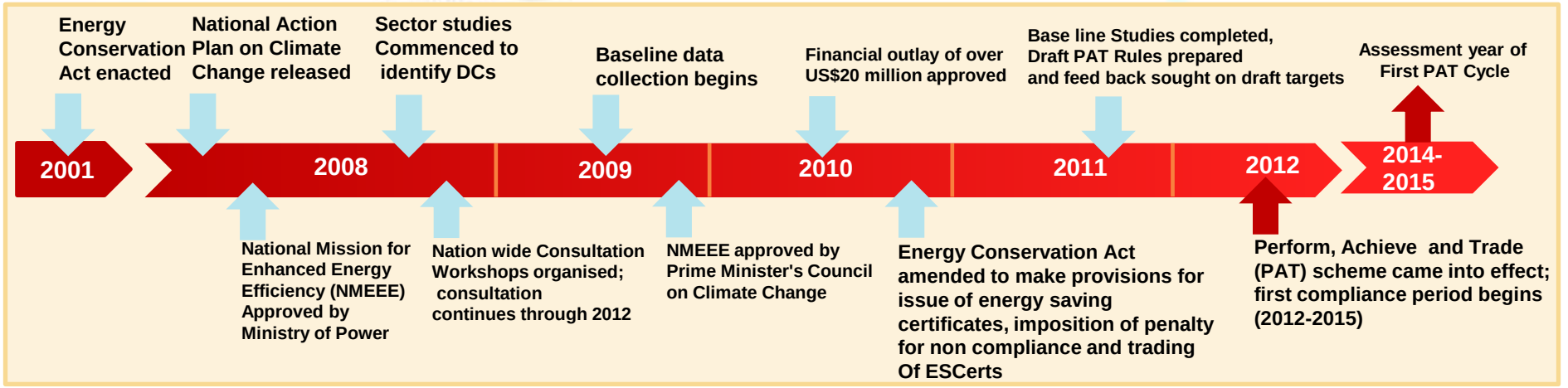
Indicators	Unit	India in 2014	India in 2030
Population	billion	1.2	1.5
Urban population	million	377 (2011)	609
GDP	USD trillion	2.04 (2016)	6.31
Per Capita GDP	USD	1408	4205
Electricity Demand	TWh	776 (2012)	2499
Per capita avg. annual energy consumption	toe	0.6 (India)	1.88 (Global average)
Energy Intensity	gm oil equivalent per Rs. of GDP	18.16 (2005)	15.02 (2012) Aiming: 11.08 (2030)

Energy Intensity Continues To Decline



Perform Achieve and Trade Scheme (PAT)

