“Energy in the Americas”

Woodrow Wilson Center
May 11, 2012

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Special Envoy and Coordinator for
International Energy Affairs
U.S. Department of State

Bureau of Energy Resources (ENR)

Sustainable, Affordable, Reliable, Access to Diverse Energy Supplies

Managing the Geopolitics of Energy

- Wealth/Power/Influence
- Market Dynamics
- Energy Frontiers
- Spare Capacity

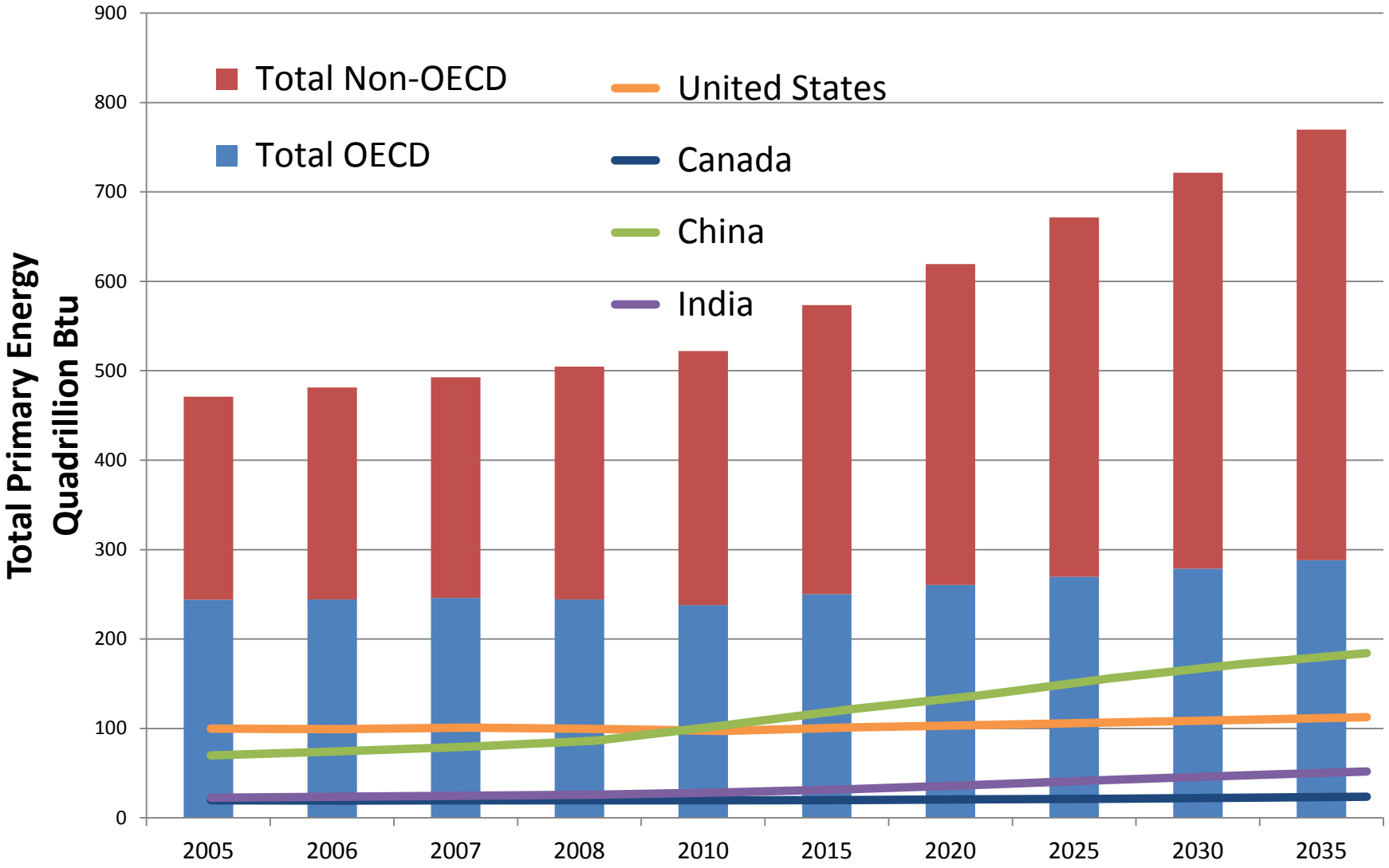
Stimulate Markets for Energy Transformation

- Private and Donor Finance
- Innovation & Investment
- Access to Electricity/ Regional Interconnection
- Tariffs and Regulations
- Renewable/Efficient/Clean Technology

