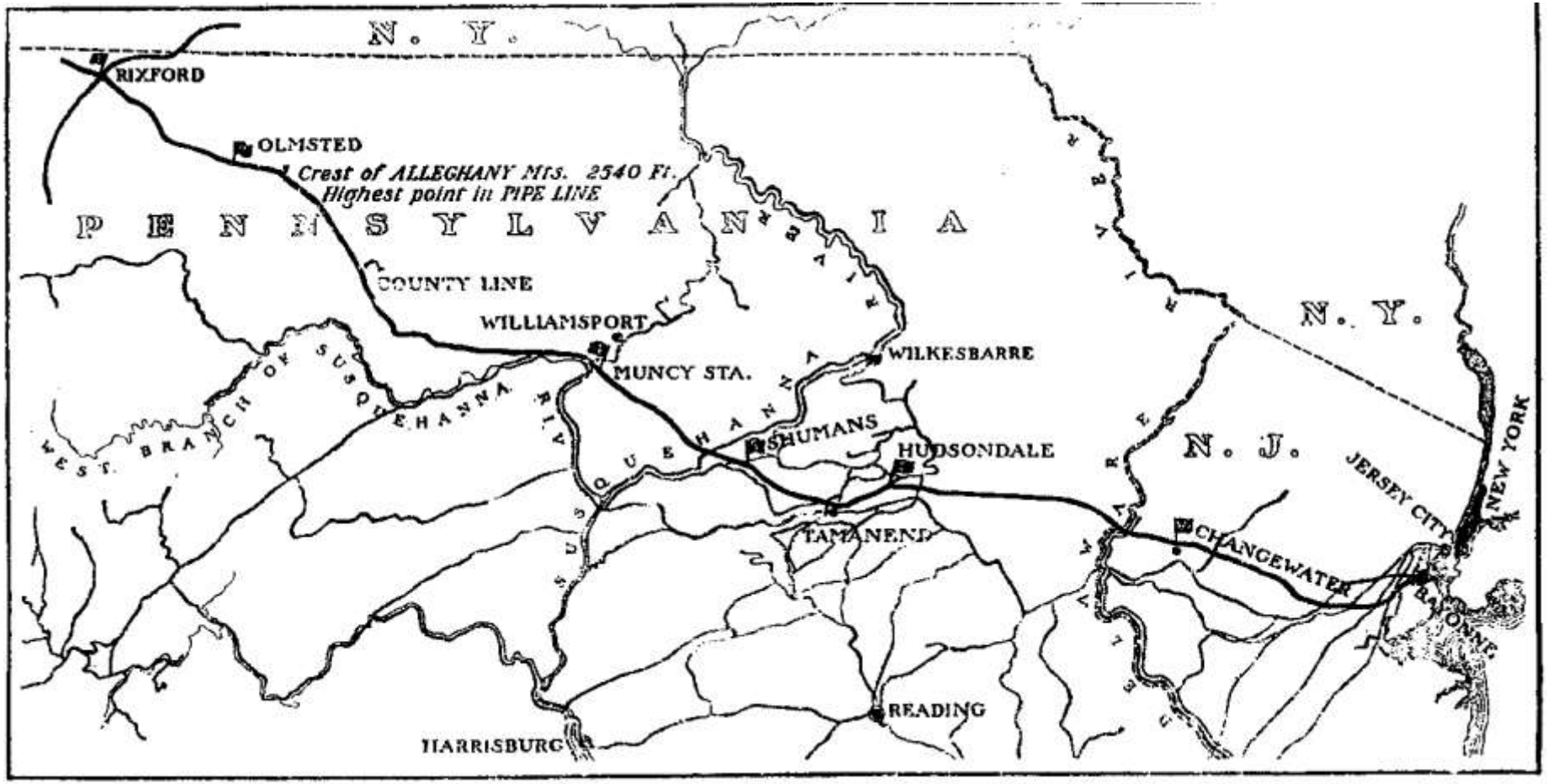
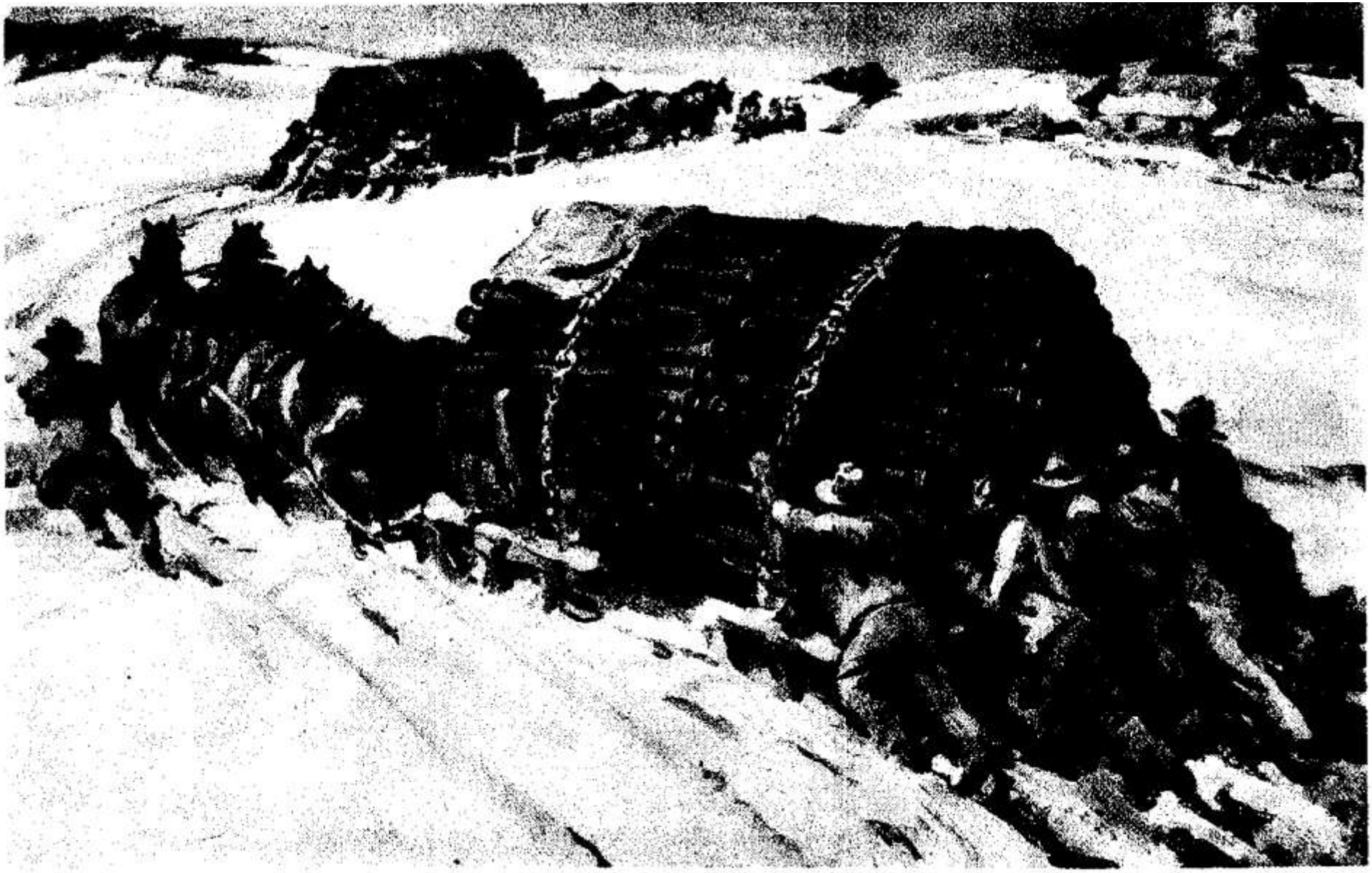
America's Oil and Natural Gas Industry

Energizing America:
Facts for Addressing Energy Policy

THE FIRST OIL WELL.

Tidewater Oil Pipeline





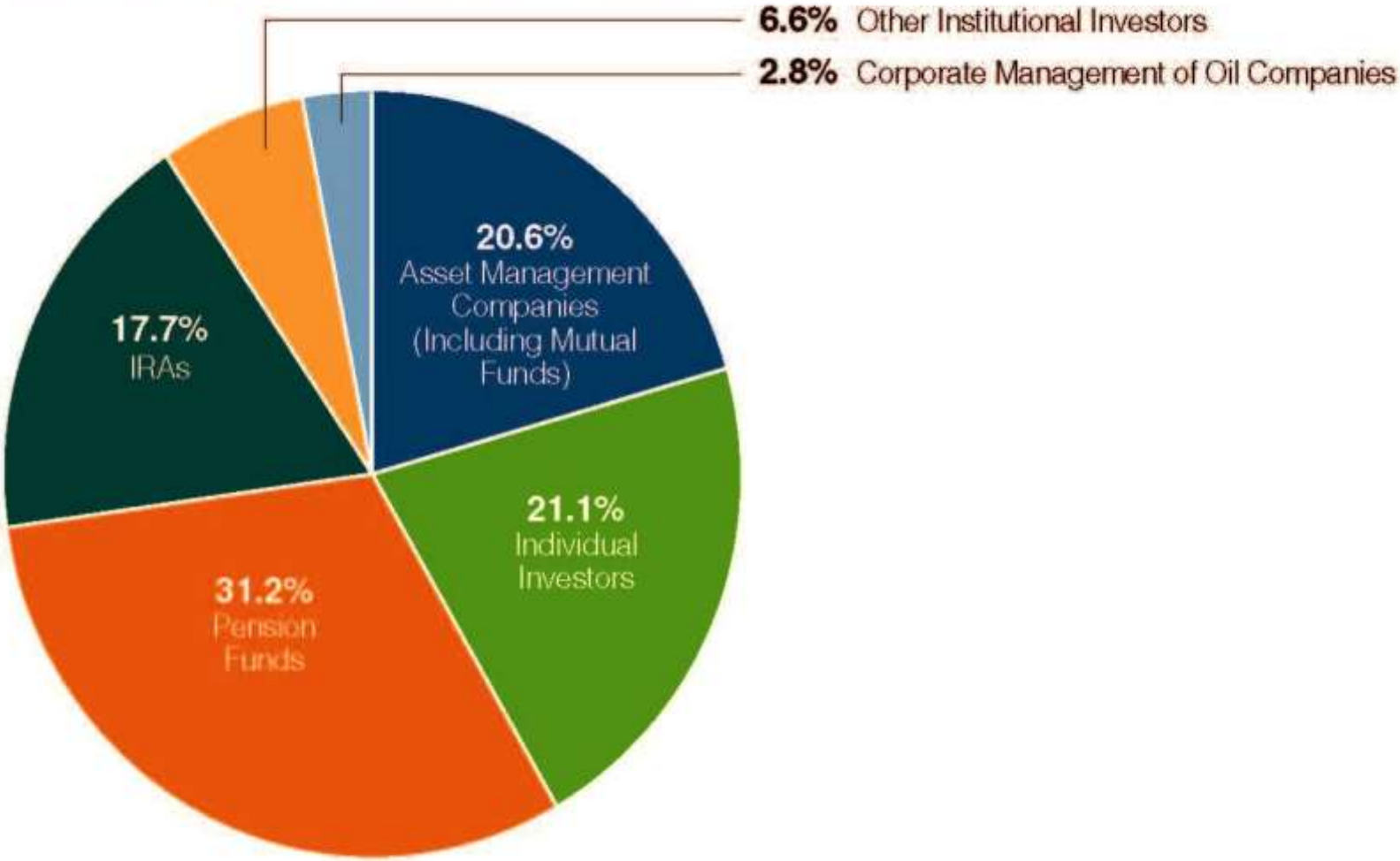
Sledging the Pipe for "Benson's Folly"

Table 2.– Total Operational and Capital Investment Impact of the Oil and Natural Gas Industry to the US Economy, 2011

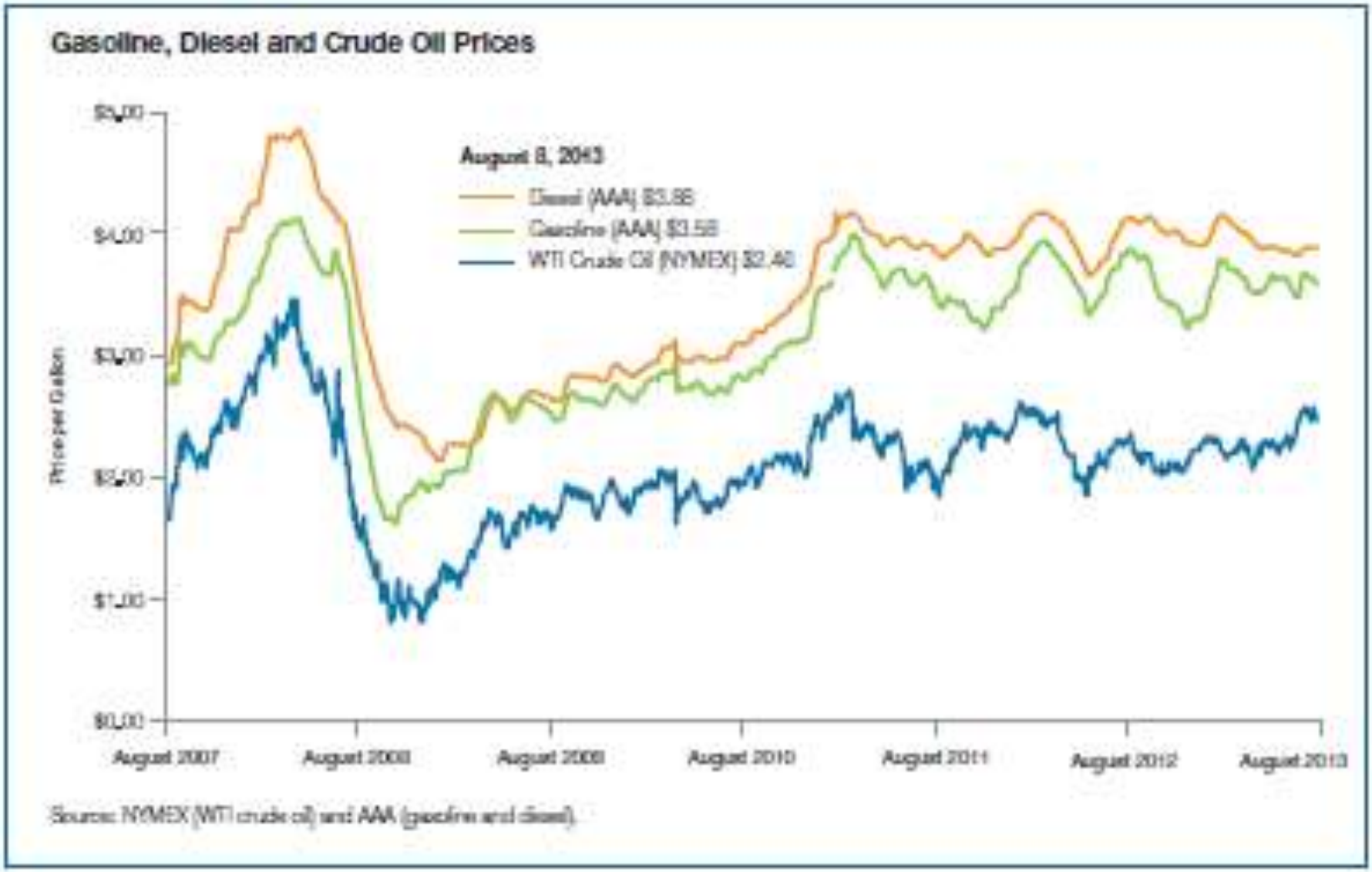
Item	Amount	Percent of US Total
Operational Impact		
Employment*	8,445,200	4.9%
Labor Income ($ millions)**	$515,368	5.4%
Value Added ($ millions)	$1,073,552	7.1%
Capital Investment Impact		
Employment*	1,388,100	0.7%
Labor Income ($ millions)**	$82,247	0.9%
Value Added ($ millions)	$135,837	0.9%
Total Impacts		
Employment*	9,833,200	5.6%
Labor Income ($ millions)**	$597,615	6.3%
Value Added ($ millions)	$1,209,389	8.0%

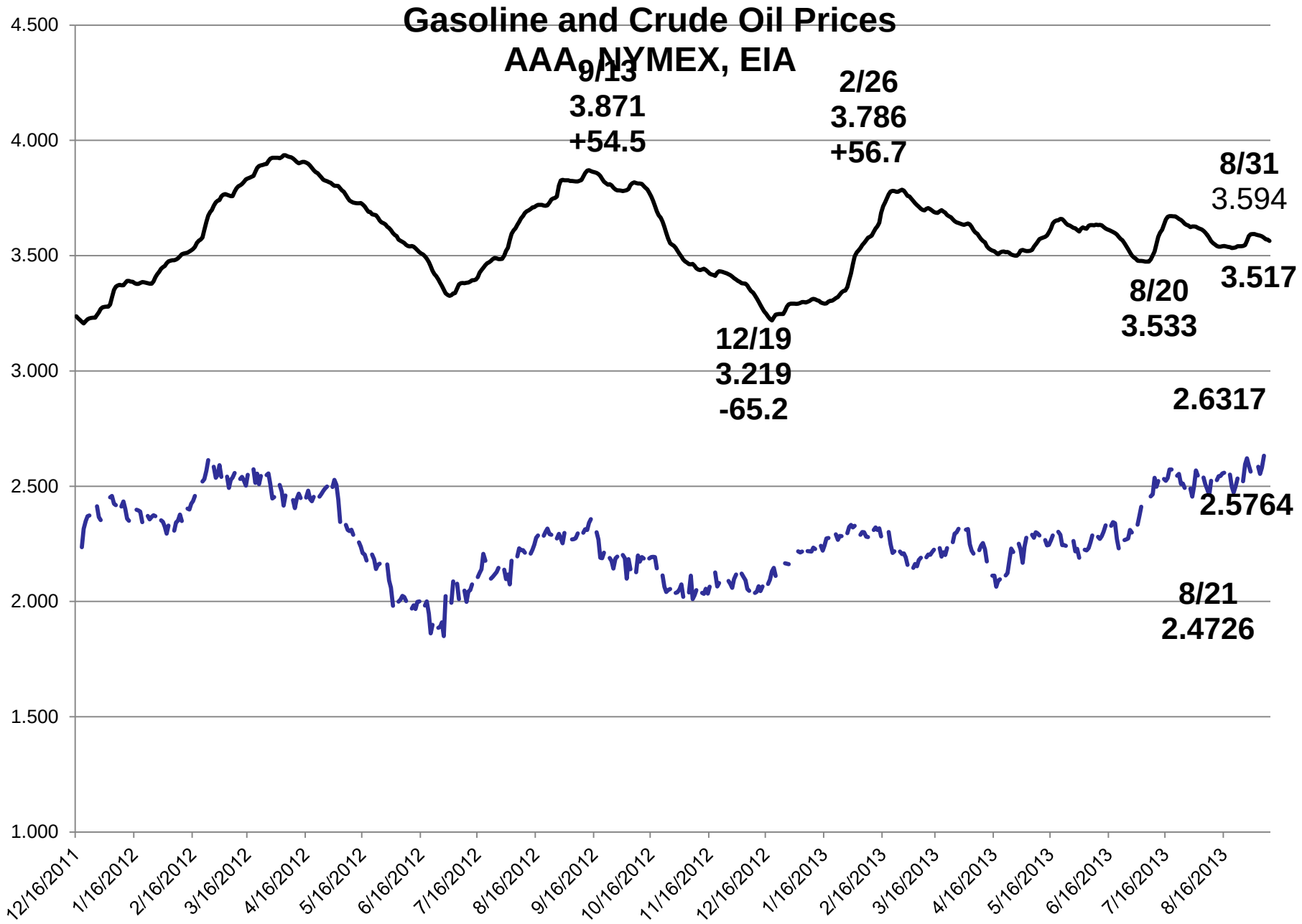
Source: PwC calculations using the IMPLAN modeling system (2011 database).
Details may not add to totals due to rounding.
* Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.
** Labor income is defined as wages and salaries and benefits as well as proprietors' income.

