

Liquid Fuels and Natural Gas in the Americas



January 2014

Energy Information Administration, Office of Energy Analysis

Major Takeaways

The Americas are a significant contributor to global markets, rivaling the Middle East in oil production and exceeding the Former Soviet Union in natural gas production

TRADE

Crude Oil: U.S. crude oil imports from Latin America are declining, but crude imports from Canada are up; Crude exports from other Americas countries are shifting to Asia; intra-American trade accounted for 56% of total crude imports and 73% of total crude exports from the region

Petroleum Products: U.S. product exports to Latin America are rising to meet growing demand that is outstripping growth in their refinery capacity; intra-American trade accounted for 66% of total product imports and 86% of total product exports from the region

Natural Gas: The Panama Canal's ability to handle larger ships starting in 2015 will improve access to Asian markets for Americas natural gas producers in the Atlantic basin

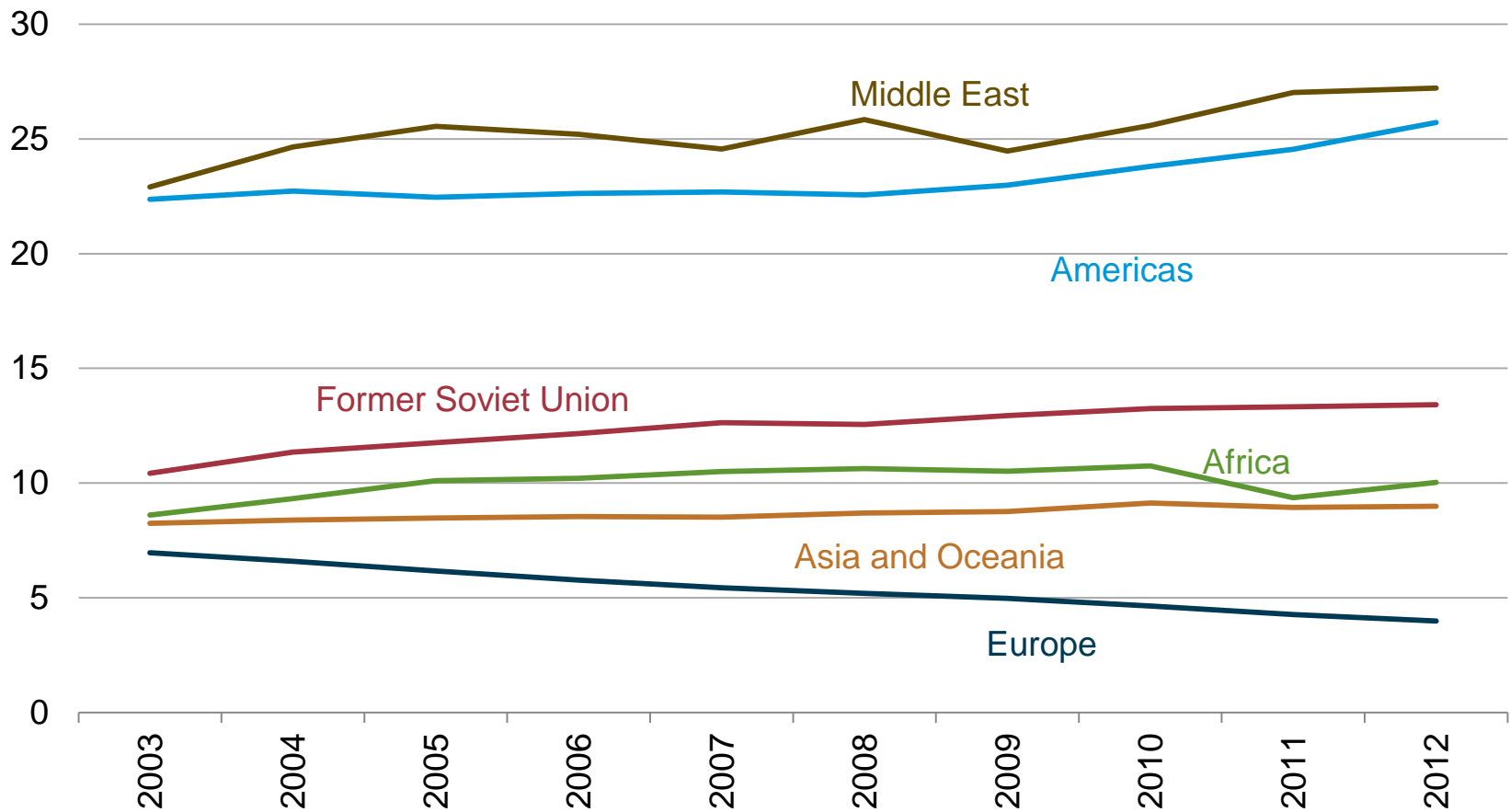
OIL AND GAS INVESTMENT CLIMATE

Openness to outside investment in the oil and gas industry varies across the Americas; recent production trends have tended to be more positive in countries with more open investment laws and regulations

China's National Oil Companies are providing significant upfront investment for physical oil and gas in the Americas

Americas liquid fuels production is second to the Middle East

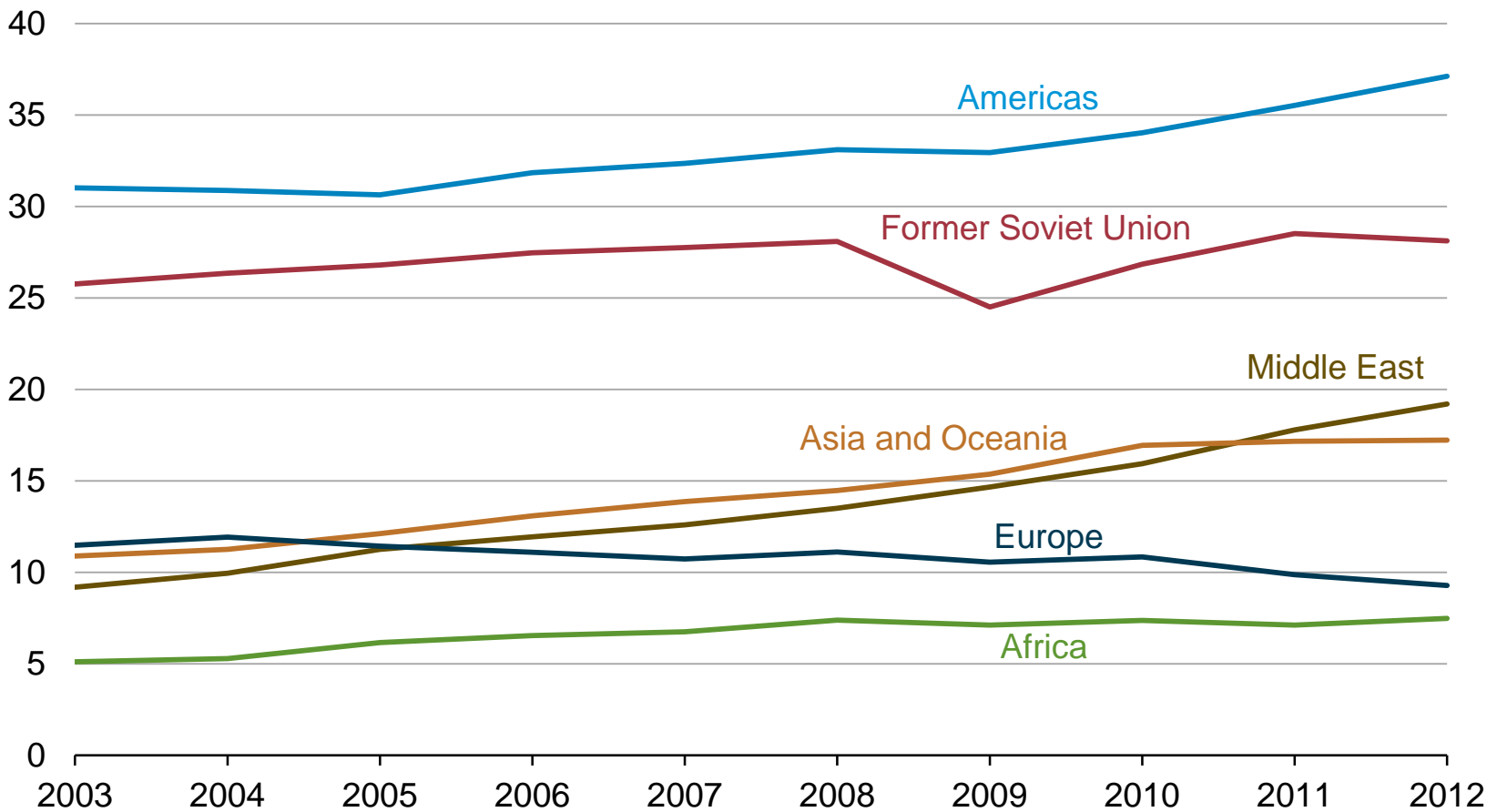
liquid fuels production by region
million barrels per day



