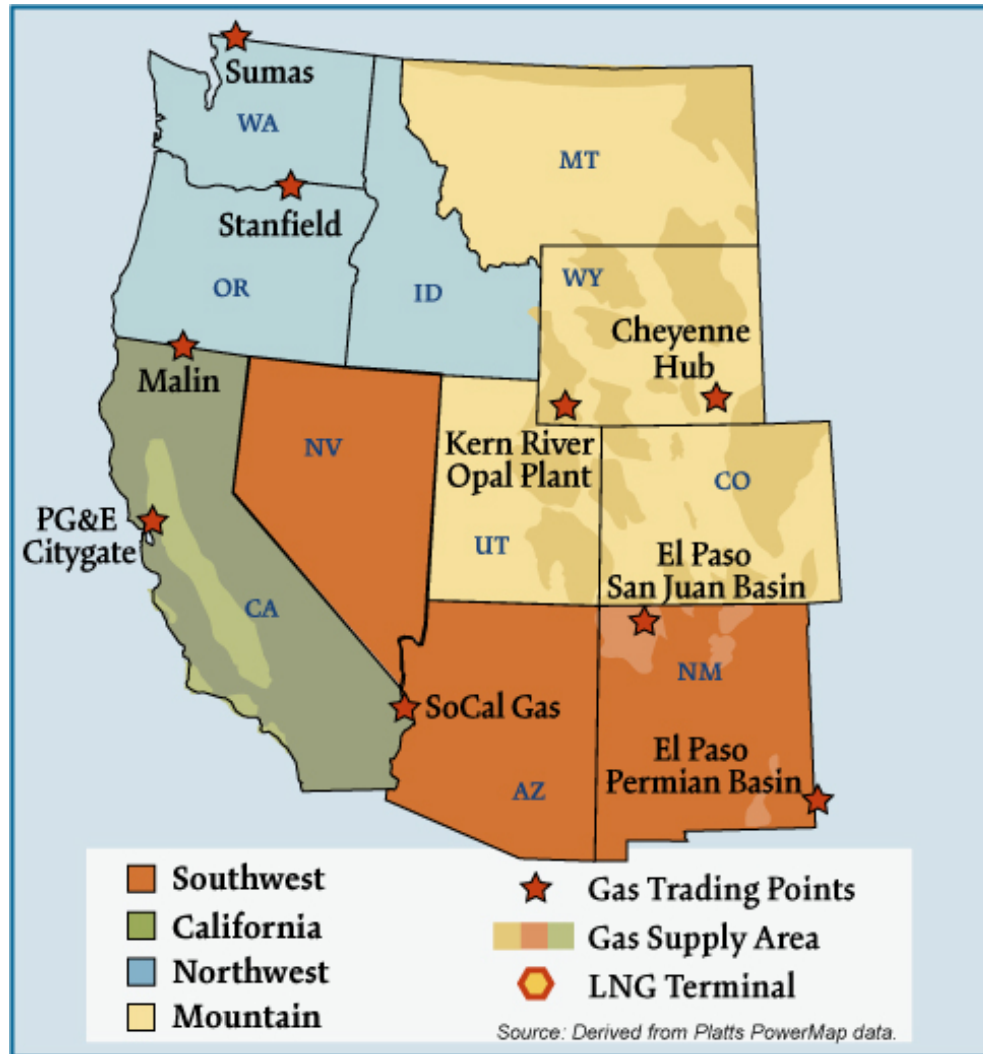


# Western Natural Gas Regions



## Overview:

### Market Description

The Western market is becoming a more prolific supplier and consumer of natural gas. Natural gas is the marginal fuel for dispatching power plants throughout most of the West. However, gas use is dependent on a complex set of factors: weather, storage inventory levels, pipeline capacity availability, hydroelectric resource availability, power-related imports, transmission line congestion, and other fossil-plant availabilities. The Western gas market is much more robust than it was 5-years ago because of massive, across the board investments in all phases of the natural gas supply chain (upstream wells, gathering and processing facilities, interstate pipeline expansions, market area storage, and distribution systems). Because of expanded drilling, Rockies natural gas production now equals about 8 Bcfd or 15 percent of total U.S. domestic dry gas production. Imports from Western Canada supply another 2 to 3 Bcfd of natural gas to the West. California accounts for the more than one-half of total regional gas use. Overall regional gas use is split somewhat comparably amongst the residential, industrial, and power sectors. Physical and financial gas-related products are traded actively at numerous market locations in the West. Storage capacity limitations in the Southwest can influence pipeline operating conditions, especially during peak periods.

### Geography

**States covered:** Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

### Major Trading Hubs

Cheyenne Hub, Opal, PG&E Citygate, SoCal Border, El Paso San Juan, El Paso Permian, and Sumas.

## Storage

**State Capacity:** California and Montana have 68 percent of total West capacity.

Aquifer Capacity: 5%

Depleted Field Capacity: 95%

Total Capacity: 1,345 Bcf. Comprises 16 percent of total U.S. storage capacity.