Transparency , Governance, and Access to Energy

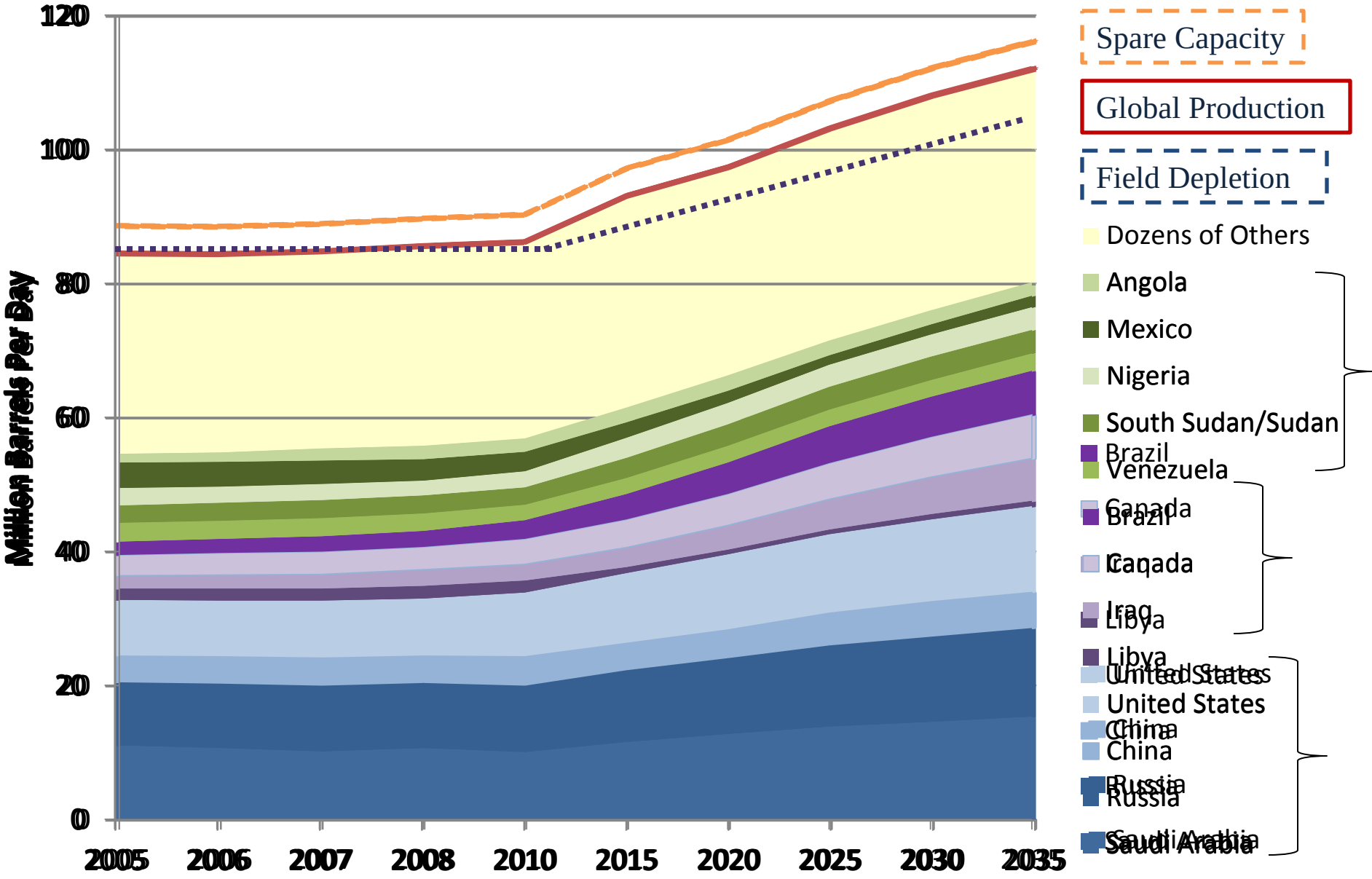
- Resources: Budgets/People
- Energy Poverty
- Markets Amid Poverty
- Entrepreneurship/Innovation