Source: EIA, International Energy Statistics

Americas natural gas production is pulling away from other regions

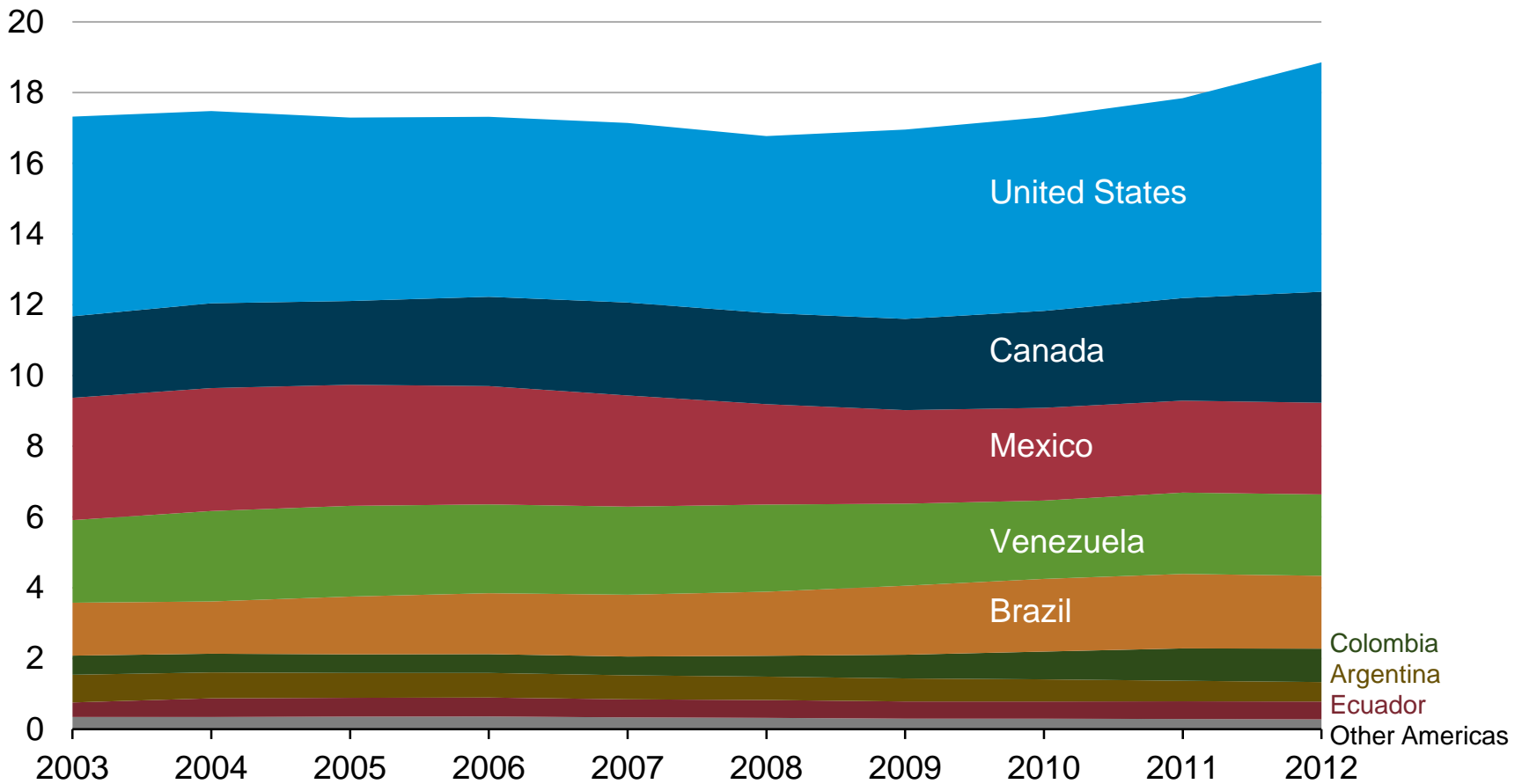
dry natural gas production by region
trillion cubic feet



Source: EIA, International Energy Statistics

The Americas produced nearly 19 MMbbl/d of crude oil in 2012

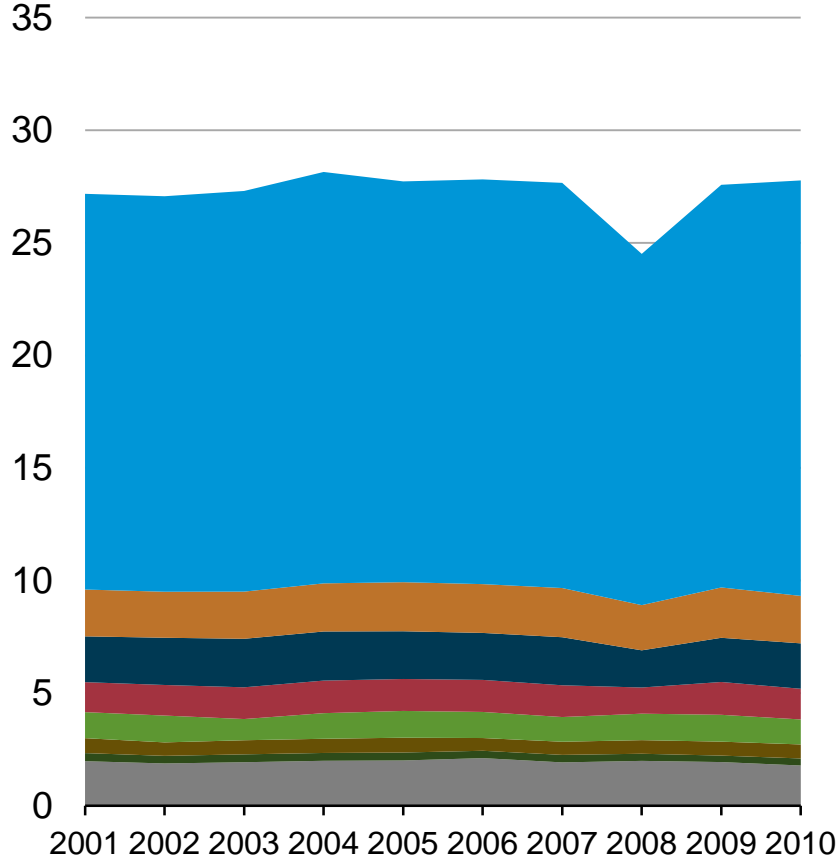
crude oil production by Americas country
million barrels per day