Major Storage Pipelines and Capacity:

California

SoCal Gas: 130 Bcf

PG&E: 42 Bcf

Lodi: 17 Bcf

Wild Goose: 24 Bcf

Wyoming

Clay Basin: 51 Bcf

Washington

Jackson Prairie: 22 Bcf

Colorado

Fort Morgan: 8.5 Bcf

Young: 5.8 Bcf

Latigo: 8.3 Bcf

Flank: 7.2 Bcf

Boehm: 5.2 Bcf

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**Demand by Sector (2005):**

- Residential: 22%
- Commercial: 12%
- Industrial: 28%

**State:** California accounts for 52 percent of total Western market demand. Arizona, Colorado, Oregon and Washington comprise about 30 percent of total West demand.

**Western Total:** 4.3 Tcf annually (11.9 Bcfd), which comprises 19 percent of total U.S. demand.

**Consumer Total:** 18.0 million, which is approximately 20 percent of total consumers in the U.S.

**Key Consuming States:** California, Arizona, Colorado, and Washington make up 55 percent of the consumers in the West and about 16 percent of the total consumers in the U.S.

**Residential Consumers:** 94%

**Production**

**State:** Colorado, Wyoming, and Utah make up 86 percent of total West production. They comprise 23 percent of total U.S. production.

**Total:** Total West production comprises 27 percent of total U.S. production.

**Prices at Southern California****2005**

- \* Average Daily Price: \$7.56
- \* Average Daily Basis: -\$1.24
- \* Highest Daily Price: \$13.92
- \* Lowest Daily Price: \$5.24

**2006**

- \* Average Daily Price: \$6.09
- \* Average Daily Basis: -\$0.69
- \* Highest Daily Price: \$8.27
- \* Lowest Daily Price: \$3.55

## Pipeline Flows

**Major Pipelines:** Kern River Gas Transmission, El Paso Natural Gas, Transwestern Pipeline, TransCanada GTN, Northwest Pipeline, and Southern Trails Pipeline.

### Average Daily Rockies Deliveries to the Midwest:

2005: 3.3 Bcfd

2006: 3.3 Bcfd

**Major Pipelines:** Trailblazer, Cheyenne Plains, El Paso and Colorado Interstate Gas carry a significant amount of gas from the Rockies to the Midwest. They carried:

2005: 73%

2006: 72%

### Average Daily Rockies Deliveries to the West:

2005: 5.1 Bcfd

2006: 5.5 Bcfd

**Major Pipelines:** El Paso, Kern River and Northwest carry most of the gas from the Rockies further to the West. They flow:

2005: 88%

2006: 88%

## Imports and Exports

### Average Daily Imports from Canada into the West:

2005: 2.5 Bcfd

2006: 2.5 Bcfd

**Major Importers:** Northwest and GTN are the only two pipelines importing all of the gas from Canada into the Western U.S.

## Focal Points

**Southwest Generation:** A combination of structural demand growth, hot weather, nuclear power plant outages at Palo Verde, and the mothballing of the Mohave generating station in Nevada contributed to significant increases in natural gas consumption by power generators in the Southwest. Based on analysis of pipeline data, estimated daily natural gas demand in Arizona rose by more than 500 MMcfd in 2006, or 62 percent, rising to 1,332 MMcfd from 820 MMcfd. Two-thirds of the growth in Arizona demand (342 MMcfd) came from the power sector.

**Pipeline Capacity:** The Cheyenne Plains Pipeline began commercial service in December 2005. Based on pipeline postings, average daily flow was 548 MMcfd in 2006, up 98 MMcfd from 2005. The lack of surplus take-away capacity on pipelines transporting western volumes into Mid-Continent was the main bottleneck retarding greater production volumes. The Rockies Express Pipeline is another system designed to address this bottleneck. The first phase and furthest upstream leg of the Rockies Express Pipeline – the Entrega Pipeline – began commercial service in 2006. According to available capacity postings from pipelines, initial flows averaged 175 MMcfd in 2006. The overall project is slated to be completed in 2010 and will ultimately link Colorado and Wyoming gas receipts with downstream markets in the Mid-Continent, Upper Midwest, and market area storage in Pennsylvania.