PAT: Overview and Elements



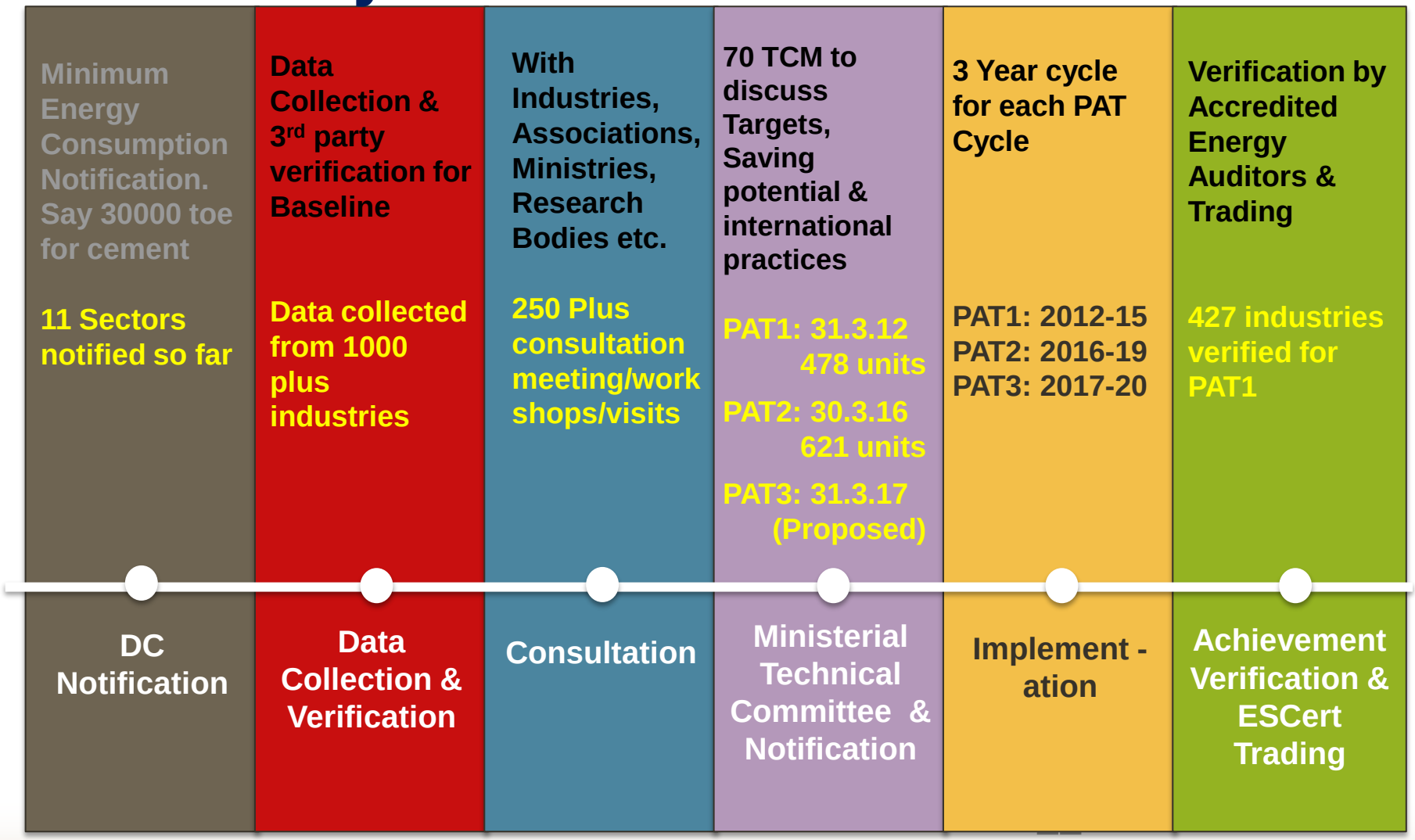
HIGHLIGHTS

- Covers 478 Designated Consumer (DCs) in 8 energy intensive industry and Gate to Gate boundary concept adopted.
- Large variations in energy intensities of different units in almost every sector
- **Key Goal: Mandate Specific Energy Consumption improvement**
- Energy Intensity reduction target for each unit based on its current efficiency in base line (2009-10)
- Multi-cycle process – First PAT cycle till 2014-15
- Design based on extensive consultations over 2010-12

