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World Wide Fuel Charter Implications on India

Session – III

Indo-Japanese conference on "Fuel quality & vehicular emissions"

New Delhi, March 17th 2009

India's response to WWFC

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1. Auto Fuel Quality (World and WWFC)
2. India Today and Challenges to HPI
3. Implication to Indian oil industry
4. Is market ready to absorb in current scenario?
5. Small acts and big impacts
6. Towards sustainability

Auto Fuel Quality of WWFC....

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Gasoline Spec proposed by WWFC

Properties	Cat 1	Cat 2	Cat 3	Cat 4	UOM
RVP	45 - 105	45 - 105	45 - 105	45 - 105	kPa
Sulfur	1000	150	30	10	ppm
Aromatics	50	40	35	35	% vol
Benzene	5	2.5	1	1	% vol
Olefins	25	18	10	10	% vol
T90	190	175	175	175	deg C
FBP	215	195	195	195	deg C

Diesel Spec proposed by WWFC

Density @15deg C max	860	850	840	840	Kg/cum
Cetane Index min	48	51	53	55	Number
T95% max	360	355	340	340	deg C
Sulphur max	2000	300	50	10	ppm
Aromatics / PAH	-	25/5	20/3	15/2	%wt

India Today & Challenges

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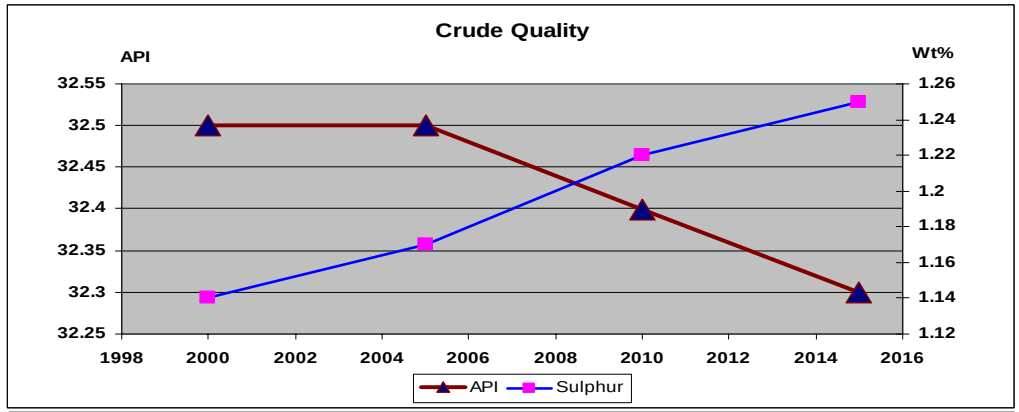
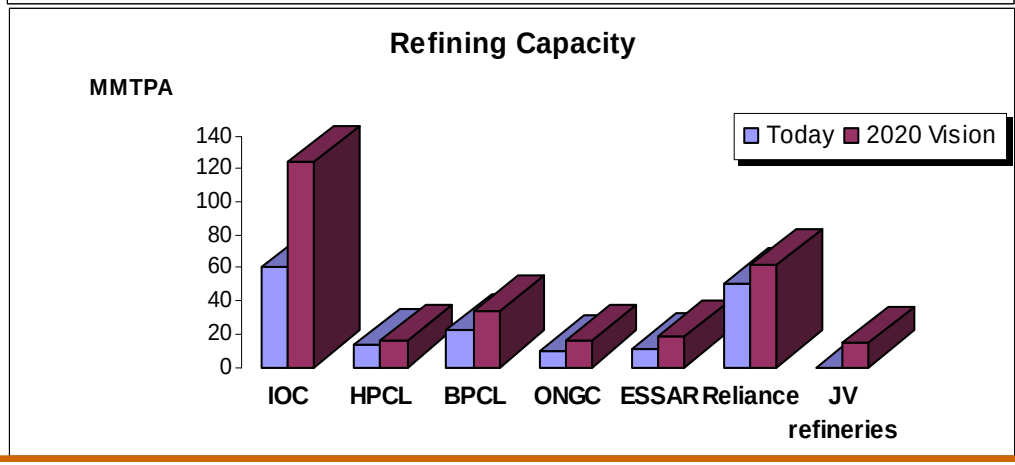
- India needs to maintain its growth despite global recession
- Choking Urbanization & Greater thrust on infrastructure for sustainable Mobility
- Global impact is never before as can be seen from pulsating crude / product prices
- Continued export of Petro goods
- Reliable refining operation with 'tougher' crudes (high S, Acid, Metals, etc.)
- Skewed pricing mechanism
- Maturity of Bio-fuel technology
- Indian HPI secondary processing ~ 35% only as against 50%+ needed
- Lower in Human Dev Index 128th





Need to innovate to sustain growth with $50+ billion on crude import bill

India Today & Challenges Contd...