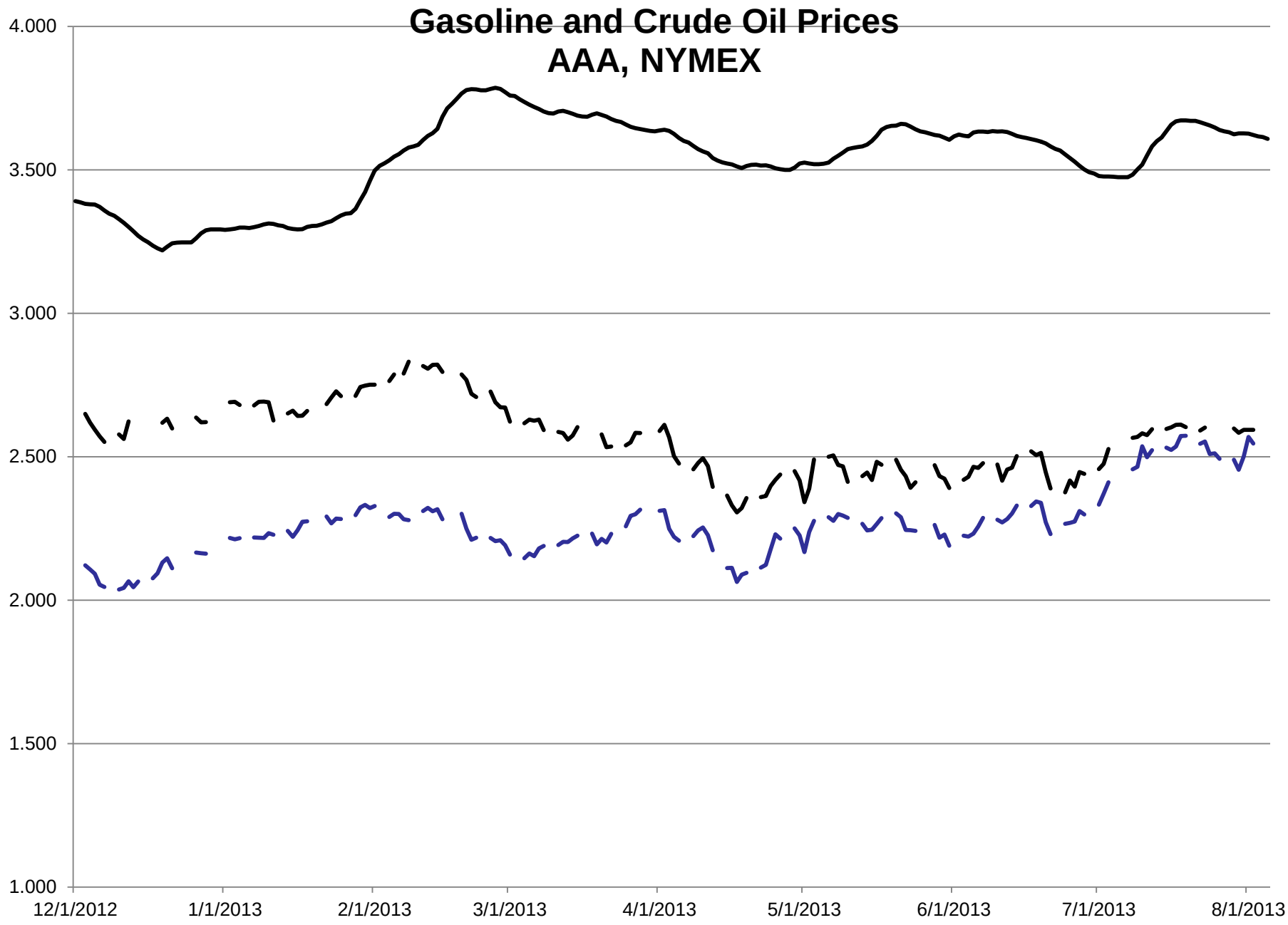
Who Owns "Big Oil?" (Holdings of Oil Stocks, 2011)

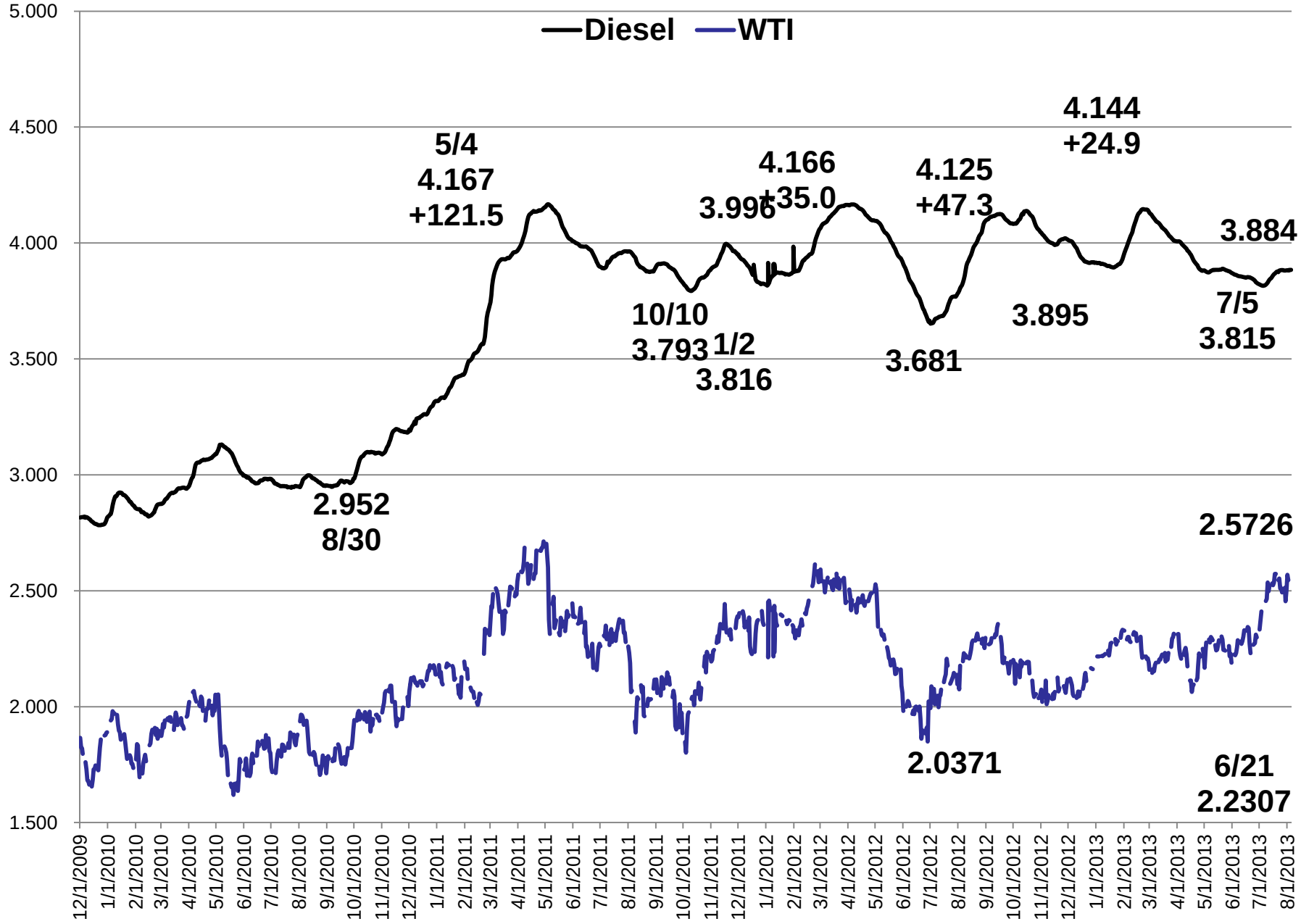


Source: *Who Owns America's Oil and Natural Gas Companies*, SONECON, October 2011.


Gasoline, Diesel and Crude Oil Prices
August 8, 2013
Diesel (AAA) $3.86
Gasoline (AAA) $3.58
WTI Crude Oil (NYMEX) $2.40
Price per Gallon
$5.00
$4.00
$3.00
$2.00
$1.00
$0.00
August 2007
August 2008
August 2009
August 2010
August 2011
August 2012
August 2013
Source: NYMEX (WTI crude oil) and AAA (gasoline and diesel).


Gasoline and Crude Oil Prices
AAA, NYMEX, EIA
9/13
3.871
+54.5
2/26
3.786
+56.7
8/31
3.594
3.517
8/20
3.533
12/19
3.219
-65.2
2.6317
2.5764
8/21
2.4726
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
12/16/2011
1/16/2012
2/16/2012
3/16/2012
4/16/2012
5/16/2012
6/16/2012
7/16/2012
8/16/2012
9/16/2012
10/16/2012
11/16/2012
12/16/2012
1/16/2013
2/16/2013
3/16/2013
4/16/2013
5/16/2013
6/16/2013
7/16/2013
8/16/2013

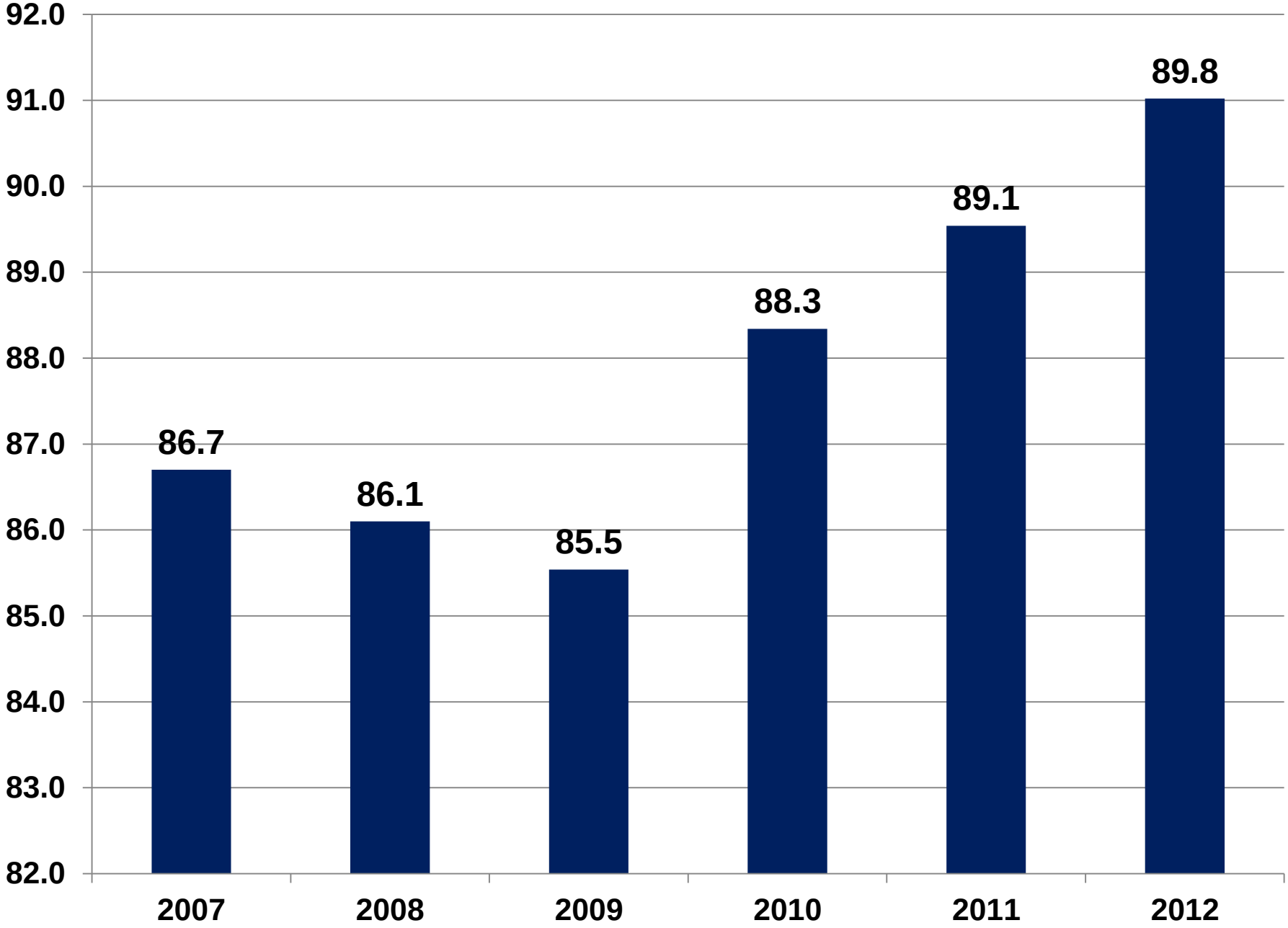

Gasoline and Crude Oil Prices
AAA, NYMEX
4.000
3.500
3.000
2.500
2.000
1.500
1.000
12/1/2012
1/1/2013
2/1/2013
3/1/2013
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013

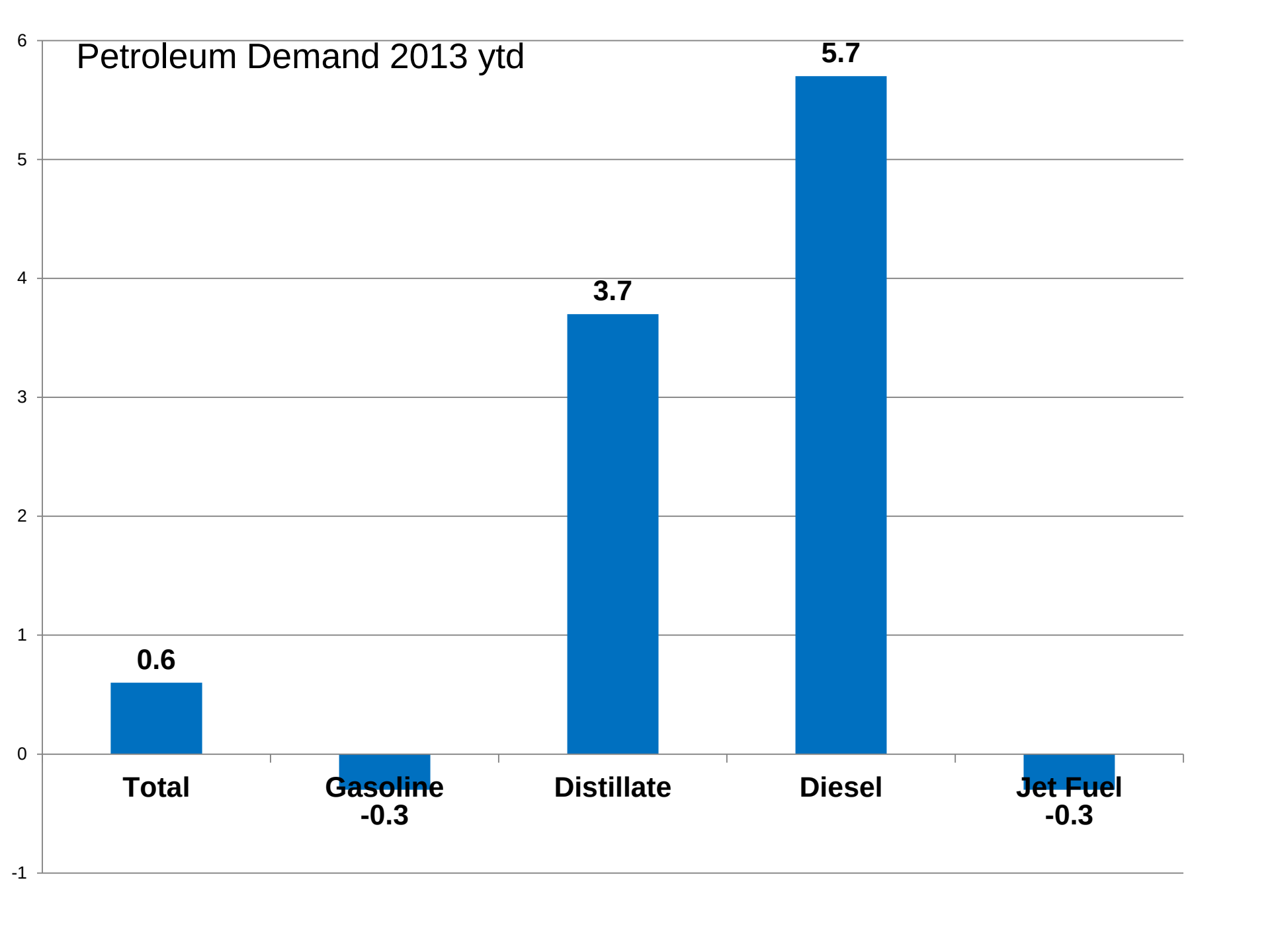

Diesel
WTI
5.000
4.500
4.000
3.500
3.000
2.500
2.000
1.500
5/4
4.167
+121.5
2.952
8/30
10/10
3.793
3.996
1/2
3.816
4.166
+35.0
4.125
+47.3
3.681
4.144
+24.9
3.895
3.884
7/5
3.815
2.5726
2.0371
6/21
2.2307
12/1/2009
1/1/2010
2/1/2010
3/1/2010
4/1/2010
5/1/2010
6/1/2010
7/1/2010
8/1/2010
9/1/2010
10/1/2010
11/1/2010
12/1/2010
1/1/2011
2/1/2011
3/1/2011
4/1/2011
5/1/2011
6/1/2011
7/1/2011
8/1/2011
9/1/2011
10/1/2011
11/1/2011
12/1/2011
1/1/2012
2/1/2012
3/1/2012
4/1/2012
5/1/2012
6/1/2012
7/1/2012
8/1/2012
9/1/2012
10/1/2012
11/1/2012
12/1/2012
1/1/2013
2/1/2013
3/1/2013
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013

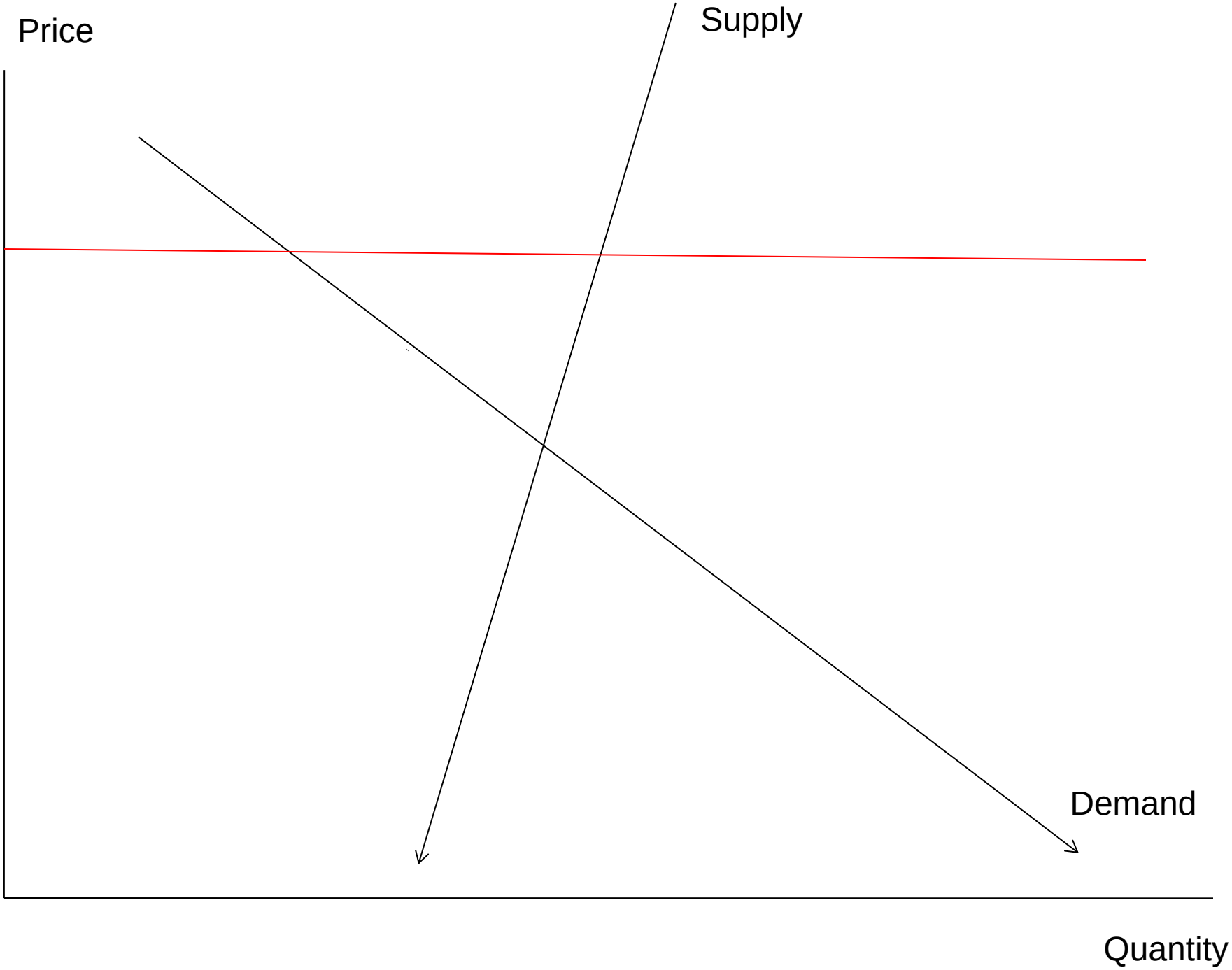
Oil prices relate to many uncertain factors

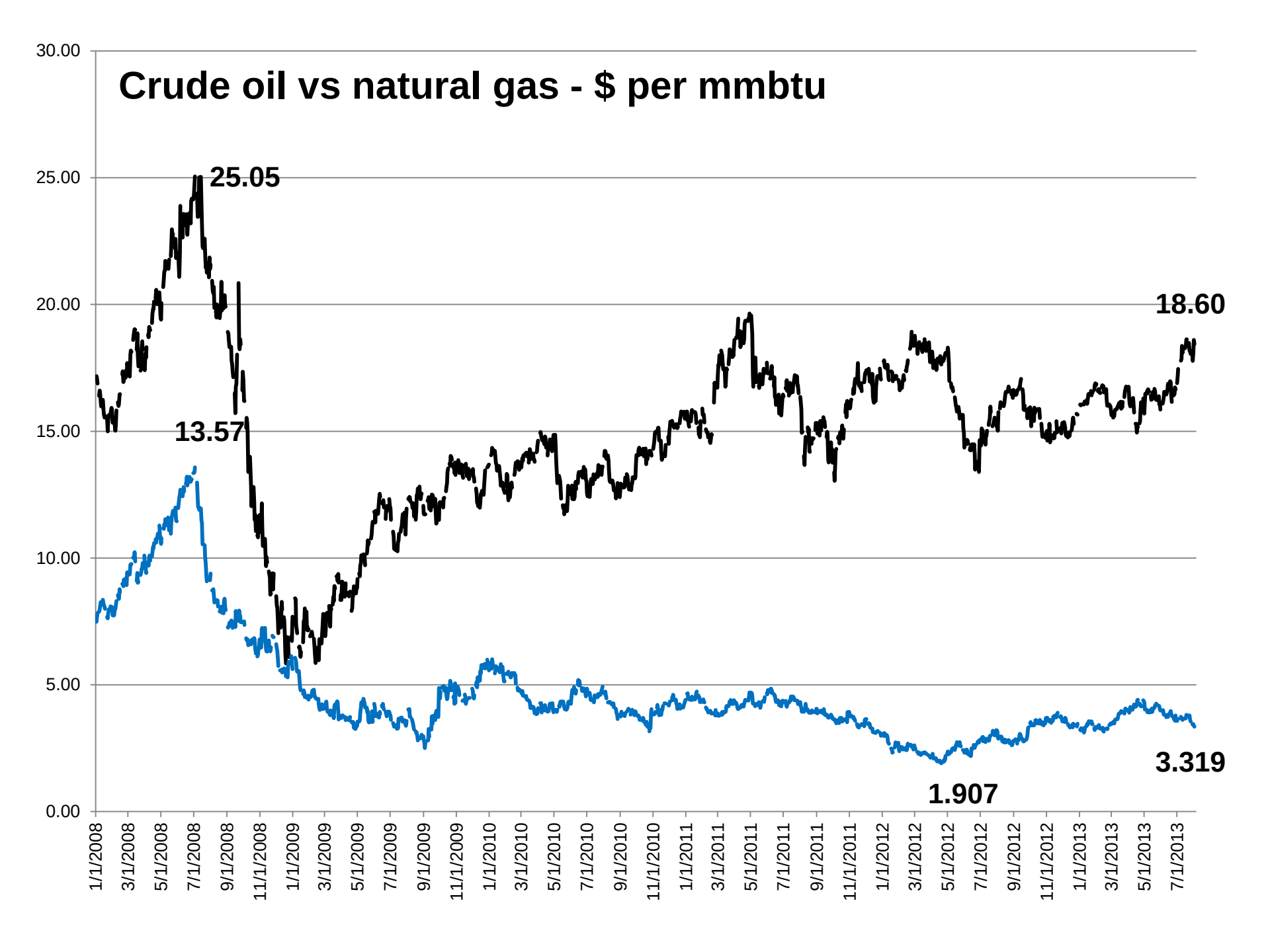
U.S. Energy Information Administration

World Oil Demand - IEA




Petroleum Demand 2013 ytd
6
5
4
3
2
1
0
-1
0.6
-0.3
3.7
5.7
-0.3
Total
Gasoline
Distillate
Diesel
Jet Fuel