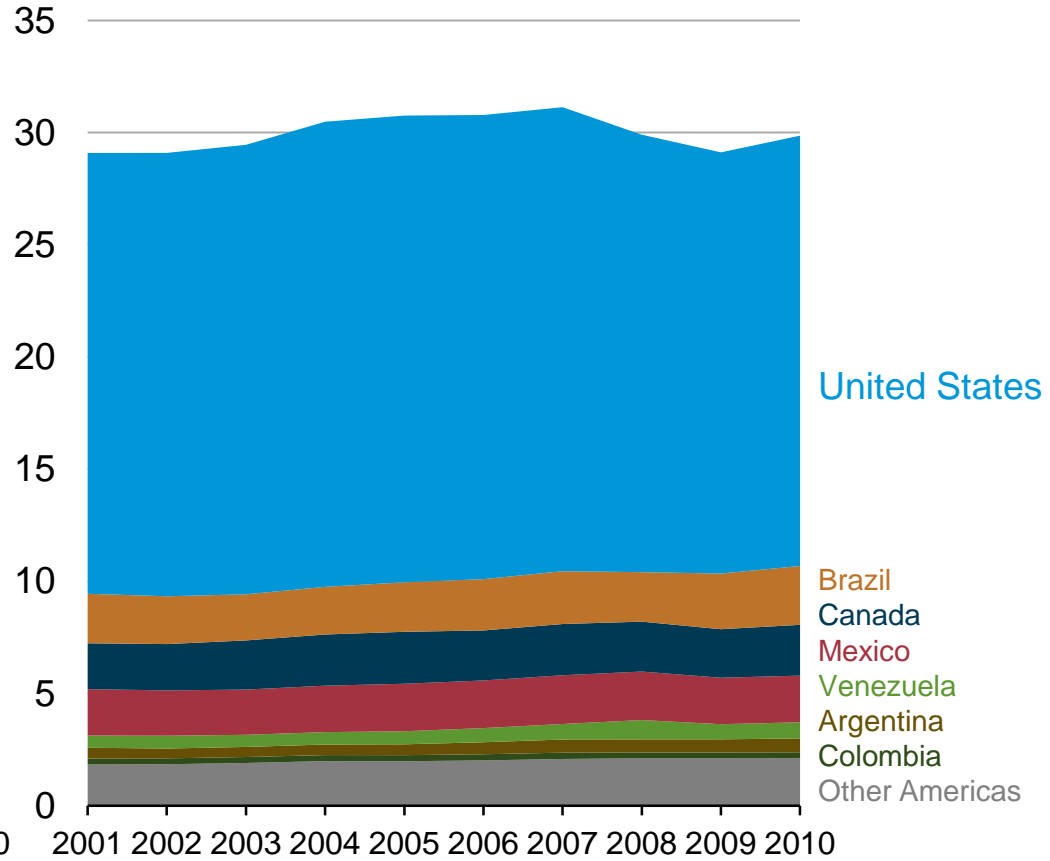
Source: EIA, International Energy Statistics

The United States is the dominant producer and consumer of petroleum products in the Americas

production of Americas petroleum products
million barrels per day



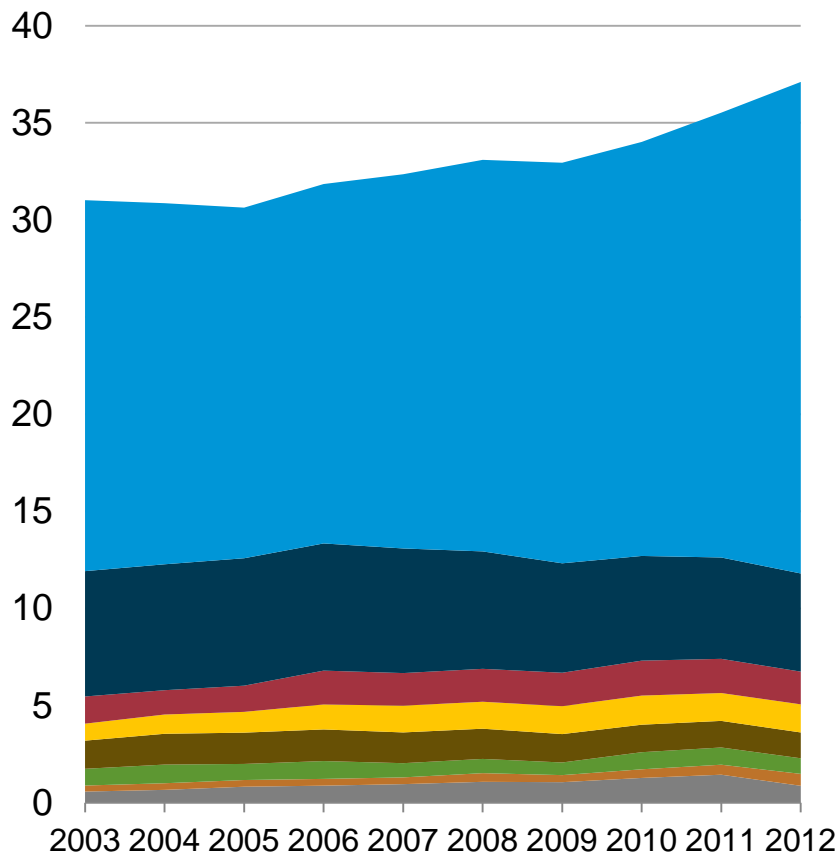
consumption of Americas petroleum products
million barrels per day



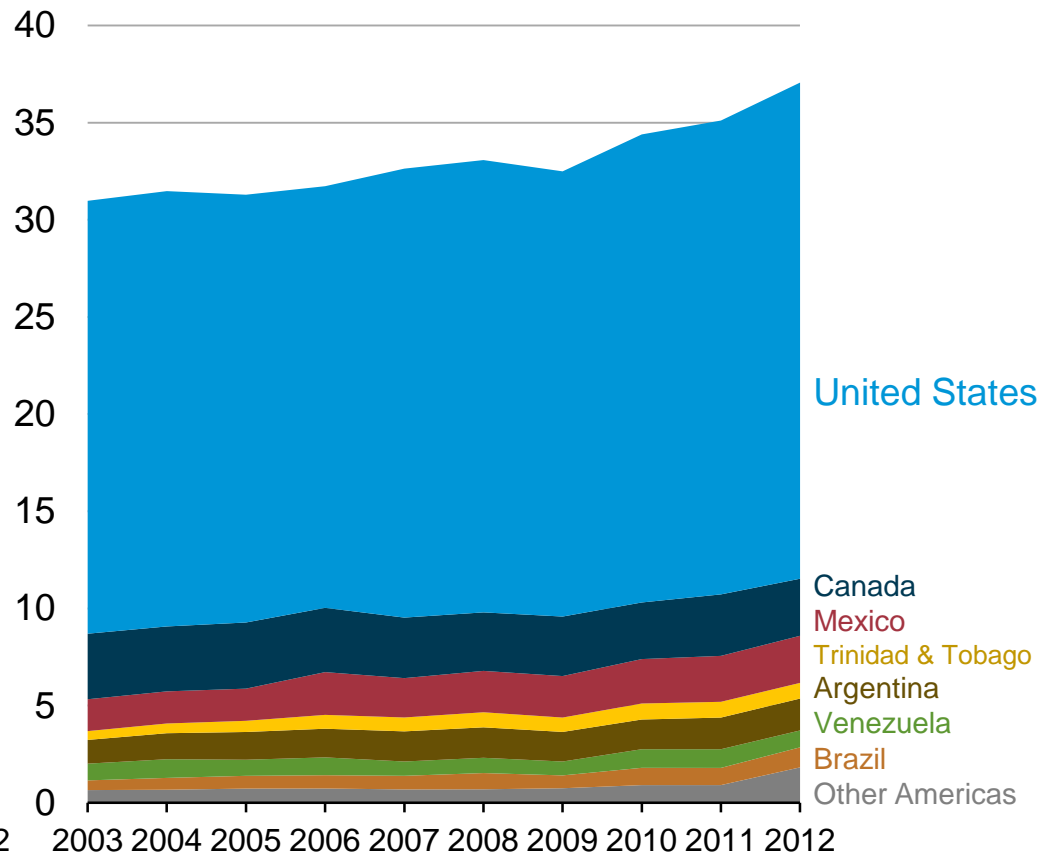
Source: EIA, International Energy Statistics