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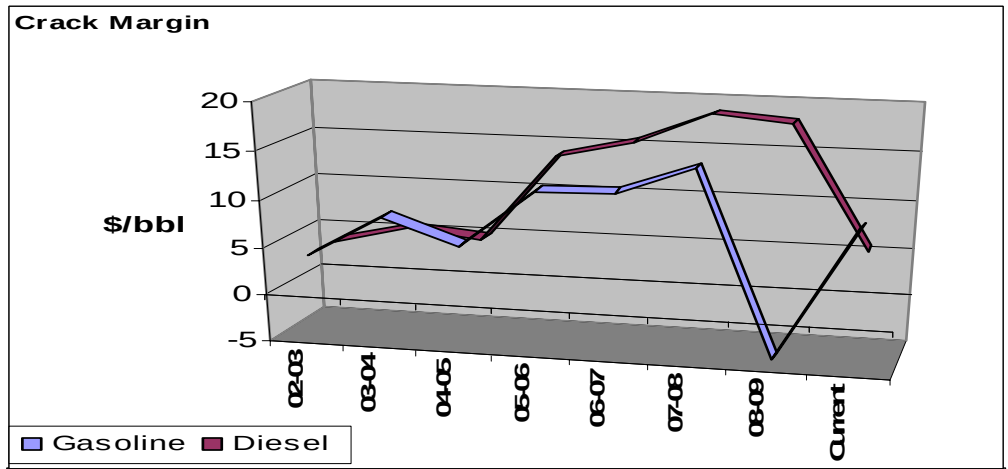
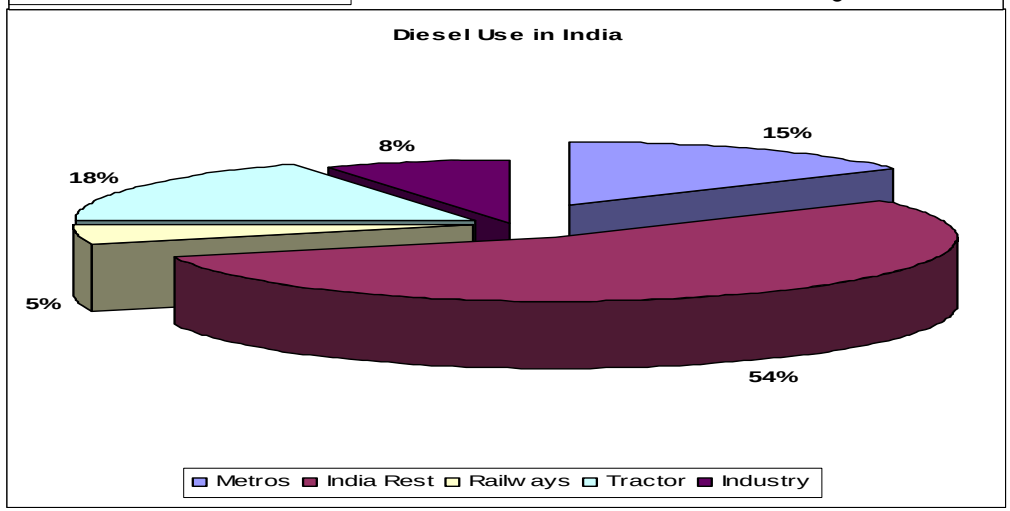
- Shift towards diesel owing to better fuel economy & lower GHG emissions.
- Global recession & first casualties – Gasoline, Petro Chemicals, Naphtha.....
- Changing Geo political alignments
- Vehicle retiring policy????
- Technology maturity of tail pipe devices for Diesel vehicles?????
- Penalizing all for urban BAQ?????
- Natural gas impact – especially on fuel oil movement from refineries
- Hydrogen use in refineries & resulting GHG emissions
- In transit quality – many gaps????





