



## **Coal's role in the U.S. economy**

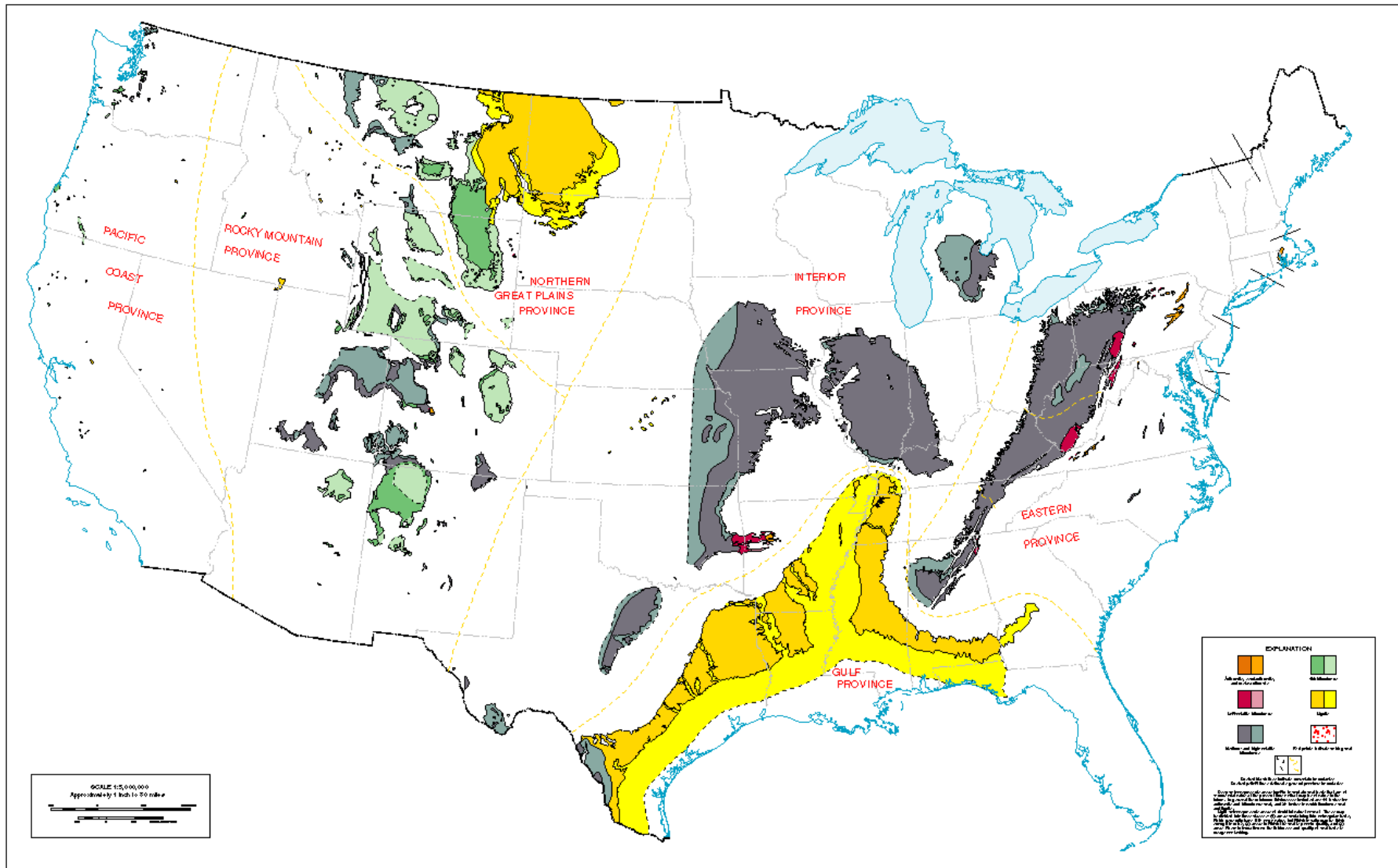
### **NCAC-SAIS Washington Energy Policy Conference**

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April 29, 2015  
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# U.S. coal resources: World's largest.



Source: U.S. Geological Survey.