The United States is the largest producer of natural gas in the world, largely driven by U.S. shale gas production

production of Americas dry natural gas
trillion cubic feet



consumption of Americas dry natural gas
trillion cubic feet

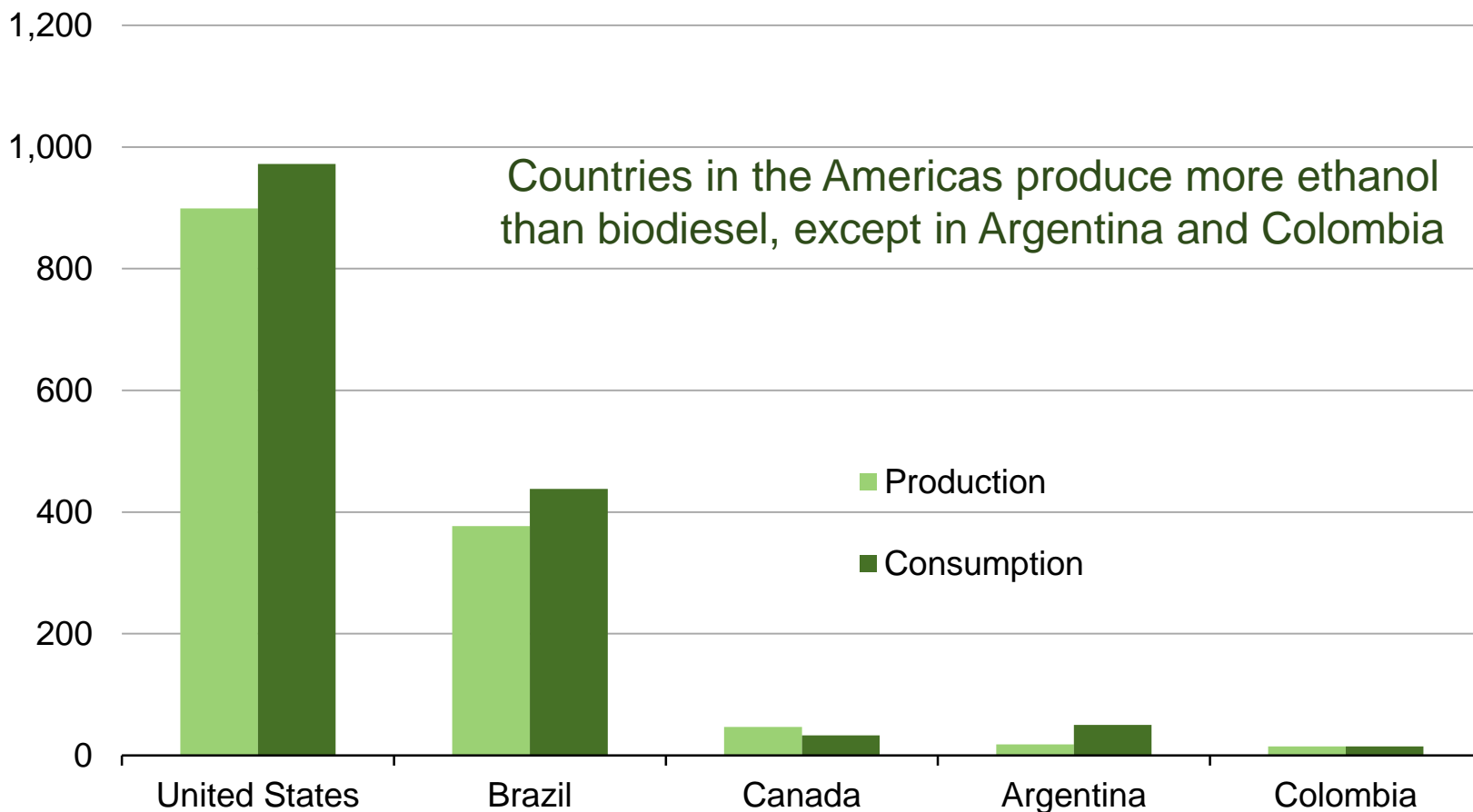


Source: EIA, International Energy Statistics

The United States and Brazil made up nearly 75% of the world's biofuels output and 70% of the world's consumption