World Energy Consumption, 1990-2035



Source: U.S. Energy Information Administration, AEO 2011

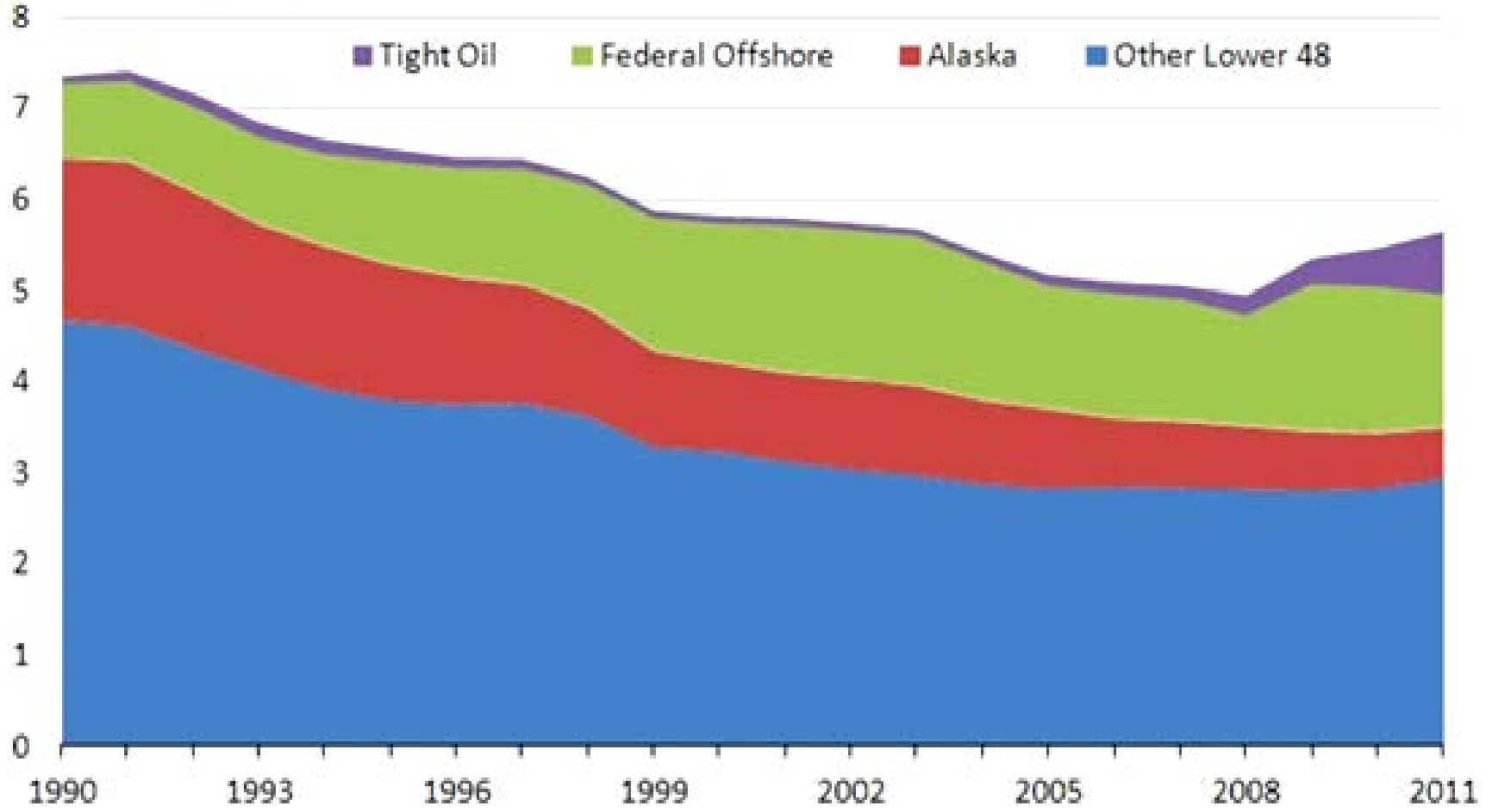