**Large differences in states' reliance on coal for power generation in 2014.**

**2014 U.S. share:**

**Coal 38.7%**

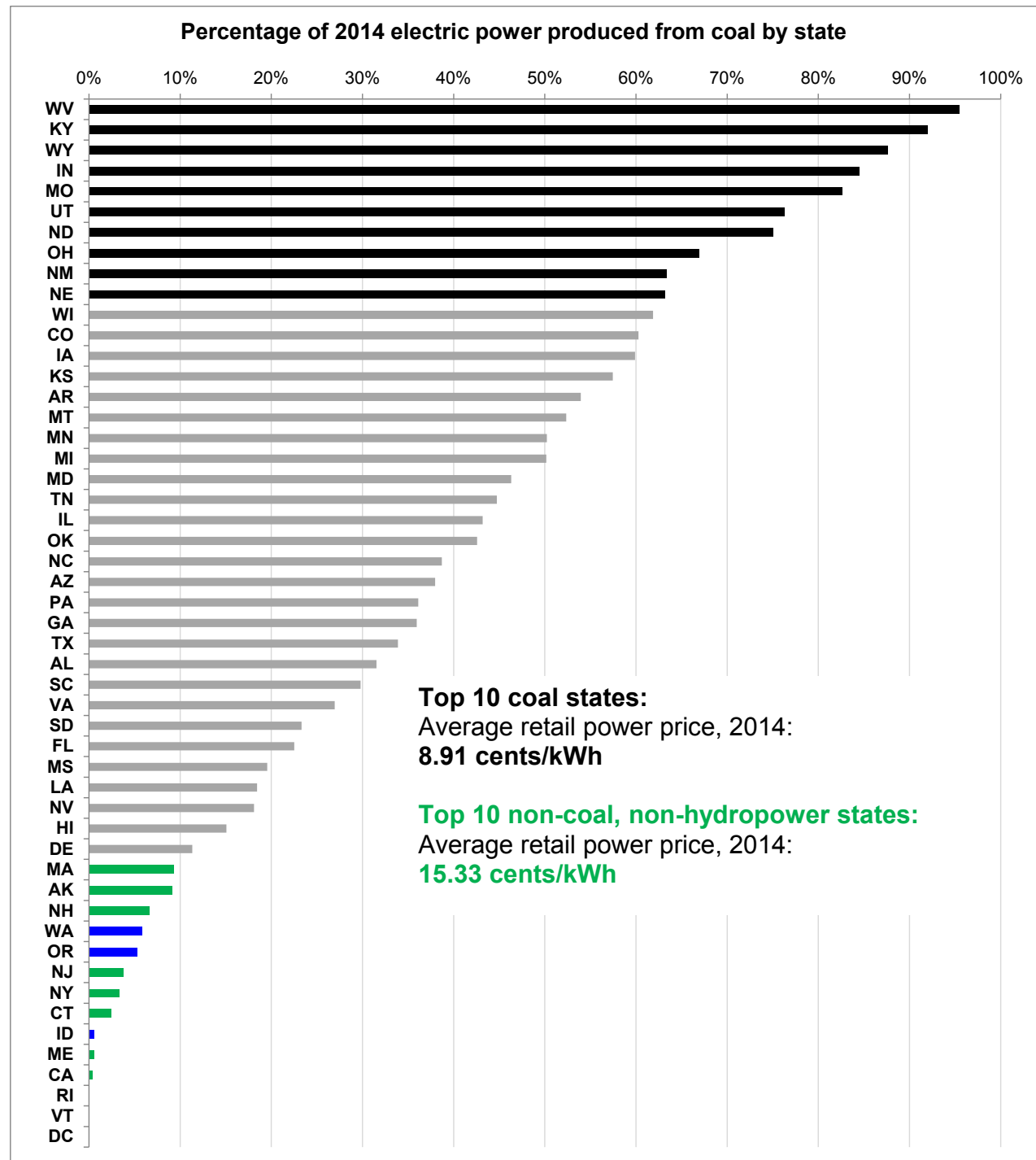
**Gas 27.4%**

**Nuclear 19.5%**

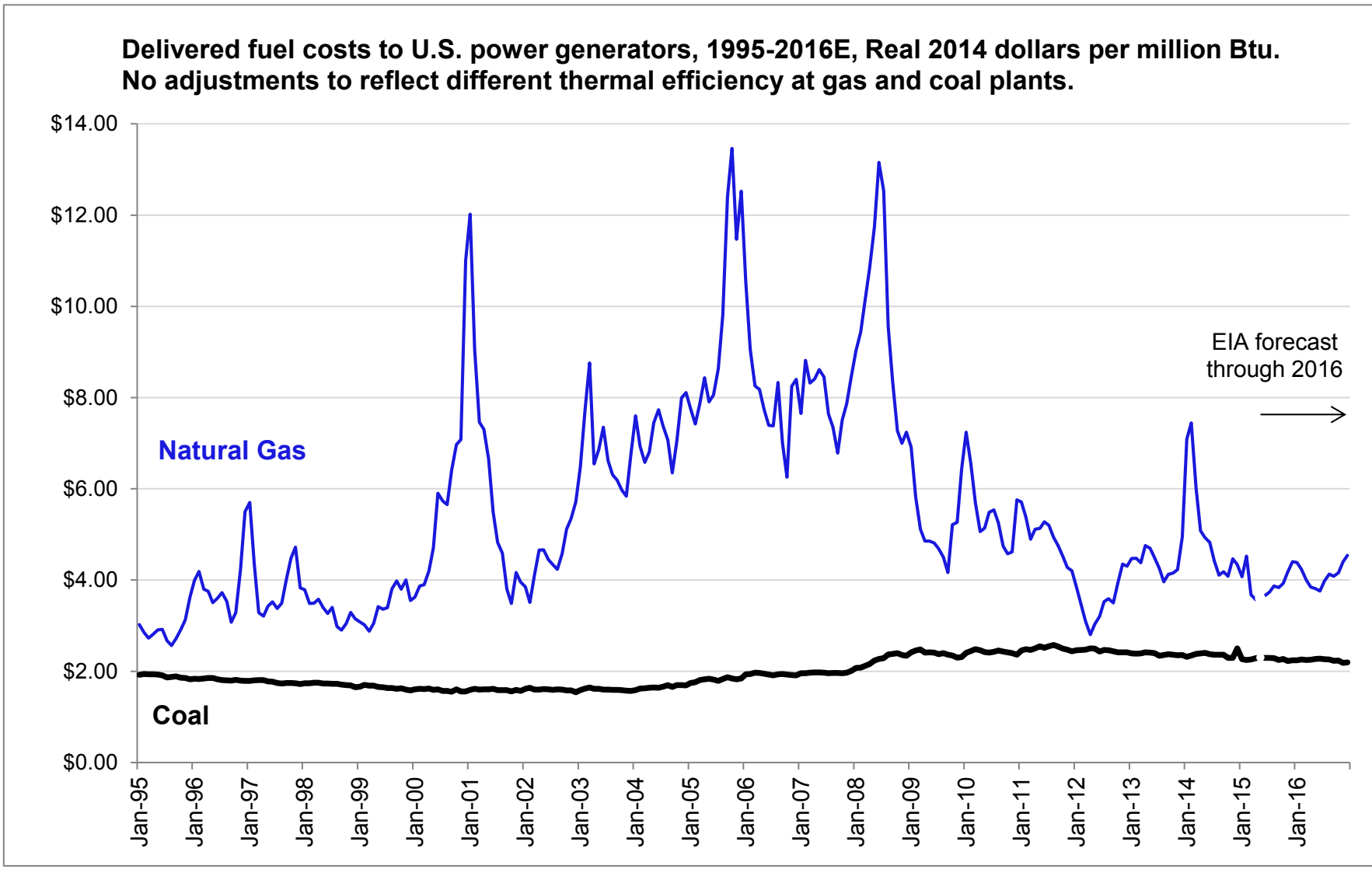
**Hydro 6.3%**

**Non-hydro renewables: 6.9%**

Source: EIA, February 2015 Electric Power Monthly. Top 10 non-coal, non-hydro states: VT, RI, CA, ME, CT, NY, NJ, NH, AK, MA. Average power prices from 2014 source: EIA-826 survey data.