biofuels production and consumption by Americas country, 2012

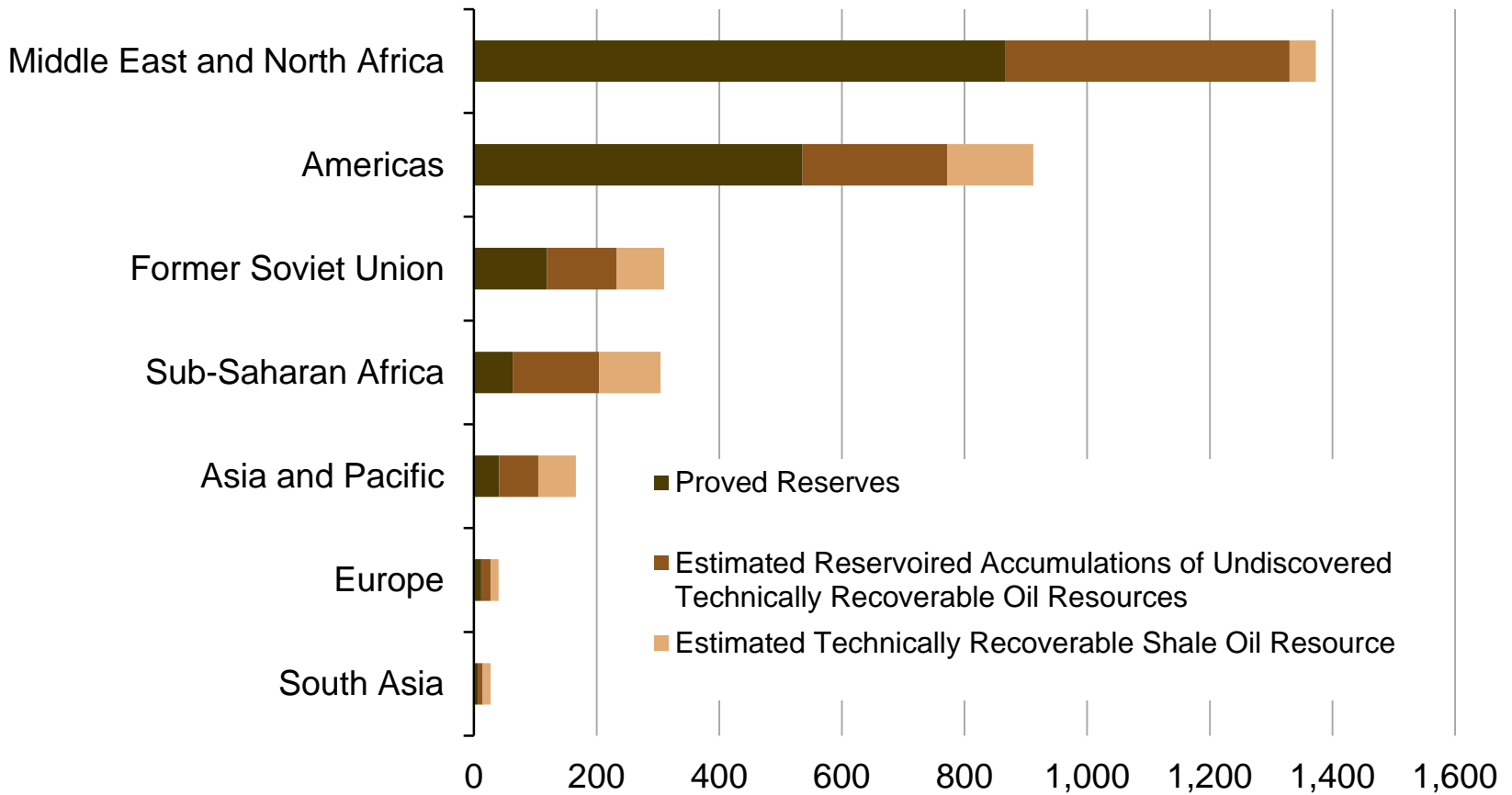
thousand barrels per day



Source: EIA, International Energy Statistics

The Americas are the second largest region in oil reserves and resources

regional oil reserves and resources, 2012
billion barrels

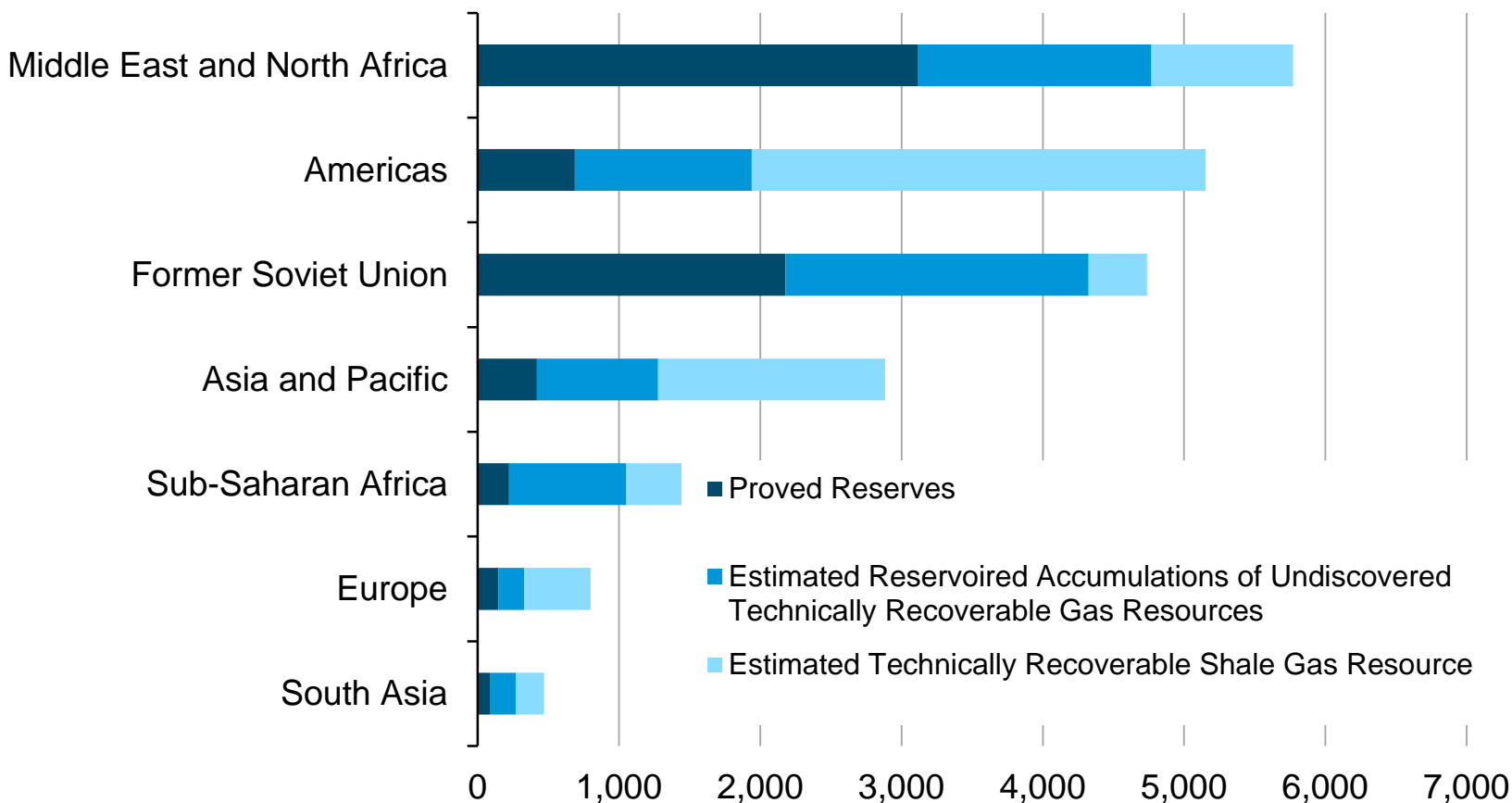


Source: U.S. Energy Information Administration, Oil and Gas Journal, U.S. Geological Survey, EIA/ARI World Shale Gas and Shale Oil Resource Assessment

The Americas are the second largest region in natural gas reserves and resources

regional natural gas reserves and resources, 2012

trillion cubic feet



Source: U.S. Energy Information Administration, Oil and Gas Journal, U.S. Geological Survey, EIA/ARI World Shale Gas and Shale Oil Resource Assessment

The Americas conducted more than 6 million barrels per day in intra-Americas trade of crude oil, accounting for 56% of all imports and 73% of all exports of crude oil conducted by the Americas

Intra-American crude oil trade, 2012
thousand barrels per day

Importer → ↓ Exporter	Bahamas	Canada	Chile	Panama	Peru	United States	Other Americas	Total Exports
Argentina	0	0	28	0	0	26	1	55
Brazil	5	18	27	0	5	226	6	288
Canada	0	n/a	0	0	0	2,946	0	2,946
Colombia	9	3	31	63	9	433	29	577
Ecuador	0	1	48	9	47	180	10	293
Mexico	0	23	0	0	0	1,035	18	1,076
United States	0	67	0	0	0	n/a	0	67
Venezuela	0	0	0	0	3	960	28	991
Total Imports	14	113	132	72	64	5,806	92	6,218

Source: U.S. Energy Information Administration, International Energy Statistics, Global Trade Information Services, Global Trade Atlas

The Americas conducted about 3 million barrels per day in intra-American trade in petroleum products, accounting for 66% of all imports and 86% of all exports of petroleum product conducted by the Americas

Intra-American petroleum product trade, 2012
thousand barrels per day

Importer ↓ Exporter	Brazil	Canada	Chile	Colombia	Mexico	Panama	United States	Venezuela	Other Americas	Total Exports
Argentina	19	0	1	0	0	0	5	0	6	29
Brazil	n/a	0	0	0	0	0	37	0	68	105
Canada	0	n/a	0	0	0	0	521	0	19	510
Colombia	1	0	0	n/a	1	2	30	1	61	96
Ecuador	0	0	0	0	0	16	4	0	7	28
Mexico	4	0	0	28	n/a	0	60	0	2	95
United States	166	349	148	75	565	126	n/a	85	363	1,966
Venezuela	13	1	0	9	0	0	47	n/a	32	102
Total Imports	203	351	150	112	567	145	704	86	559	2,962