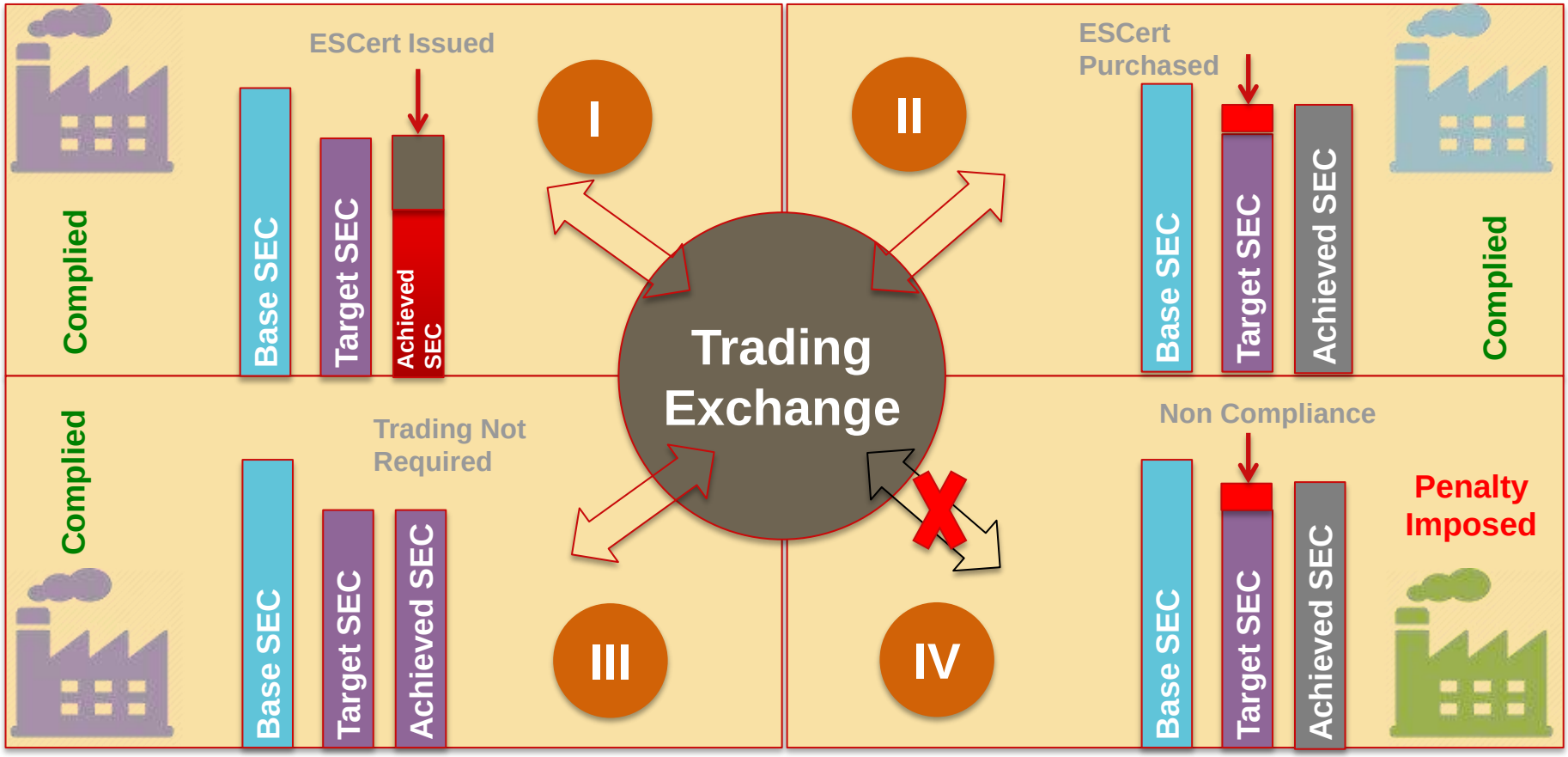
DCs

- **THERMAL POWER STATIONS**
- **IRON & STEEL**
- **CEMENT**
- **FERTILIZER**
- **PULP&PAPER**
- **ALUMINIUM**
- **CHLOR-ALKALI**
- **TEXTILE**

PAT Cycle


Minimum Energy Consumption Notification. Say 30000 toe for cement
11 Sectors notified so far
DC Notification
Data Collection & 3rd party verification for Baseline
Data collected from 1000 plus industries
Data Collection & Verification
With Industries, Associations, Ministries, Research Bodies etc.
250 Plus consultation meeting/work shops/visits
Consultation
70 TCM to discuss Targets, Saving potential & international practices
PAT1: 31.3.12 478 units
PAT2: 30.3.16 621 units
PAT3: 31.3.17 (Proposed)
Ministerial Technical Committee & Notification
3 Year cycle for each PAT Cycle
PAT1: 2012-15
PAT2: 2016-19
PAT3: 2017-20
Implement - ation
Verification by Accredited Energy Auditors & Trading
427 industries verified for PAT1
Achievement Verification & ESCert Trading

Mechanism



SEC (Specific Energy Consumption): Energy Consumed per unit production

PAT 1– Targets & Achievements

S. No	Sector	No of DCs	Annual Energy Consumption (Million toe)	Target Reduction (Mtoe)	Actual Savings (Mtoe)	% Increase
1	Aluminium	10	7.71	0.46	0.73	59%
2	Cement	85	15	0.82	1.44	76%
3	Chlor- Alkali	22	0.88	0.05	0.13	100%
4	Fertilizer	29	8.2	0.48	0.83	73%
5	Iron & Steel	67	25.3	1.49	2.1	41%
6	Paper & Pulp	31	2.09	0.12	0.26	117%
7	Textile	90	1.2	0.07	0.12	71%
8	Thermal Power Plant	144	105	3.21	3.06	-5%
	Total	478	165.38	6.686	8.67	29%