Challenges to Oil Market Stability



Source: U.S. Energy Information Administration, IEO 2011

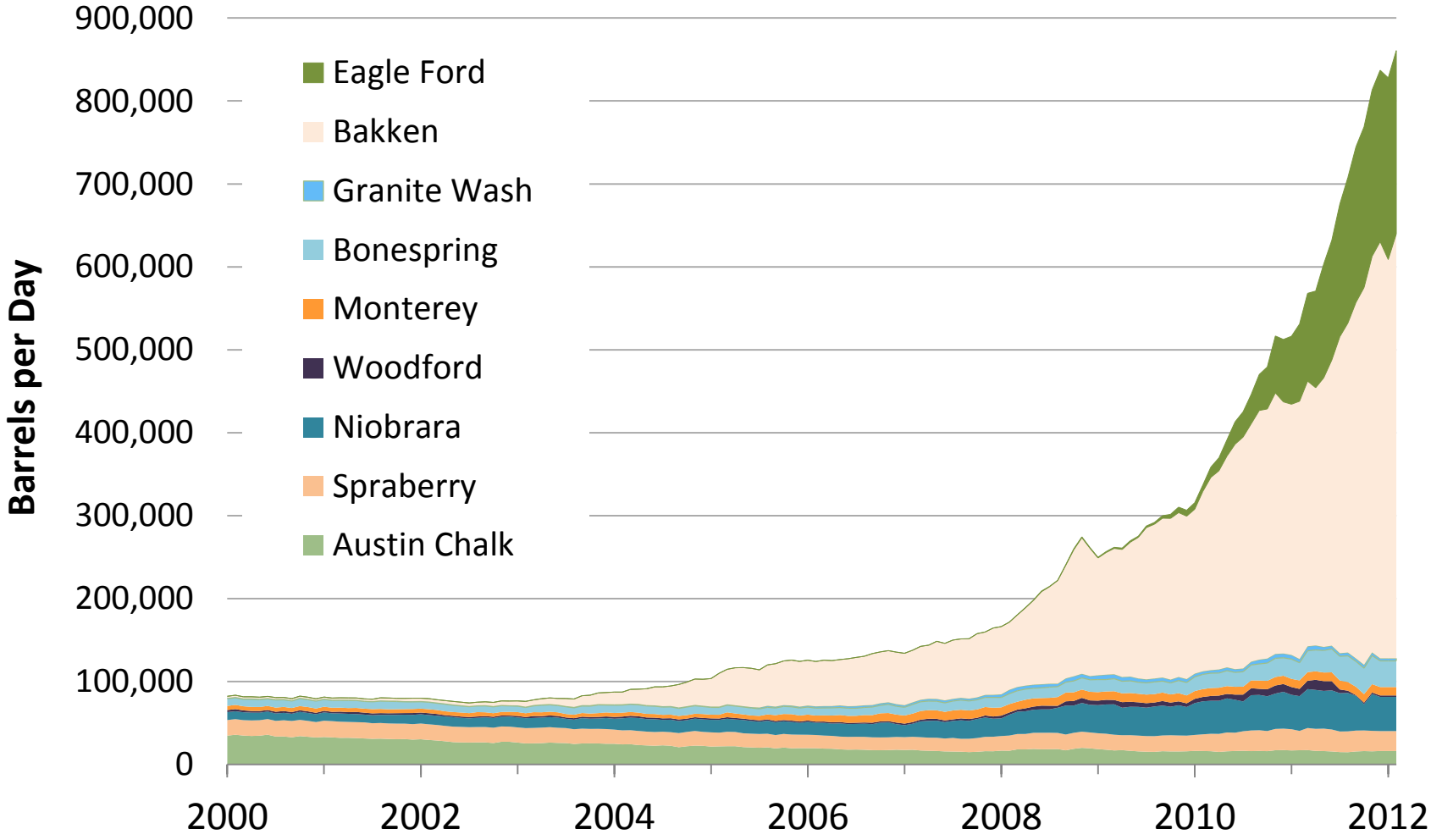
