



EMERGING TRENDS IN THE REFINING INDUSTRY AND THEIR IMPACT ON CAPITAL PROJECTS

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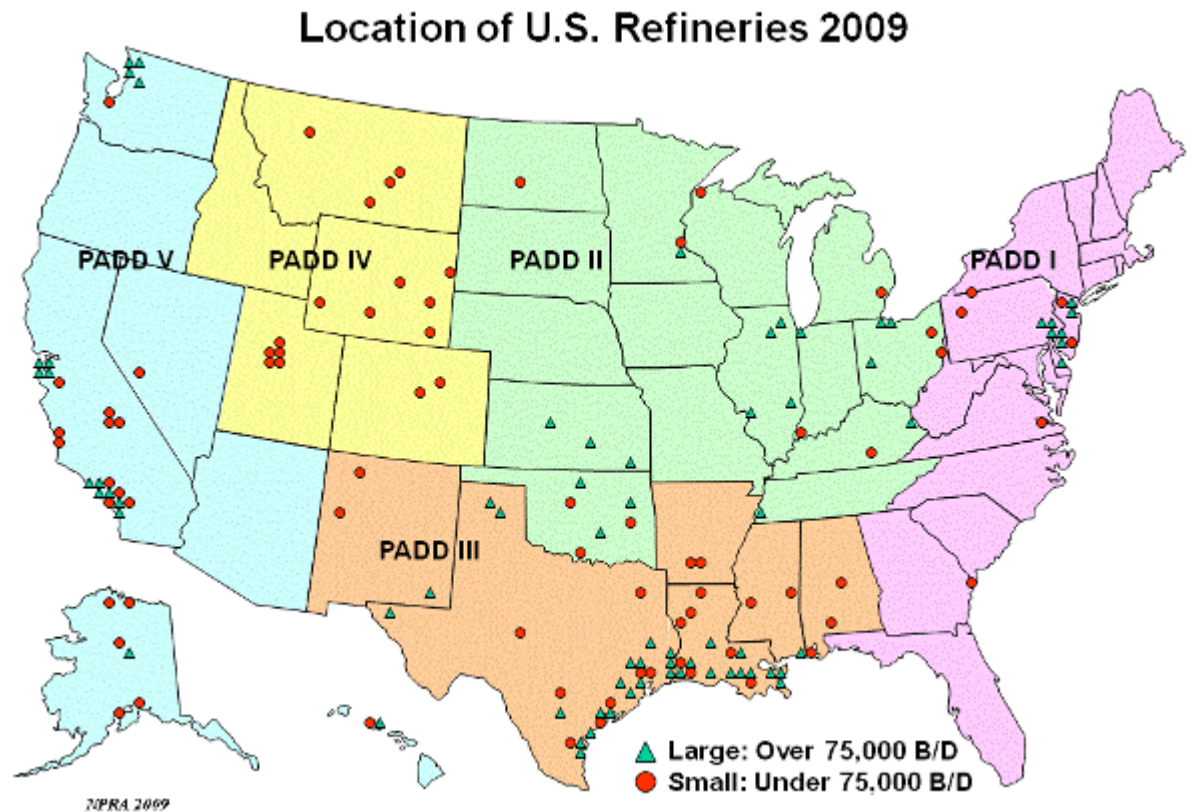
US REFINING OVERVIEW

As of January 1, 2011

- 148 Operable Refineries
- 17.7 million barrels per calendar day capacity

On January 1, 2001

- 153 Operable Refineries
- 16.6 million barrels per calendar day capacity



Source: NPRA website

KEY EMERGING ISSUES IN REFINING

Ø REGULATORY & LEGISLATIVE INITIATIVES

- Ø Green House Gas Emissions

- Ø Biofuels Mandate

Ø OPPORTUNITY CRUDE PROCESSING

Ø INTEGRATED MAJORS – DECOUPLING OF REFINING

REGULATORY AND LEGISLATIVE INITIATIVES

2010 – 2011 LEGISLATIVE AND REGULATORY ISSUES POTENTIALLY IMPACTING THE US REFINING INDUSTRY

- E15 Partial Waiver
- **Green House Gases**
 - Prevention of Significant Deterioration
 - Tailoring Rule
 - Stationary Source Regulations / NSPS**
 - New Source Performance Standards
 - Cap and Trade
- § Low Carbon Fuel Standard
- § NAAQS (ozone regulation)
- § Oil Spill Liability Trust Fund Tax
- **Reformulated Fuel Standard (RFS2)**
- Flex Permitting
- TSCA Reform
- Boiler MACT
- CFATS / IST
- Keystone Pipeline
- Personal Surety Program