Price
Supply
Demand
Quantity


Crude oil vs natural gas - $ per mmbtu
30.00
25.00
20.00
15.00
10.00
5.00
0.00
25.05
13.57
18.60
3.319
1.907
1/1/2008
3/1/2008
5/1/2008
7/1/2008
9/1/2008
11/1/2008
1/1/2009
3/1/2009
5/1/2009
7/1/2009
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
9/1/2011
11/1/2011
1/1/2012
3/1/2012
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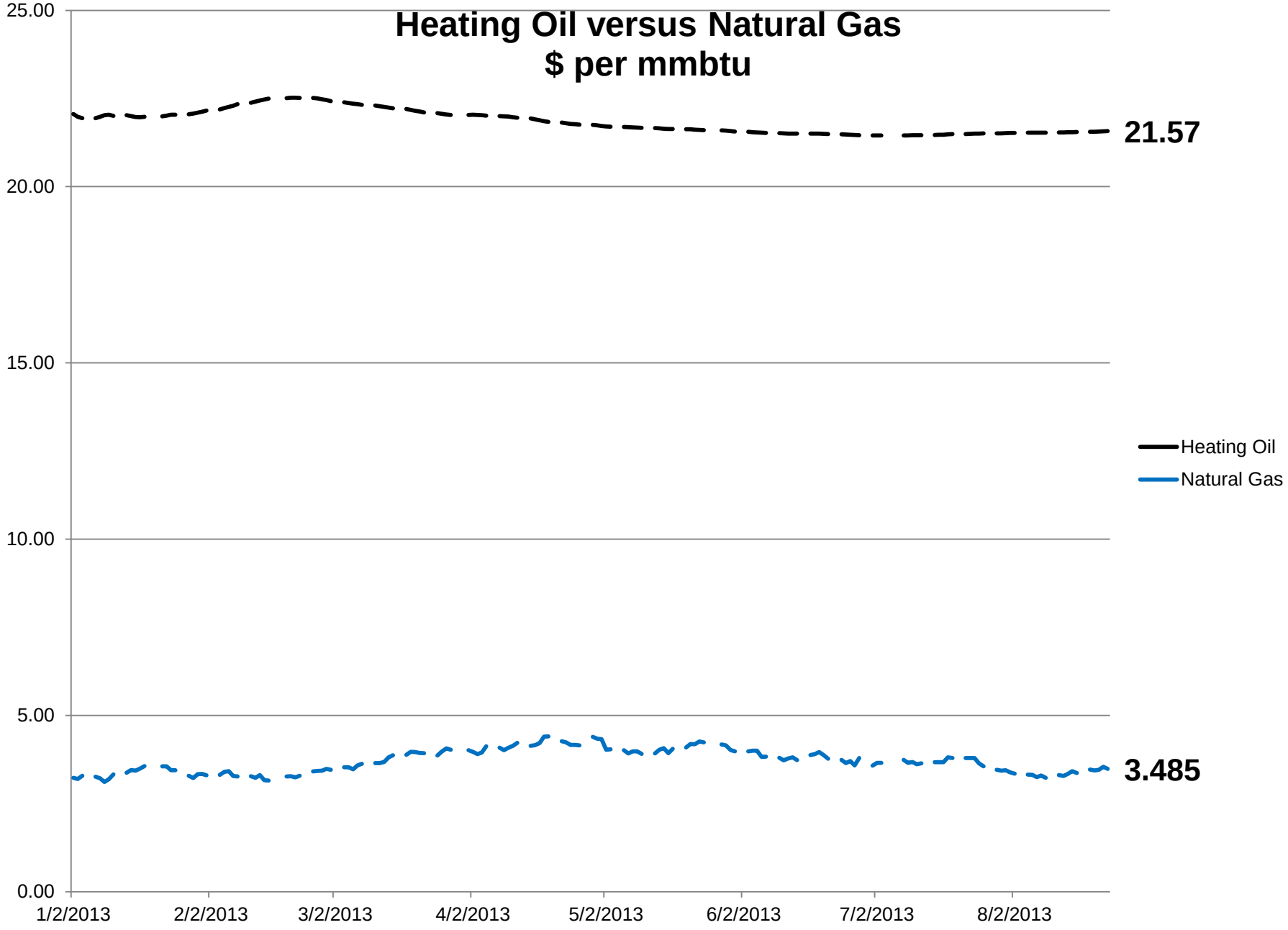
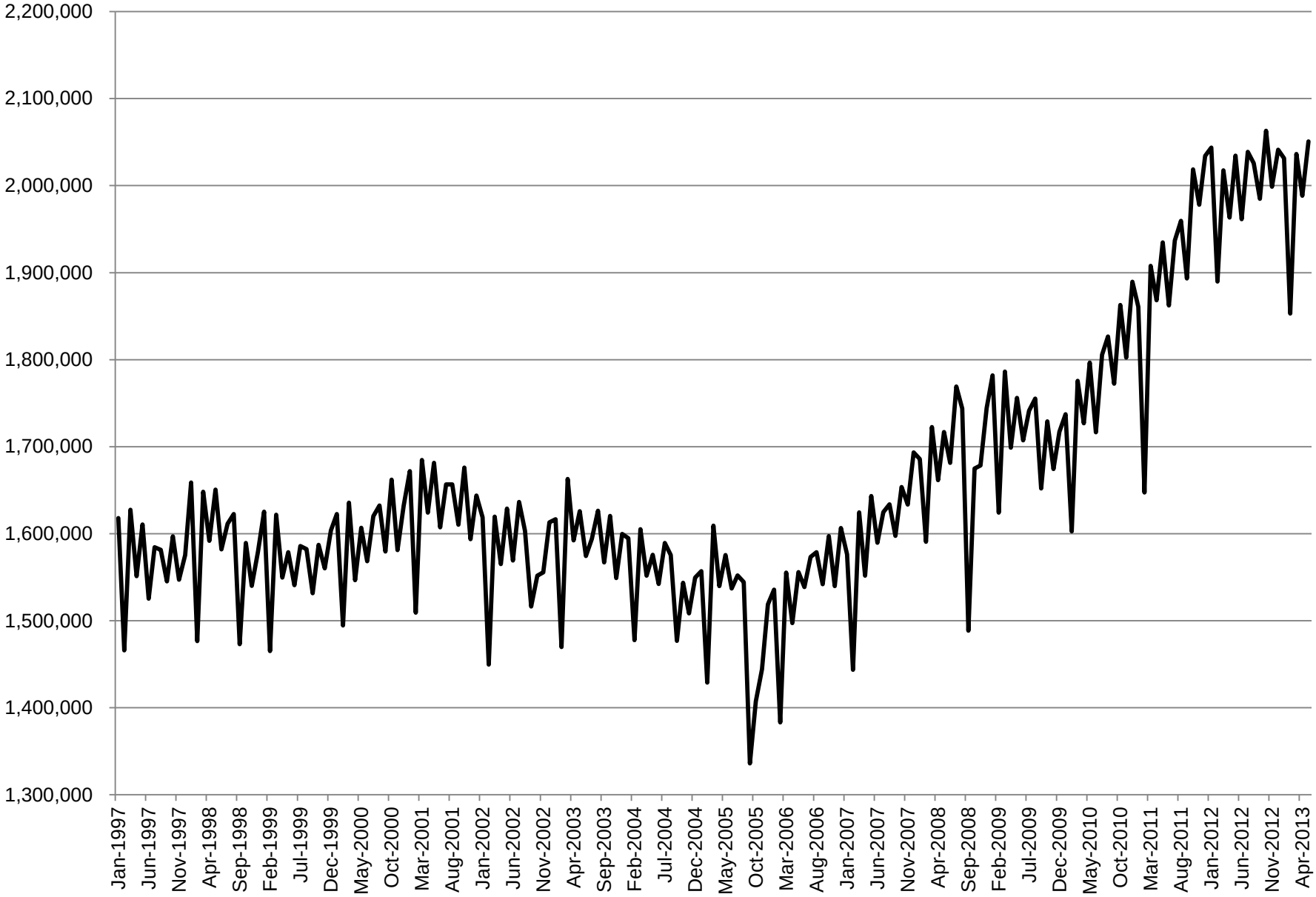
7/1/2012
9/1/2012
11/1/2012
1/1/2013
3/1/2013
5/1/2013
7/1/2013


Heating Oil versus Natural Gas
$ per mmbtu
25.00
20.00
15.00
10.00
5.00
0.00
1/2/2013
2/2/2013
3/2/2013
4/2/2013
5/2/2013
6/2/2013
7/2/2013
8/2/2013
21.57
3.485
Heating Oil
Natural Gas

Natural Gas Production Monthly MMcf



Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI.
Updated: May 9, 2011

Table 1. INTEK estimates of undeveloped technically recoverable shale gas and shale oil resources remaining in discovered shale plays as of January 1, 2009

Onshore Lower-48 Oil and Gas Supply Submodule region	Shale play	Shale gas resources (trillion cubic feet)	Shale oil resources (billion barrels)
Northeast	Marcellus	410	--
	Antrim	20	--
	Devonian Low Thermal Maturity	14	--
	New Albany	11	--
	Greater Sittstone	8	--
	Big Sandy	7	--
	Cincinnati Arch*	1	--
Subtotal		472	--
Percent of total		63%	--
	Haynesville	75	--
	Eagle Ford	21	3
	Floyd-Neal & Conasauga	4	--
Subtotal		100	3
Percent of total		13%	14%
Mid-Continent	Fayetteville	32	--
	Woodford	22	--
	Cana Woodford	6	--
Subtotal		60	--
Percent of total		8%	--

Table 1. INTEK estimates of undeveloped technically recoverable shale gas and shale oil resources remaining in discovered shale plays as of January 1, 2009

Southwest	Barnett	43	--
	Barnett-Woodford	32	--
	Avalon & Bone Springs	--	2
Subtotal		76	2
Percent of total		10%	7%
Rocky Mountain	Mancos	21	--
	Lewis	12	--
	Williston-Shallow Niobraran*	7	--
	Hilliard-Baxter-Mancos	4	--
	Bakken	--	4
Subtotal		43	4
Percent of total		6%	15%
West Coast	Monterey/Santos	--	15
Subtotal		--	15
Percent of total		--	64%
Total onshore Lower-48 States		750	24

America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy – IHS Key Findings

• More than $5.1 trillion in capital expenditures will take place between 2012 and 2035 across unconventional oil and natural gas activity, of which:

• Over $2.1 trillion in capital expenditures will take place between 2012 and 2035 in unconventional oil activity.

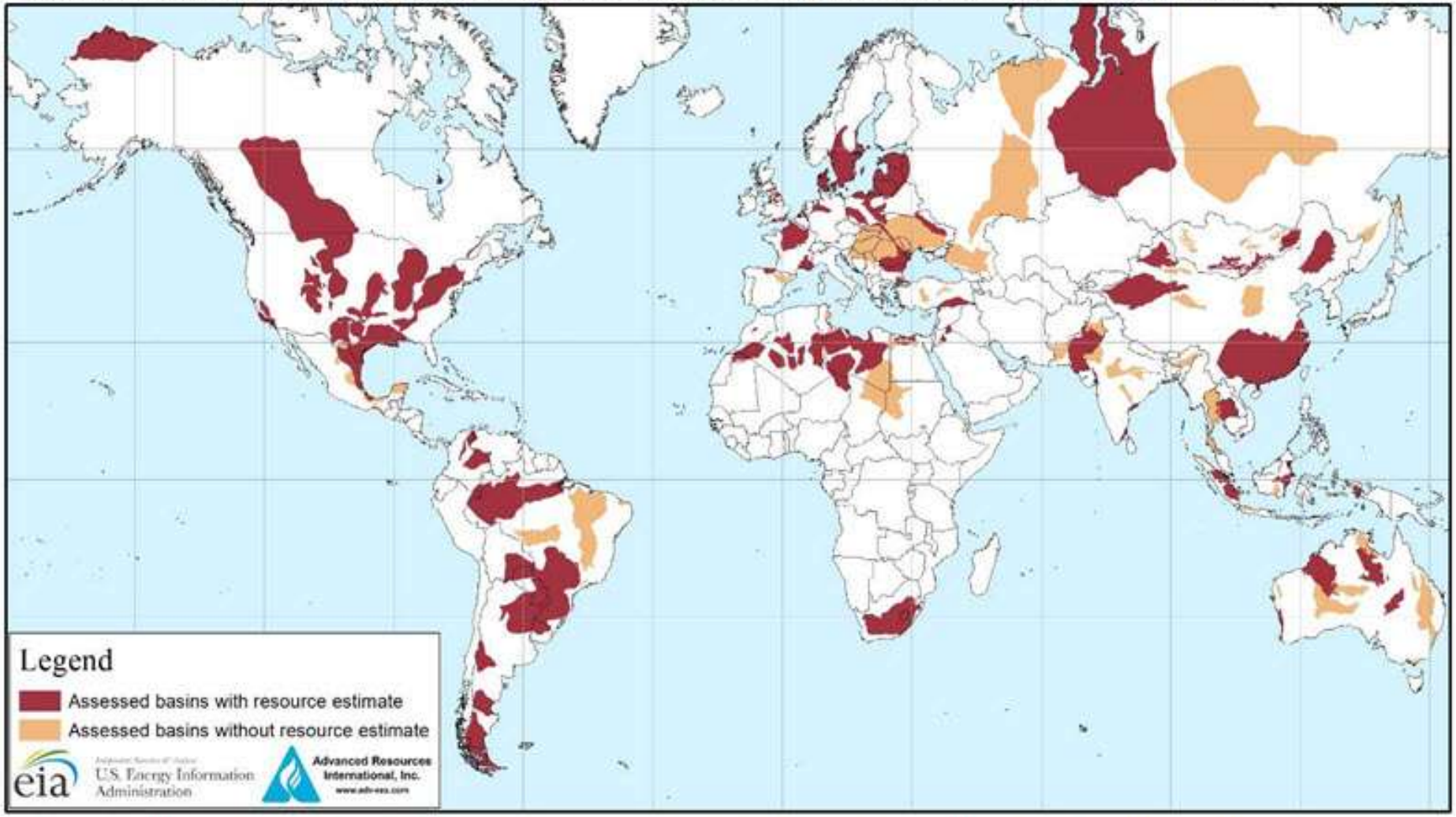
• Close to $3.0 trillion in capital expenditures will take place between 2012 and 2035 in unconventional natural gas activity.

• Employment attributed to upstream unconventional oil and natural gas activity will support more than 1.7 million jobs in 2012, growing to some 2.5 million jobs in 2015, 3 million jobs in 2020, and 3.5 million jobs in 2035.

• On average, direct employment will represent about 20% of all jobs resulting from unconventional oil and natural gas activity with the balance contributed by indirect and induced employment.

• In 2012, unconventional oil and natural gas activity will contribute nearly $62 billion in federal, state and local tax receipts. By 2020, total government revenues will grow to just over $111 billion. On a cumulative basis, unconventional oil and natural gas activity will generate more than $2.5 trillion in tax revenues between 2012 and 2035.

Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013



Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

Offshore Undiscovered Technically Recoverable Federal Oil (Bbl) and Natural Gas (Tcf) Resources

Source: Minerals Management Service and Department of the Interior.

Table 2. Technically recoverable shale oil and shale gas unproved resources in the context of total world resources (assessment dates shown in footnotes)

	Crude oil (billion barrels)	Wet natural gas (trillion cubic feet)
Outside the United States		
Shale oil and shale gas unproved resources	287	6,634
Other proved reserves[1]	1,617	6,521
Other unproved resources[2]	1,230	7,296
Total	**3,134**	**20,451**
Increase in total resources due to inclusion of shale oil and shale gas	**10%**	**48%**
Shale as a percent of total	**9%**	**32%**
United States		
EIA shale / tight oil and shale gas proved reserves[3,4]	n/a	97
EIA shale / tight oil and shale gas unproved resources[5]	58	567
EIA other proved reserves[6]	25	220
EIA other unproved resources[5]	139	1,546
Total	**223**	**2,431**
Increase in total resources due to inclusion of shale oil and shale gas	**35%**	**38%**
Shale as a percent of total	**26%**	**27%**
Total World		
Shale / tight oil and shale gas proved reserves	n/a	97
Shale / tight oil and shale gas unproved resources	345	7,201
Other proved reserves	1,642	6,741
Other unproved resources	1,370	8,842
Total	**3,357**	**22,882**
Increase in total resources due to inclusion of shale oil and shale gas	**11%**	**47%**
Shale as a percent of total	**10%**	**32%**

Gentlemen, we can rebuild him. **We have the technology**.


NO
FRACKIN'
WAY!
STATEWIDE
BAN
www.GoodMain.org
TEMPORARY
MY CHILD'S
FUTURE
STATEWIDE
BAN
STATEWIDE
BAN
DO NO
FRAC

DAILY NEWS NYDailyNews.com

All Yoko Ono and Sean Lennon were saying in Albany yesterday is don't give fracking a chance.

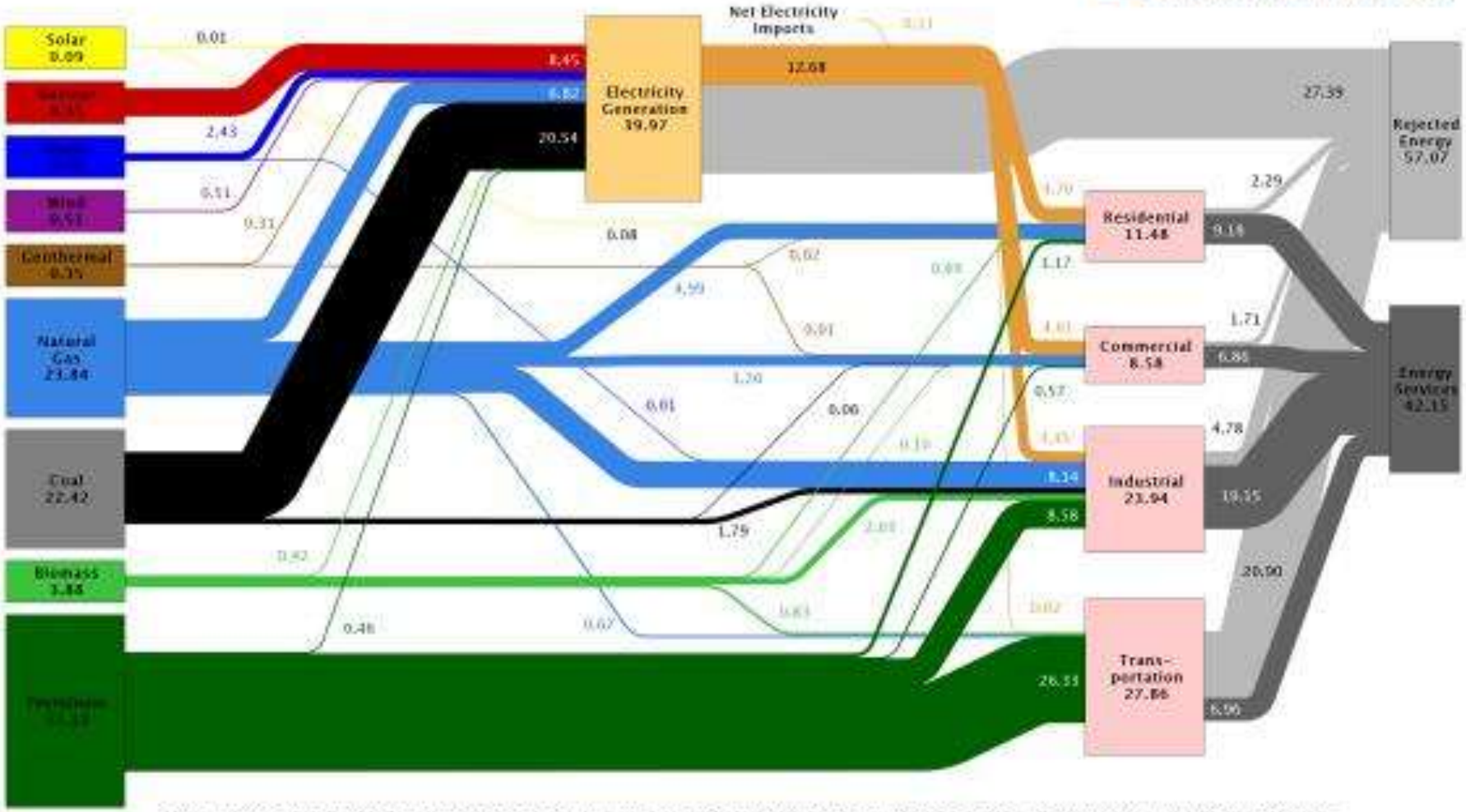
AP

Fracking kills world – Yoko


MY LAND
MY GAS
MY LAND
MY GAS
NOT

Estimated U.S. Energy Use in 2008: ~99.2 Quads

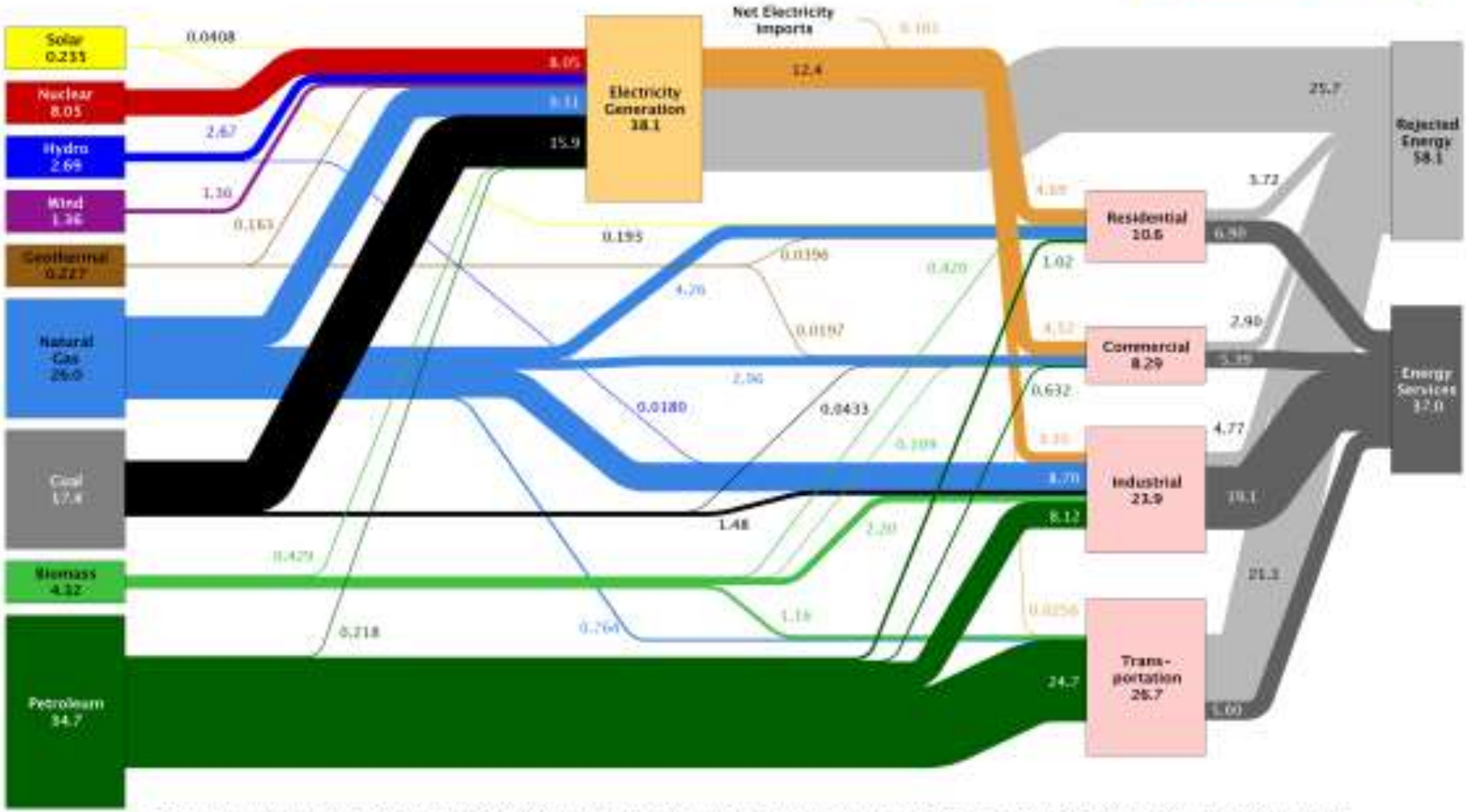
Lawrence Livermore National Laboratory



Source: LLNL 2009. Data is based on DOE/EIA-0384(2008), June 2009. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports flows for non-thermal resources (i.e., hydro, wind and solar) in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 80% for the residential, commercial and industrial sectors, and as 25% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