## Yearly Average of Spot Hub Prices

### Annual Average Day Ahead Prices (\$/MMBtu)

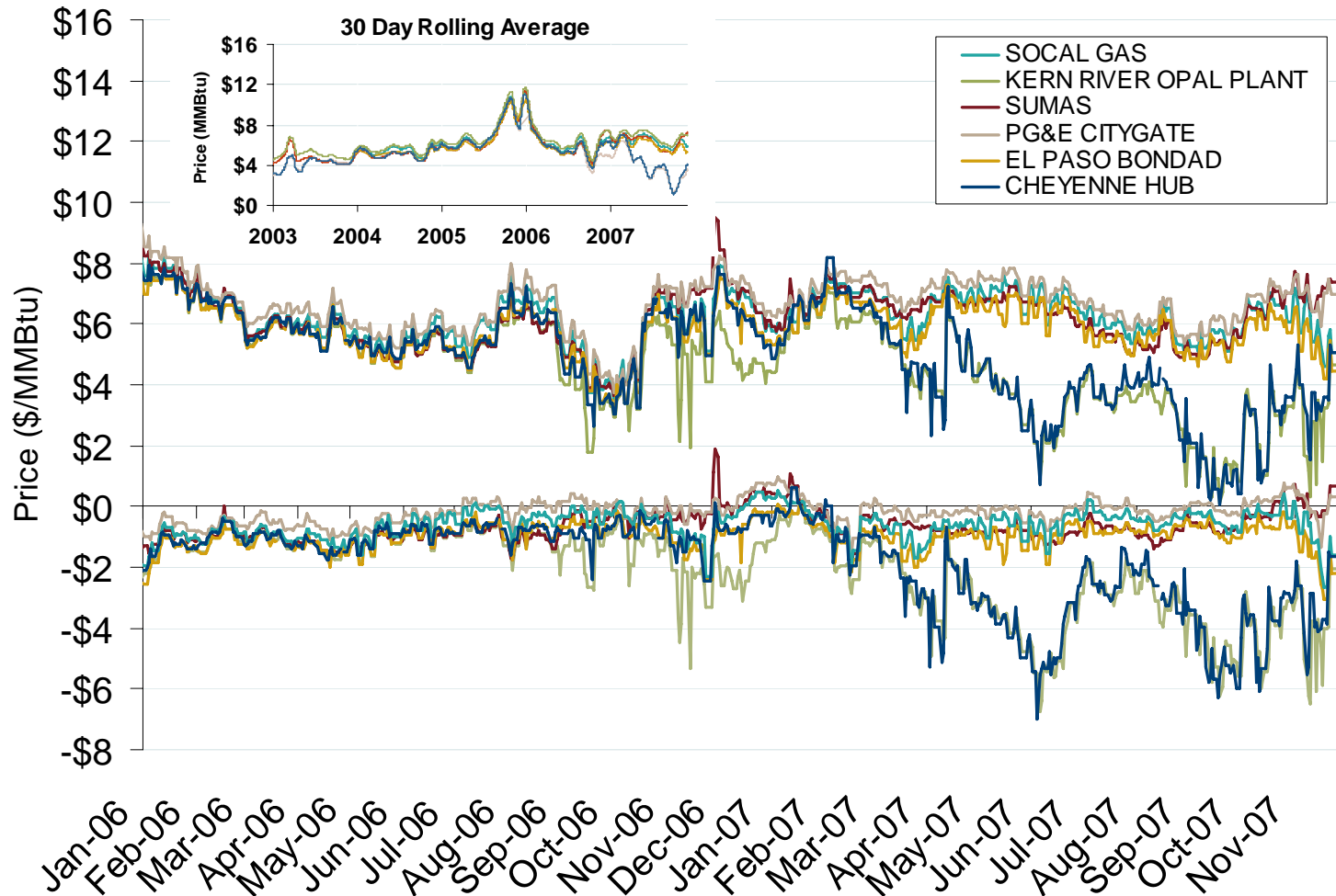
	2005	2006	5 Years
Socal border	\$7.56	\$6.10	\$5.48
PG&E citygates	\$7.94	\$6.47	\$5.70
Opal	\$7.14	\$5.39	\$4.78
Sumas (Huntington)	\$7.40	\$6.01	\$5.18
El Paso San Juan	\$7.12	\$5.74	\$4.87

Source: Derived from *Platts* data.

Updated January 16, 2007

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## Western Day-Ahead Hub Spot Prices and Basis