Source: U.S. Energy Information Administration, International Energy Statistics, Global Trade Information Services, Global Trade Atlas

Latin America is increasing crude oil exports to China and India

Major Americas countries' crude oil exports to China and India
thousand barrels per day

	2008	2009	2010	2011	2012
Exports to China by Origin Country					
Venezuela	129	105	151	230	306
Brazil	60	81	161	134	121
Colombia	23	25	40	45	58
Argentina	15	14	23	9	24
Total Americas	256	272	421	475	563
Exports to India by Origin Country					
Venezuela	132	108	205	182	349
Brazil	3	41	48	63	96
Mexico	38	35	19	42	75
Colombia	0	13	28	20	35
Total Americas	183	213	314	316	582

Source: U.S. Energy Information Administration, International Energy Statistics, Global Trade Information Services, Global Trade Atlas

U.S. gross product exports meeting increasing Latin American demand for liquid fuels

U.S. petroleum product exports to the Americas
thousand barrels per day

	2009	2010	2011	2012
Mexico	322	448	570	565
Canada	179	192	305	349
Brazil	55	123	157	166
Chile	78	75	126	148
Panama	66	86	102	126
Venezuela	26	20	32	85
U.S. Virgin Islands	3	7	8	15
Total Americas	1,059	1,394	1,781	1,979
Total World	1,980	2,311	2,939	3,137

U.S. petroleum product imports from the Americas
thousand barrels per day

	2009	2010	2011	2012
Canada	536	565	504	521
Mexico	118	132	105	60
Venezuela	111	76	83	47
Brazil	13	17	21	37
Chile	3	2	2	2
Panama	0	0	0	0
U.S. Virgin Islands	277	253	186	12
Total Americas	1,218	1,145	1,111	819
Total World	2,678	2,580	2,501	2,071

Refining capacity in Latin America has failed to keep pace with the growth in petroleum product demand that has resulted as economies have expanded and demand for cleaner fuels have increased. The increase in Latin American product demand is being supplied by imports, primarily from the United States.

Source: U.S. Energy Information Administration, Petroleum and Other Liquids Data.

Most liquefaction projects are in North America and will increase the region's total capacity 8-fold by 2019



Source: IHS EDIN

Note: Displays larger import/export facilities only

Liquefaction (bcf/d)

Country	Operating	Construction	Engineering
Peru	0.6		
Trinidad and Tobago	2.0		
Colombia		0.1	
United States		1.2	13.1
Brazil			0.4
Canada			3.3
Total	2.6	1.3	16.8

Regasification (bcf/d)

Country	Operating	Construction	Engineering
Argentina	0.9		
Brazil	1.2	0.8	
Canada	1.0		
Chile	0.6		
Dominican Republic	0.2		
Mexico	2.3		
Puerto Rico	0.4		
United States	10.2		
Total	16.8	0.8	0

Oil investment climate in the Americas vary; recent Mexican reforms should allow for more private investment.

Laws and regulations in the oil sector of selected major producers in the Americas

United States	Possibly subject to CFIUS review
Colombia	No restrictions
Canada	No restrictions with exception of review of investments greater than \$330M from NOCs
Brazil	Upstream: Open except for presalt layer Downstream: No restrictions
Mexico	Mexico to finalize contract terms in 2014
Argentina	Repatriate 100% of export earnings; restrictions on E&P activities in disputed waters
Ecuador	Companies limited to service contracts, tariff per barrel produced
Venezuela	Reserved for PdVSA

Source: U.S. Energy Information Administration based on IHS, World Markets Energy, Reuters.

In the Americas' oil sector, there has been positive correlation between open investment structures and total liquids production

Total liquids production by select Americas countries, 2003-2012

thousand barrels per day

Country	Gains/Losses in production	Change (%)	Production in 2012
United States	2,344	27	11,110
Brazil	805	44	2,652
Canada	743	24	3,856
Colombia	414	75	969
Ecuador	93	23	505
Venezuela	-92	-4	2,489
Argentina	-143	-30	723
Mexico	-872	-23	2,936

Source: EIA, International Energy Statistics

China's NOCs are providing substantial upfront investment for resource development

China's upfront investment deals in the Americas

Country	Loan Amount	Comments
Bolivia	\$2 Billion	Signed in 2009 Natural gas networks and infrastructure development
Brazil	\$10 Billion	Signed in 2009 Petrobras to supply Unipecc (China) with 150,000-200,000 bbl/d of crude oil until 2018
Ecuador	\$7 Billion	Since 2009, 4 separate agreements explicitly backed by oil sales. Latest deal is December 2012, includes crude oil sales to 2018 and fuel oil to 2020
Venezuela	~\$40 Billion	Several deals made since 2009 Committed to China 600,000 bbl/d of crude oil until 2020

Source: FACTS Global Energy, PFC Energy, Reuters, Rigzone, and other trade press

For more information

Subject matter experts for this presentation:

Michael Yo, Analyst

michael.yo@eia.gov, 202-586-4058

Shirley Neff, Senior Advisor

shirley.neff@eia.gov, 202-586-7111

Erik Kreil, Acting Team Lead for International Energy Analysis

erik.kreil@eia.gov, 202-586-6573

Adam Sieminski, Administrator

adam.sieminski@eia.gov, 202-586-4361

John Conti, Assistant Administrator for Energy Analysis

johh.conti@eia.gov, 202-586-4430

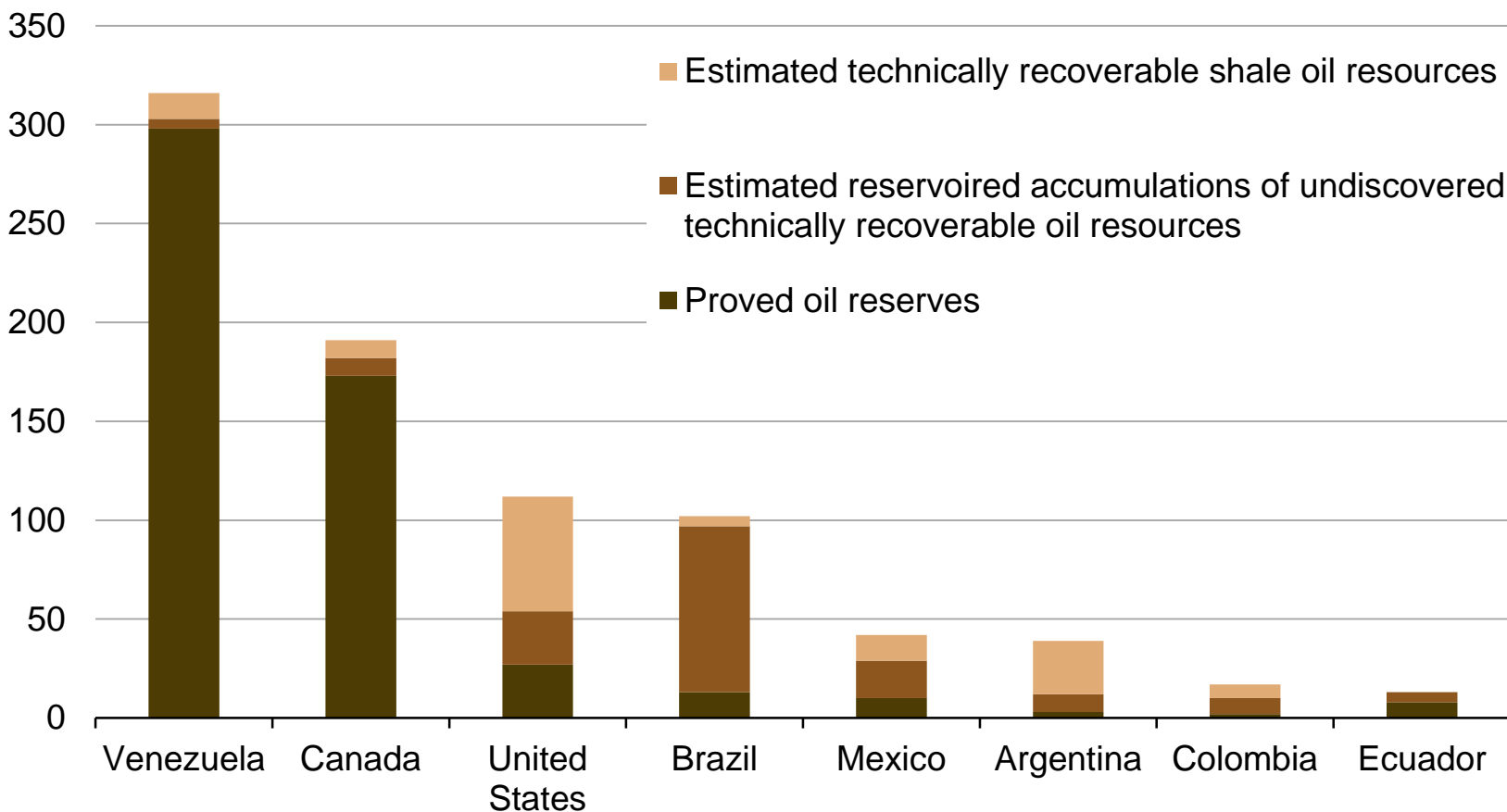
Sam Napolitano, Director for Integrated and International Energy Analysis

sam.napolitano@eia.gov, 202-586-0687

Venezuela has the largest proven oil reserves among Americas producers (and the world)

Americas proved oil reserves and recoverable oil resources, 2012

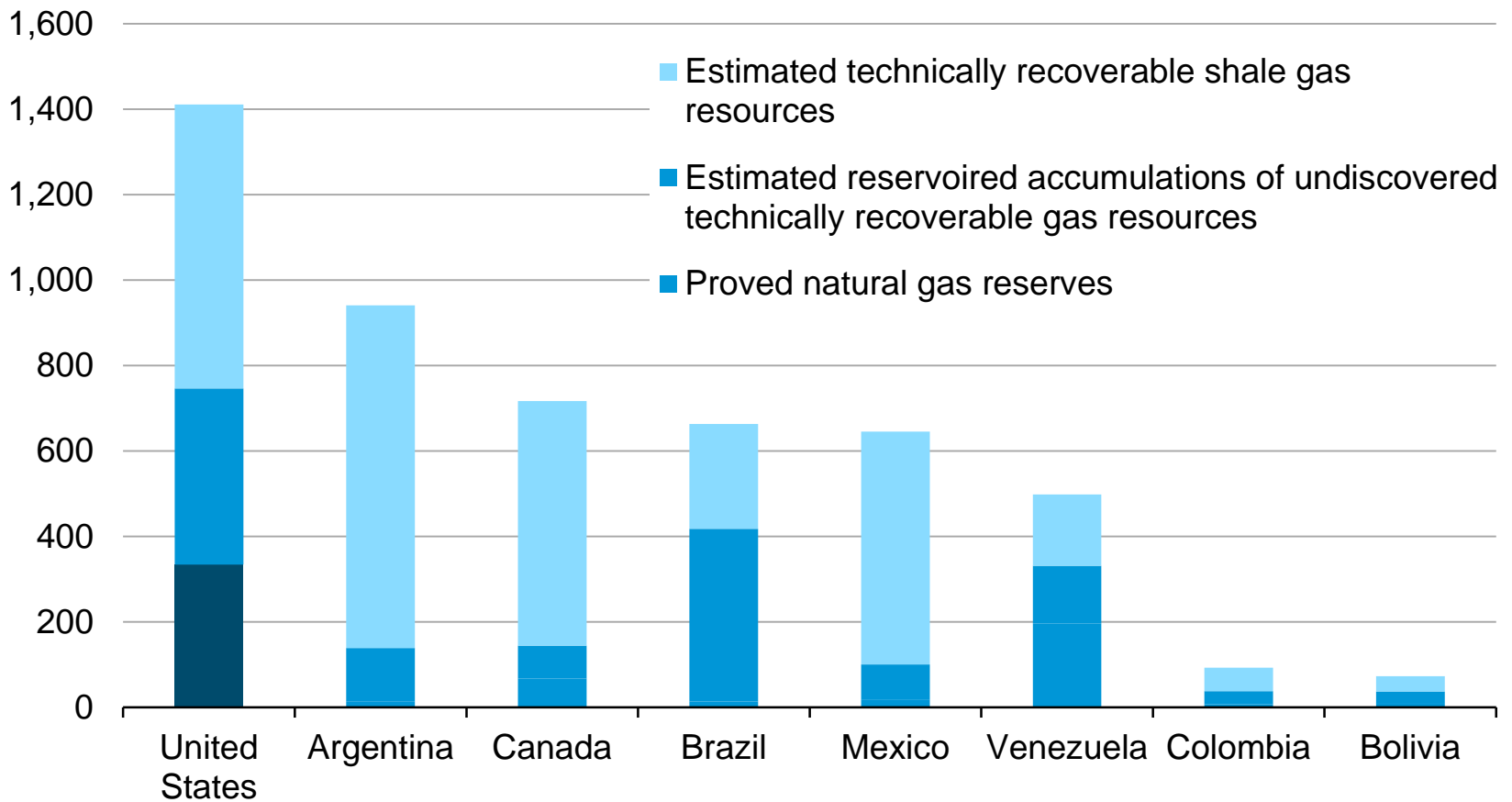
billion barrels



Source: U.S. Energy Information Administration, Oil and Gas Journal, U.S. Geological Survey, EIA/ARI World Shale Gas and Shale Oil Resource Assessment

The Americas hold an abundance of shale gas resources, undeveloped except in the U.S. and Canada