Estimated U.S. Energy Use in 2012: ~95.1 Quads

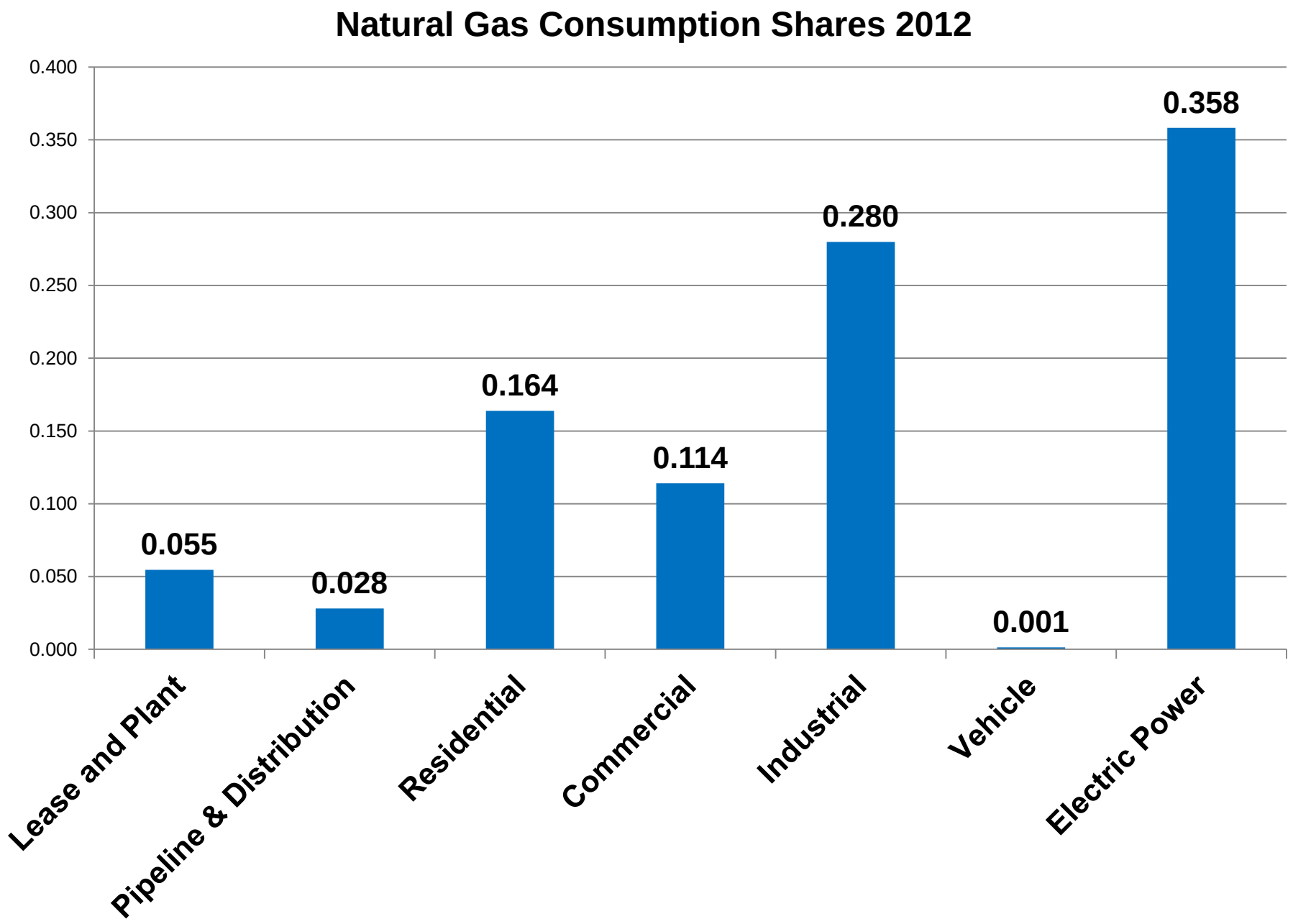
Lawrence Livermore National Laboratory

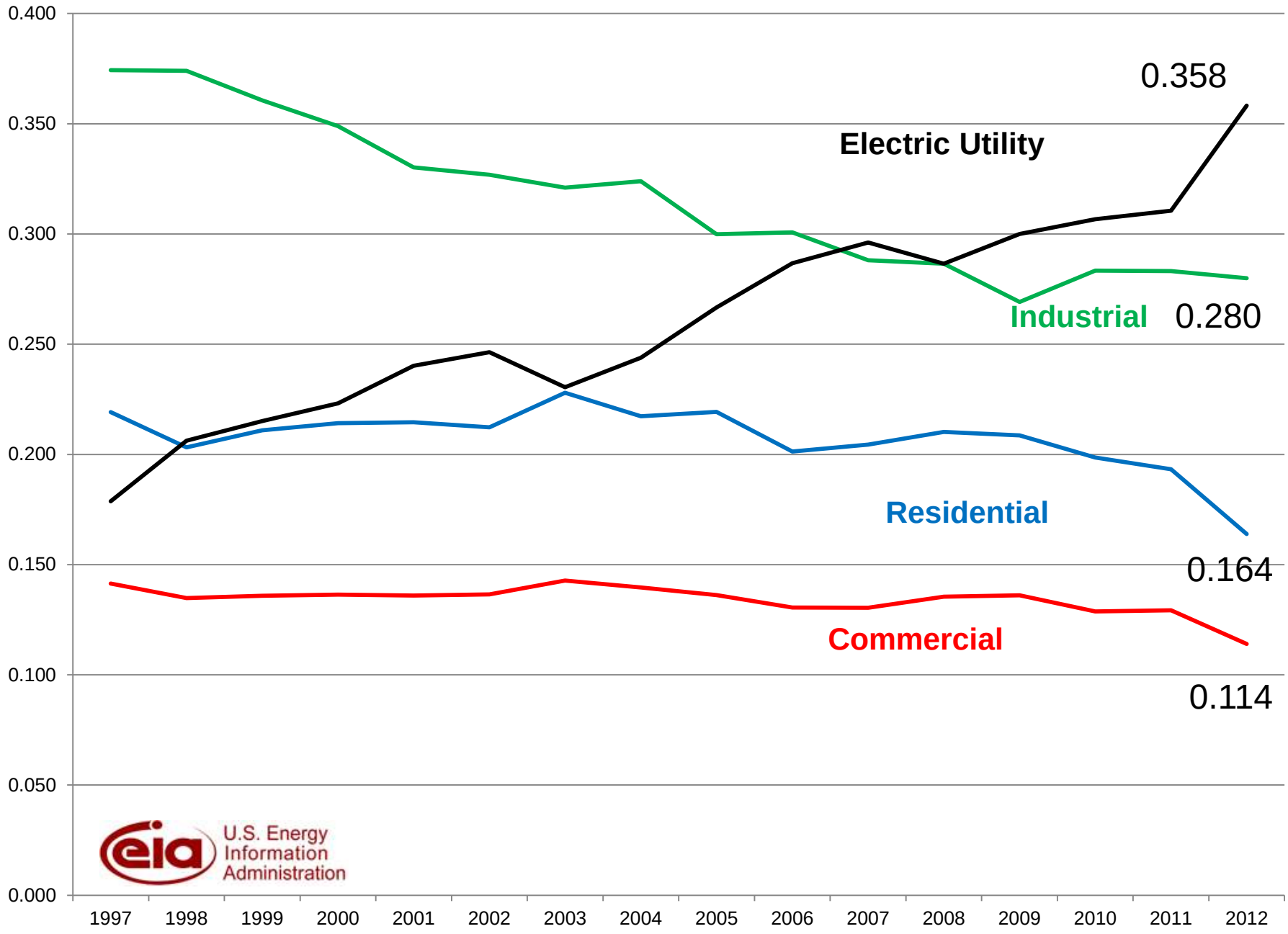


Source: LLNL 2013. Data is based on DOE/EIA-0035(2013-05), May, 2013. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential and commercial sectors 80% for the industrial sector, and 21% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

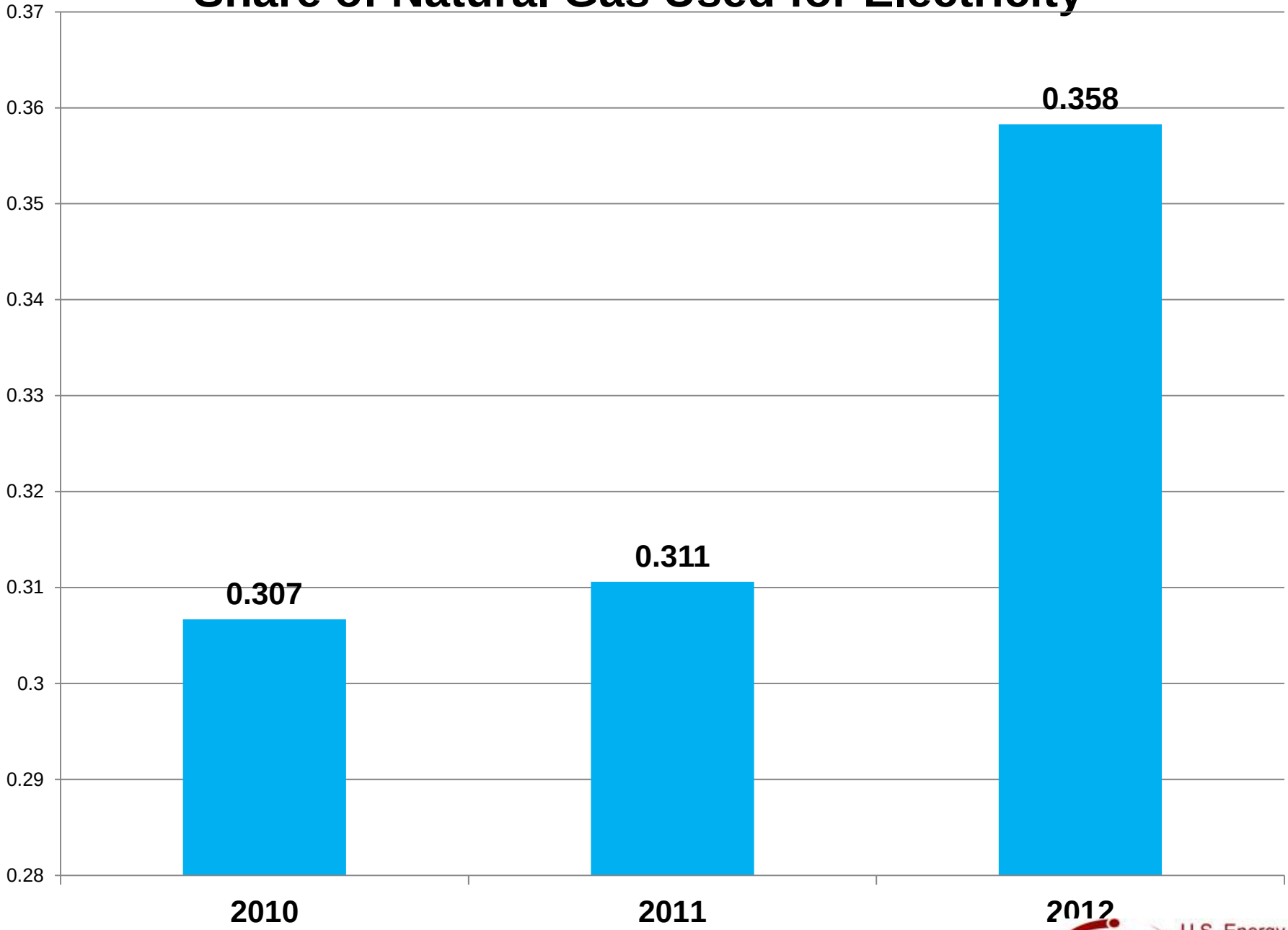
	2008		2012		
Solar	0.09	0.0009	0.24	0.0025	0.0016
Nuclear	8.45	0.0852	8.05	0.0846	-0.0005
Hydro	2.45	0.0247	2.69	0.0283	0.0036
Wind	0.53	0.0053	1.36	0.0143	0.0090
Geothermal	0.35	0.0035	0.23	0.0024	-0.0011
Natural Gas	23.84	**0.2403**	26.00	**0.2734**	0.0331
Coal	22.42	**0.2260**	17.40	**0.1830**	-0.0430
Biomass	3.88	0.0391	4.32	0.0454	0.0063
Petroleum	37.13	0.3743	34.70	0.3649	-0.0094
	99.2		95.1		

U.S. Energy Information Administration


Natural Gas Consumption Shares 2012
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.055
0.028
0.164
0.114
0.280
0.001
0.358
Lease and Plant
Pipeline & Distribution
Residential
Commercial
Industrial
Vehicle
Electric Power

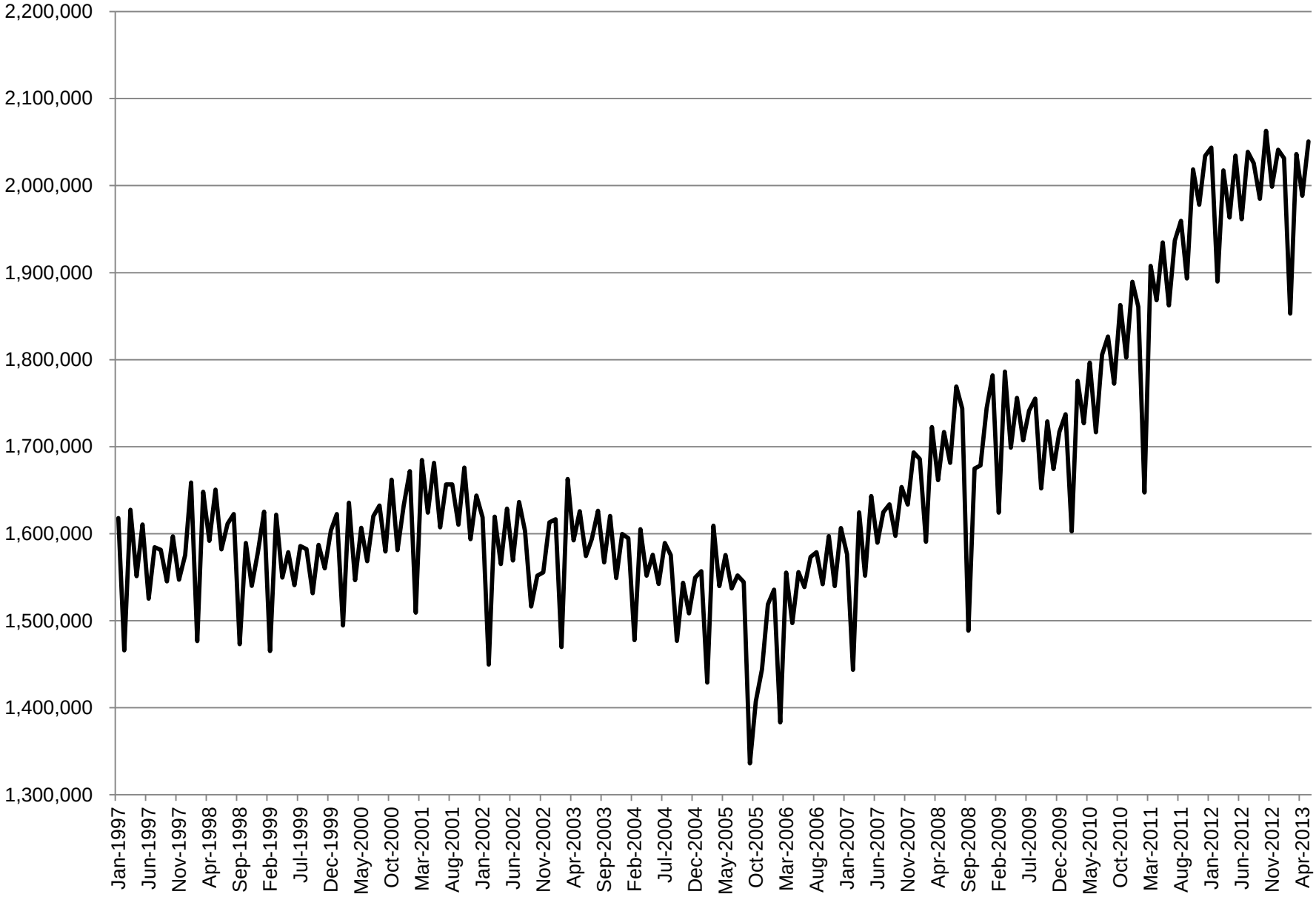

0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
0.358
Electric Utility
Industrial
0.280
Residential
0.164
Commercial
0.114
U.S. Energy
Information
Administration

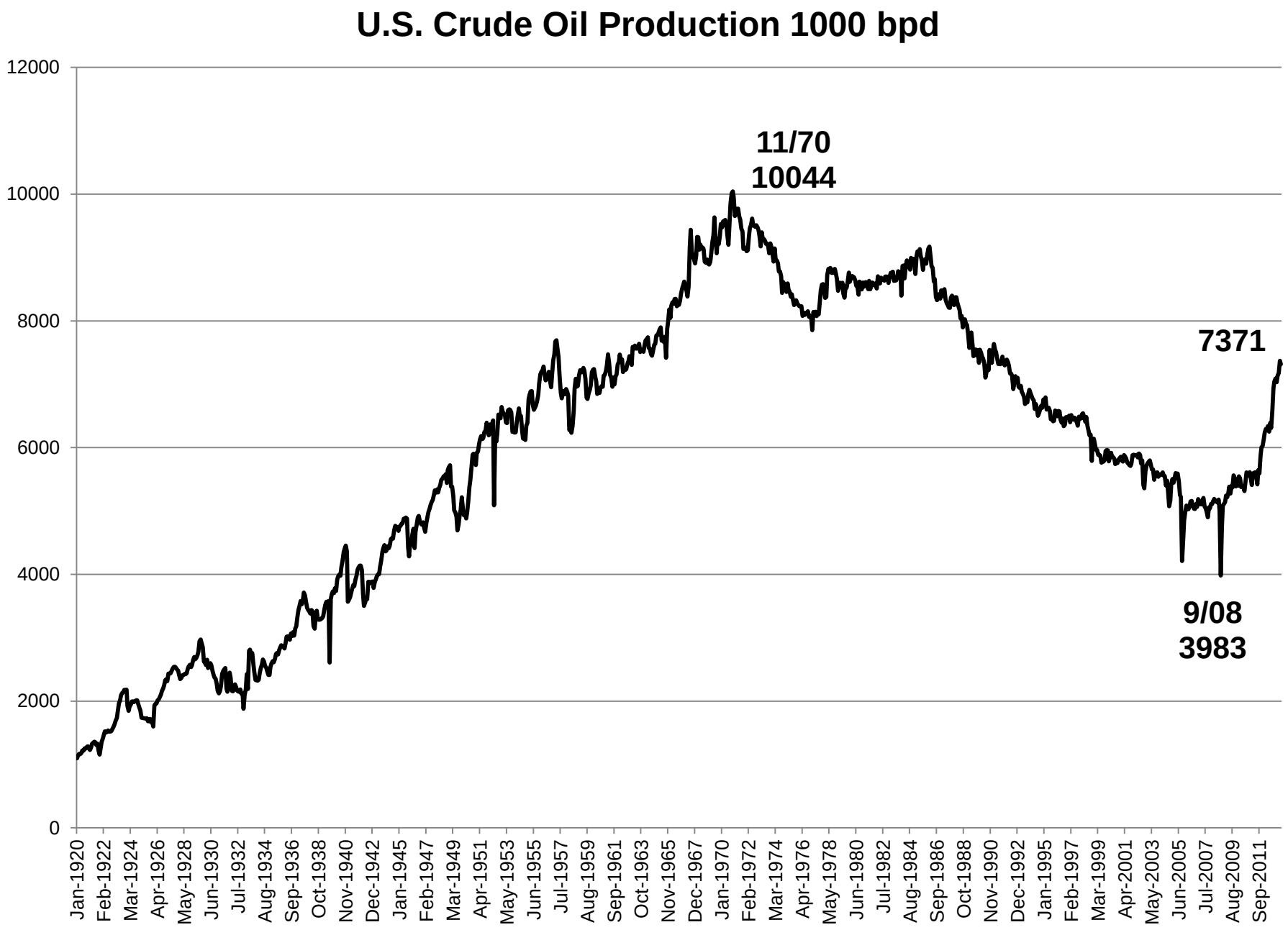
Share of Natural Gas Used for Electricity