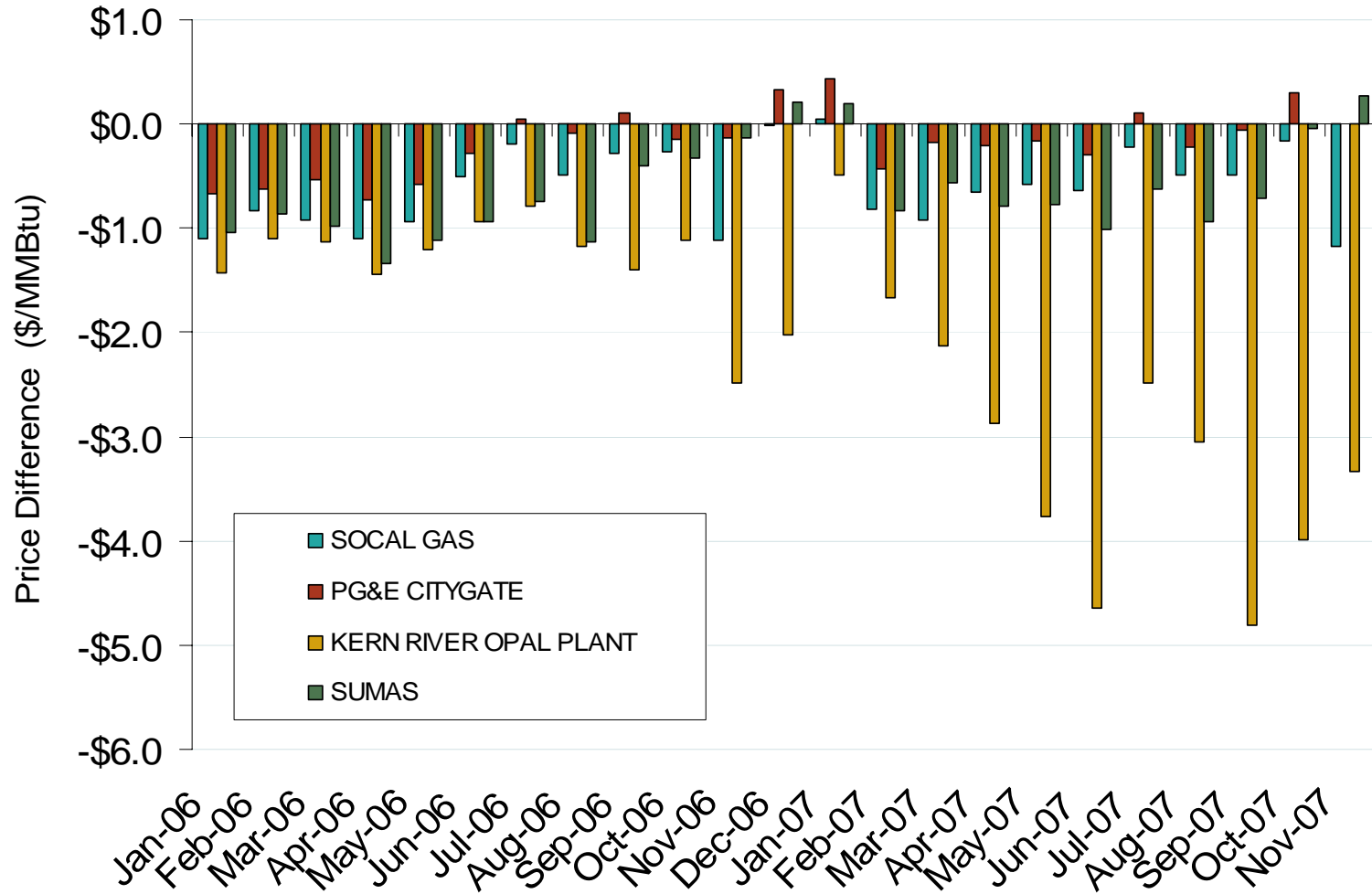


Source: Derived from *Platts* data.