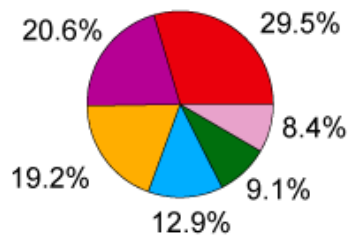
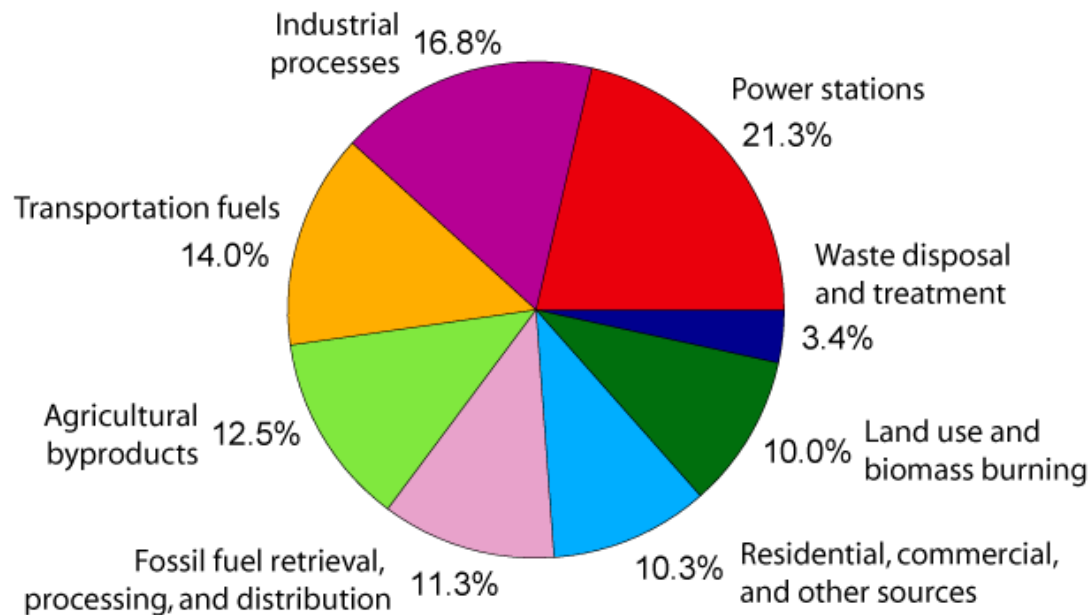
GREEN HOUSE GAS REGULATION

Background

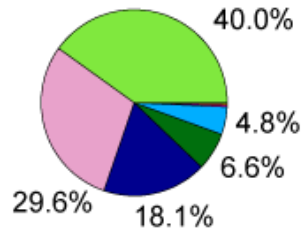
- q US Supreme Court ruled in *Massachusetts vs. EPA* that the EPA can regulate Green House Gases (GHG's) under the existing Clean Air Act (CAA)
- q EPA has started to propose regulation of GHG's under existing CAA programs such as Vehicle Emissions standards rule, Prevention of Significant Deterioration, and New Source Performance Standards
- q Under these regulations, permits will be required for projects that emit threshold levels of CO₂ (regardless of emissions of other criteria pollutants such as SO_x, NO_x, etc.

GREEN HOUSE GAS SOURCES

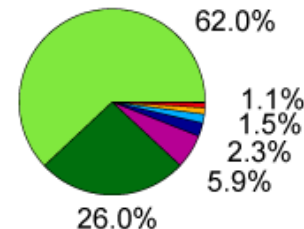
Annual Greenhouse Gas Emissions by Sector



Carbon Dioxide
(72% of total)



Methane
(18% of total)



Nitrous Oxide
(9% of total)

Source - Wikipedia

IMPLICATIONS

- Significantly more permits will be required for refinery modifications
- Require installation of BACT (Best Available Control Technology) for managing CO₂ emissions. BACT to be determined on case-by-case basis.
- EPA is currently working on approach for refinery GHG measures:
 - Energy management
 - Command and control (source specific emission limits)
 - BenchmarkingIn any case, greater focus on energy reduction projects will likely be required.