Impacts – PAT 1

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

8.67 mtoe
5635 MW
6600 rakes of coal

1.25% of India's total primary energy supply

32 million tonnes of CO_2 reduction

1.93% of India's emissions

Skill Development

Capacity building: 5000+ Engineers and operators

13718 Energy Auditors & Managers

219 Accreditation

Energy Savings of

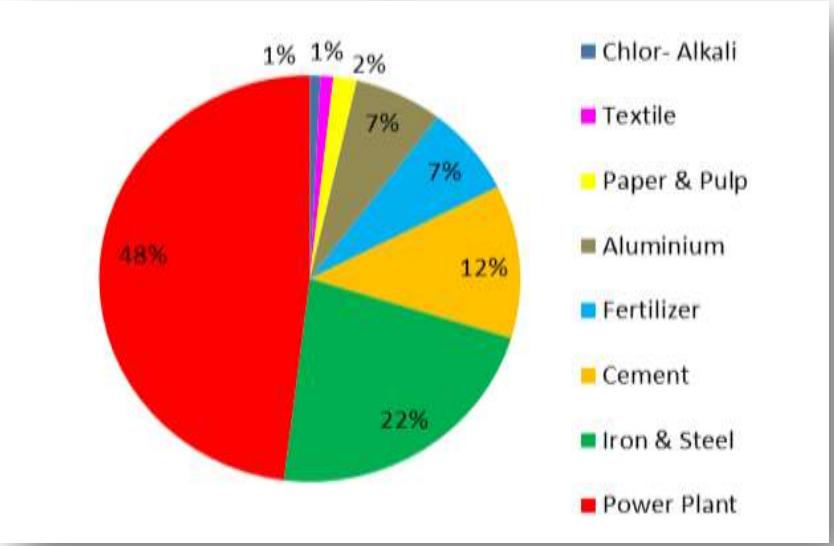
5.2 Billion €

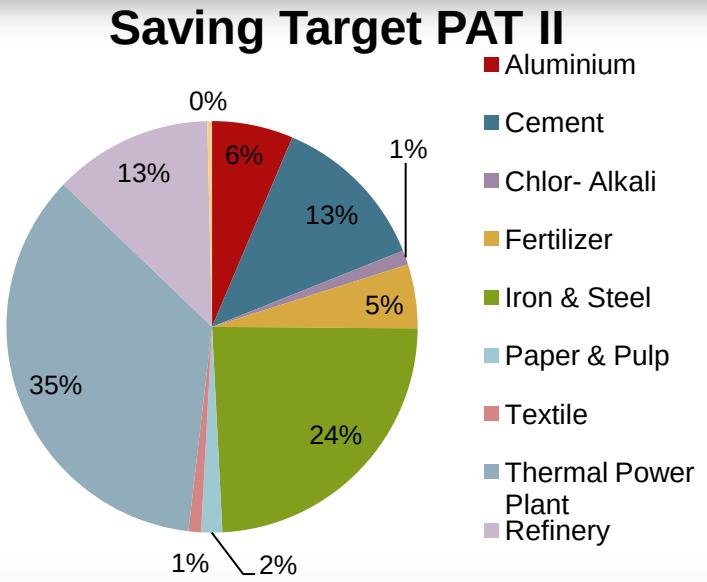
Encouraged investments for energy efficient technologies for manufacturing in India

2.9 Billion € invested

PAT-II Overview and Status

Sr No	Sector	Notified Nos	Energy Consumption	Old DCs	Nos	Energy Consumption	Target 2018-19
		Old			New		
1	Aluminium	10	7.71	10	12	10.66	0.57
2	Cement	85	15.01	84	111	21.43	1.12
3	Chlor- Alkali	22	0.88	21	24	1.77	0.101
4	Fertilizer	29	8.2	29	37	8.25	0.45
5	Iron & Steel	67	25.32	62	71	40.44	2.14
6	Paper & Pulp	31	2.09	25	29	2.68	0.15
7	Textile	90	1.2	85	99	1.48	0.087
8	Thermal Power Plant	144	104.56	132	154	120.16	3.13
9	Refinery				18	18.50	1.10
10	Railways				22	1.39	0.033
11	Discom				44		
	Total	478	164.97	448	621	226.76	8.869