# Coal's defense: Lower average delivered cost vs. gas...

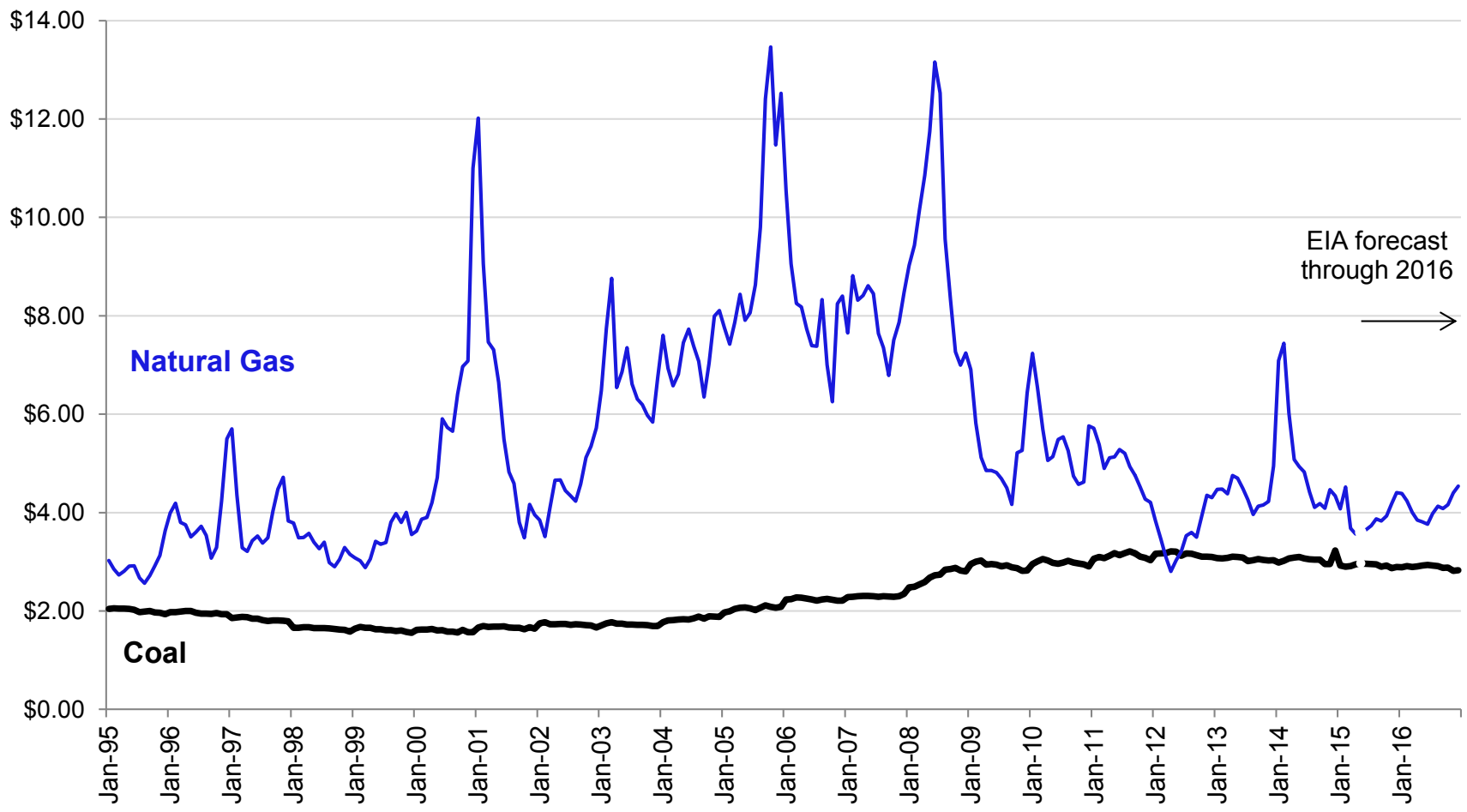


Source: EIA for history and April 2015 Short Term Energy Outlook