Gasoline Quality .....different world

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Gasoline Specification

Properties	UOM	Euro 3	Euro 4	India	China	Japan	Australia
RVP	kPa	70/100	70/ 100	60 max	65 / 88	62	##
Sulfur	ppm	150	50	150	50	10	50
Aromatics	%vol	42	35	42	*	No spec	42
Benzene	%vol	1	1	1	1	1	1
Olefins	%vol	21/18	18	21/18	25*	No spec	18
Oxygen	%wt	2.7	---	2.7 max	2.7	1.2	2.7
T90	deg C	---	---	-	190 max	190	185
T50	deg C	---	---	-	120 max	110	110
E150	%vol	75	75	75 min.	---	---	-
E100	%vol	46	46	40 - 70	---	---	-

*** Total Olefins and aromatics : 60 vol % max**
 # Varies from 62 to 90kPa.

Specifications with major influence on oil industry as well as GHG as production to different requirement needs Hydrogen use in refinery

Needed 'cost effective' and smooth change management plan

Gasoline Quality Given by WWFC....

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Gasoline Spec proposed by WWFC					
Properties	Cat 1	Cat 2	Cat 3	Cat 4	UOM
RVP	45 - 105	45 - 105	45 - 105	45 - 105	kPa
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T90	190	175	175	175	deg C
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Impact on India

1. New units came up in 90s viz. Isomerization, Platformer, MTBE, TAME...
2. These shrunk liquid barrel (value loss) just to meet olefins spec.
3. EP drop threw out aromatics (value drop), requiring H2 to upgrade.
4. RVP reduction is substantial with no change in summer / winter.

Diesel Quality .....different world

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Diesel Specification

Properties	UOM	Euro 3	Euro 4	India	China	Japan	Australia
Sulfur	ppm	350	50	350	50	10	10
CN	-	51	51	51	47#	45	No spec
CI	-	46	46	46	46	45	46
Density	kg/cum	845	845	845	-		850
T90	deg C	-	-	-	355	360	
T95	deg C	360	360	360	365	-	360
PAH	%wt	11	4	11	11	No spec	11
CCR 10%	%wt	0.3	0.3	0.3	0.3	0.1	0.2
Aromatics	%wt	-	-	-	-	-	> 15

 # : Depends on region and temperature ;

Specifications with major influence on oil industry as well as GHG as production to different requirement needs Hydrogen use in refinery

Shows good thoughts gone into while specifying.

Needed 'cost effective' and smooth change management plan

Diesel Quality Specified by WWFC....