Updated December 7, 2007 2072

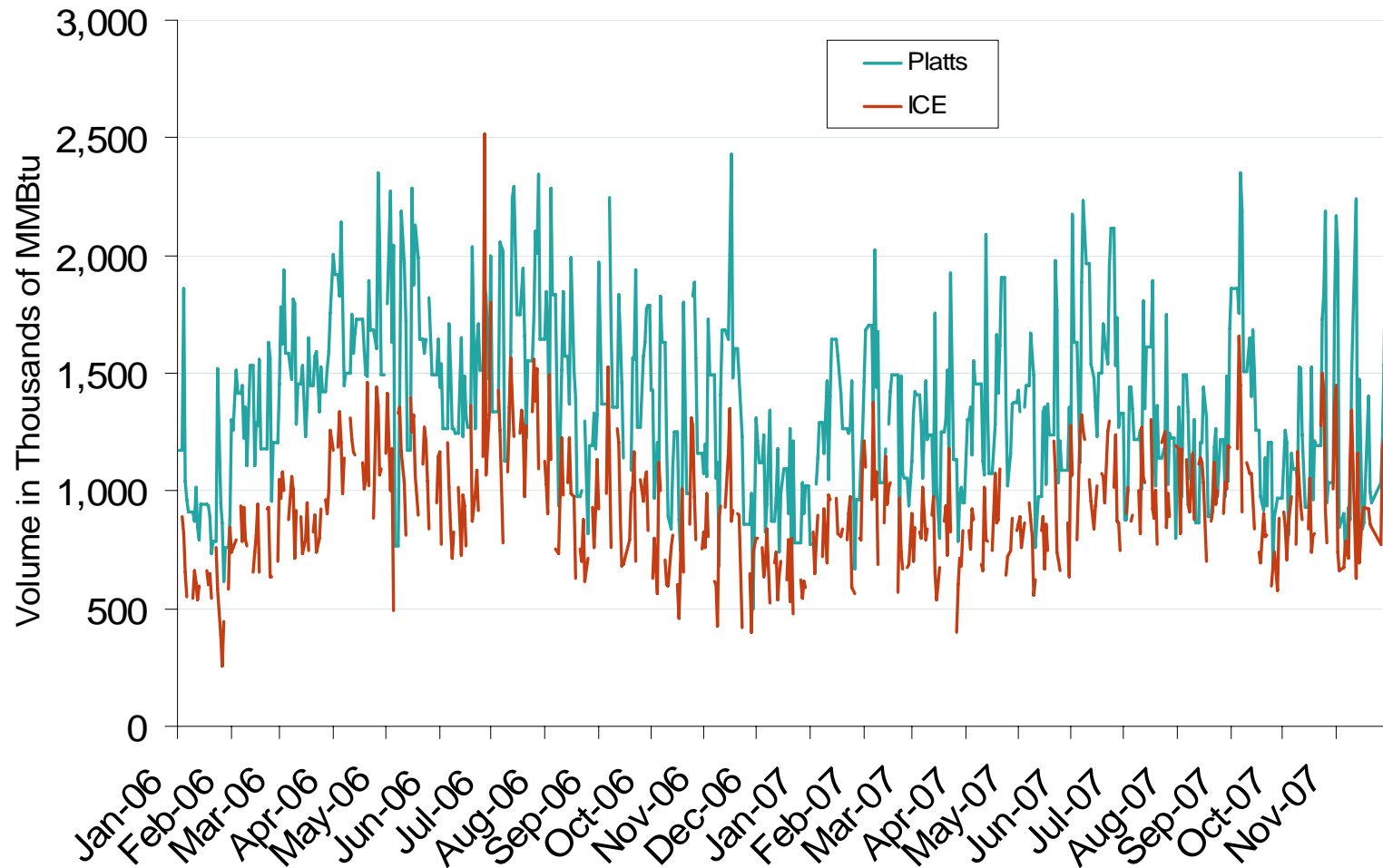


## Western Monthly Average Basis Value to Henry Hub



Source: Derived from *Platts* data.

## Published and Traded Daily Spot Volumes at Social Border

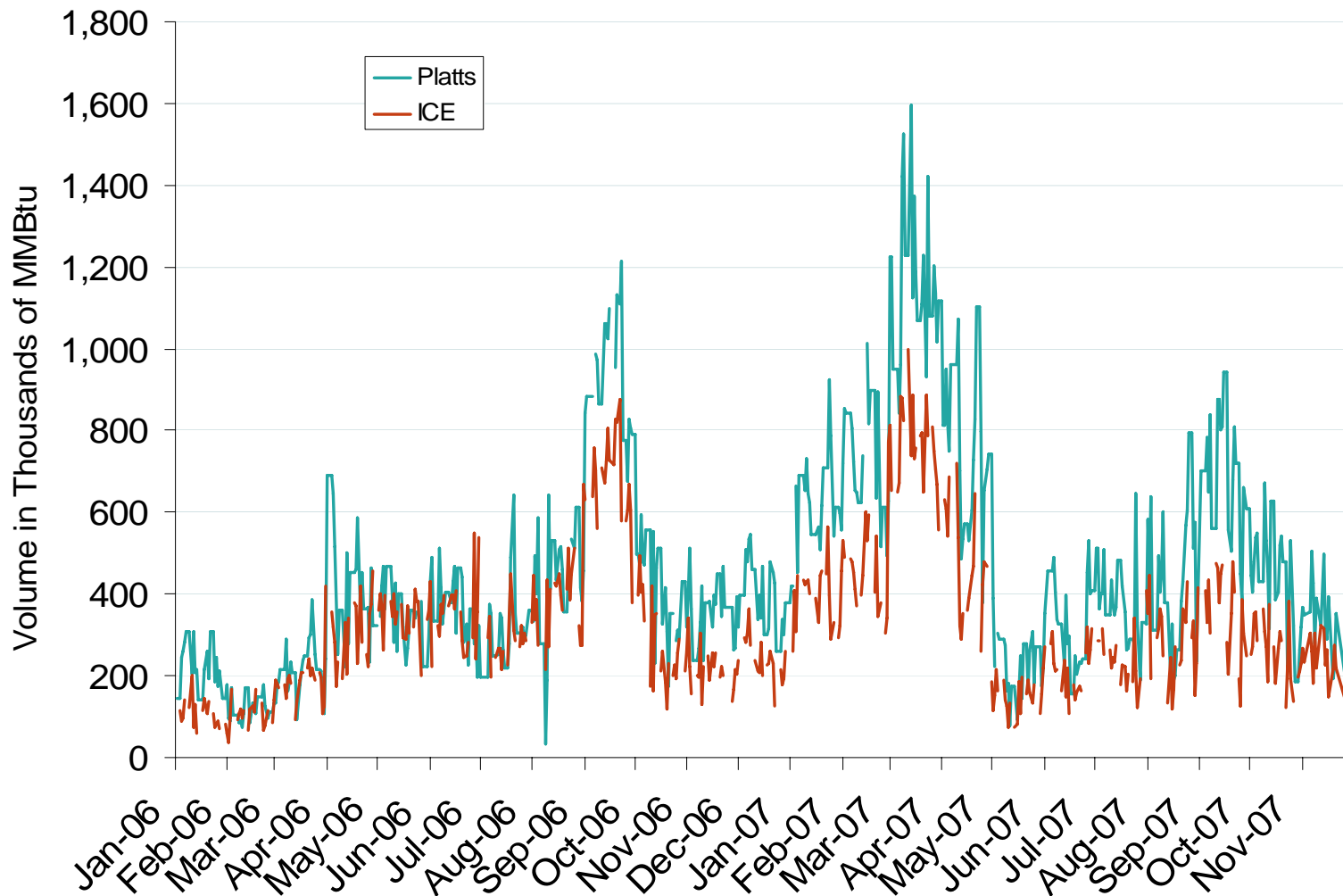


Source: Derived from *Platts* and *ICE* data.