for projection. Conversion to real terms using BLS CPI data.



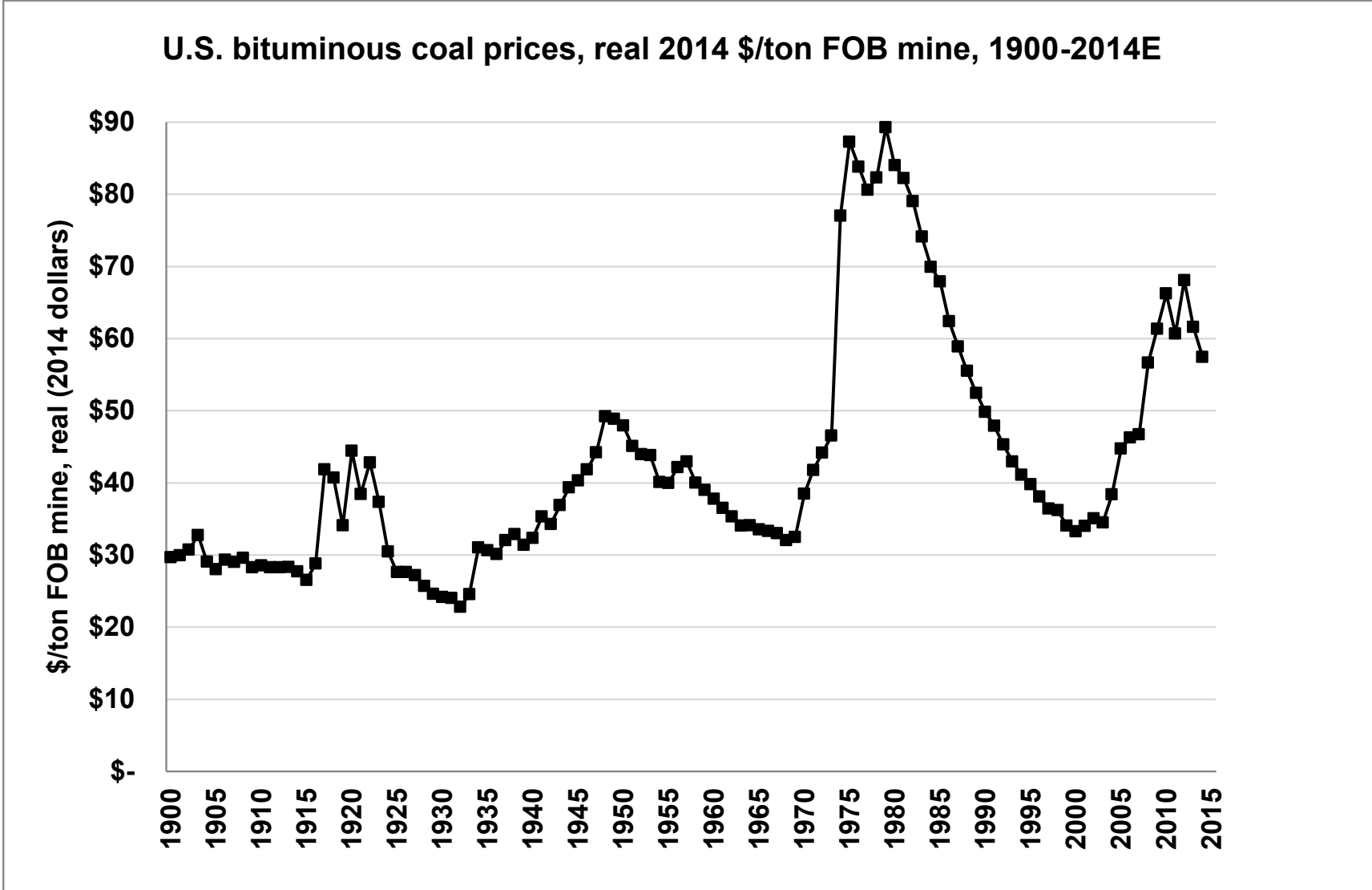
# ...although adjusting for heat rates narrows the gap.