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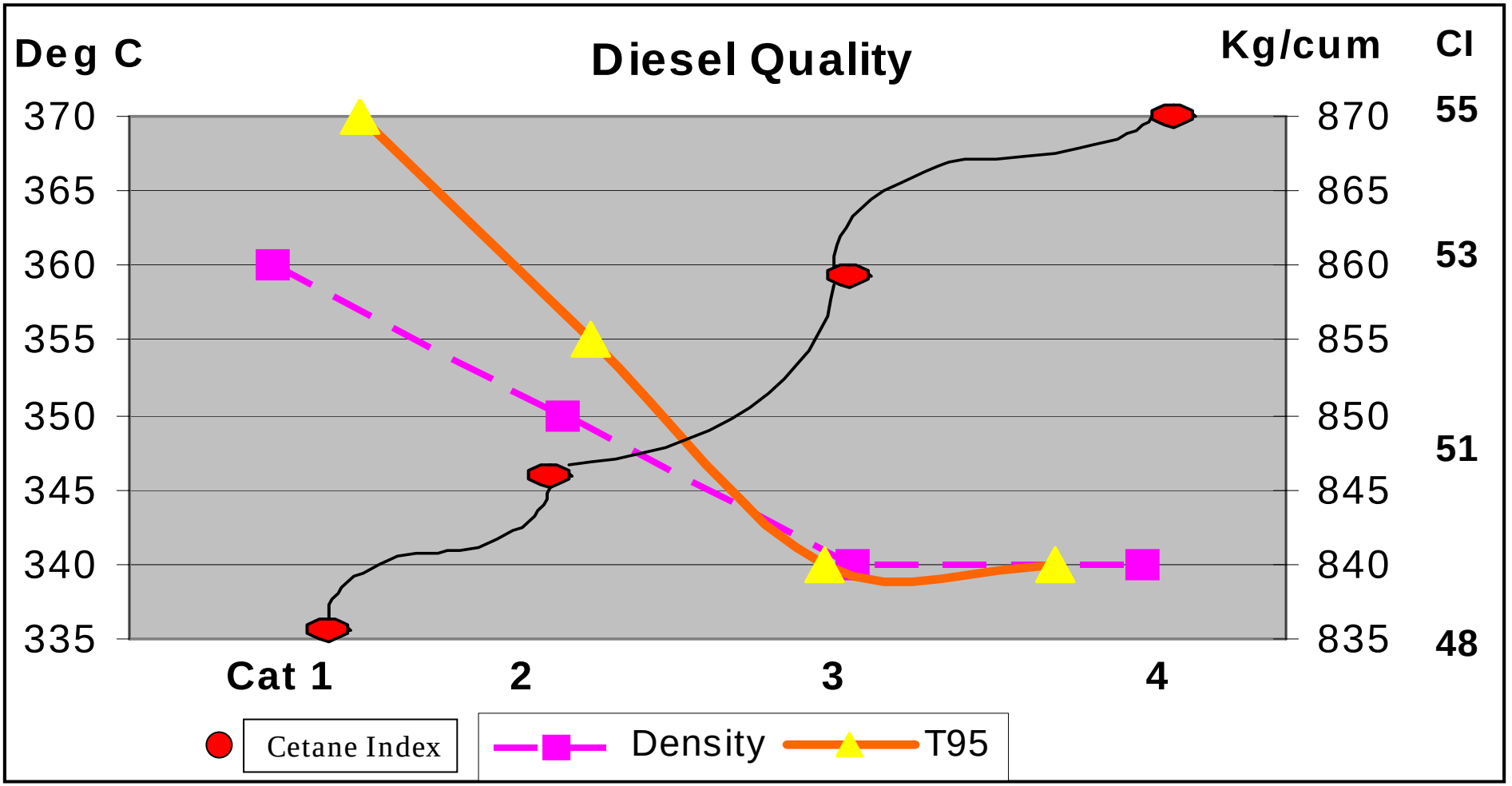

Both yield penalty and H2 use increase in Indian refineries over the years. It would double with WWFC specifications.