Updated December 7, 2007

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## Published and Traded Daily Spot Volumes at Kern River

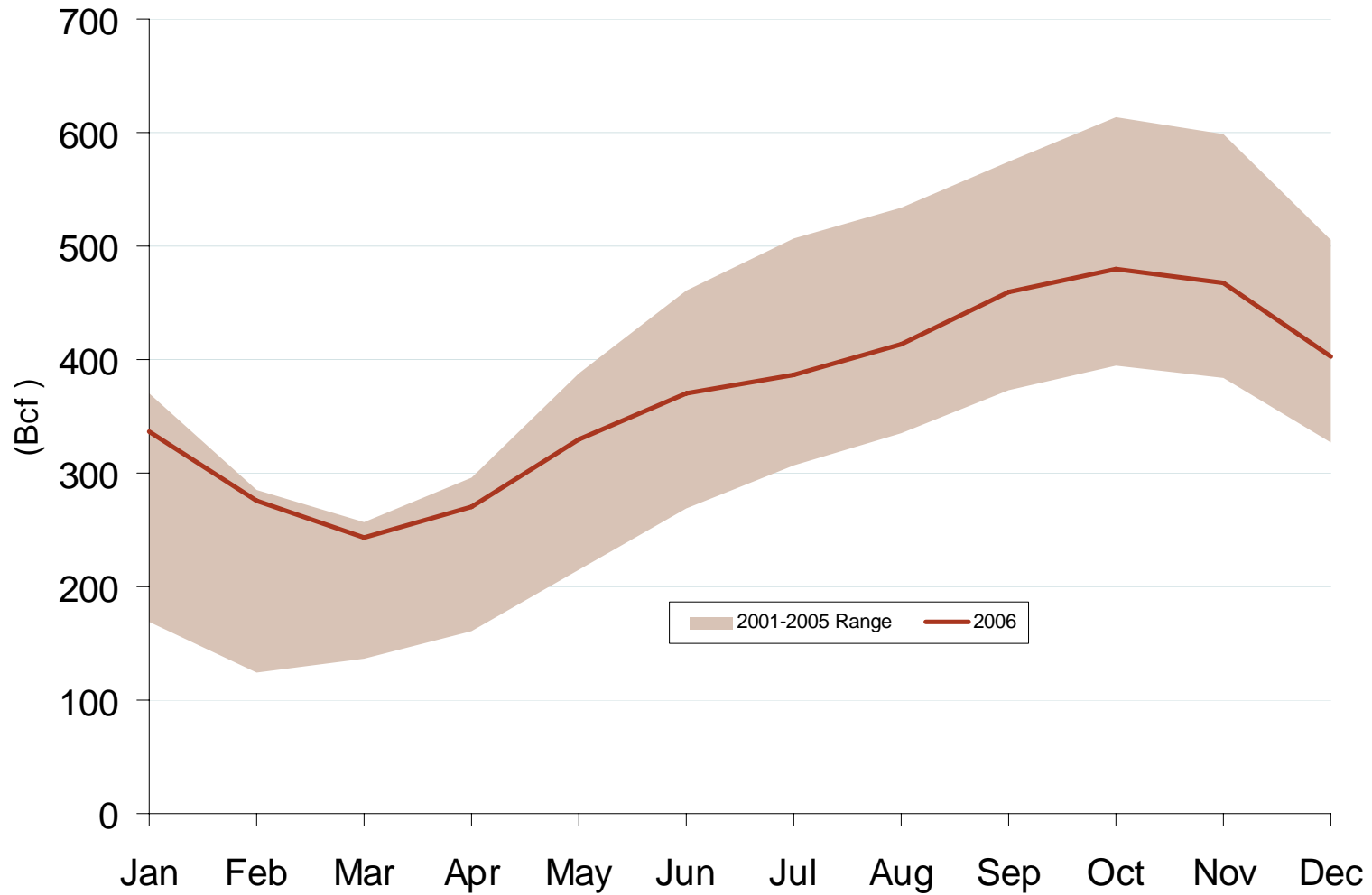


Source: Derived from *Platts* and *ICE* data.

Updated December 7, 2007

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## Western Regional Storage Inventory Levels



Source: Derived from EIA data.