Impacts – PAT 2

17.5 mtoe
11407 MW
13500 rakes of coal

2.09% of India's total primary energy supply

60 million tonnes of CO_2 reduction

3-4% of India's emissions

Skill Development

Capacity building:
12000+ Engineers and operators
15000 Energy Auditors & Managers
500 Accreditation

Energy Savings of

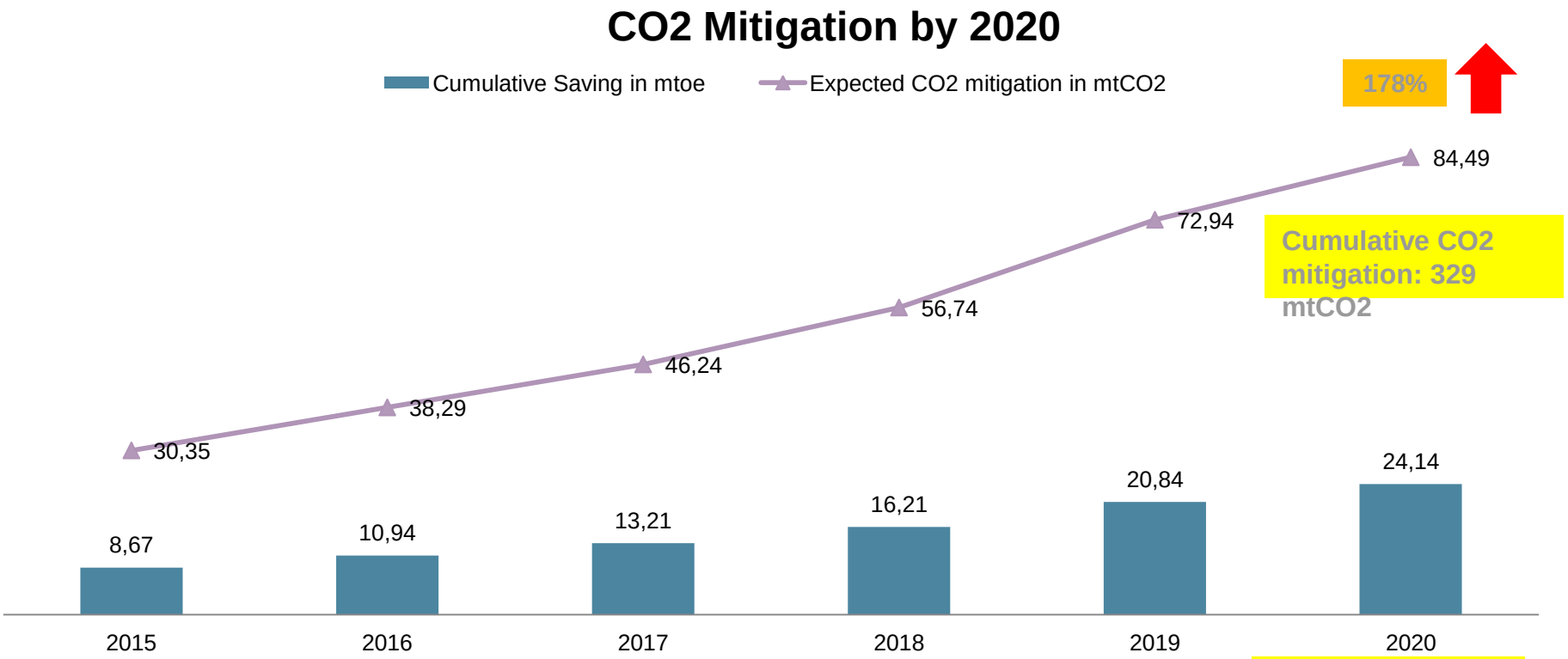
6.6 Billion €

Encouraged investments for energy efficient technologies for manufacturing in India