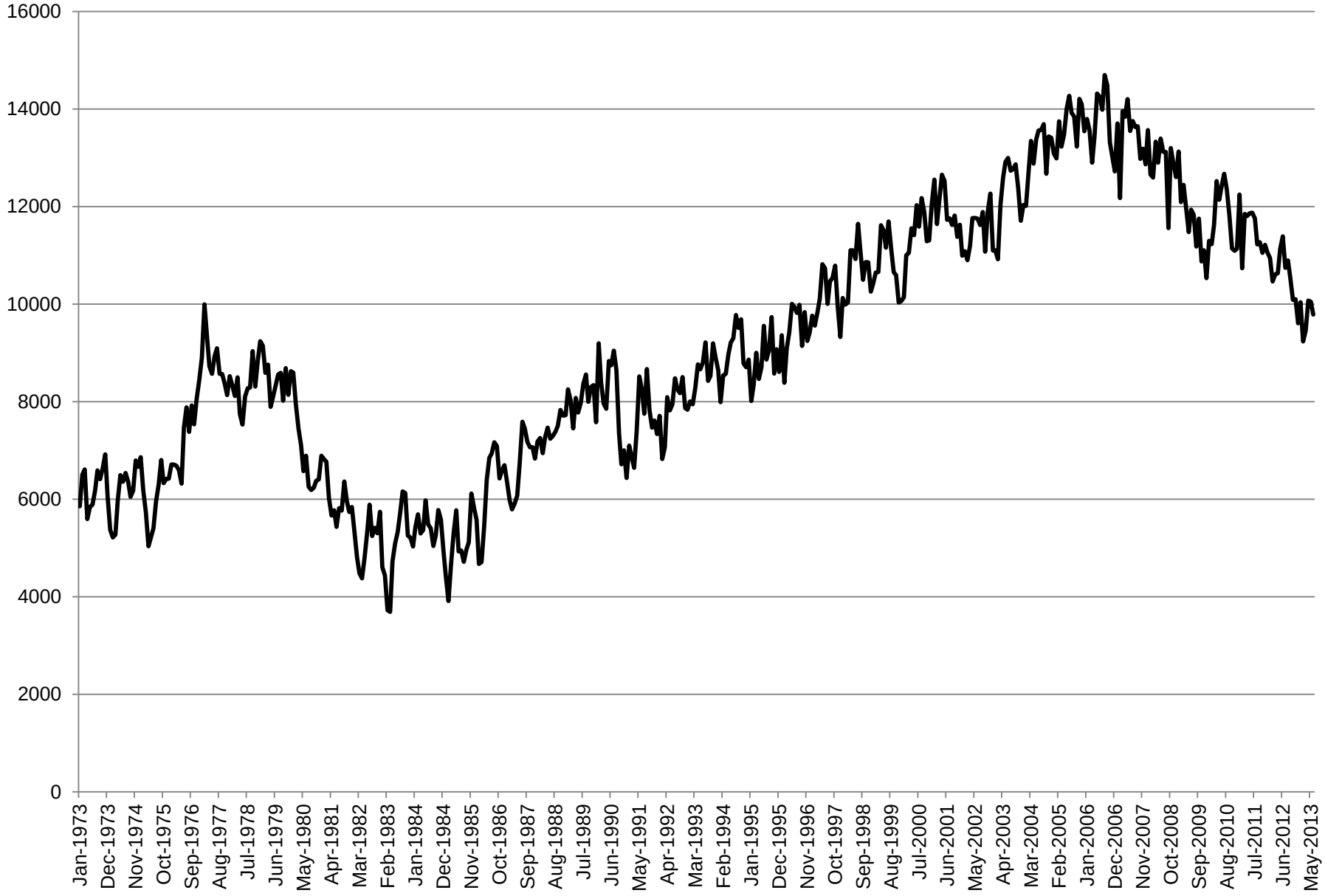
U.S. Energy Information Administration

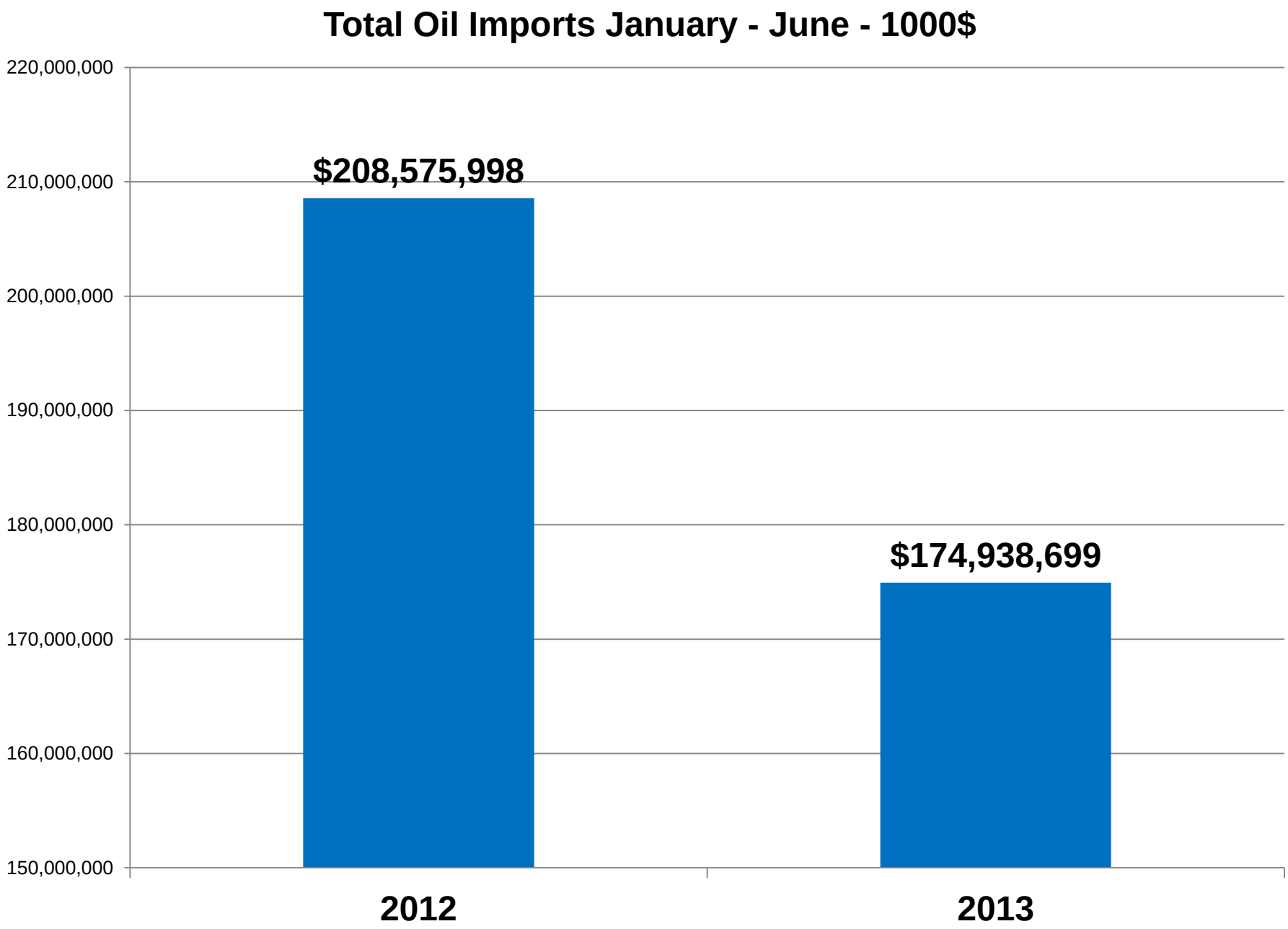
Natural Gas Production Monthly MMcf



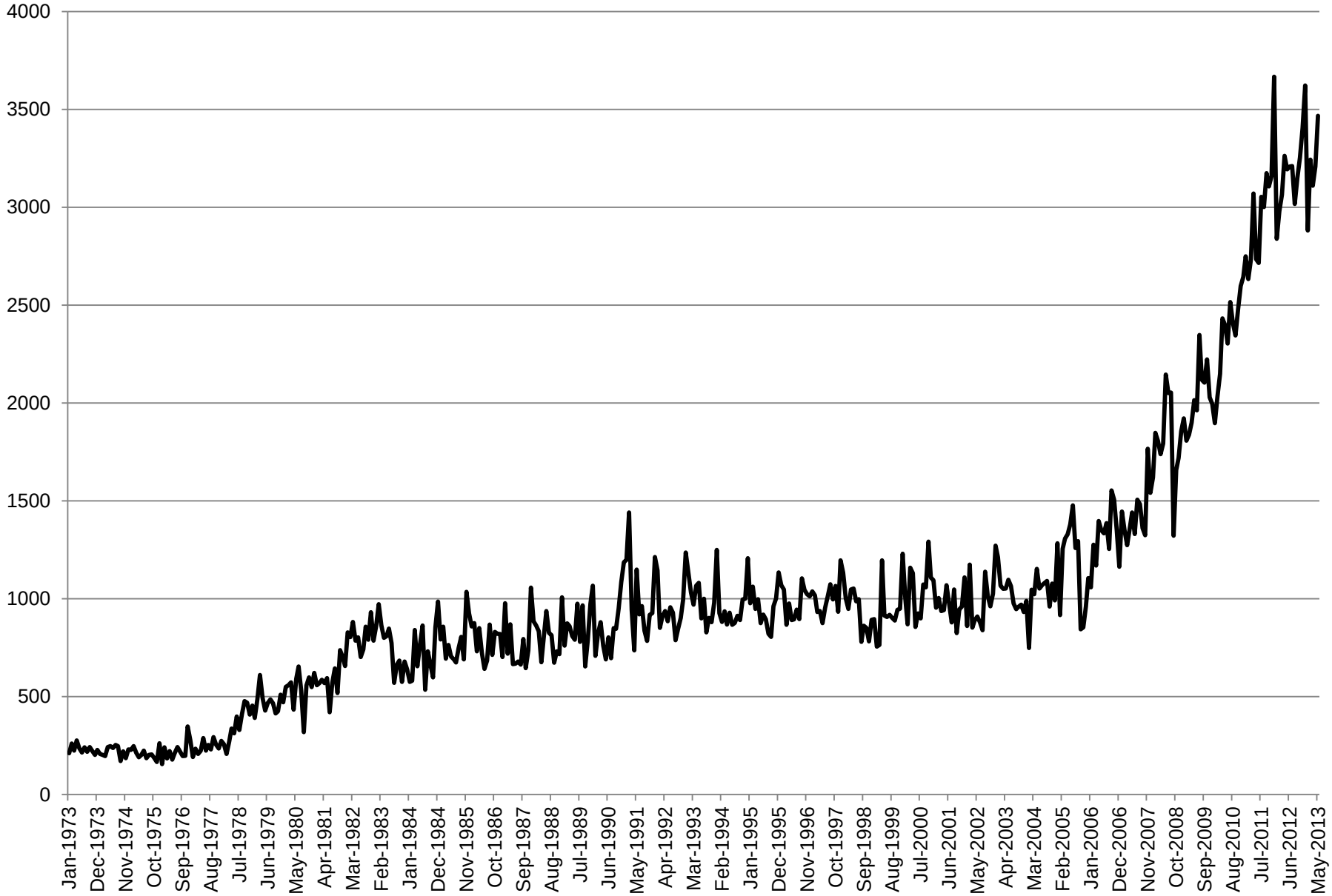

U.S. Crude Oil Production 1000 bpd
11/70
10044
7371
9/08
3983
12000
10000
8000
6000
4000
2000
0
Jan-1920
Feb-1922
Mar-1924
Apr-1926
May-1928
Jun-1930
Jul-1932
Aug-1934
Sep-1936
Oct-1938
Nov-1940
Dec-1942
Jan-1945
Feb-1947
Mar-1949
Apr-1951
May-1953
Jun-1955
Jul-1957
Aug-1959
Sep-1961
Oct-1963
Nov-1965
Dec-1967
Jan-1970
Feb-1972
Mar-1974
Apr-1976
May-1978
Jun-1980
Jul-1982
Aug-1984
Sep-1986
Oct-1988
Nov-1990
Dec-1992
Jan-1995
Feb-1997
Mar-1999
Apr-2001
May-2003
Jun-2005
Jul-2007
Aug-2009
Sep-2011

Imports - Total Petroleum

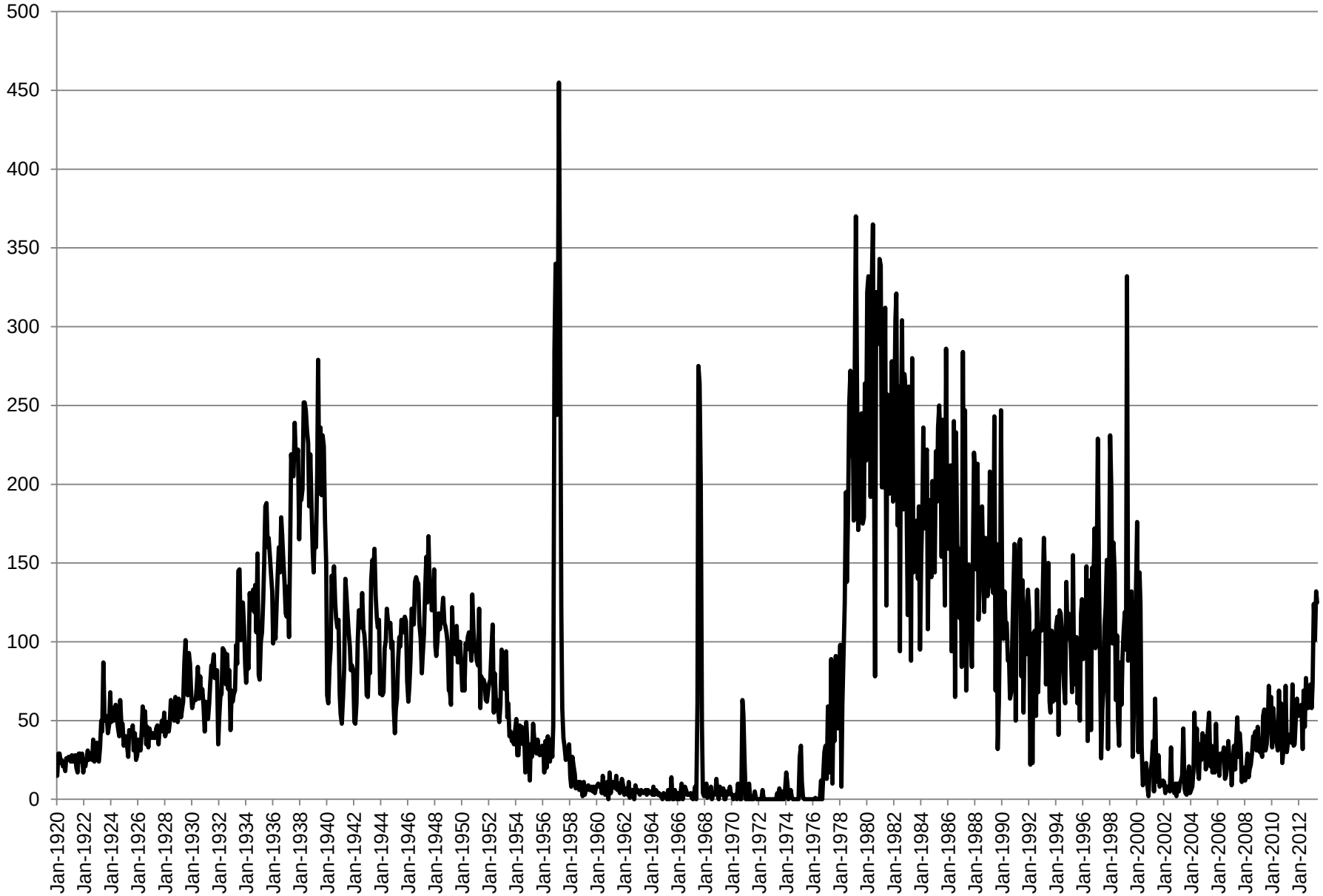



Total Oil Imports January - June - 1000$
220,000,000
210,000,000
200,000,000
190,000,000
180,000,000
170,000,000
160,000,000
150,000,000
$208,575,998
$174,938,699
2012
2013