Updated August 9, 2007

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## Pipeline Projects

Pipeline Projects						
Company	Project Name	Capacity (MMcf/d)	Capital Cost (Millions)+	Status	Year Certificated	From-To State
Cheyenne Plains Gas Pipeline Co., LLC	Cheyenne Plains 2005 Expansion	170	\$7.8	In-Service 11/05	2004	CO-CO
Questar Pipeline Company	Questar	10	\$2.5	In-Service 01/05	2004	UT-UT
Transwestern Pipeline Company	San Juan Lateral Expansion	375	\$138.4	In-Service 04/05	2004	NM-NM
Colorado Interstate Gas Company	Raton Basin 2005 Expansion	105	\$60.6	In-Service 09/05 & 12/05	2005	CO-OK
El Paso Natural Gas Company	Line No. 1903	502	\$73.6	In-Service 12/05 & 01/06	2005	CA-AZ
Rockies Express	EnCana Project	3,500	\$664.0	In-Service in 02/07	2005	WY-CO
Northwest Pipeline Corporation	Capacity Replacement Project		\$333.1	Under Construction	2005	WA-WA
Questar Pipeline Company	Southern System Expansion	102	\$54.6	In-Service 09/05 & 11/05	2005	CO-UT
Rendezvous Gas Services, L.L.C.	Rendezvous	300	\$11.3	Under Construction	2005	WY-WY
TransColorado Gas Transmission Corp.	North Expansion Project	300	\$15.3	In-Service 01/06	2005	CO-CO
Wyoming Interstate Company, Ltd.	Piecance Basin Expansion	350	\$120.2	Interm Service 03/06	2005	WY-CO
Northwest Pipeline Corporation	Parachute Lateral Project	450	\$57.8	Under Construction	2006	CO-CO
Questar Pipeline Project	Overthrust to Opal Pipeline	550	\$51.5	Under Construction	2006	WY-WY
<b>Total</b>		<b>6,714</b>	<b>\$1,590.7</b>			

+ Capital cost figures are estimates.

## Storage Projects

Storage Projects							
Company	Project Name	Capacity (Bcf)	Deliverability (MMcf/d)	Capital Cost (Millions)+	Status	Year Certificated	State
Unocal Windy Hill Gas Storage	Windy Hill	6	400	N/A	Approved	2006	CO
<b>Total</b>		<b>6</b>	<b>400</b>	<b>N/A</b>			

+ Capital cost figures are estimates.

## Natural Gas Consumers by State (2005)

Sector	Residential	Commercial	Industrial	State Total	% of US	% of Region
Arizona	1,042,662	56,572	425	1,099,659	2%	6%
California	10,124,433	434,899	40,226	10,599,558	15%	59%
Colorado	1,524,813	137,513	4,318	1,666,644	2%	9%
Idaho	301,357	33,362	195	334,914	0%	2%
Montana	240,554	31,304	716	272,574	0%	2%
Nevada	688,058	37,093	192	725,343	1%	4%
New Mexico	530,277	47,745	988	579,010	1%	3%
Oregon	626,685	73,520	1,118	701,323	1%	4%
Utah	743,761	55,174	191	799,126	1%	4%
Washington	966,199	92,417	3,489	1,062,105	2%	6%
Wyoming	139,215	17,904	127	157,246	0%	1%
<b>Regional Total</b>	<b>16,928,014</b>	<b>1,017,503</b>	<b>51,985</b>	<b>17,997,502</b>	<b>26%</b>	<b>100%</b>
<b>US Total</b>	<b>63,573,466</b>	<b>5,196,428</b>	<b>205,217</b>	<b>68,975,111</b>		
<b>% of US</b>	<b>27%</b>	<b>20%</b>	<b>25%</b>	<b>26%</b>		
<b>% of Region</b>	<b>94%</b>	<b>6%</b>	<b>0%</b>	<b>100%</b>		

Source: Derived from EIA data.

Note: Units are in millions of cubic feet.

Updated January 11, 2007

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## Natural Gas Demand by State (2005)

Sector	Residential	Commerical	Industrial	Vehicle Fuel	Electric Power	Other Fuel	State Total	% of US	% of Region
Arizona	35,767	31,888	16,975	1,462	217,485	17,581	321,158	1%	7%
California	483,115	232,789	781,381	4,167	689,169	51,515	2,242,136	10%	52%
Colorado	124,229	62,078	126,360	890	92,629	65,429	471,615	2%	11%
Idaho	21,603	13,231	22,852	104	11,425	5,339	74,554	0%	2%
Montana	19,834	13,136	22,013	80	213	13,155	68,431	0%	2%
Nevada	36,397	26,552	13,753	700	147,743	2,229	227,374	1%	5%
New Mexico	33,242	24,186	24,823	243	41,207	36,986	160,687	1%	4%
Oregon	39,806	27,631	69,645	104	87,998	7,285	232,469	1%	5%
Utah	58,044	34,447	25,370	717	12,239	29,989	160,806	1%	4%
Washington	73,626	49,745	66,874	429	65,809	8,174	264,657	1%	6%
Wyoming	11,543	9,184	43,304	15	576	43,561	108,183	0%	2%
<b>Regional Total</b>	<b>937,206</b>	<b>524,867</b>	<b>1,213,350</b>	<b>8,911</b>	<b>1,366,493</b>	<b>281,243</b>	<b>4,332,070</b>	<b>19%</b>	<b>100%</b>
<b>US Total</b>	<b>4,806,136</b>	<b>3,101,526</b>	<b>6,745,835</b>	<b>22,265</b>	<b>5,869,145</b>	<b>1,696,296</b>	<b>22,241,203</b>		
<b>% of US</b>	<b>20%</b>	<b>17%</b>	<b>18%</b>	<b>40%</b>	<b>23%</b>	<b>17%</b>	<b>19%</b>		
<b>% of Region</b>	<b>22%</b>	<b>12%</b>	<b>28%</b>	<b>0%</b>	<b>32%</b>	<b>6%</b>	<b>100%</b>		

Source: Derived from EIA data.