BIOFUELS

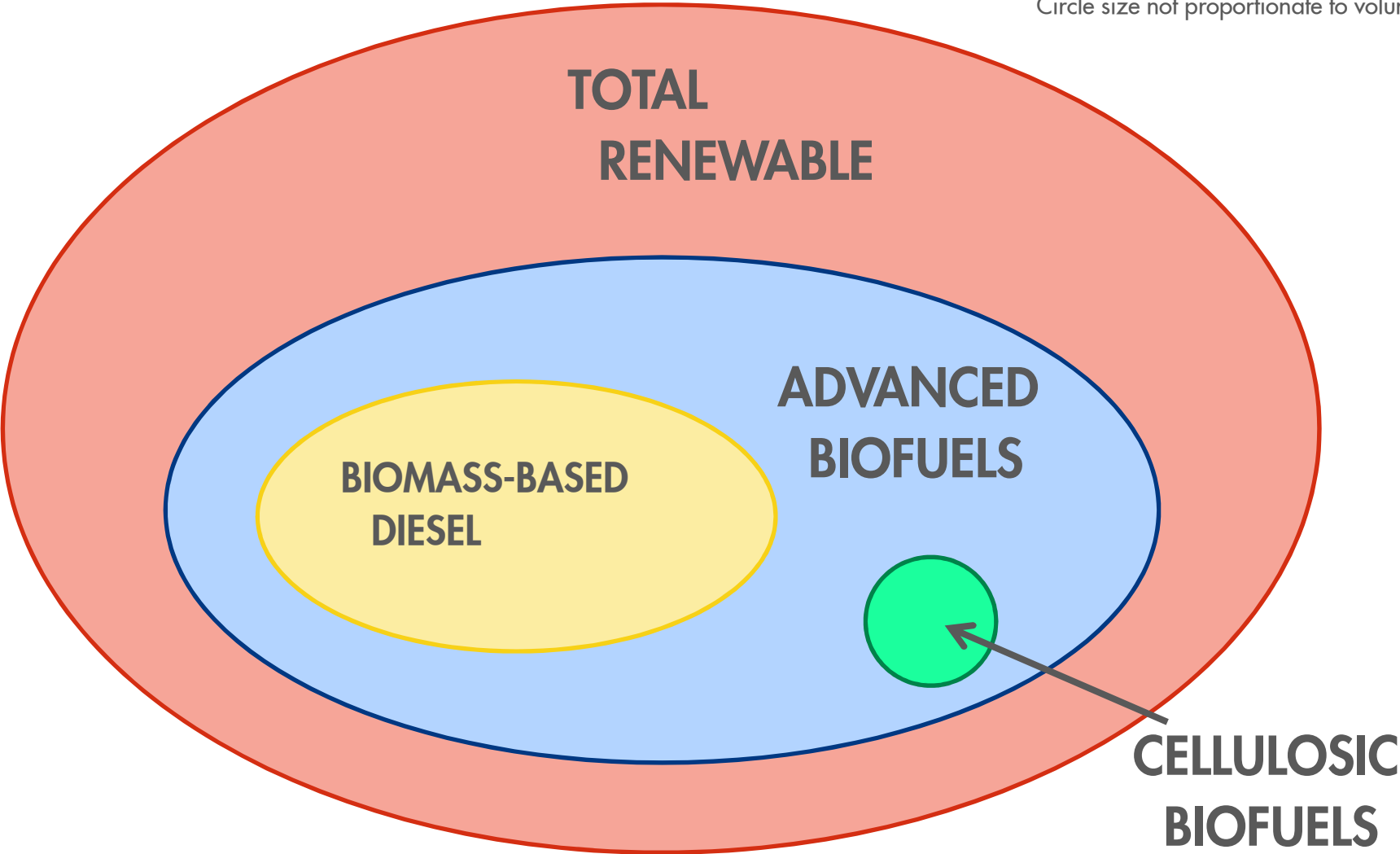
Background

q RFS program was created under the Energy Policy Act of 2005. Established first renewable fuel mandate – 7.5 billion gallons by 2012

q RFS program expanded in 2007 under the Energy Independence and Security act (RFS2). Key changes: included diesel, established new categories of renewable fuel and mandates for each, and increased volumes of renewable fuel (9 billion gallons in 2008 to 36 billion gallons by 2022)