Annual U.S. Oil Production, 1990-2011

Million barrels per day



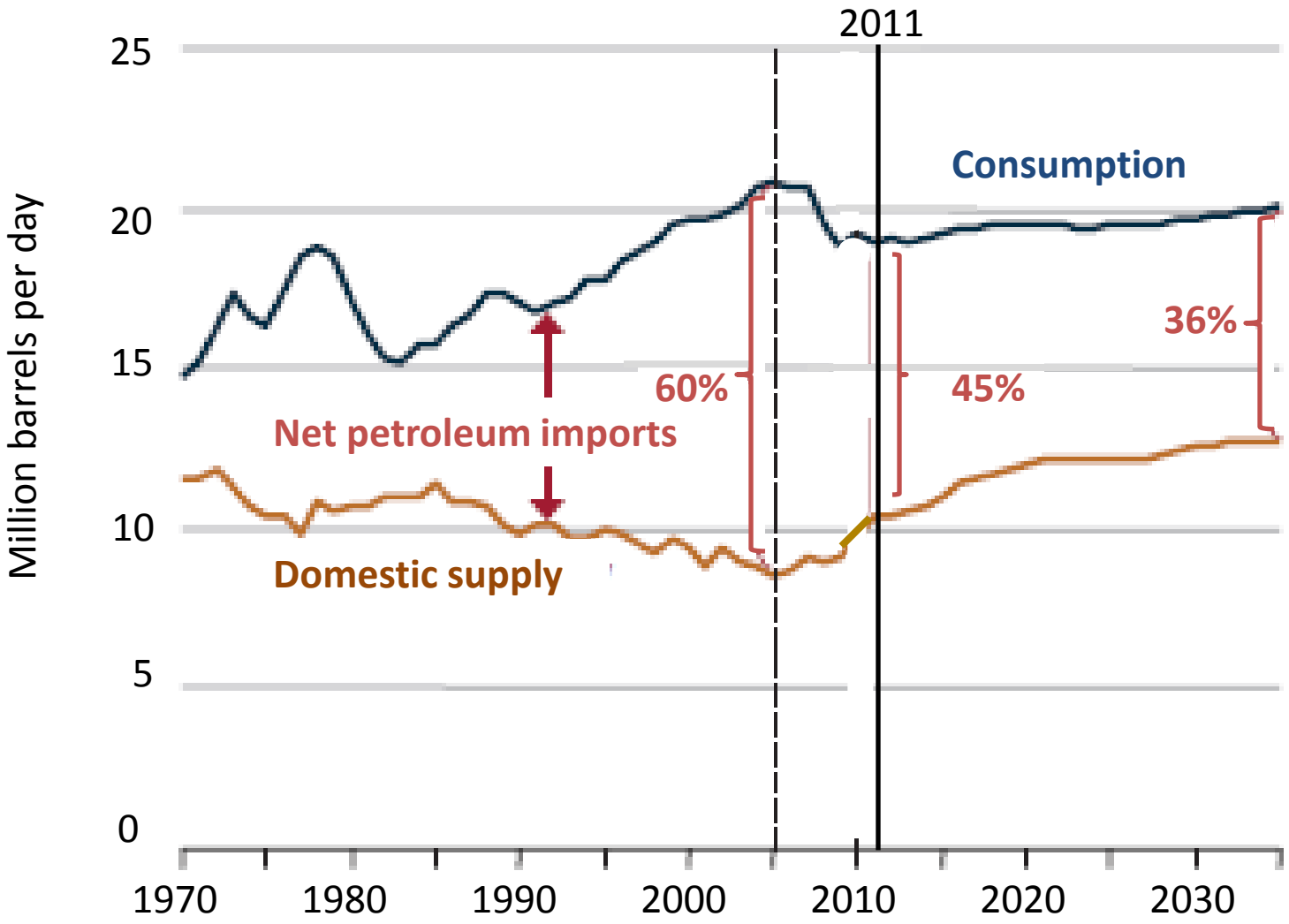
Source: U.S. Energy Information Administration