Delivered fuel costs to U.S. power generators, 1995-2016E, Real 2014 dollars per million Btu. Coal costs are adjusted to reflect difference in thermal efficiency at gas plants; for 2014 this is an upward adjustment of 28.9%.



Source: EIA for history and April 2015 Short Term Energy Outlook for projection. Conversion to real terms using BLS CPI data. Stifel compilation of EIA and SNL data for heat rates. Heat rates calculated on an annual basis as a net-generation weighted average. Gas plants <100 MW excluded. 2015-16 estimates for coal adjusted using 2014 coal to gas heat rate difference of 1.289:1 (Coal: 10,532 Btu/kWh; Gas: 8,170 Btu/kWh).

# Real coal prices: Falling since 2012 after a strong decade



Source: pre-1949, Census Bureau, Historical Statistics of the United States, Colonial Times to 1970; EIA 1949-2013; Stifel estimate for 2014 coal prices.



## U.S. coal supply/demand: Shutdowns, gas impacting demand

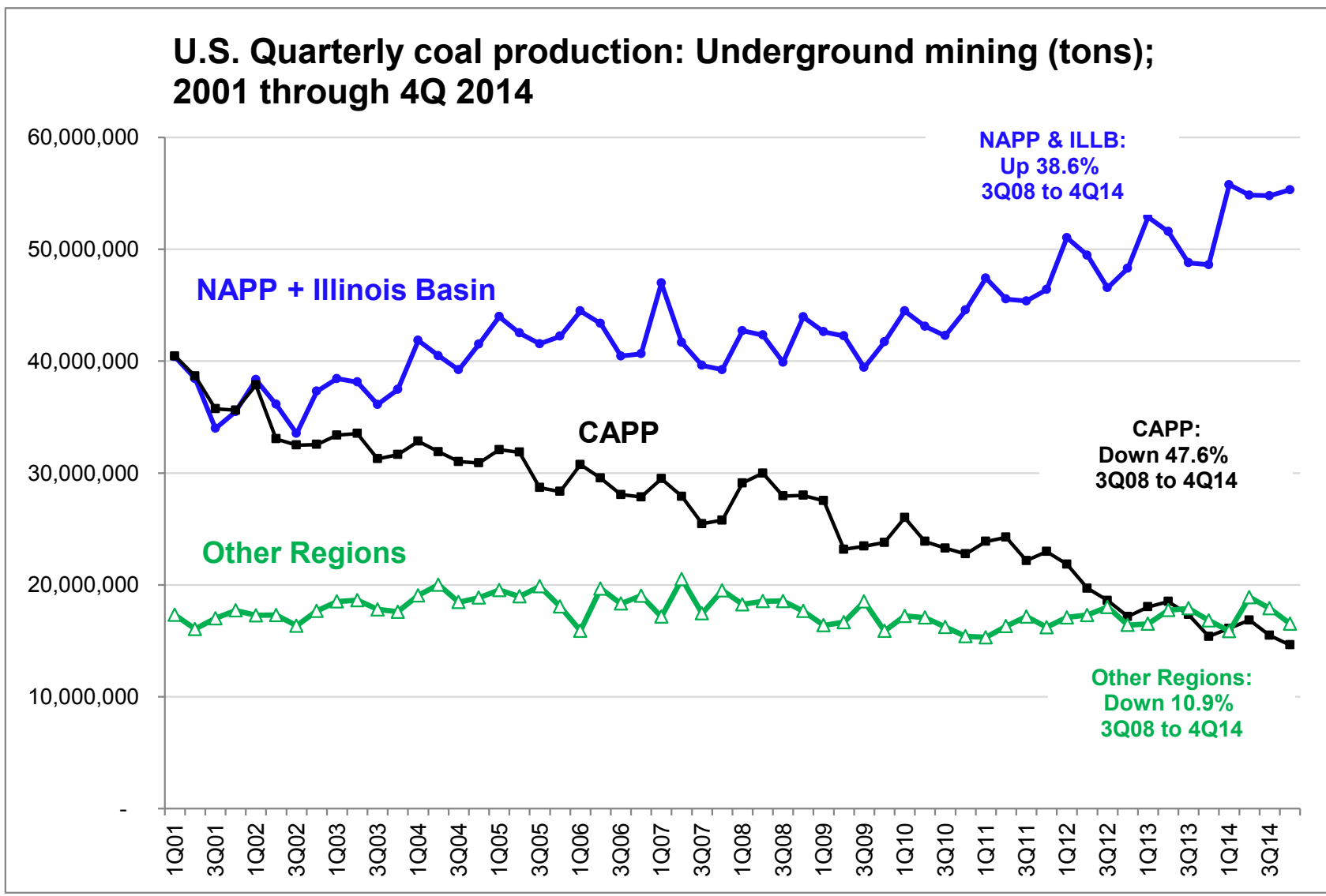
### Supply/demand balance for U.S. coal - history and projection

(In million tons)

	2007	2008	2009	2010	2011	2012	2013	2014E	2015E	2016E
<b>Coal supply:</b>										
Appalachian	378.5	391.2	343.3	336.4	337.2	293.0	270.1	268.2	230.6	211.0
Interior	147.1	147.0	146.6	156.3	170.8	179.6	182.5	188.7	177.4	173.8
West	621.0	633.6	585.0	591.6	587.6	542.7	529.7	542.8	528.7	523.9
Imports	36.3	34.2	22.6	19.4	13.1	9.2	8.9	11.3	12.2	12.2
Refuse Recovery	0.8	1.4	2.7	1.9	2.2	1.3	1.6	1.6	1.6	1.6
<b>Total supply</b>	<b>1,183.7</b>	<b>1,207.4</b>	<b>1,100.2</b>	<b>1,105.6</b>	<b>1,110.9</b>	<b>1,025.7</b>	<b>992.9</b>	<b>1,012.5</b>	<b>950.5</b>	<b>922.6</b>
<b>Coal demand:</b>										
Electric power	1,045.1	1,040.6	933.6	975.1	932.5	824.8	858.4	854.4	786.1	774.3
Coking coal	22.7	22.1	15.3	21.1	21.4	20.8	21.1	21.0	20.6	20.2
Other industrial	56.5	54.4	45.3	49.3	46.2	42.9	41.9	42.5	42.3	42.1
Exports:										
Steam coal	27.0	39.0	21.8	25.6	37.6	55.9	54.1	34.3	29.1	27.7
Coking coal	32.2	42.5	37.3	56.1	69.5	69.9	65.4	63.0	51.7	48.6
Total exports	59.2	81.5	59.1	81.7	107.1	125.7	119.5	97.3	80.8	76.3
Other demand	3.2	3.5	3.2	3.1	2.8	2.0	2.1	2.1	2.1	2.1
<b>Total demand</b>	<b>1,186.7</b>	<b>1,202.1</b>	<b>1,056.5</b>	<b>1,130.3</b>	<b>1,110.0</b>	<b>1,016.2</b>	<b>1,042.9</b>	<b>1,017.4</b>	<b>931.9</b>	<b>914.9</b>

Source: EIA for supply/demand data 2007-2013 and most 2014 data; Stifel projections