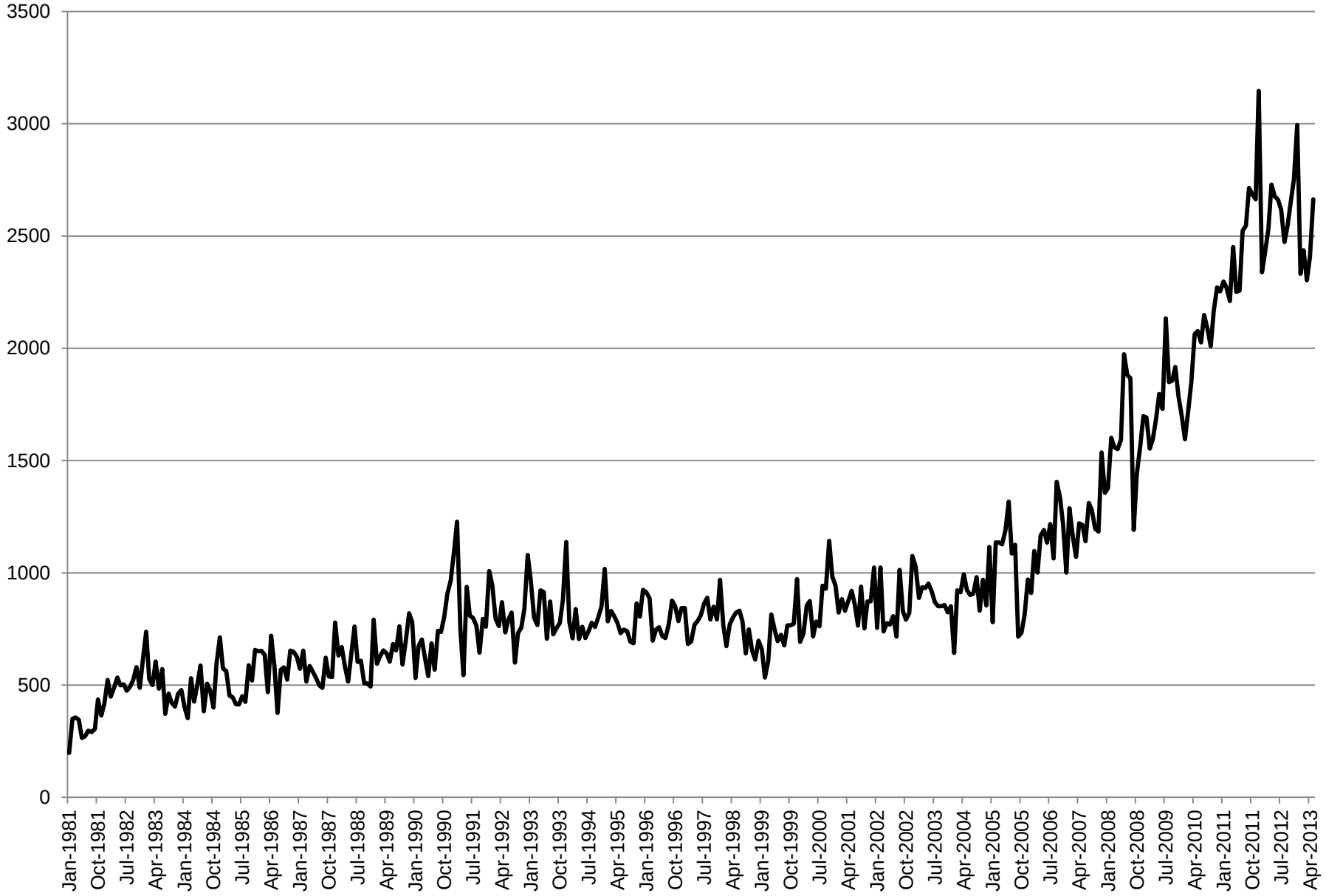
Exports – Total Petroleum

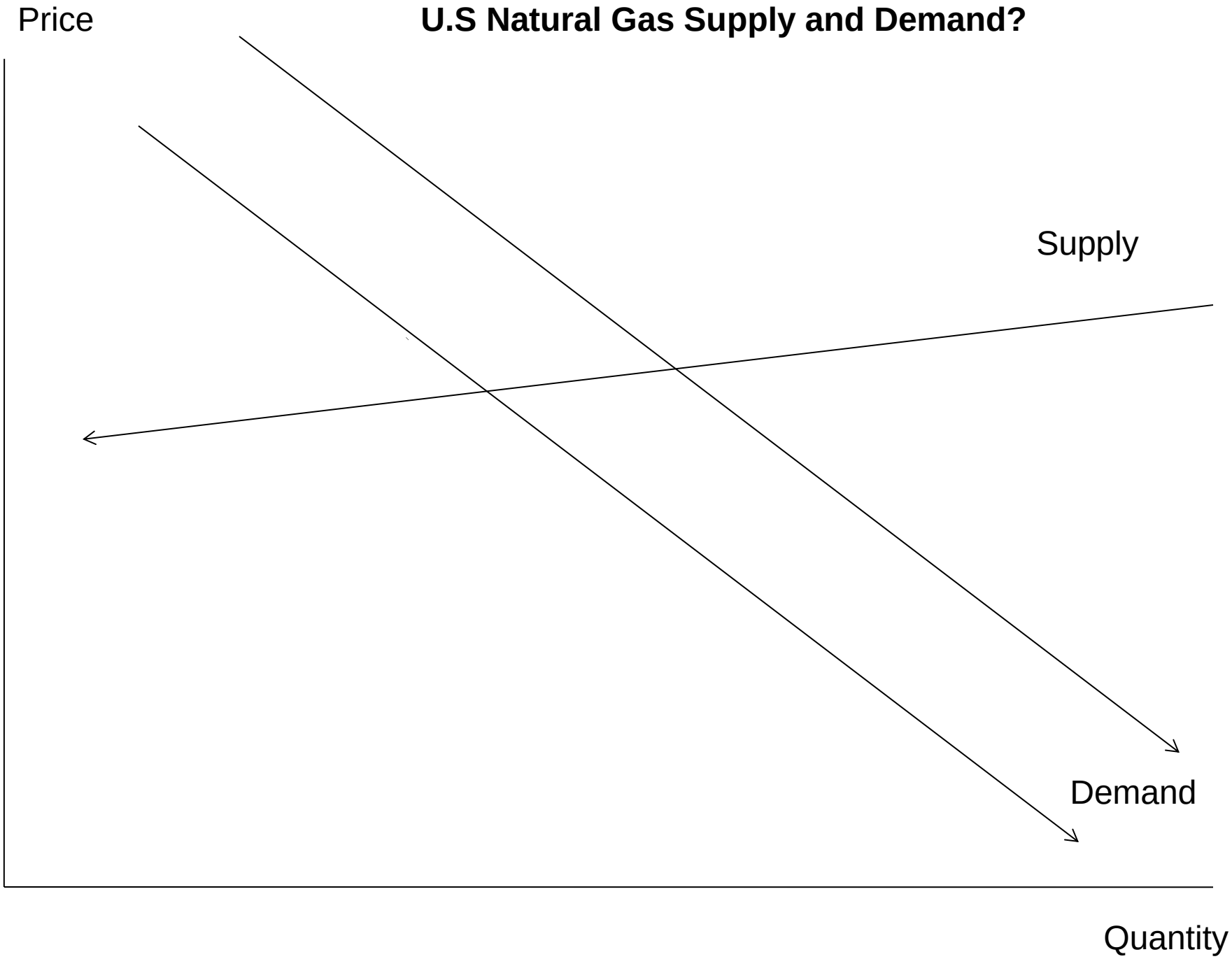


Crude exports

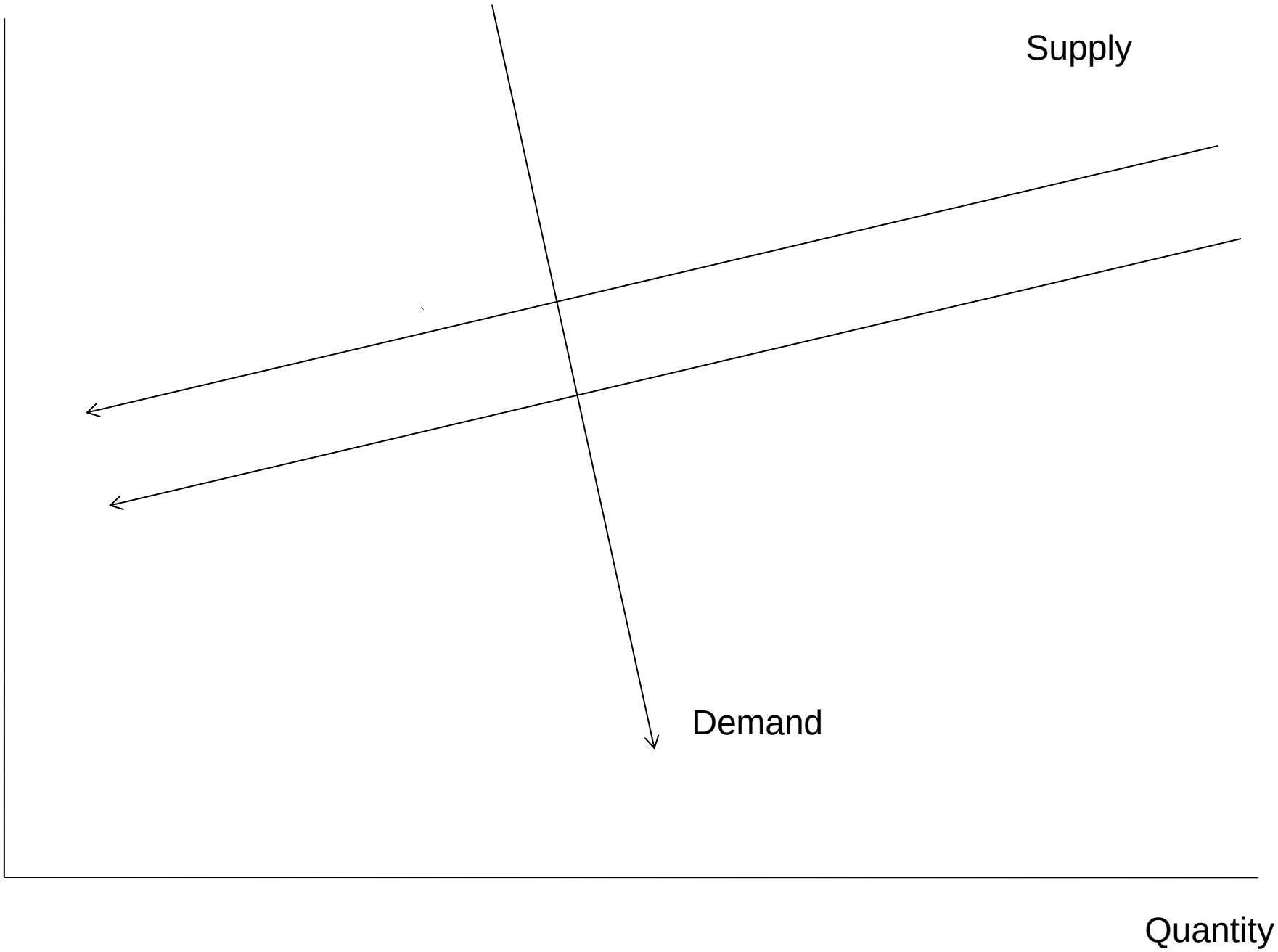


Refined product exports




Price
U.S Natural Gas Supply and Demand?
Supply
Demand
Quantity

Non-U.S. Natural Gas Supply and Demand?



Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of August 7, 2013)

All Changes Since July 12, 2013 Update Are In Red

Company	Quantity [a]	FTA Applications [b] (Docket Number)	Non-FTA Applications [c] (Docket Number)
Sabine Pass Liquefaction, LLC	2.2 billion cubic feet per day (Bcf/d) [d]	Approved (10-85-LNG)	Approved (10-111-LNG)
Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC	1.4 Bcf/d [d]	Approved (10-160-LNG)	Approved (10-161-LNG)
Lake Charles Exports, LLC	2.0 Bcf/d [e]**	Approved (11-59-LNG)	Approved (11-59-LNG)
Carib Energy (USA) LLC	0.03 Bcf/d: FTA 0.01 Bcf/d: non-FTA [f]	Approved (11-71-LNG)	Under DOE Review (11-141-LNG)
Dominion Cove Point LNG, LP	1.0 Bcf/d [d]	Approved (11-115-LNG)	Under DOE Review (11-128-LNG)
Jordan Cove Energy Project, L.P.	1.2 Bcf/d: FTA 0.8 Bcf/d: non-FTA [g]	Approved (11-127-LNG)	Under DOE Review (12-32-LNG)
Cameron LNG, LLC	1.7 Bcf/d [d]	Approved (11-145-LNG)	Under DOE Review (11-162-LNG)
Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC [h]	1.4 Bcf/d [d]	Approved (12-06-LNG)	Under DOE Review (11-161-LNG)
Gulf Coast LNG Export, LLC [i]	2.8 Bcf/d [d]	Approved (12-05-LNG)	Under DOE Review (12-05-LNG)
Gulf LNG Liquefaction Company, LLC	1.5 Bcf/d [d]	Approved (12-47-LNG)	Under DOE Review (12-101-LNG)
LNG Development Company, LLC (d/b/a Oregon LNG)	1.25 Bcf/d [d]	Approved (12-48-LNG)	Under DOE Review (12-77-LNG)
SB Power Solutions Inc.	0.07 Bcf/d	Approved (12-50-LNG)	n/a
Southern LNG Company, L.L.C.	0.5 Bcf/d [d]	Approved (12-54-LNG)	Under DOE Review (12-100-LNG)
Excelerate Liquefaction Solutions I, LLC	1.38 Bcf/d [d]	Approved (12-61-LNG)	Under DOE Review (12-146-LNG)
Golden Pass Products LLC	2.6 Bcf/d [d]	Approved (12-88 -LNG)	Under DOE Review (12-156-LNG)
Cheniere Marketing, LLC	2.1 Bcf/d [d]	Approved (12-99-LNG)	Under DOE Review (12-97-LNG)
Main Pass Energy Hub, LLC	3.22 Bcf/d***	Approved (12-114-LNG)	n/a
CE FLNG, LLC	1.07 Bcf/d [d]	Approved (12-123-LNG)	Under DOE Review (12-123-LNG)
Waller LNG Services, LLC	0.16 Bcf/d	Approved (12-152-LNG)	n/a
Pangea LNG (North America) Holdings, LLC	1.09 Bcf/d [d]	Approved (12-174-LNG)	Under DOE Review (12-184-LNG)
Magnolia LNG, LLC	0.54 Bcf/d	Approved (12-183-LNG)	n/a

Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of August 7, 2013)

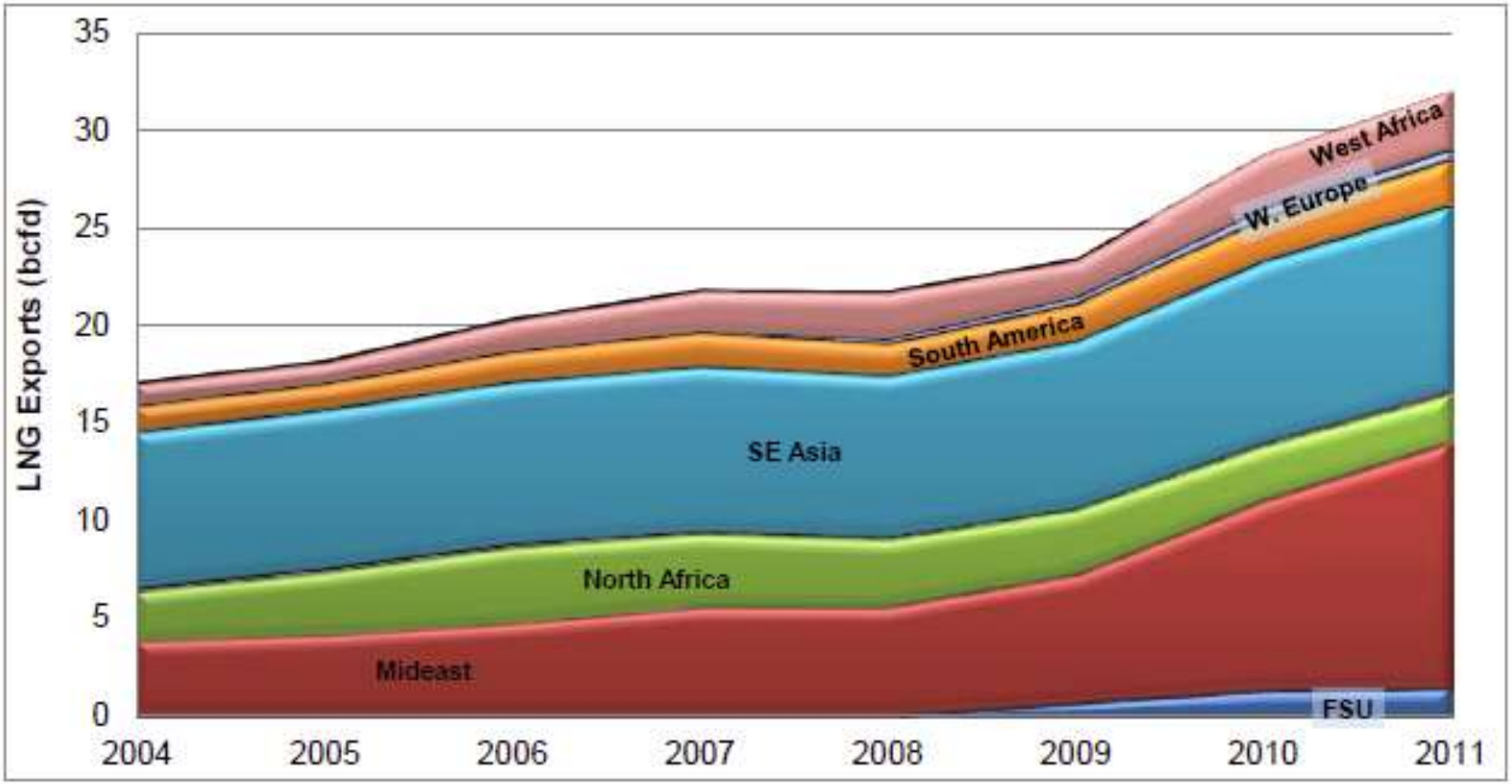
All Changes Since July 12, 2013 Update Are In Red

Company	Quantity [a]	FTA Applications [b] (Docket Number)	Non-FTA Applications [c] (Docket Number)
Trunkline LNG Export, LLC	2.0 Bcf/d**	Approved (13-04-LNG)	Under DOE Review (13-04-LNG)
Gasfin Development USA, LLC	0.2 Bcf/d	Approved (13-06-LNG)	n/a
Freeport-McMoRan Energy LLC	3.22 Bcf/d***	Approved (13-26-LNG)	Under DOE Review (13-26-LNG)
Sabine Pass Liquefaction, LLC	0.28 Bcf/d[d]	Approved (13-30-LNG)	Under DOE Review (13-30-LNG)
Sabine Pass Liquefaction, LLC	0.24 Bcf/d[d]	Approved (13-42-LNG)	Under DOE Review (13-42-LNG)
Venture Global LNG, LLC	0.67 Bcf/d[d]	Pending Approval (13-69-LNG)	Under DOE Review (13-69-LNG)
Advanced Energy Solutions, L.L.C.	0.02 Bcf/d	Pending Approval (13-82-LNG)	n/a
Total of all Applications Received		**30.62 Bcf/d(**) (***)**	**29.21 Bcf/d**

** Lake Charles Exports, LLC (LCE) and Trunkline LNG Export, LLC (TLNG), the owner of the Lake Charles Terminal, have both filed an application to export up to 2.0 Bcf/d of LNG from the Lake Charles Terminal. The total quantity of combined exports requested between LCE and TLNG does not exceed 2.0 Bcf/d (i.e., both requests are not additive and only 2 Bcf/d is included in the bottom-line total of applications received).

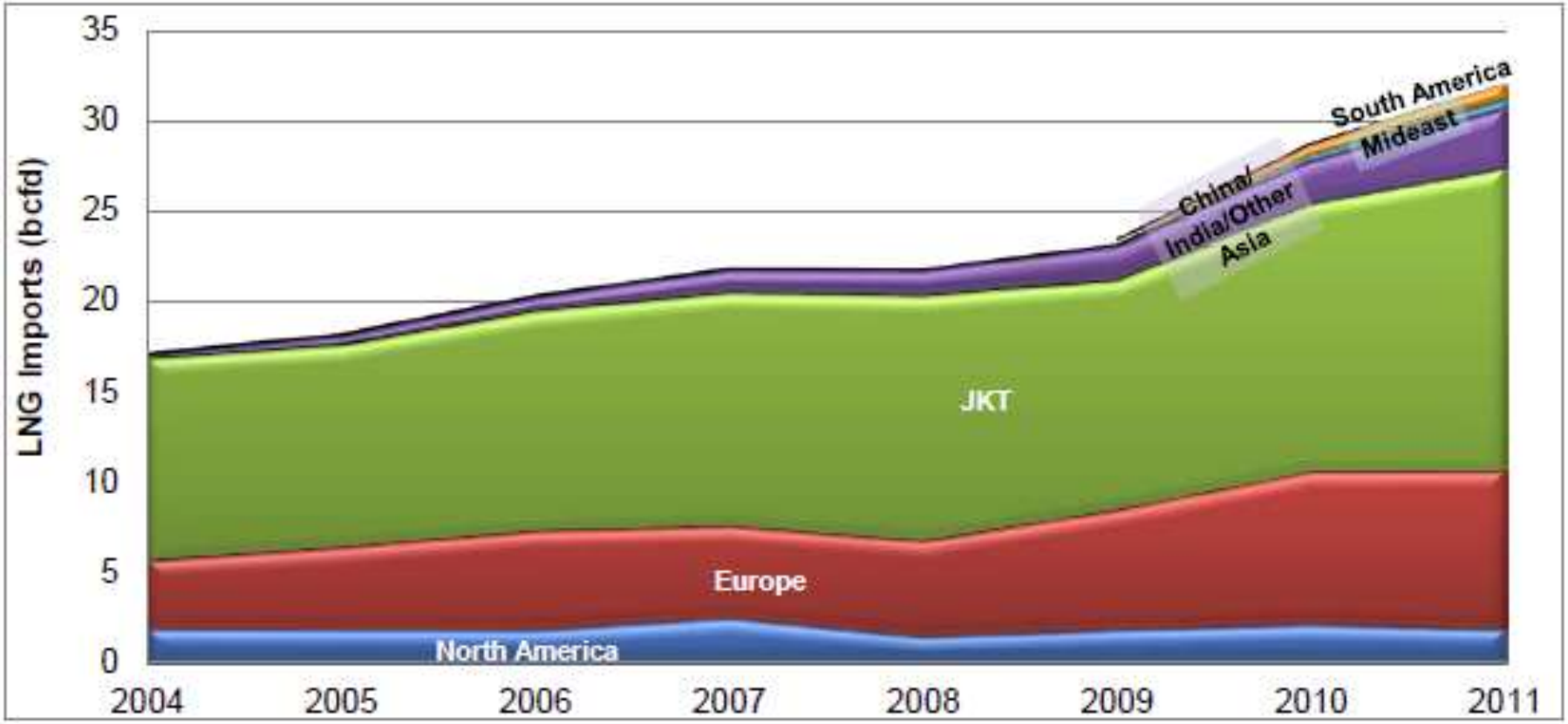
*** Main Pass Energy Hub, LLC (MPEH) and Freeport McMoRan Energy LLC (FME), have both filed an application to export up to 3.22 Bcf/d of LNG from the Main Pass Energy Hub. (The existing Main Pass Energy Hub structures are owned by FME). The total quantity of combined FTA exports requested between MPEH and FME does not exceed 3.22 Bcf/d (i.e., both requests are not additive and only 3.22 Bcf/d is included in the bottom-line total of FTA applications received). FME's application includes exports of 3.22 Bcf/d to non-FTA countries and is included in the bottom line total of non-FTA applications received, while MPEH has not submitted an application to export LNG to non-FTA countries.

Exhibit 4-1: World LNG Supply by Region (2004-2011)



Source: Various compiled by ICF

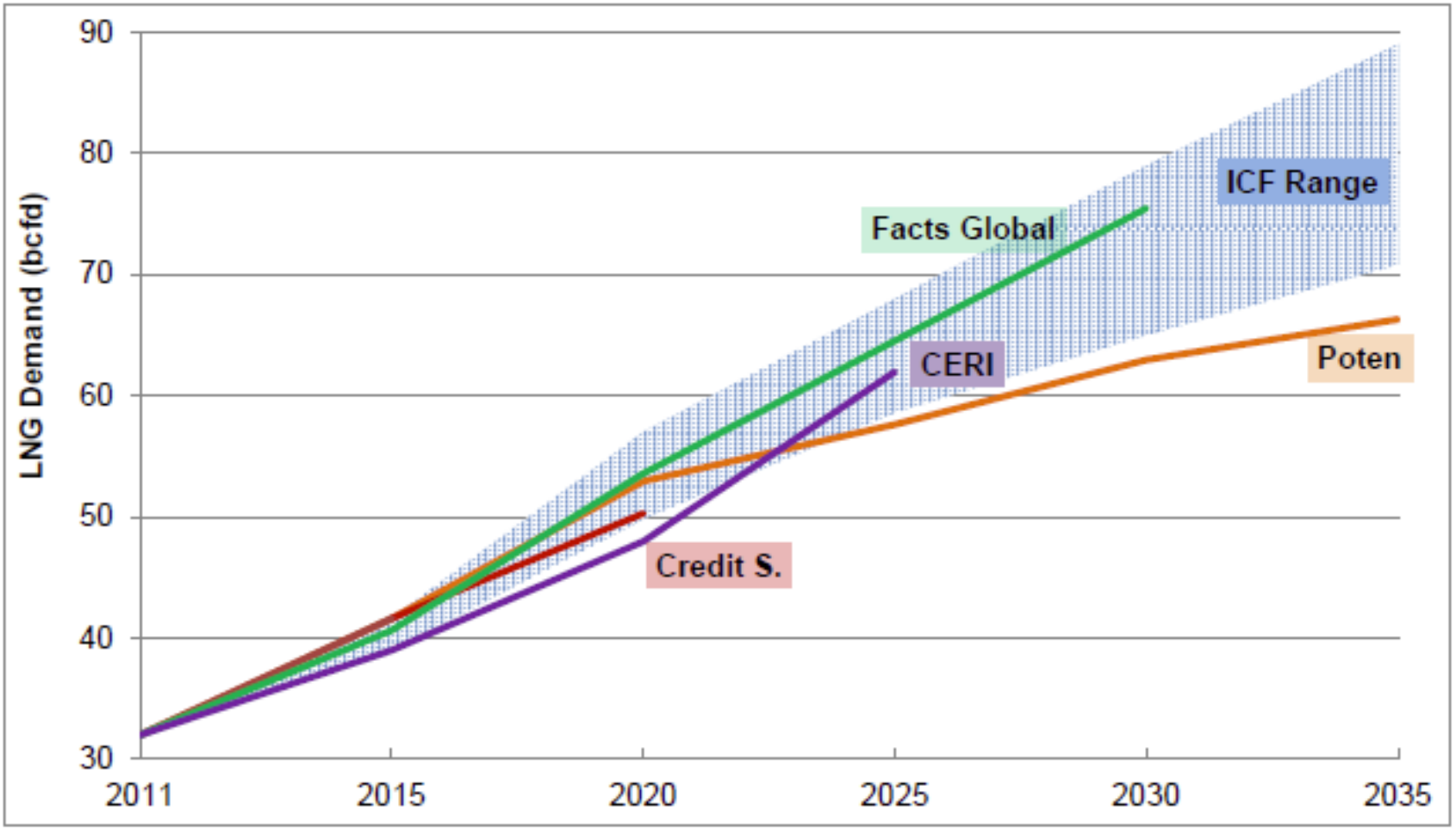
Exhibit 4-2: Historical World LNG Imports by Region (2004-2011)



Source: Various compiled by ICF

Note: JKT refers to Japan, South Korea, and Taiwan.

Exhibit 4-3: World LNG Demand Projections*



Sources: Poten (2010), Credit Suisse (2012), Facts Global Energy (2012), CERI (2013)

* Calibrated to actual 2011 LNG demand. This chart includes only growth in LNG consumption and does not include effects on total demand of declining available capacity at existing liquefaction facilities due to depleting or redirected reserves.