U.S. Oil Production from Shale Formations



Source: HPDI, Texas RRC, North Dakota department of mineral resources, and EIA, through February 2012;

U.S. Liquid Fuels Supply

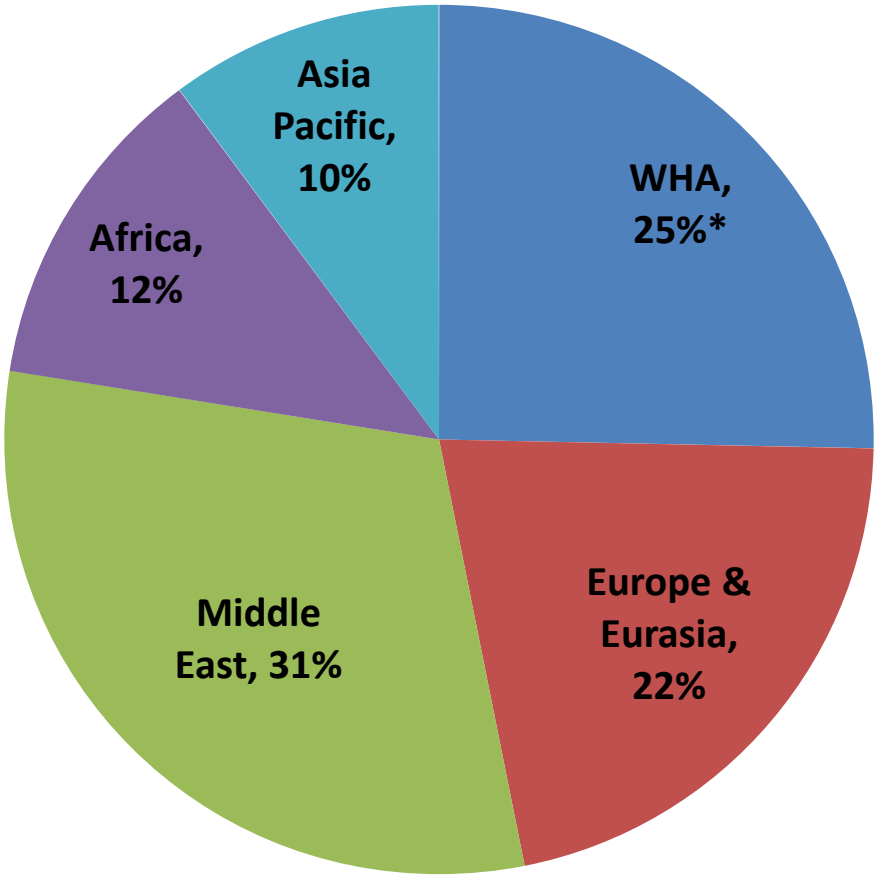


Source: U.S. Energy Information Administration, AEO 2012

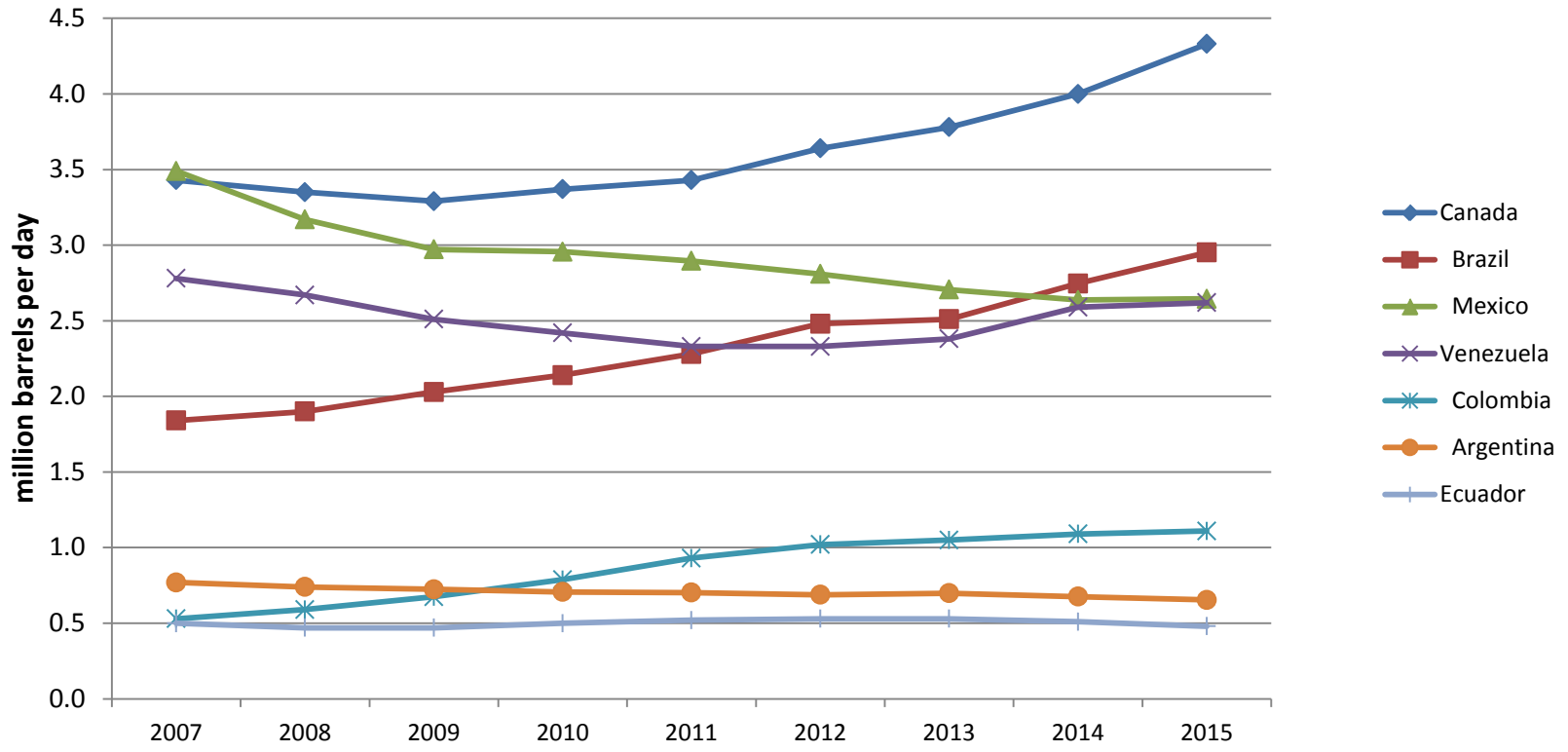
The Americas Supply ¼ of the World's Oil

Figure 39. World proved oil reserves by geographic region as of January 1, 2011
(billion barrels)