NESTED BIOFUELS CONCEPT

Circle size not proportionate to volume



RFS2 YEARLY BIOFUELS REQUIREMENTS (IN BGY)

YEAR	Total Advanced Biofuels			Total Renewables
	Cellulosic Biofuels	Biomass-Based Biofuels		
2007				4.7 (4.02%)
2008				9.0 (7.76%)
2009		.50	.6	11.1 (10.21%)
2010	.0065	.65	.95	12.95 (8.25%)
2011	.006	.80	1.35	13.95 (8.01%)
2012	.50	1.00	2.00	15.20 (est 9.31%)
2013	1.00	1.00	2.75	16.55 (est 10.09%)
2014	1.75	1.00	3.75	18.15 (est 11.05%)
2015	3.00	1.00	5.50	20.50 (est 12.48%)
2016	4.25	1.00	7.25	22.25 (est 13.49%)
2017	5.50	1.00	9.00	24.00 (est 13.49%)
2018	7.00	1.00	11.00	26.00 (est 14.56%)
2019	8.50	1.00	13.00	28.00 (est 17.11%)
2020	10.50	1.00	15.00	30.00 (est 18.50%)
2021	13.50	1.00	18.00	33.00 (est 20.54%)
2022	16.00	1.00	21.00	36.00 (est 22.65%)

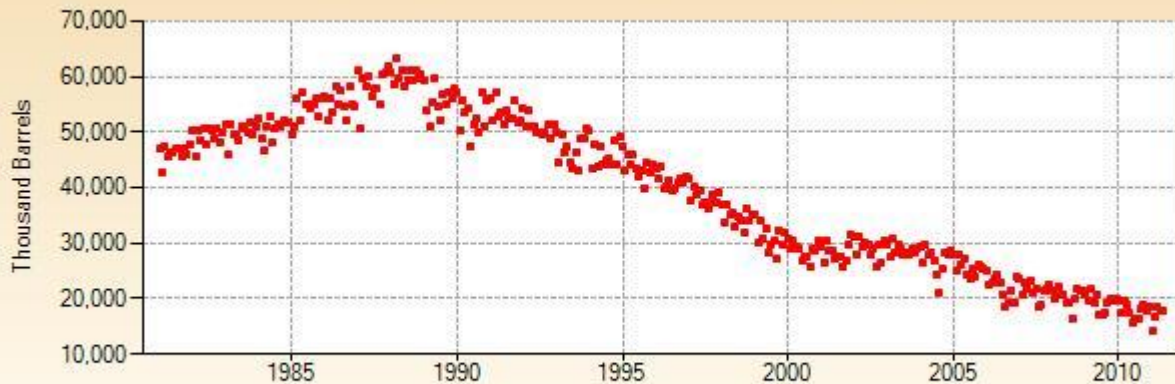
IMPLICATIONS

- Growth in biofuels exceeds overall growth in transportation fuels – increased pressure on refining
- Significant expansion in facilities required to manufacture, store, transport, and blend biofuels
- Impact of increasing biofuels volumes will result in changes to mix of fuel blending components – refinery configuration and/or new technologies

OPPORTUNITY CRUDE PROCESSING

CRUDE OIL PRODUCTION TRENDS

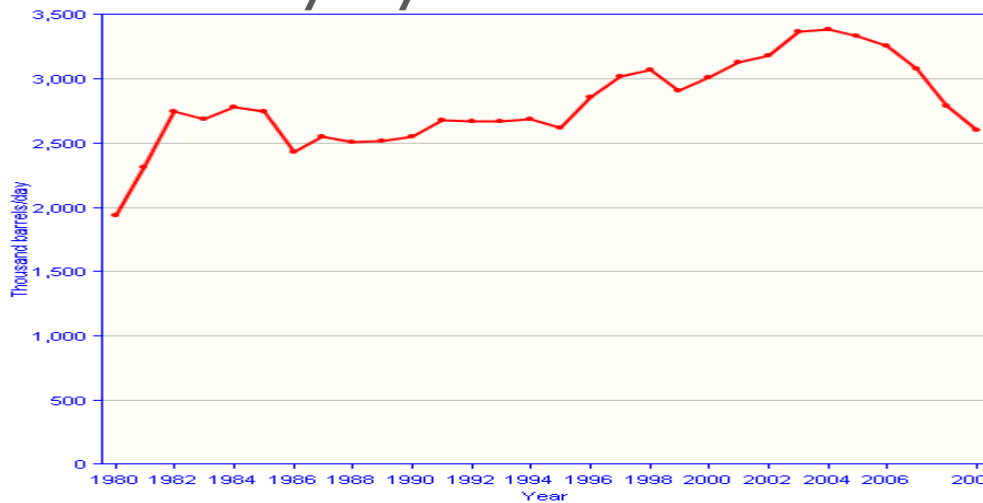
Monthly Alaska North Slope Crude Oil Production



Source: U.S. Energy Information Administration

Production of key "base" crudes is declining at a significant rate.