Product demands getting lighter

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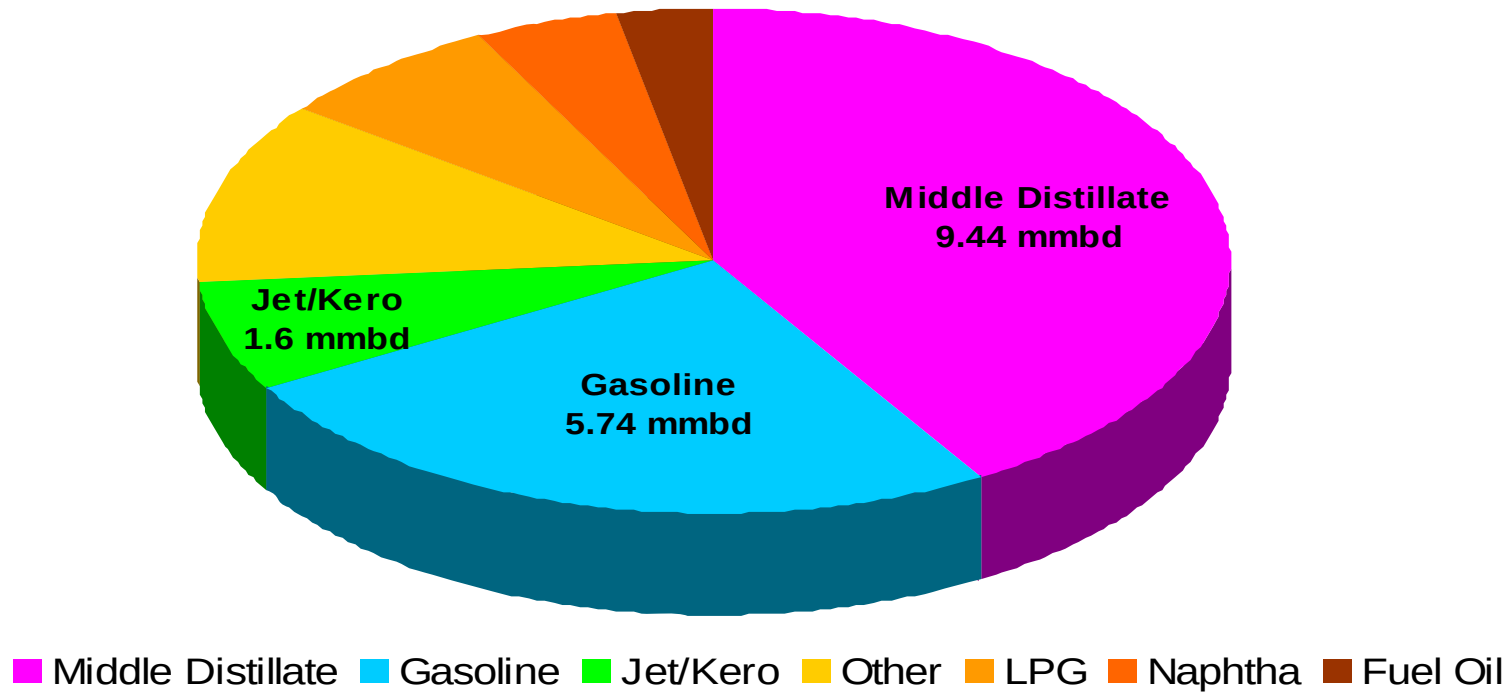
Incremental Global Demand (2005-2020) : 23 mmbd