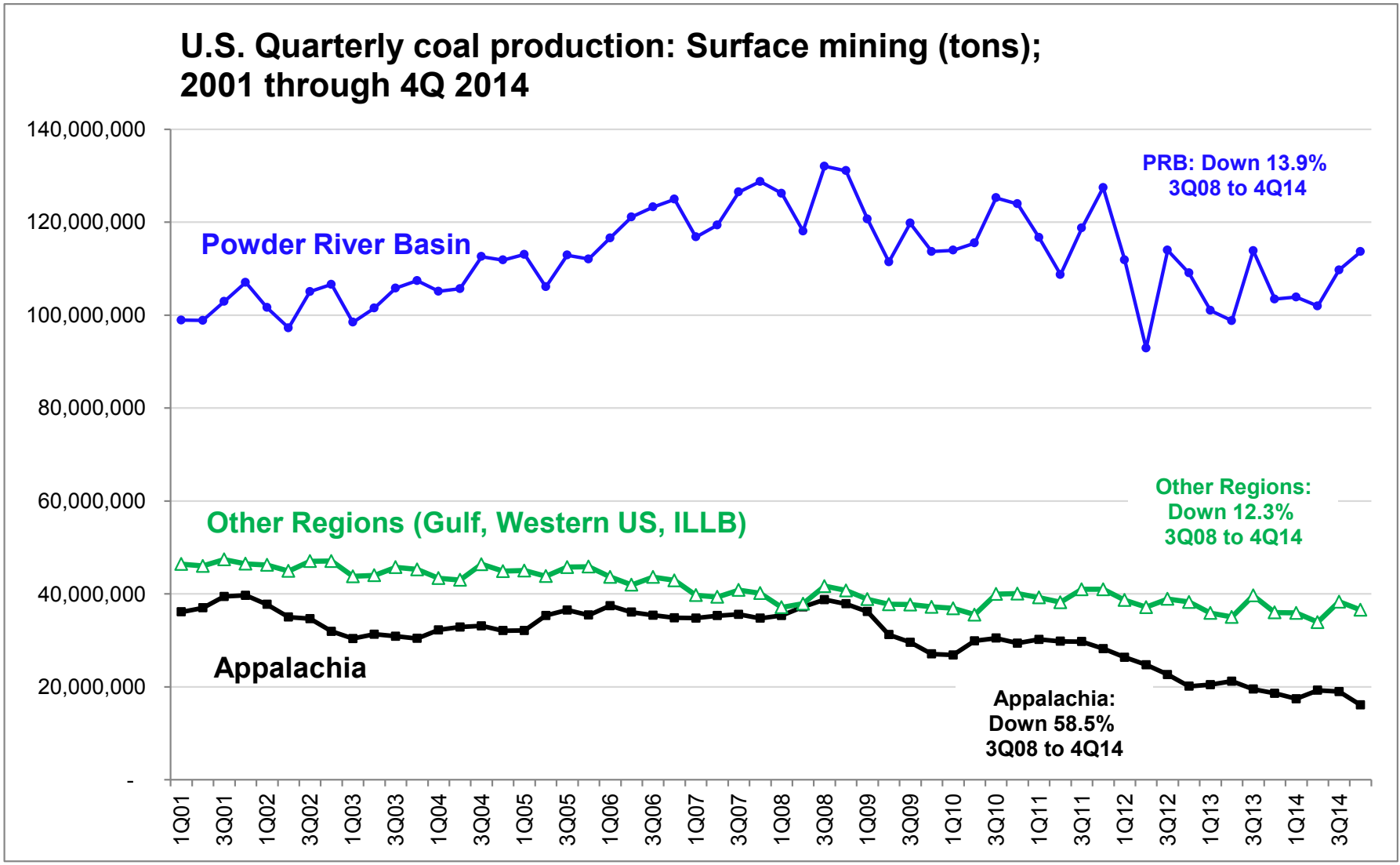
# Regional shifts in coal output since 2001: Underground.



Source: Mine Safety and Health Administration



# Regional shifts in coal output since 2001: Surface.



Source: Mine Safety and Health Administration



## The U.S. is the #2 exporter of metallurgical-grade coal.

### Metallurgical coal: World import/export flows (millions of tonnes)

<u>Imports</u>	2008	2009	2010	2011	2012	2013	2014	2015E	2016E	2013-	2014-	2015E-
										2014	2015E	2016E
Europe	60	38	57	59	56	55	63	63	63	14.6%	0.0%	1.0%
Japan	65	50	62	58	54	57	55	55	55	-3.6%	-0.5%	0.0%
China	6	43	53	48	72	90	77	73	72	-14.7%	-5.5%	-1.0%
Korea	21	20	27	30	27	29	32	33	33	9.3%	1.0%	1.0%
India	26	28	35	33	35	37	45	48	51	21.2%	6.5%	7.0%
Brazil	12	11	12	12	12	12	14	14	13	12.3%	1.0%	-3.0%
Taiwan	6	4	9	9	9	10	10	11	11	1.0%	3.0%	3.0%
Rest of World	29	17	20	18	16	17	18	18	19	3.4%	3.0%	3.5%
<b>Total</b>	<b>225</b>	<b>211</b>	<b>274</b>	<b>266</b>	<b>280</b>	<b>308</b>	<b>314</b>	<b>313</b>	<b>317</b>	<b>1.8%</b>	<b>-0.1%</b>	<b>1.3%</b>