Monthly Maya Crude Oil Production



■ Crude Oil Production

OPPORTUNITY CRUDES KEY CHARACTERISTICS

	API	Total Acid Number (TAN)	Sulfur (%)	Total N2 (ppm)	Pitch Vanadium (ppm)	Pitch Nickel (ppm)
Alaska North Slope	31	0.23	0.9	1725	32	93
Crude 1	31	0.49	1.5	1268	35	45
Crude 2	31	0.56	2.6	1551	250	92
Crude 3	19	0.34	2.1	4678	241	135
Crude 4	20	0.12	3.9	1114	180	49
Crude 5	22	0.97	3.7	3164	348	141

IMPLICATIONS

- Refiners will increasingly rely on “opportunity crudes” as production rates of “base crudes” continue to decline.
- Most refiners will have to “metal up” to accommodate increasing amounts of these crudes – not just in crude distillation units but throughout refinery.
- Technology / facilities to monitor “real time” corrosion rates will be a focus in coming years

INTEGRATED MAJORS – DECOUPLING OF REFINING

REFINING CAPACITY CHANGES FOR INTEGRATED MAJORS

Company	Peak Refining Capacity (mbpd)	Peak Year	2009 Refining Capacity (mbpd)	Percentage Change
Exxonmobil	6,666	1999	6,232	- 6.5%
Royal Dutch Shell	4,387	2003	3,639	- 17.1%
ConocoPhillips	2,831	2006	2,657	- 6.1%
BP	3,111	2002	2,666	- 14.3%
Total	2,708	2005	2,594	- 4.2%
Chevron	2,400	2001	2,158	- 10.1%

RECENT DOWNSTREAM DIVESTMENTS

The Marathon Oil Corporation announced plans on Thursday to spin off its downstream business, creating two independent businesses.

"The substantial improvement in the global business and financial environments over the last two years has created the conditions under which we believe it is now appropriate to move forward with the formation of two strong independent energy companies," Clarence P. Cazalot Jr., the president and chief executive, said in a statement. "Marathon has a long history of adapting to changing market and business conditions, and at this point in our almost 125 year history there is a compelling strategic rationale for this transformation."

Consistent with ConocoPhillips' previously stated strategies and focus on value creation for its shareholders, ConocoPhillips' board of directors has approved pursuing the separation of the company's Refining & Marketing and Exploration & Production businesses into two stand-alone, publicly traded corporations via a tax-free spin of the refining and marketing business to ConocoPhillips shareholders.

"Consistent with our strategy to create industry-leading shareholder value, we have concluded that two independent companies focused on their respective industries will be better positioned to pursue their individually focused business strategies," said Jim Mulva, chairman and chief executive officer. "Both companies will continue to benefit from the size and scale of their significant high-quality asset bases and free cash flow generation, allowing them to invest and create shareholder value in a changing environment."

IMPLICATIONS

- Integrated majors continuing to exit refining business – some through divestment of refining assets and some through spinning off of Downstream business as a separate corporate entity. Result is that refinery ownership is moving away from integrated majors towards non-integrated companies.
- To remain viable, refining businesses will need to be able to generate sufficient cash to provide an adequate return to their owners. Since capital expenditures are a significant part of the “cash equation”, these expenditures will come under increasing pressure.
- In addition, focus of capital expenditures will be more weighted toward projects that have a monetary return.

SUMMARY

- ∅ The Refining business is facing key challenges on several fronts – regulatory, legislative, and economic.
- ∅ Refiners will increasingly be facing these challenges in world where they will have to “stand own their own two feet” from a cash perspective.
- ∅ Projects for refiners will become more complex, need to be planned further in advance, and as lean as possible to be viable
- ∅ Continued partnership (albeit in perhaps a different way) will be the key to success for both refiners and engineering / construction firms

Q & A