Global Oil Production, 2010

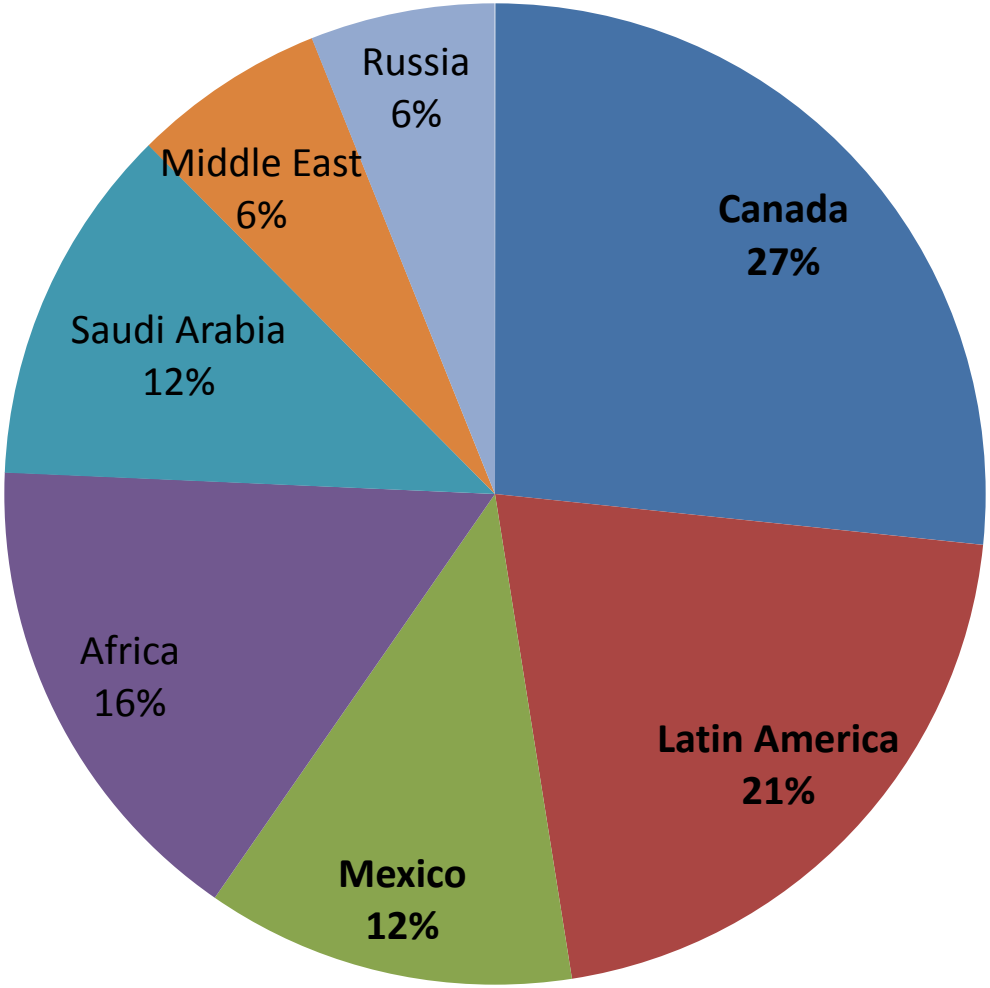


Western Hemisphere Producers, 2007-2015



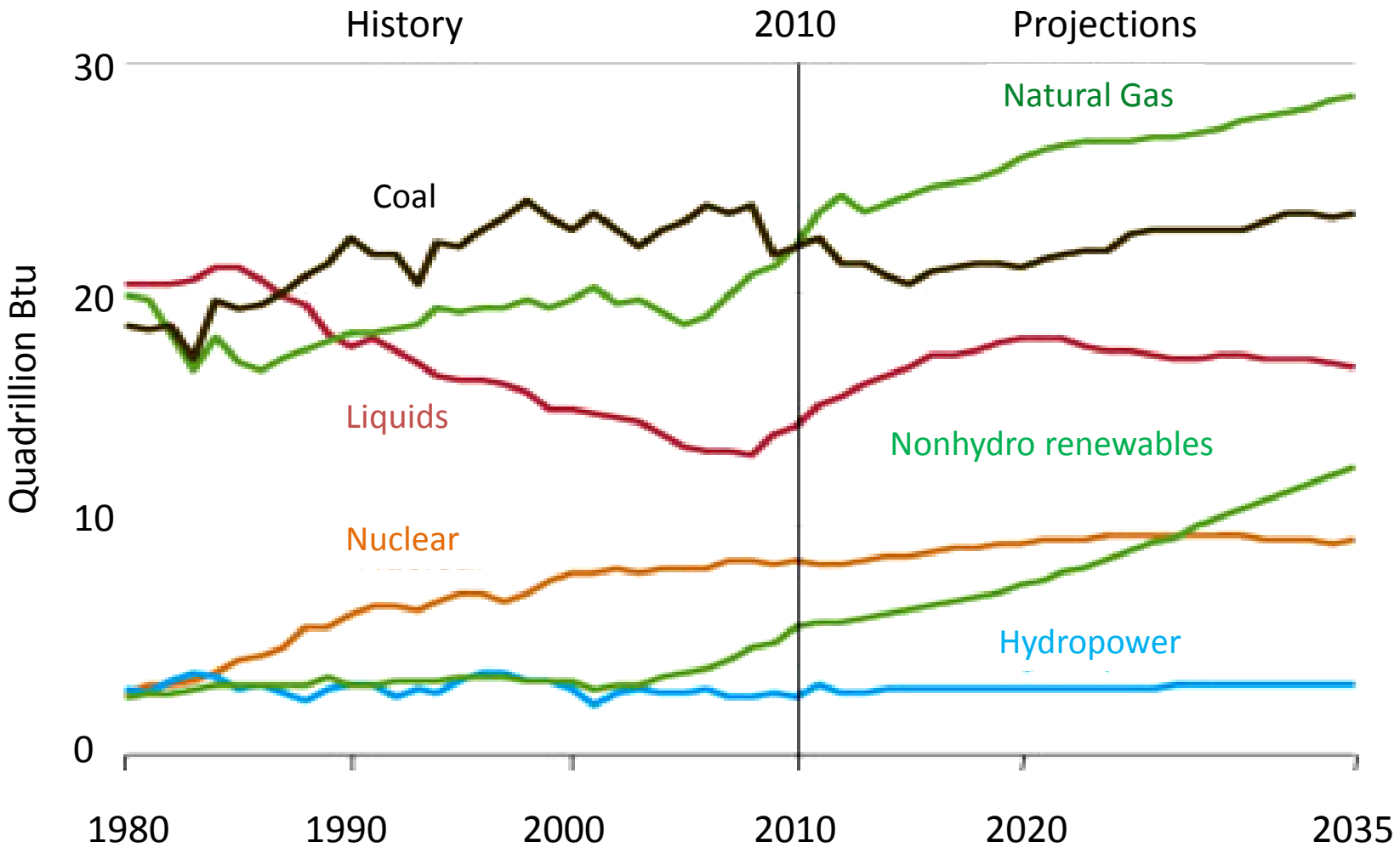
Estimated increase of 1.5-2 mb/d over the time period