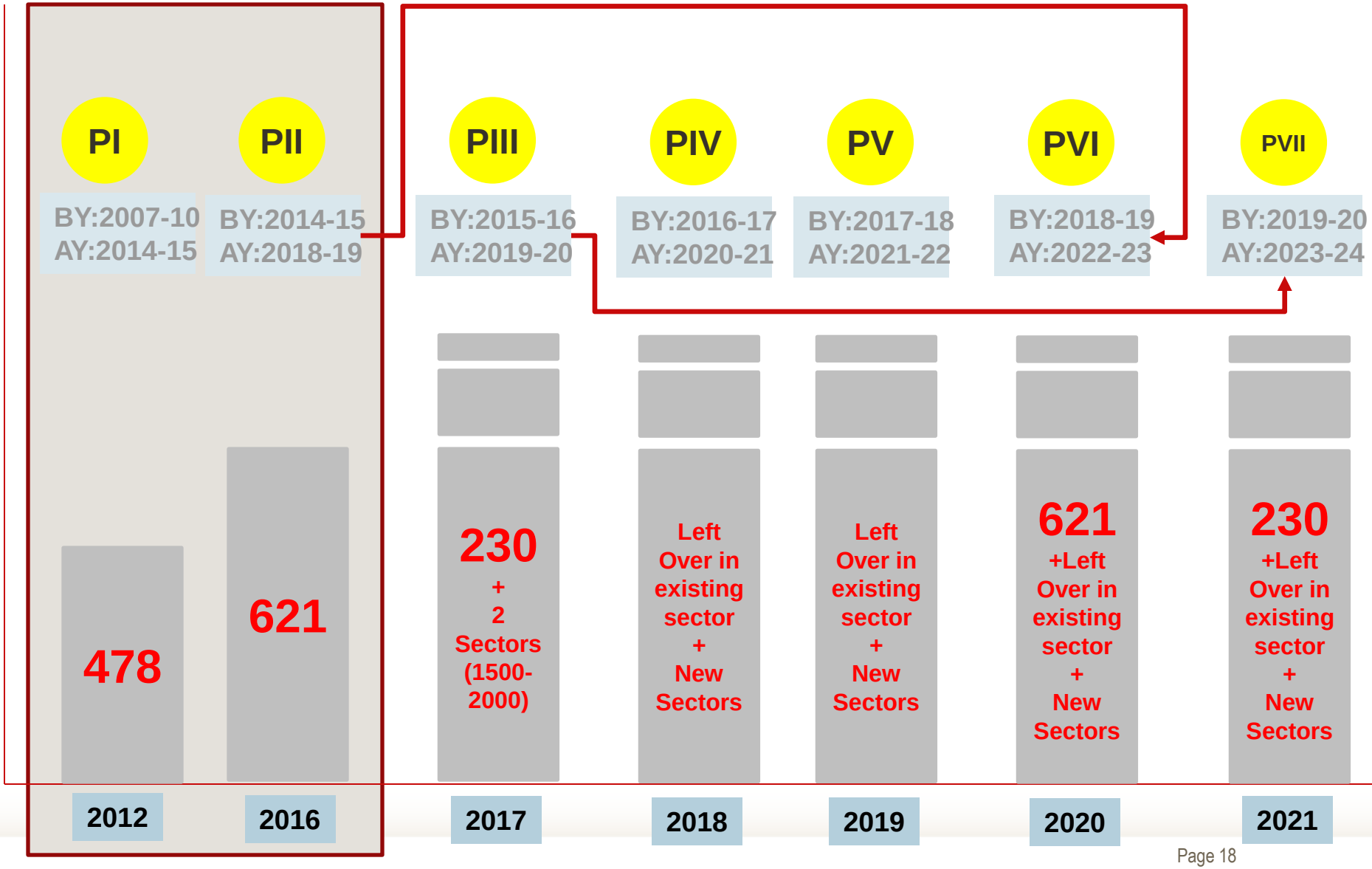
3 Billion € to be invested

CO2 mitigation by 2020 from Industries

Total CO_2 reduction by 85 million tonnes of CO_2 from all 13 sectors

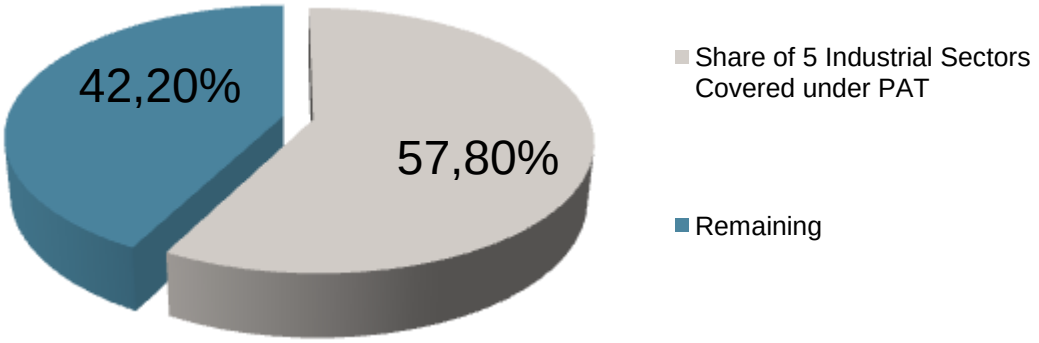


PAT II and Beyond (Rolling Cycle)



Share of 5 PAT industrial Sector in CO_2 Emission

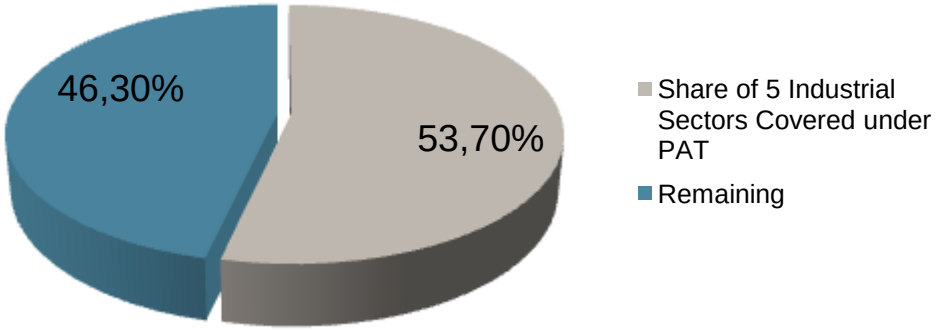
{Power, Steel, Cement, Fertilizer, Aluminium}



CO_2 Emission in Million Tonnes (2008-09)

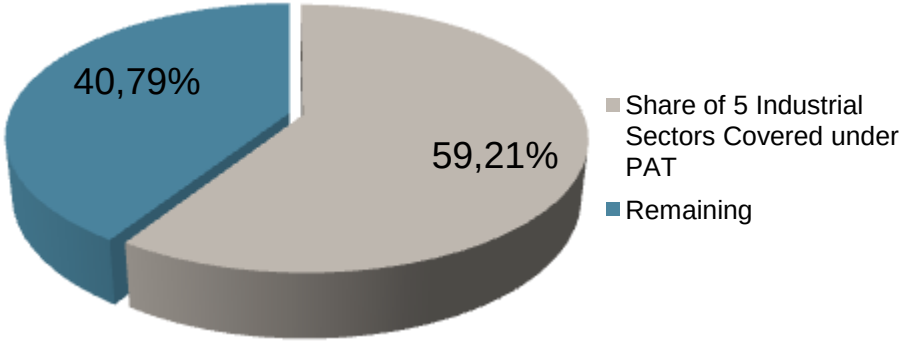
Head	Emission (in MT)
Total	1500
Share of 5 Sectors	867

Projected



CO_2 Emission in Million Tonnes (2020-21)

	Emission (in MT)
Total	2800-3400
Share of 5 Sectors	1826



CO_2 Emission in Million Tonnes (2030-31)

	Emission (in MT)
Total	4000-5670
Share of 5 Sectors	3360

Visions for PAT

Vision Document

Trust Building

Strong Measurement and Monitoring System

No Monitoring and Verification

Standard Operating Procedure (SOPs)

PAT Cycle SOPs for all sectors

Baseline and Target Setting Methodology

Online Filing

Direct Entry of Data in pro-forma through PATNet

Development of Strong data base

Direct measurement and Entry from Field Instruments >> No need of BL verification and M&V

Financial Platform

Gap Funding through Accelerated Depreciation

Tax Incentives for Energy Efficient Equipment/Technology/Process >> Study initiated

Development of ESCO model before final implementation

Mobile-app

Mobil App for PAT Industries

Real time Application

India's NDC

- India Intended Nationally Determined Contribution (INDC) in response to COP decision will reduce the emission intensity of its GDP by 33-35% by 2030 from 2005.
- The emission intensity of our GDP has decreased by 12% between 2005 and 2010.
- To achieve 40% cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030.

Questions?

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