Exhibit 4-4: International LNG Projects

Country	LNG Project Name	Planned Startup	Capacity (MM TPA*)	Capacity (Bcfd)
Facilities in Construction Phase				
Algeria	Arzew GL3-Z	2015	4.7	0.63
Algeria	Skikda expansion	2013	4.6	0.61
Angola	Angola LNG	2012	5.2	0.69
Australia	AP LNG (Origin)	2016	4.5	0.6
Australia	Gladstone LNG	2015	7.8	1.04
Australia	Gorgon LNG T1-3	2015	15	2
Australia	Ichthys LNG	2016	8.4	1.12
Australia	Pluto LNG	2012	4.8	0.64
Australia	Prelude FLNG	2016	3.5	0.47
Australia	QC LNG	2015	8.5	1.13
Australia	Wheatstone	2016	9	1.2
Indonesia	Donggi Senoro LNG	2015	2	0.27
PNG	PNG LNG	2015	6.6	0.88
Total in Construction Phase			***84.6***	***11.3***
Facilities in Planning Phase				
Angola	Angola LNG T2	2021	5	0.67
Australia	AP LNG (Origin) T2	2017	4.5	0.6
Australia	Arrow	2023	8	1.07
Australia	Bonaparte	2016	2	0.27
Australia	Browse	2016	3.5	0.47
Australia	Fisherman's L.	2023	1.5	0.2
Australia	Gorgon LNG T4	2018	5	0.67
Australia	Pluto LNG T2	2017	4.3	0.57
Australia	Pluto LNG T3	2018	4.3	0.57
Australia	QCLNG Train 3	2017	4.3	0.57
Australia	Scarborough	2022	6	0.8
Australia	Sunrise LNG	2017	3.5	0.47
Australia	Tassie Shoal	2020	3	0.4
Australia	Wheatstone T3	2020	4.5	0.6
Brazil	Santos FLNG	2017	3.5	0.47
Canada	BC LNG Douglas Channel	2017	2	0.27
Canada	Kitimat LNG	2017	10	1.33
Canada	Petronus Prince Rupert	2018	7.5	1
Canada	Shell LNG Canada	2018	10	1.33
Eq Guinea	EG LNG T2	2018	4.4	0.59
Indonesia	Abadi FLNG 1	2016	2.5	0.33
Indonesia	Abadi FLNG 2	2019	2.5	0.33
Indonesia	Sengkang LNG	2014	2	0.27

Country	LNG Project Name	Planned Startup	Capacity	Capacity
Facilities in Planning Phase (cont.)				
Indonesia	Sulawesi LNG	2014	2	0.27
Indonesia	Tangguh T3	2019	3.8	0.51
Iran	Iran LNG	2020	10.5	1.4
Iraq	Shell Basra FLNG T1	2022	4.5	0.6
Iraq	Shell Basra FLNG T2	2022	4.5	0.6
Malaysia	Bintulu Train 9	2016	2.5	0.33
Malaysia	PFLNG1 (Sarawak)	2015	1.2	0.16
Malaysia	PFLNG1 (Sabah)	2016	1.5	0.2
Mozambique	Mozambique LNG 1,2	2018	9	1.2
Mozambique	Mozambique LNG 3,4	2021	9	1.2
Mozambique	Mozambique LNG 5,6	2024	9	1.2
Mozambique	Mozambique LNG 7,8	2027	9	1.2
Mozambique	Mozambique LNG 9,10	2030	9	1.2
Nigeria	Brass LNG	2016	10	1.33
Nigeria	NLNG Train 7	2021	8.4	1.12
Nigeria	NLNG Train 8	2024	8.4	1.12
Nigeria	Olokola	2022	5	0.67
Norway	Snøhvit T2	2018	4.2	0.56
PNG	Gulf LNG Interoil	2022	4	0.53
PNG	PNG LNG T3	2017	3.3	0.44
Qatar	Debottleneck	2021	12	1.6
Russia	Sakhalin 2 T3	2019	5	0.67
Russia	Shtokman (Ph 1)	2022	7.5	1
Russia	Shtokman (other)	2025	12.5	1.67
Russia	Vladivostok	2018	10	1.33
Russia	Yamal LNG	2018	16.5	2.2
Tanzania	Tanzania LNG	2019	8	1.07
Total in Planning Phase			***294.1***	***39.2***
Total in Construction and Planning Phases			**378.7**	**50.5**

Sources: Various compiles by ICF

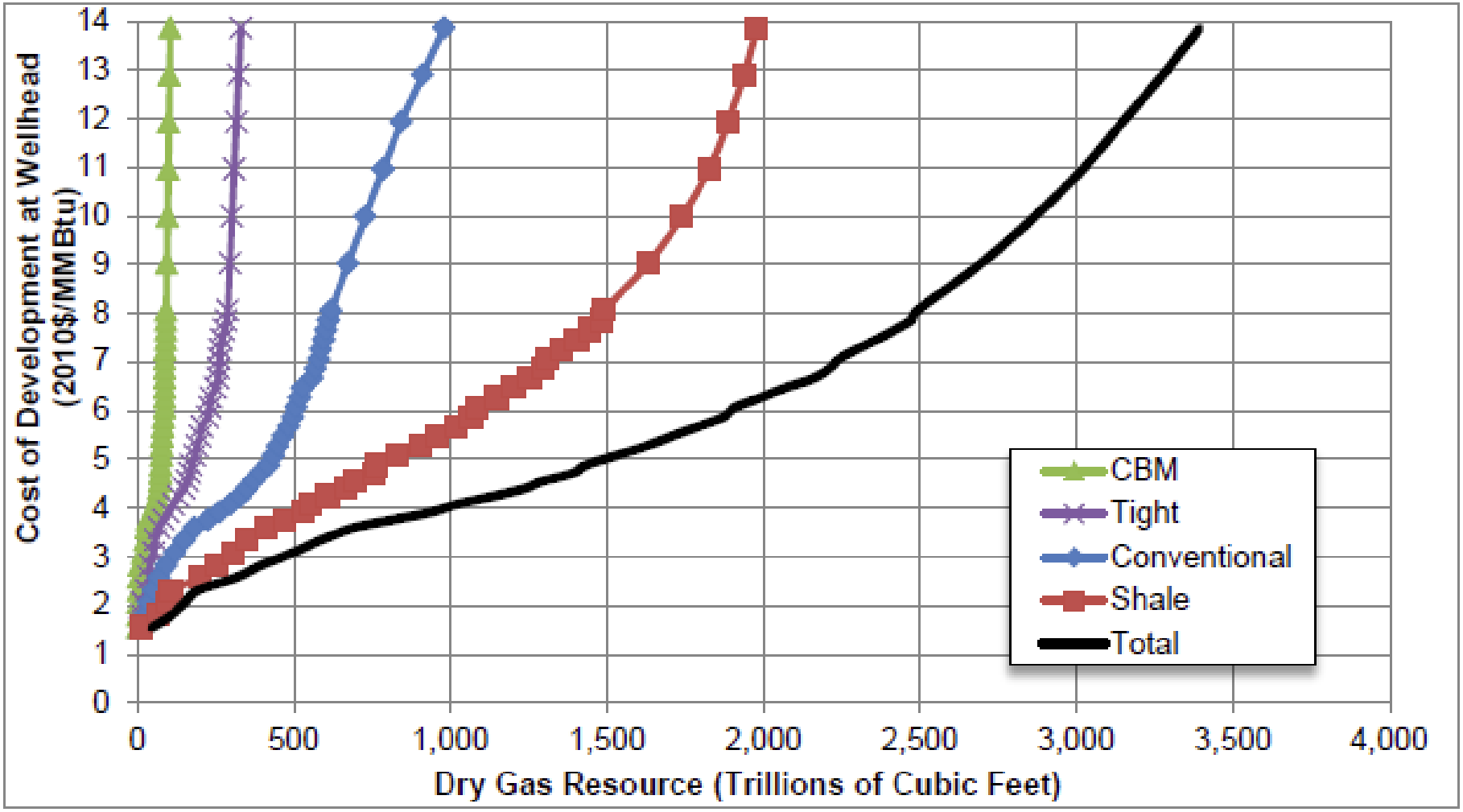
Exhibit 3-12: U.S. and Canadian Natural Gas Resource Base

(Tcf of Economically Recoverable Resource, assuming current E&P technologies)

Resource Base Type	Total Gas (Tcf)	Crude and Cond. (Bil Bbl)
Lower 48		
Proved reserves	297	21
Reserve appreciation and low Btu	204	23
Stranded frontier	0	0
Enhanced oil recov.	0	42
New fields	488	68
Shale gas and condensate	1,964	31
Tight oil	88	25
Tight gas	438	4
Coalbed methane	66	0
Lower 48 Total	**3,545**	**214**
Canada		
Proved reserves	61	4
Reserve appreciation	29	3
Stranded frontier	40	0
Enhanced oil recov.	0	3
New fields	219	12
Shale gas and condensate	601	0
Tight oil	116	20
Tight gas (with conv.)	0	0
Coalbed methane	76	0
Canada Total	**1,142**	**43**
Lower-48 and Canada Total	**4,687**	**257**

Source: ICF GMM

Exhibit 3-13: North American Gas Supply Curves



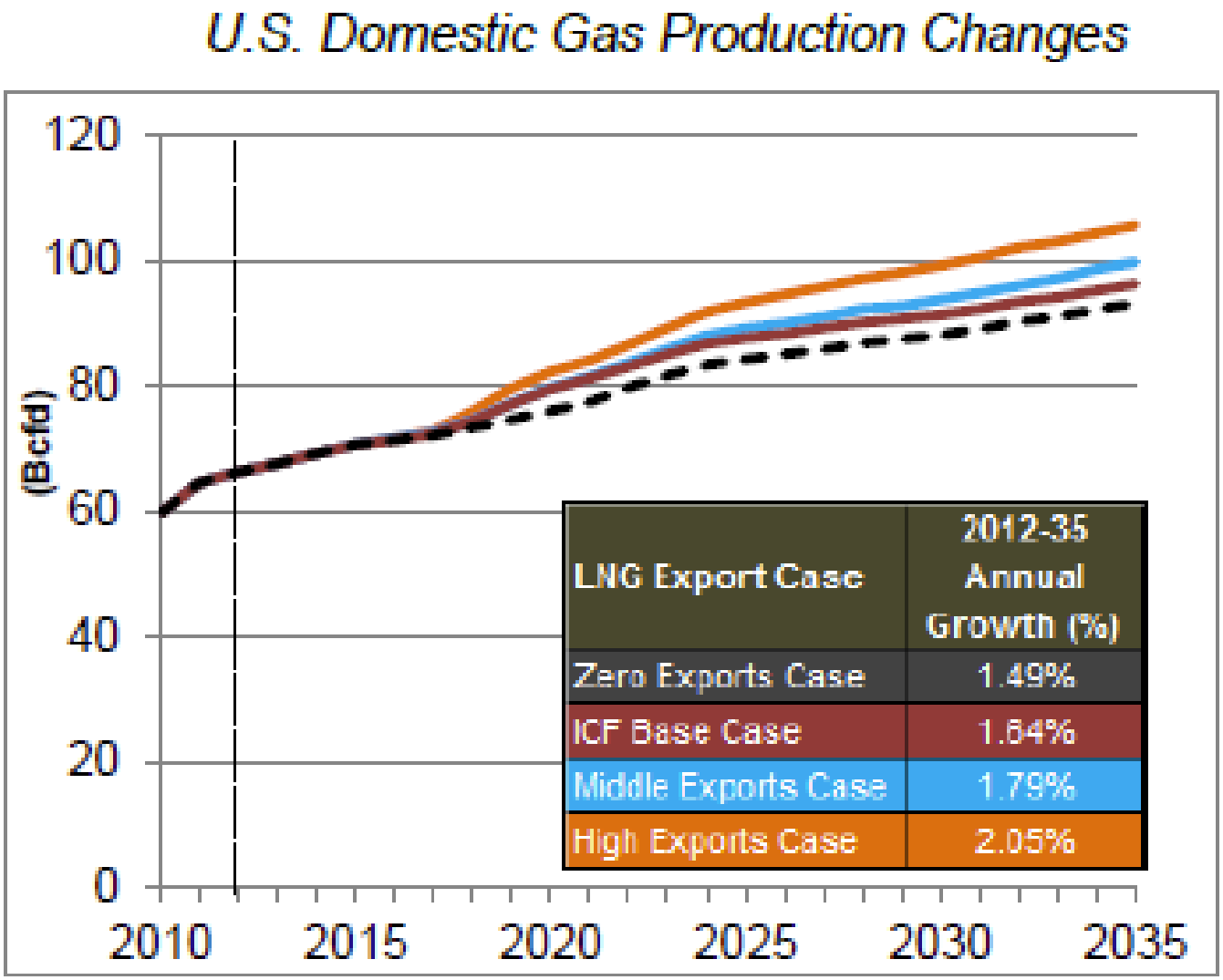
Source: ICF GMM

Key Economic Impacts Relative to the Zero Exports Case

Impact (2016-2035 Averages)*	LNG Export Case (Change from Zero Exports Case)		
	ICF Base Case (up to ~4 Bcfd)	Middle Exports Case (up to ~8 Bcfd)	High Exports Case (up to ~16 Bcfd)
Employment Change (No.)	73,100-145,100	112,800-230,200	220,100-452,300
GDP Change (2010$ Billion)	$15.6-$22.8	$25.4-$37.2	$50.3-$73.6
Henry Hub Price (2010$/MMBtu)	$5.03	$5.30	$5.73
Henry Hub Price Change (2010$/MMBtu)	$0.32	$0.59	$1.02

*Source: ICF estimates. Note: * Includes direct, indirect, and induced impacts*

Exhibit 5-1: U.S. Domestic Natural Gas Market Changes by LNG Export Case



Source: ICF estimates

Exhibit 5-1: U.S. Domestic Natural Gas Market Changes by LNG Export Case

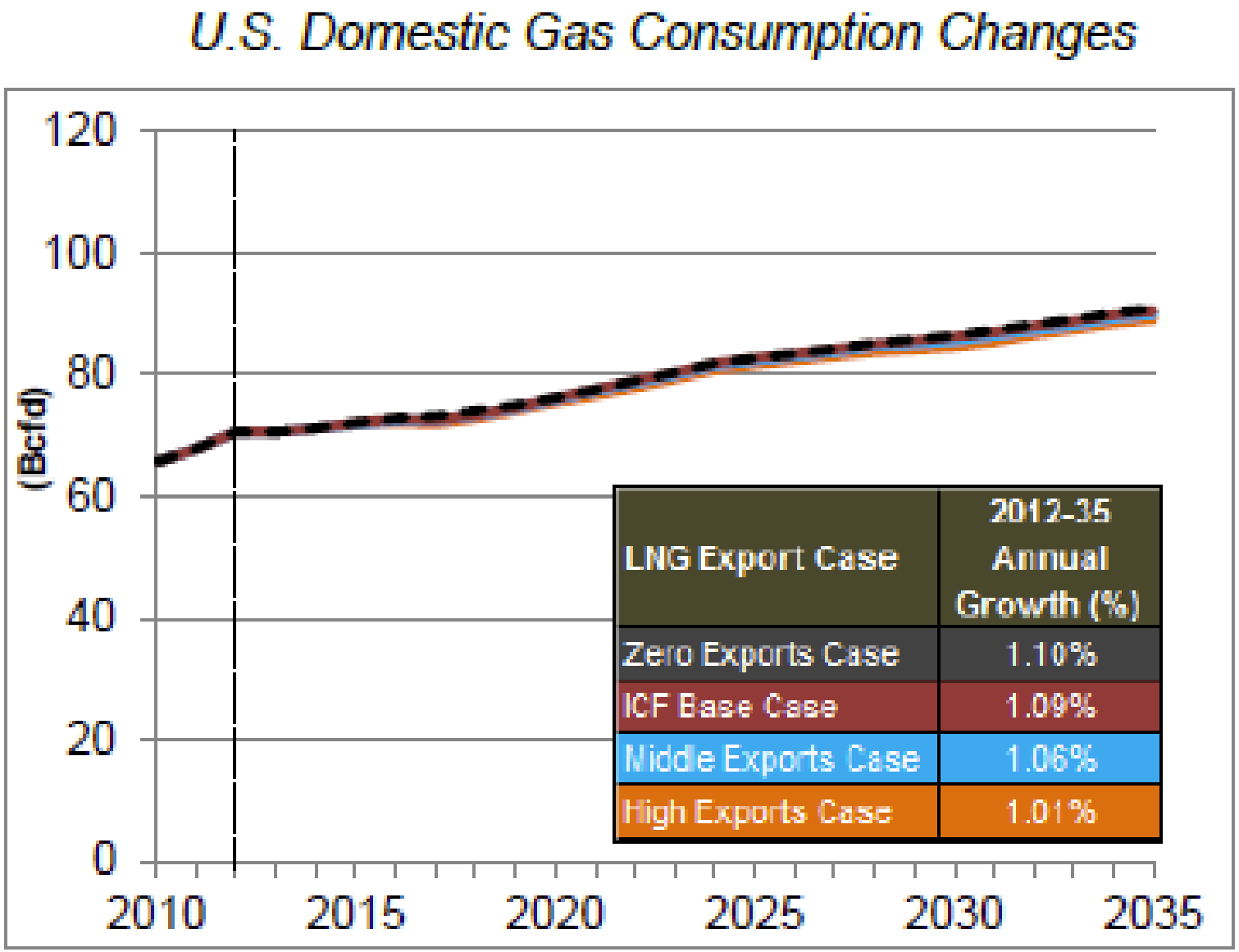
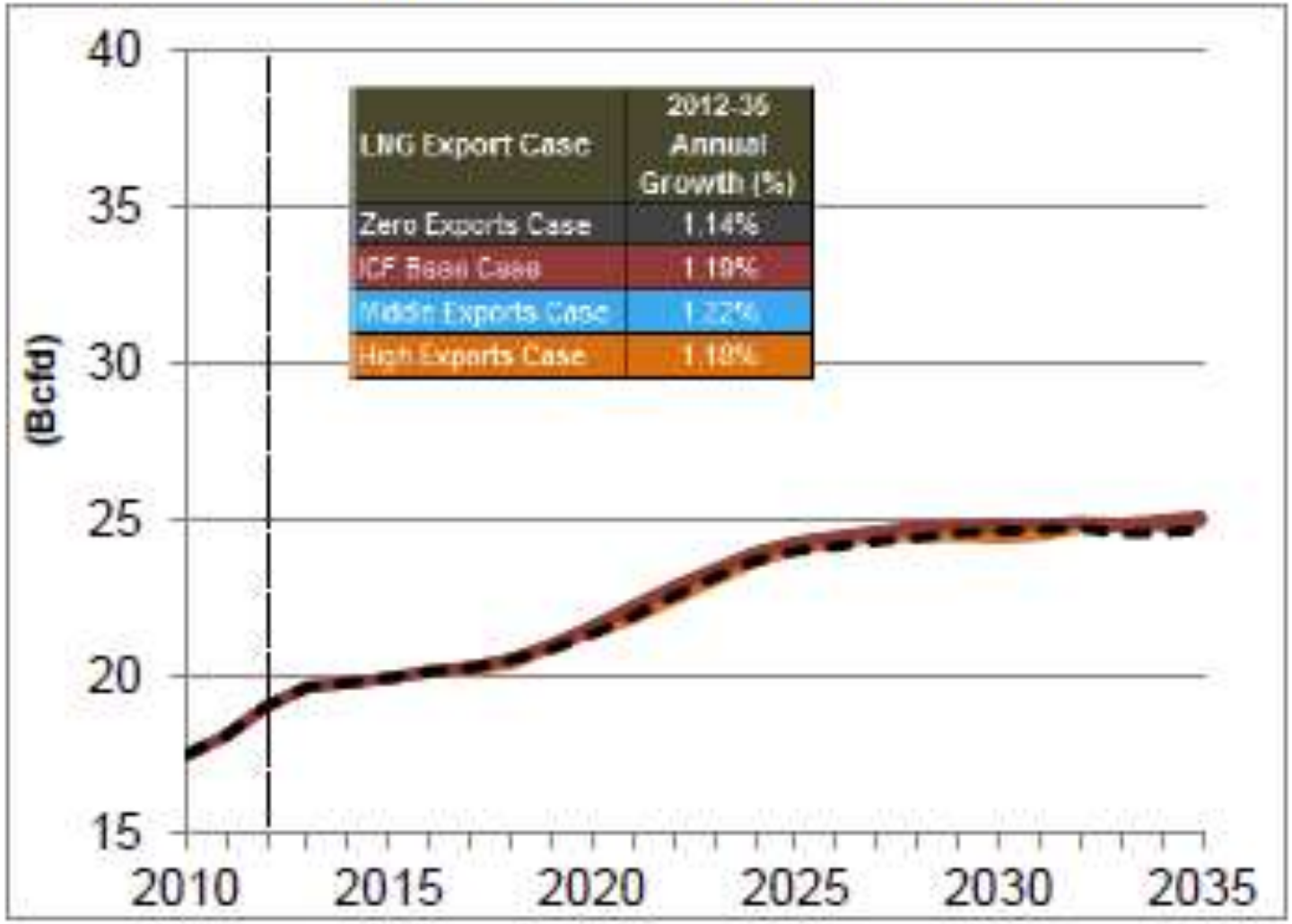


Exhibit 5-2: Selected U.S. Natural Gas Market Changes by LNG Export Case



Source: ICF estimates

Exhibit 5-2: Selected U.S. Natural Gas Market Changes by LNG Export Case

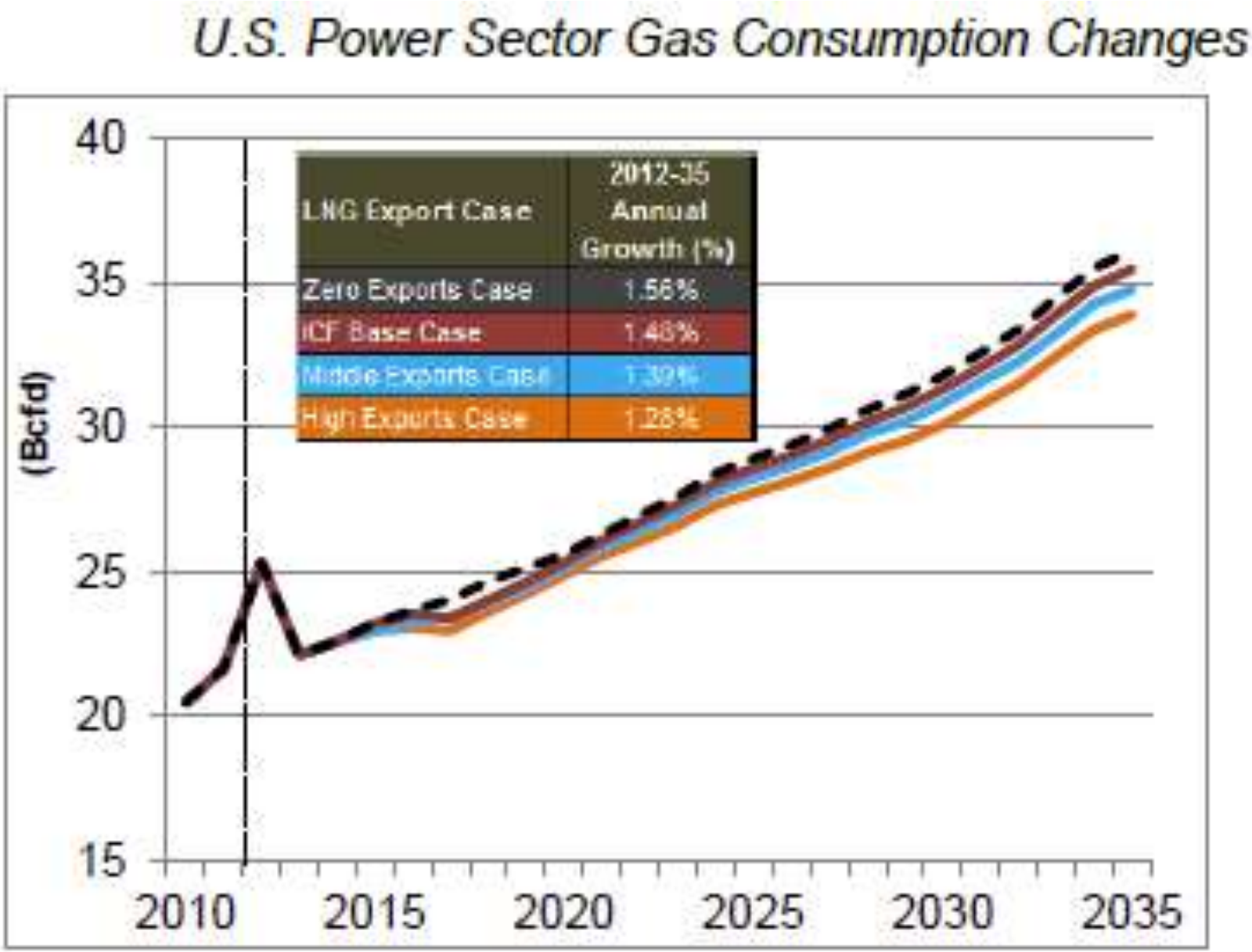


Exhibit 6-15: Total Employment Impacts on the U.S. Economy

LNG Export Case	2035 Annual New Jobs per I-O Analysis No.)	2035 New Jobs as Share of Total 2035 U.S. Employment (%)	LNG Export Jobs as Share of 2012 to 2035 Job Growth (%)	Wage Increase to Support Labor Demand Increase (%)	
				Labor Supply Elasticity = 0.75*	Labor Supply Elasticity = 0.40*
M.E. = 1.0 (Direct and Indirect Jobs Only)					
ICF Base Case (up to ~4 Bcfd)	30,431	0.02%	0.10%	0.02%	0.04%
Middle Case (up to ~8 Bcfd)	42,251	0.02%	0.10%	0.03%	0.06%
High Case (up to ~16 Bcfd)	122,462	0.07%	0.30%	0.09%	0.17%
M.E. = 1.3 (Direct, Indirect, and Induced Jobs)					
ICF Base Case (up to ~4 Bcfd)	72,045	0.04%	0.10%	0.05%	0.10%
Middle Case (up to ~8 Bcfd)	135,145	0.07%	0.30%	0.10%	0.18%
High Case (up to ~16 Bcfd)	303,308	0.17%	0.60%	0.22%	0.41%
M.E. = 1.9 (Direct, Indirect, and Induced Jobs)					
ICF Base Case (up to ~4 Bcfd)	155,275	0.08%	0.30%	0.11%	0.21%
Middle Case (up to ~8 Bcfd)	320,933	0.17%	0.70%	0.23%	0.44%
High Case (up to ~16 Bcfd)	665,000	0.36%	1.40%	0.48%	0.91%