<u>Exports</u>	2008	2009	2010	2011	2012	2013	2014	2015E	2016E	2013-	2014-	2015E-
										2014	2015E	2016E
Australia	134	134	159	133	145	170	186	194	198	9.9%	4.0%	2.0%
USA	39	34	51	63	63	59	57	47	44	-3.8%	-18.0%	-6.0%
Canada	27	22	27	28	31	35	31	30	31	-11.8%	-3.0%	2.0%
Russia	5	7	10	9	10	16	15	15	16	-9.4%	6.0%	5.0%
Mongolia	4	4	15	20	19	15	15	15	17	-4.4%	4.0%	10.0%
China	3	1	1	2	1	1	1	1	1	71.1%	0.0%	0.0%
Indonesia	3	3	5	4	3	4	1	1	1	-65.3%	0.0%	0.0%
Rest of World	9	7	6	6	8	7	7	8	8	0.3%	10.0%	3.5%
<b>Total</b>	<b>224</b>	<b>211</b>	<b>275</b>	<b>265</b>	<b>280</b>	<b>308</b>	<b>314</b>	<b>312</b>	<b>316</b>	<b>2.0%</b>	<b>-0.5%</b>	<b>1.4%</b>
Balancing value (exports less imports)	(1)	(0)	0	(2)	(0)	(1)	0	(1)	(1)			

Source: Stifel and McCloskey (IHS) compilations of public data. Stifel forecasts for 2015-2016. Numbers may not foot due to rounding Chinese imports include PCI and Semi-soft coal from Australia.

## U.S. exports of thermal coal: Swing supply in billion ton market

### Thermal coal: World import/export flows (millions of tonnes)

<u>Imports</u>	2008	2009	2010	2011	2012	2013	2014	2015E	2016E	2013- 2014	2014- 2015E	2015E- 2016E
China	39	98	138	184	219	243	202	199	205	-16.9%	-1.5%	3.0%
India	36	60	76	94	123	143	176	194	209	23.0%	10.0%	8.0%
Japan	129	111	125	119	129	138	132	132	134	-3.9%	0.0%	1.0%
South Korea	77	82	94	98	92	92	95	96	97	3.7%	1.0%	1.0%
Europe	190	171	158	172	194	190	180	180	178	-5.4%	0.0%	-1.0%
Asia - Other	109	107	118	123	124	131	132	138	143	0.4%	5.0%	3.5%
Rest of World	89	64	65	59	60	58	63	64	66	8.4%	1.0%	3.5%
<b>Total</b>	<b>668</b>	<b>693</b>	<b>773</b>	<b>849</b>	<b>942</b>	<b>995</b>	<b>980</b>	<b>1,003</b>	<b>1,032</b>	<b>-1.5%</b>	<b>2.3%</b>	<b>2.9%</b>
<u>Exports</u>	2008	2009	2010	2011	2012	2013	2014	2015E	2016E	2013- 2014	2014- 2015E	2015E- 2016E
Australia	125	139	142	148	171	188	201	204	208	6.7%	1.5%	2.0%
Indonesia	200	234	298	353	384	424	408	412	421	-3.8%	1.0%	2.0%
Colombia	69	63	69	76	80	74	75	82	86	1.7%	10.0%	5.0%
Russia	74	80	79	88	105	112	117	126	139	4.3%	8.0%	10.0%
China	42	22	18	11	8	6	5	4	3	-22.6%	-20.0%	-20.0%
South Africa	69	67	71	69	76	73	76	78	79	4.0%	2.0%	1.0%
USA	35	19	23	34	50	46	31	26	25	-33.7%	-15.0%	-5.0%
Rest of World	58	70	78	80	73	77	73	77	79	-4.6%	4.5%	2.5%
<b>Total</b>	<b>671</b>	<b>695</b>	<b>778</b>	<b>860</b>	<b>947</b>	<b>1,001</b>	<b>986</b>	<b>1,009</b>	<b>1,039</b>	<b>-1.5%</b>	<b>2.3%</b>	<b>2.9%</b>
Balancing value (exports less imports)	3	2	5	11	5	5	5	6	6			

Source: Stifel and McCloskey (IHS) compilations of public data. Stifel forecasts for 2015-2016. Numbers may not foot due to rounding.

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