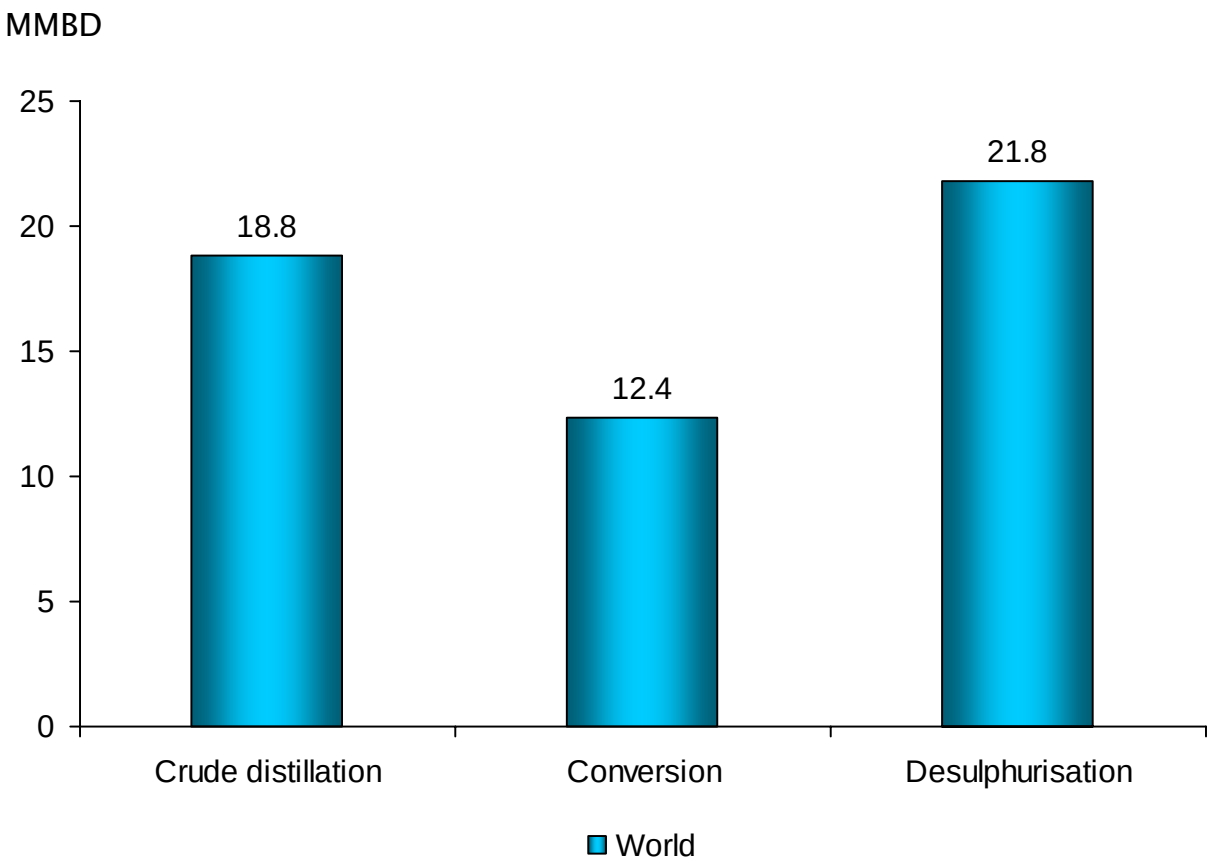


Source: HART'S World Refining and Fuel Services, Dec'05

Light & Middle distillates account for 75% of incremental demand interalia rise in cost of quality.

Refiners need to spend substantial to meet quality.

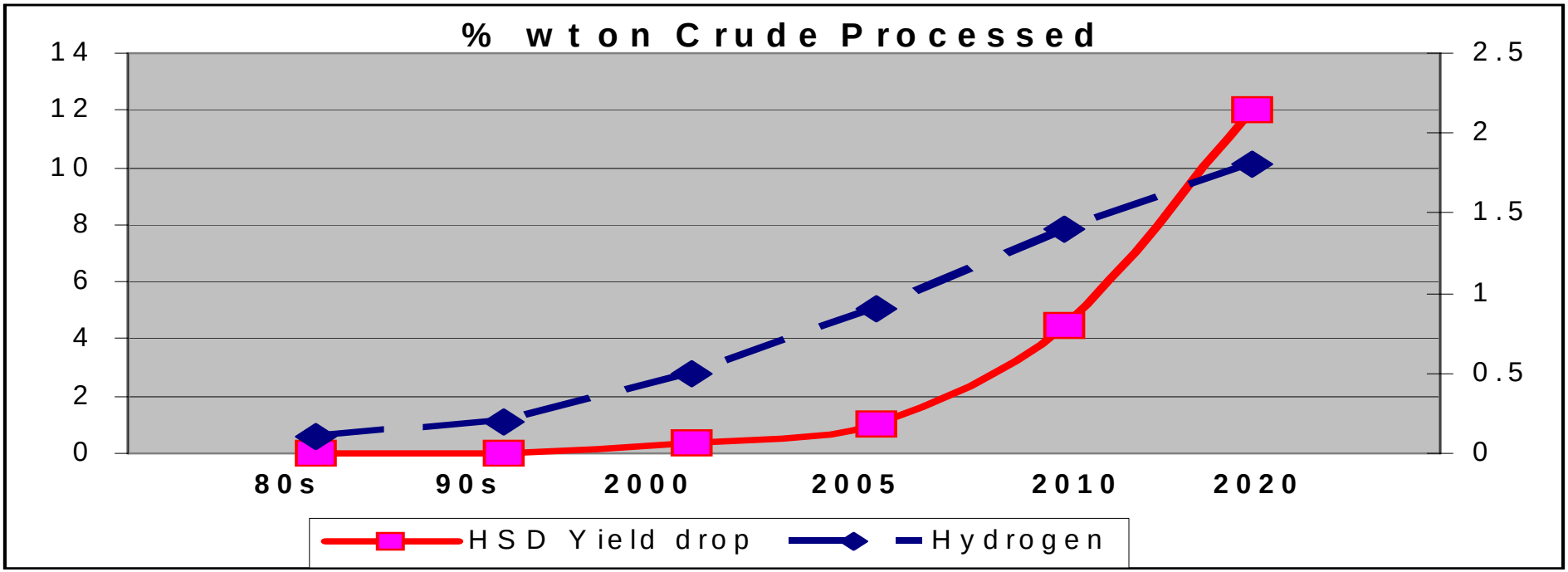
World (India Inclusive) view by 2020



Source: HART'S World Refining and Fuel Services, Dec'05

- Require 22% increase in crude distillation capacity
- **51% increase in conversion capacity**
- **54% increase in desulphurization capacity**

Impact on Indian Refineries



Impact on India

1. **Low Cetane and high density cycle oil and coker diesel to be pulled out …**
2. **Leads to negative refining margin too in 2020 after considering CAPEX.**
3. **Black oil disposal issue.**

Expected loss is $15+billion per year by 2020

Impact on Indian Refineries Contd...