Source: ICF estimates

Exhibit 7-3: Energy Market Impact Comparisons by Study

Facility	Summary of Analysis	Case	Henry Hub Price Change Relative to Reference Case	
			($/MMBtu)	($/MMBtu per 1 Bcfd)
Price and Supply Source Assumptions				
Sabine Pass (Navigant)	5 cases examining different levels of U.S. demand and LNG export ranging from 0 to 2 Bcfd (only 2 relevant cases - 1 Bcfd exports, 2 Bcfd exports)	1 Bcfd LNG exports	$0.18	$0.18
		2 Bcfd LNG exports	$0.35	$0.18
Jordan Cove (Navigant)	7 cases examining different levels of U.S. demand and LNG exports ranging from 2.7 to 7.1 Bcfd	2.9 Bcfd [0.9 Bcfd incremental LNG exports from Jordan Cove (in addition to 2 Bcfd assumed in the base case)]	$0.03 (0.9 Bcfd)	$0.03
		5.9 Bcfd [3 Bcfd incremental LNG exports (in addition to base case 2 Bcfd and 0.9 Bcfd incremental)]	$0.38 (3.9 Bcfd)	$0.10
Freeport (Deloitte)	Single scenario, with and without	6 Bcfd LNG exports	$0.12 citygate national average, $0.22 at HH (2016-2035)	$0.02 (citygate), $0.04 (HH)
EIA (NEMS Modeling)	Total of 16 cases with 4 export scenarios examining impacts of either 6 or 12 Bcfd of exports phased in at a rate of 1 Bcfd per year or 3 Bcfd per year	5.3 Bcfd - 11.2 Bcfd (AEO Ref)	$0.55-$1.22	$0.10-$0.12
		5.3 Bcfd - 11.2 Bcfd (High Shale)	$0.38-$0.87	$0.07-$0.12
		5.3 Bcfd - 11.2 Bcfd (Low Shale)	$0.77-$1.65	$0.15-$0.17
		5.3 Bcfd - 11.2 Bcfd (High GDP)	$0.55-$1.26	$0.10-$0.12

Exhibit 7-3: Energy Market Impact Comparisons by Study

Facility (cont.)	Summary of Analysis	Case	Henry Hub Price Change Relative to Reference Case ($/MMBtu)	Henry Hub Price Change Relative to Reference Case ($/MMBtu per 1 Bcfd)
Price and Supply Source Assumptions (cont.)				
DOE (NERA)	8 cases examining different levels of U.S. demand and LNG export ranging from 3.75 to 15.75 Bcfd	6 Bcfd (Reference)	$0.34-$0.60	$0.09 to $0.10
		12 Bcfd (Reference)	$1.20	
		Unlimited Bcfd (Reference)	$1.58	
	7 cases examining different levels of U.S. demand and LNG exports ranging from 6 to 23 Bcfd	6 Bcfd (High EUR)	$0.42	$0.07
		12 Bcfd (High EUR)	$0.84	
		Unlimited Bcfd (High EUR)	$1.08 - $1.61	
	Single scenario with LNG exports reaching 1.42 Bcfd	6 Bcfd (Low EUR)	$0.14 (1 Bcfd)	$0.14
Dow Chemical (CRA)	3 export scenarios with CRA Base Demand (adjusted AEO 2013 for industrial demand)	4 Bcfd LNG export (AEO export), CRA Base Demand	$0.90 (2013-2030)	$0.23 (using 4 Bcfd)
		9 Bcfd LNG exports by 2025 and 20 Bcfd by 2030 layered on CRA Base Demand	$2.50 (2013-2030)	$0.13 (using 20 Bcfd)
		20 Bcfd LNG exports by 2025 and 35 Bcfd by 2030 layered on CRA Base Demand	$4.00 (2013-2030)	$0.11(using 35 Bcfd)
RBAC, REMI	2 export scenarios: 3 Bcfd and 6 Bcfd relative to a no export scenario	3 Bcfd	About $0.60 (2012-2025)	$0.20
		6 Bcfd	About $2.00 (2012-2025)	$0.33
API (ICF)	ICF Base Case	Up to ~4 Bcfd	$0.35	$0.10
	Middle Exports Case	Up to ~8 Bcfd	$1.19	$0.11
	High Exports Case	Up to ~16 Bcfd	$1.33	$0.10

WHERE FUNDS WILL GO FOR US PROJECTS

Table 1

	2013, million $	Change 2013-2012, %	2012, million $	Change 2012-2011, %	2011, million $
Exploration-production					
Drilling-exploration	240,154	0.4	239,205	7.3	222,936
Production	45,629	0.4	45,449	7.3	42,358
OCS lease bonus	2,100	15.7	1,815	458.5	325
Subtotal	287,883	0.5	286,469	7.8	265,619
Other					
Refining and Marketing	12,700	-2.3	13,000	7.4	12,100
Petrochemicals	1,800	38.5	1,300	333.3	300
Crude and products pipelines	23,246	435.2	4,344	214.6	1,381
Natural gas pipelines	15,254	252.6	4,327	-44.1	7,744
Other transportation	1,800	50.0	1,200	9.1	1,100
Mining, other energy	1,100	—	1,100	10.0	1,000
Miscellaneous	4,500	7.1	4,200	5.0	4,000
Subtotal	**60,401**	**105.0**	**29,471**	**6.7**	**27,625**
Total	**348,284**	**10.2**	**315,939**	**7.7**	**293,244**

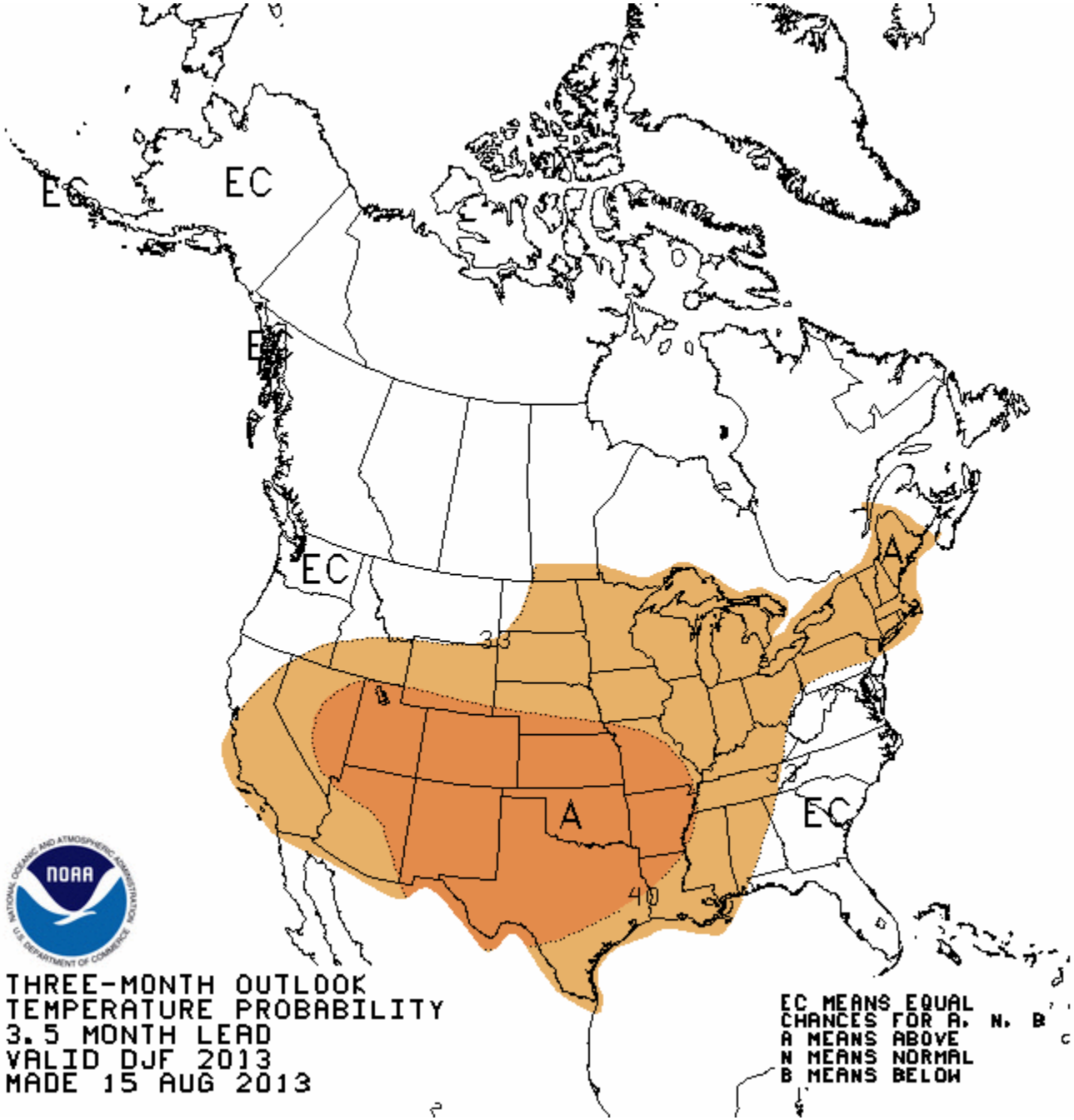
I end with a quote from Ellis Wyatt, one of the novel's heroes: "How many years ago was it that they gave up trying to get oil from shale, because it was too expensive?" he opines, surveying the Wyatt Oil Fields of Colorado, "Well, wait till you see the process I've developed. It will be the cheapest oil ever to splash in their faces, and an unlimited supply of it, an untapped supply that will make the biggest oil pool look like a mud puddle. Give me an unobstructed right of way and I'll show them how to move the earth!"

Drake Lawhead, London,
April 2013

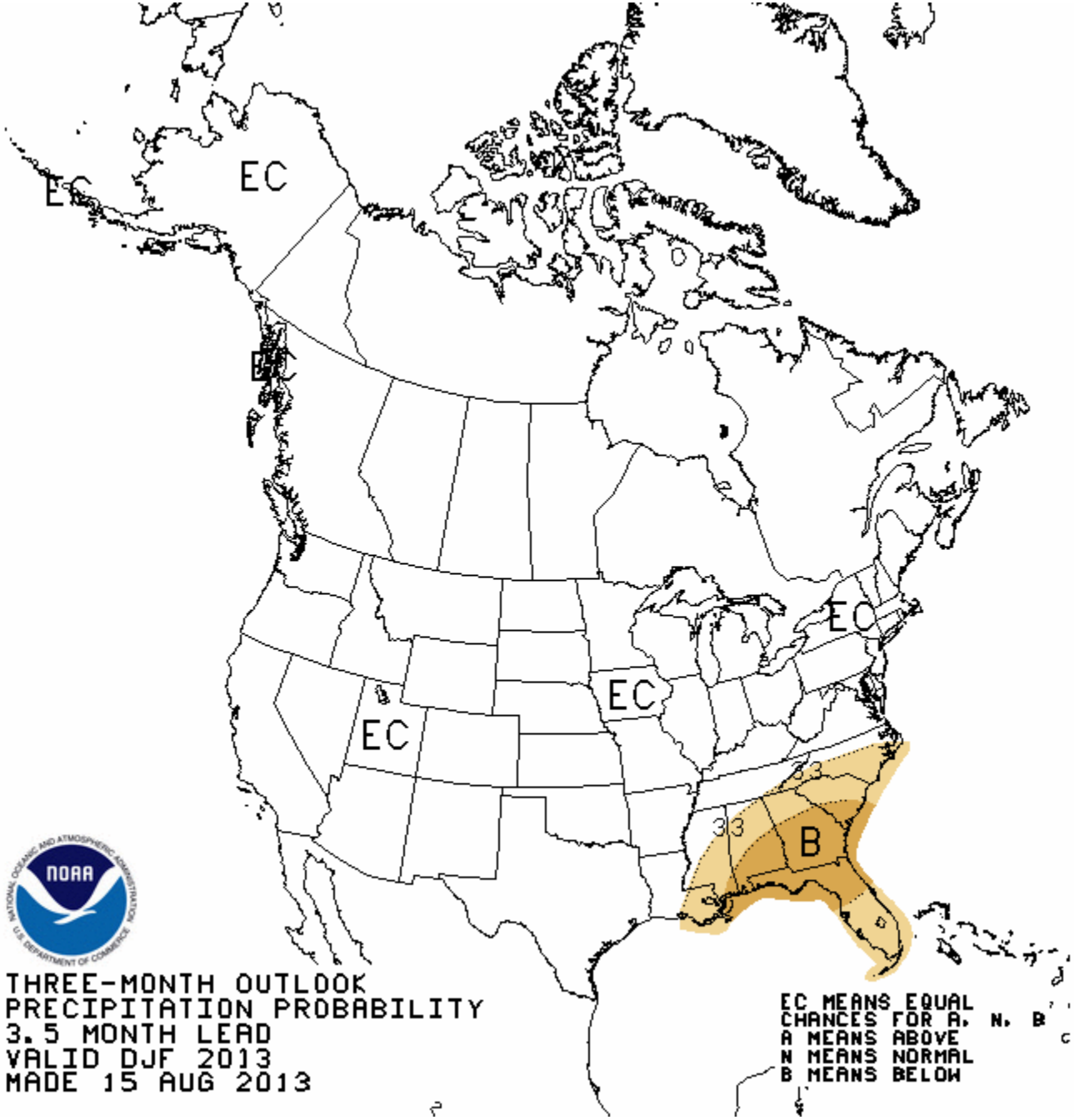
U.S. Distillate Fuel Oil Data

	Week Ending Aug 23	Week Ending Aug 16	Year Ago	% Change from Last Year	Average 2008-2012	% Change from Average
Total Distillate Fuel Oil Inventories (Million Barrels)						
U.S. Total	129.4	129.4	126.5	2.3%	147.9	-12.5%
East Coast	42.2	43.4	42.6	-0.9%	57.8	-27.0%
New England	4.7	4.8	7.3	-35.7%	10.1	-53.3%
Central Atlantic	25.7	25.3	23.5	9.2%	34.2	-24.8%
Lower Atlantic	11.8	13.3	11.7	0.4%	13.5	-13.1%
Midwest	29.6	29.5	29.7	-0.5%	30.1	-1.8%
Gulf Coast	42.4	41.1	39.3	7.9%	44.9	-5.5%
Mountain	3.2	3.3	3.3	-1.3%	3.2	0.8%
West Coast	12.0	12.1	11.6	3.4%	11.9	0.7%

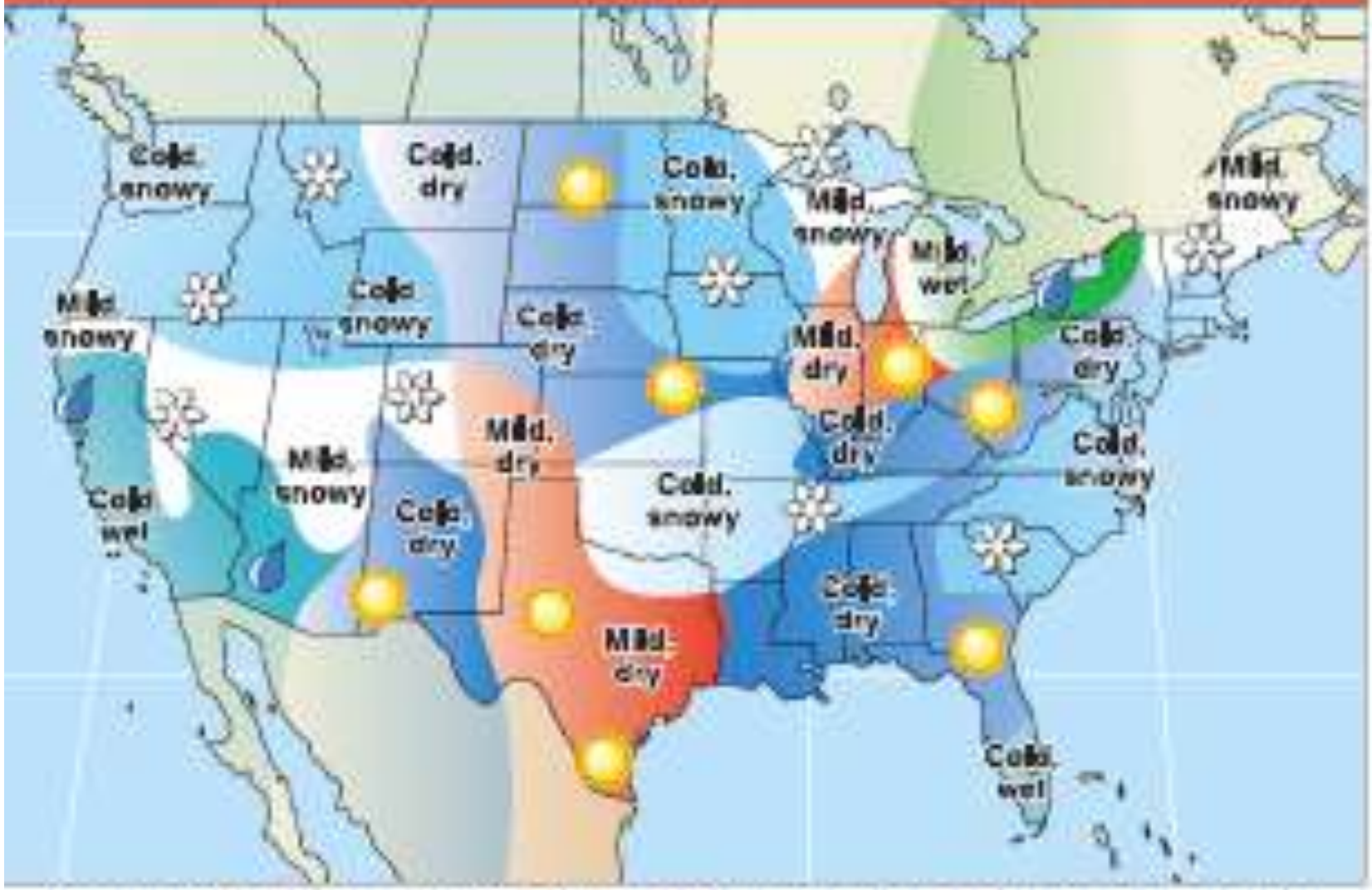
OFFICIAL Forecasts Dec-Jan - Feb 2013-14



OFFICIAL Forecasts Dec-Jan - Feb 2013-14



Winter 2013–14



These weather maps correspond to the winter (November through March) and summer (June through August) predictions in the General Weather Forecast (opposite). Forecast terms here represent deviations from the normals: learn more on page 202.

U.S. Gasoline Inventories						
	Week Ending Aug 23	Week Ending Aug 16	Year Ago	% Change from Last Year	Average 2008-2012	% Change from Average
Total Gasoline Inventories (Million Barrels)						
U.S. Total	219.1	220.2	204.1	7.3%	209.8	4.4%
East Coast	59.4	60.0	51.1	16.2%	55.8	6.4%
New England	5.7	5.4	3.1	80.8%	4.0	43.6%
Central Atlantic	30.2	30.4	26.0	16.0%	30.1	0.0%
Lower Atlantic	23.5	24.3	22.0	7.1%	21.7	8.4%
Midwest	48.1	47.8	48.4	-0.6%	48.5	-0.8%
Gulf Coast	76.8	76.4	70.6	8.7%	71.3	7.7%
Mountain	6.6	6.5	6.6	-0.3%	6.2	5.4%
West Coast	28.2	29.5	27.4	3.1%	28.0	1.0%

U.S. Refinery Operations						
	Week Ending Aug 23	Week Ending Aug 16	Year Ago	% Change from Last Year	Average 2008-2012	% Change from Average
U.S. Industry Operations						
Gross Inputs	16,246	16,324	15,668	3.7%	15,243	6.6%
Percent Operated	91.2	91.6	90.9	0.3%	86.8	5.1%
Total Gasoline Production (Million Barrels)						
U.S. Total	9.1	9.4	9.1	0.1%	9.3	-1.8%
Reformulated	3.1	3.0	3.1	0.3%	3.1	-0.5%
Conventional	6.1	6.4	6.1	0.0%	6.2	-2.4%
Distillate Fuel Oil Production (Million Barrels)						
U.S. Total	5.0	5.1	4.7	6.0%	4.5	11.7%
Low Sulfur	4.7	4.8	4.4	7.4%	4.0	16.6%
ULSD	4.5	4.6	4.2	8.2%	3.5	28.0%
High Sulfur	0.3	0.3	0.3	-12.0%	0.4	-25.2%

Source: API's *Weekly Statistical Bulletin*

- **Taxes – Access - Regulation**
- **Hydraulic fracturing**
- **Exports**
- **Oil sands/Keystone XL**
- **RFS, E15, Other fuels issues**

Thank You

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