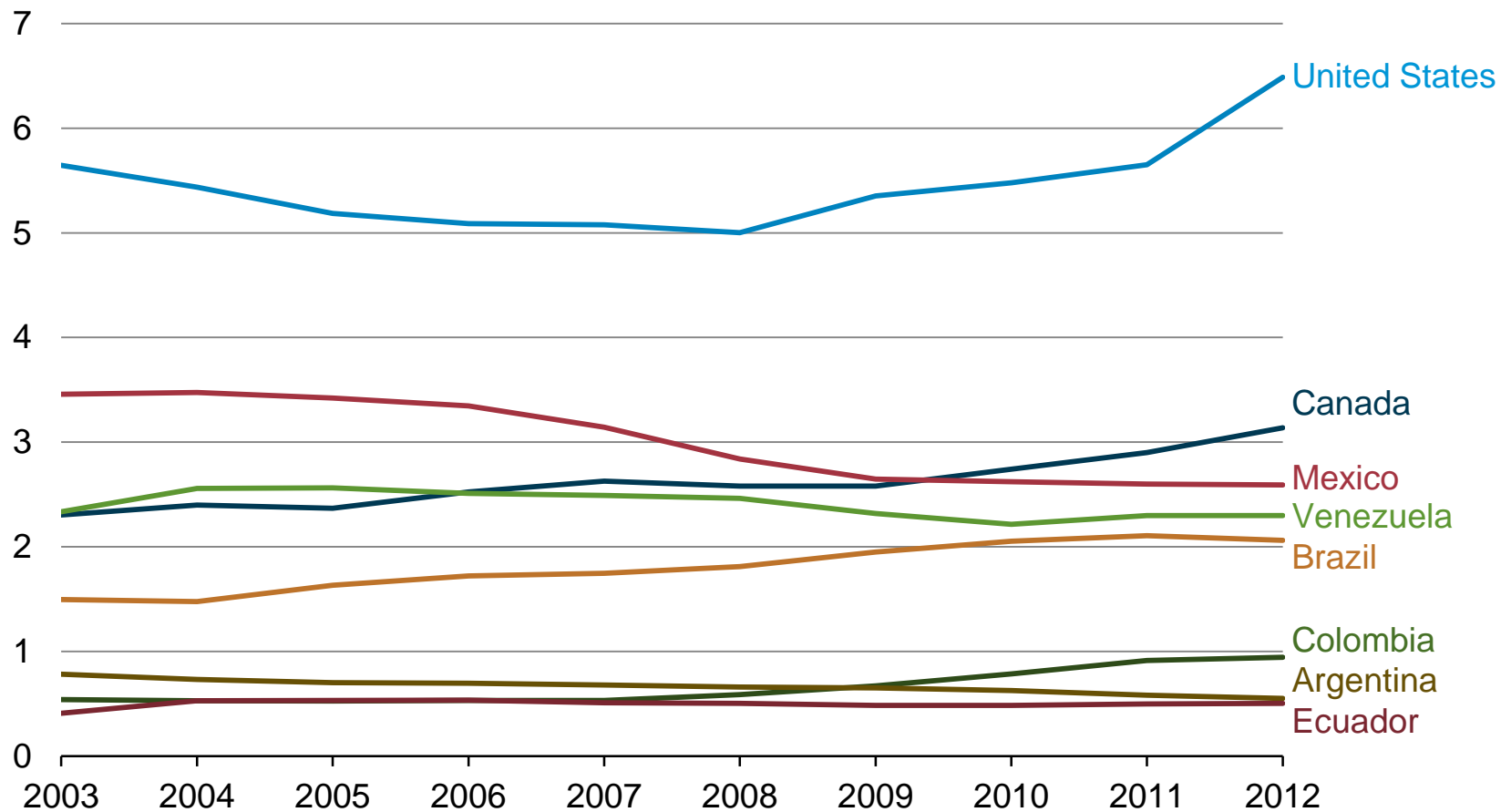
Americas natural gas reserves and resources, 2012
trillion cubic feet



Source: U.S. Energy Information Administration, Oil and Gas Journal, U.S. Geological Survey, EIA/ARI World Shale Gas and Shale Oil Resource Assessment.

In the Americas' oil sector, recent gains in production are concentrated in countries with open investment structures

crude oil production by select Americas country
million barrels per day



Source: EIA, International Energy Statistics

Latin American refineries are upgrading to meet recent cleaner fuel standards

Several Latin American nations have passed legislation to lower sulfur content in fuels. Until planned refinery upgrades are completed, many of these countries are importing low-sulfur fuels from the United States. However, it is not yet clear that planned upgrades will allow production of sufficient fuel to meet the region's rapidly growing demand. As a result, imports may still be required.

Harmonization of fuel specifications in the Americas by select country

Country	Maximum Sulfur in Standard Gasoline	Maximum Sulfur in Standard Diesel	Maximum Sulfur in Distillate
United States	5 - 30	15	15 - 5,000
Brazil	800	10 - 50	1,800
Canada	30	15	500
Mexico	80 - 500	15	500
Venezuela	1,000	5,000	5,000
Argentina	50 - 100	500 - 1,500	n/a
French Guyana	10	10	n/a
Jamaica	1,500	15	n/a

Source: EIA, *International Energy Statistics*, Hart Energy, *International Fuel Quality Center*.

Currently, the Panama Canal can accommodate only 9% of the world's LNG carrier fleet. After the expansion, it will be able to accommodate 88% of currently active carriers

Global LNG carrier fleet, January 2014

Type	Active	Ordered	Pass through Panama Canal after Expansion (Active only)
Conventional	319	107	Y
Floating Storage Regasification Unit	15	3	Y
Floating Liquefaction	0	10	Y
Floating Storage Unit	3	0	Y
Q-Flex	31	0	N
Q-Max	14	0	N

Source: PFC Energy, Shipping Database

Canada, Trinidad and Tobago, Colombia, Brazil and Mexico are receptive to foreign investment in natural gas; Venezuela and Argentina are not

Laws and regulations in the natural gas sector of selected major producers in the Americas

United States	Possibly subject to CFIUS review
Colombia	No restrictions
Trinidad & Tobago	No restrictions
Canada	No restrictions with exception of review of investments greater than \$330M from NOCs
Mexico	Mexico to finalize contract terms in 2014
Brazil	Upstream: Limited to less than 70% stake in pre-salt layer Downstream: No restrictions
Argentina	Export taxes, dividend repatriation first 5 years
Venezuela	Upstream: 100% foreign participation allowed, PdVSA can own up to 65% of equity once commercially viable Downstream: No restrictions

Source: U.S. Energy Information Administration based on IHS, World Markets Energy, Reuters.

Over 120 U.S. oil companies are invested in other countries in the Americas

Number of oil companies invested in the Americas

	Number of U.S. companies invested in	Number of foreign companies invested in the United States
Canada	36	8
Colombia	22	1
Argentina	8	1
Peru	8	1
Brazil	7	1
Trinidad and Tobago	6	0
Venezuela	4	1
Ecuador	2	0
Mexico	0	1
Other Americas	30	2

Source: Rystad Energy

Asian companies have growing investment stakes in LNG projects in the Americas

Selected Asian investment in liquefaction terminals in the Americas

Liquefaction Terminal	Asian Stakeholders	Status	Comments
Atlantic LNG (Trinidad)	China Investment Corp.(CIC) (China)	Existing	CIC acquired GDF Suez's (France) 10% stake in Train 1 in 2012
Peru LNG (Peru)	SK Energy (S. Korea) 20% Marubeni (Japan) 10%	Existing	Operated by Hunt Oil; 200 Bcf/y capacity; Sales contract to Mexico's Manzanillo regasification terminal
Sabine Pass LNG (United States)	None	Under construction	Train 3: KOGAS (S. Korea) 168 Bcf/y, Train 4: GAIL (India) 168 Bcf/y
Cameron LNG (United States)	Mitsubishi (Japan) 16.6% Mitsui (Japan) 16.6%	Planned; FERC review in process; Expected online 2017	648 Bcf/y, 3-train facility; Operated by Sempra Energy; Tolling agreements with Mitsubishi, Mitsui, and GDF Suez
LNG Canada (Canada)	KOGAS (S. Korea) 20% CNPC (China) 20% Mitsubishi (Japan) 20%	Planned; Environmental review in process; Expected online 2020	Operated by Shell; 1,156 Bcf/y, 4-train facility in Western Canada. Sales purchase agreements pending
Pacific Northwest LNG (Canada)	Petronas (Malaysia) 90% JAPEX (Japan) 10%	Planned; Environmental review in process; Expected online 2018	576 Bcf/y, 2-train facility, Petronas in discussion with other companies to sell off part of its project share

Source: FACTS Global Energy, PFC Energy, Reuters, Rigzone, and other trade press