Note: Units equal millions of cubic feet. Other Fuel consists of Lease Fuel, Plant Fuel, and Pipeline & Distribution use.

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## Natural Gas Production by State

Dry Production	2004	2005	Yearly Change	2005 % of US	2005 % of Region
Arizona	331	233	-30%	0%	0%
California	305,858	303,889	-1%	2%	6%
Colorado	1,043,414	1,098,304	5%	6%	22%
Montana	96,128	106,769	11%	1%	2%
Nevada	5	5	0%	0%	0%
New Mexico	1,527,127	1,544,102	1%	9%	31%
Oregon	467	454	-3%	0%	0%
Utah	274,588	298,408	9%	2%	6%
Wyoming	1,521,372	1,571,754	3%	9%	32%
<b>Regional Total</b>	<b>4,769,290</b>	<b>4,923,918</b>	<b>3%</b>	<b>27%</b>	<b>100%</b>
<b>US Total</b>	<b>18,757,477</b>	<b>18,074,237</b>	<b>-4%</b>		
<b>% of US</b>	<b>8%</b>	<b>9%</b>			

Source: Derived from EIA data.

Note: Units are in millions of cubic feet.

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## Natural Gas Storage by Field Type (2005)

Field Type	Salt Dome Fields	Salt Dome Capacity	Aquifers	Aquifers Capacity	Depleted Fields	Depleted Fields Capacity	Total Fields	Total Capacity	% of US Capacity	% of Region	Dry Proved Reserves
California	0	0	0	0	11	477,726	11	477,726	6%	36%	3,228,000
Colorado	0	0	0	0	8	98,068	8	98,068	1%	7%	16,596,000
Montana	0	0	0	0	5	374,201	5	374,201	5%	28%	986,000
New Mexico	0	0	1	4,700	2	78,424	3	83,124	1%	6%	18,201,000
Oregon	0	0	0	0	6	24,034	6	24,034	0%	2%	0
Utah	0	0	2	11,980	1	117,500	3	129,480	2%	10%	4,295,000
Washington	0	0	1	42,191	0	0	1	42,191	1%	3%	0
Wyoming	0	0	1	10,000	7	104,160	8	114,160	1%	9%	23,774,000
<b>Total</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>68,871</b>	<b>40</b>	<b>1,274,113</b>	<b>45</b>	<b>1,342,984</b>	<b>16%</b>	<b>100%</b>	<b>67,080,000</b>
<b>US Total</b>	<b>30</b>	<b>250,532</b>	<b>44</b>	<b>1,350,689</b>	<b>320</b>	<b>6,667,222</b>	<b>394</b>	<b>8,268,443</b>			<b>204,385,000</b>
<b>% of US</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>5%</b>	<b>13%</b>	<b>19%</b>	<b>11%</b>	<b>16%</b>			<b>33%</b>
<b>% of Region</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>5%</b>	<b>89%</b>	<b>95%</b>	<b>100%</b>	<b>100%</b>			

Source: Derived from EIA data.

Note: Units are in millions of cubic feet.

Updated January 11, 2007

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## Average Daily Rockies Deliveries to the East

Pipeline	2004	2005	2006
<b>Cheyenne Plains</b>	0	4,173	5,601
<b>CIG</b>	5,349	5,454	5,780
<b>El Paso</b>	5,633	5,638	4,633
<b>KMI</b>	3,054	2,479	2,394
<b>Southern Star</b>	1,793	1,793	1,806
<b>Trailblazer</b>	8,483	8,393	8,424
<b>Transwestern</b>	1,586	3,228	3,685
<b>Williston Basin</b>	1,063	1,070	1,152
<b>Net Deliveries</b>	<b>26,961</b>	<b>32,227</b>	<b>33,475</b>

Source: Derived from *Bentek* data.

Note: Units are in MMcf/d.

Updated January 11, 2007

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## Average Daily Rockies Deliveries to the West

<b>Pipeline</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>El Paso</b>	2,020	2,009	2,149
<b>Kern River</b>	1,762	1,780	1,953
<b>Northwest</b>	483	524	599
<b>Southern Trails</b>	80	80	79
<b>Transwestern</b>	687	667	731
<b>Net Deliveries</b>	<b>5,032</b>	<b>5,060</b>	<b>5,512</b>

Source: Derived from *Bentek* data.

Note: Units are in MMcf/d

Updated January 11, 2007

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## Average Daily Western Imports of Canadian Gas

Pipeline	2004	2005	2006
GTN System	1,974	1,744	1,864
Northwest	812	780	603
Net Imports	2,786	2,524	2,467

Source: Derived from *Bentek* data.

Note: Units are in MMcf/d

Updated January 11, 2007

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## Average Daily Western Exports to Mexico

Pipeline	2004	2005	2006
El Paso Natural	209,734	234,210	263,443
North Baja Pipeline	254,674	248,203	297,637
Net Exports	464,409	482,414	561,080

Source: Derived from *Bentek* data. El Paso Natural Gas exports to Mexico shown above include volumes transported through the Samalayuca Lateral.

Note: Units are in MMBtus.

Updated March 12, 2007

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