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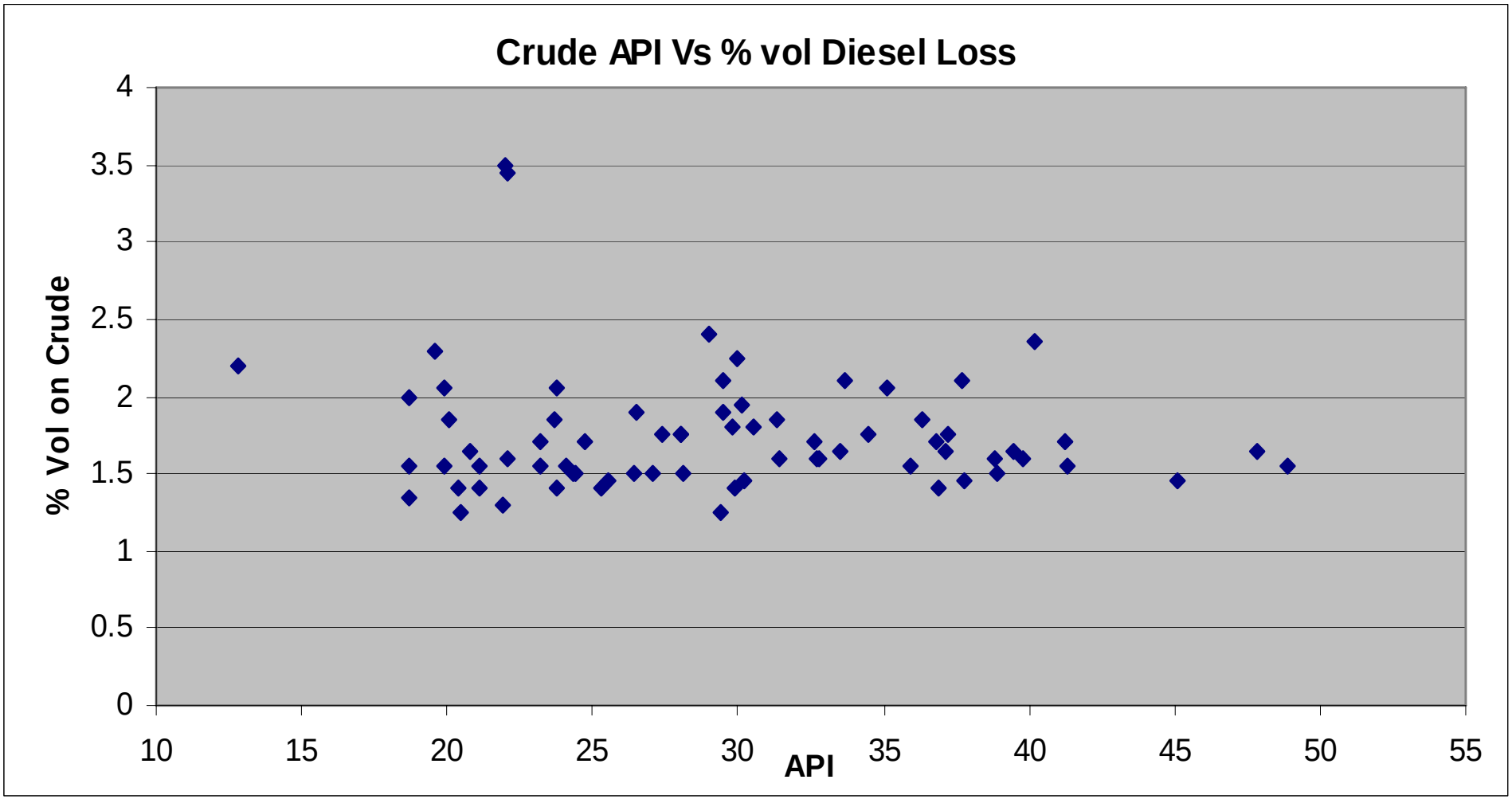

No refinery is spared as loss on diesel make is nearly constant

Is Market ready

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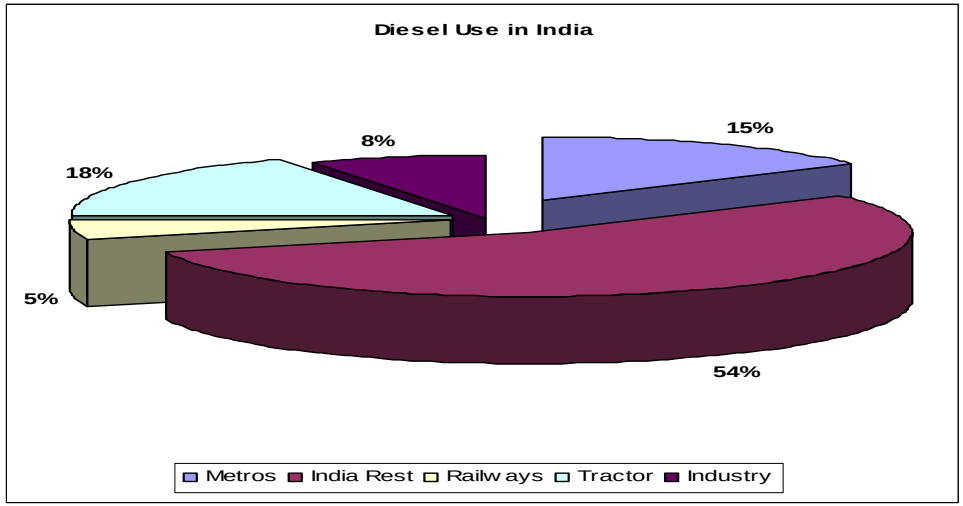
- 15% of market deciding spec for all?

Solution lies in market segmentation



- Kero adulteration – *A sore issue could be checked by "S" test now !*

- Availability of 'right' fuel for mobility across country?

- Emphasis on fuel economy / hybrid vehicles for BAQ !

- Issues still on harmonization of vehicle testing cycles to reflect field reality!

Small acts / big impacts

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Easy to implement & high returns actions

1. Product hygiene
2. In transit quality
3. Centrally recognized and certified SMEs in garages
4. Exclusive Anti Pollution Squad (APS) under NGOs
5. Road worthiness of vehicles once in 3 yrs at least
6. Empower common man to SMS to APS on polluting vehicles
7. 'Right' fuel for right application

Annual cost is hardly $ 20mm while savings will be in $ billion

Small acts / big impacts contd..

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Easy to implement & high returns actions Contd..

1.Product hygiene (To be met at Refinery gate first)

	Attributes	(UOM)	MS	HSD	Remarks
1.	Total Acidity	(mg KOH /gm)	-	0.08	
2.	Particulates	(mg/lt)	20	20	
3.	NACE corrosion	(rating)	B+ min	B+ min	
4.	Total water	(ppm)	200	200	
5.	pH of wash water	-	7.5 max	-	
6.	Biological growth content	mg/lt	-	Zero	Test to be introduced.
7.	Foam vanishing time	(secs)	-	15 max	Test to be introduced.
8.	MeOH content	(ppm)	##	-	## Addition not allowed.
9.	Chloride content	(ppm)	~~	-	~~ Typical spec < 0.5ppm.
10.	Filter plugging tendency	mg/lt	-	1.4	

2. In transit quality

Use Ablock system for all trucks and ensure internals hygiene.

Small acts / big impacts contd..

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Easy to implement & high returns actions Contd..

3. Retain all specifications of Euro II except the following changes in auto fuels viz,
   - "S" of both diesel & gasoline to increase life of tail pipe devices
   - Bz in gasoline
   - Bio-fuels as long as it is derived from non edible sources
4. End users like Tractor, Railways, GTs, Marine, Heating oil, etc. can on low CCAI diesel.
5. Rank garages and introduce a system of rewards
6. Phase out pre Euro II vehicles atleast by 2015

Towards Sustainability

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Time for

Automobile Industries and Oil sector

to focus their activity towards sustainability

to overcome the current global recession