U.S. Petroleum Imports from Top 15 Suppliers



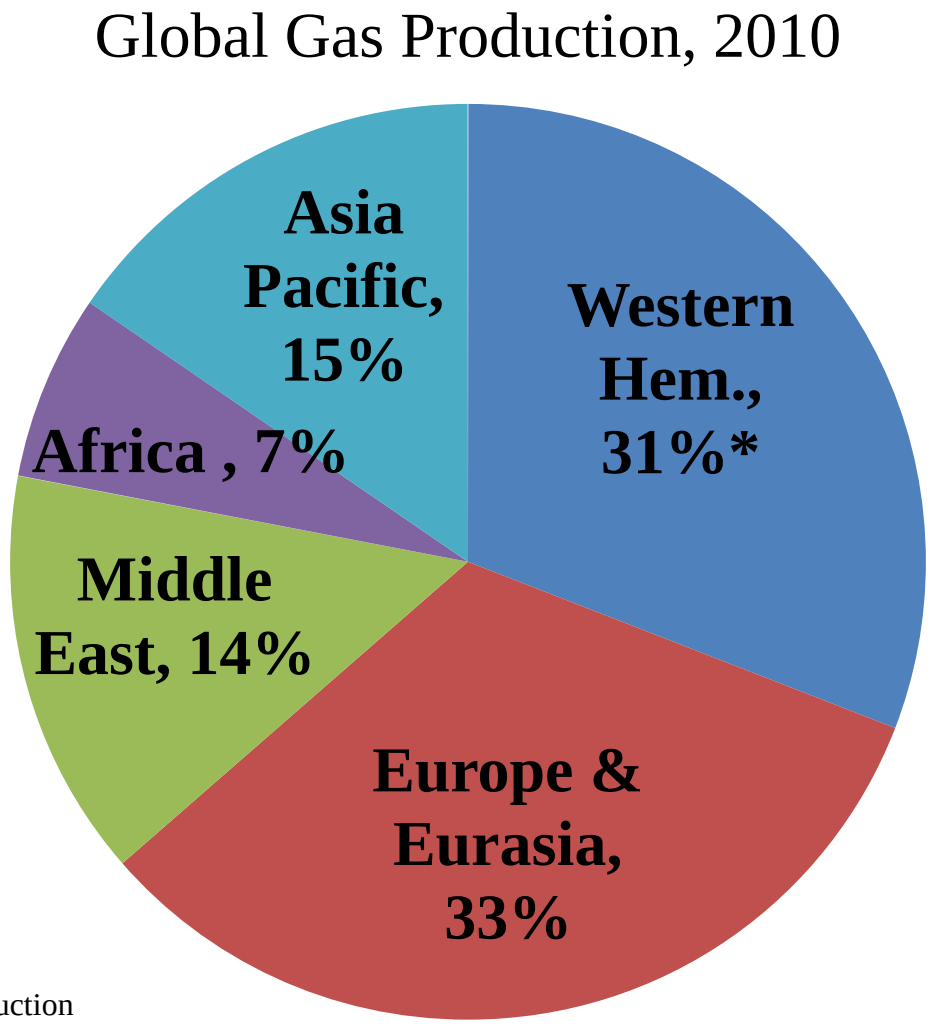
Total ~ 10,000 barrels per day, 2011

U.S. Production By Fuel, 1980-2035



Source: U.S. Energy Information Administration, AE0 2012

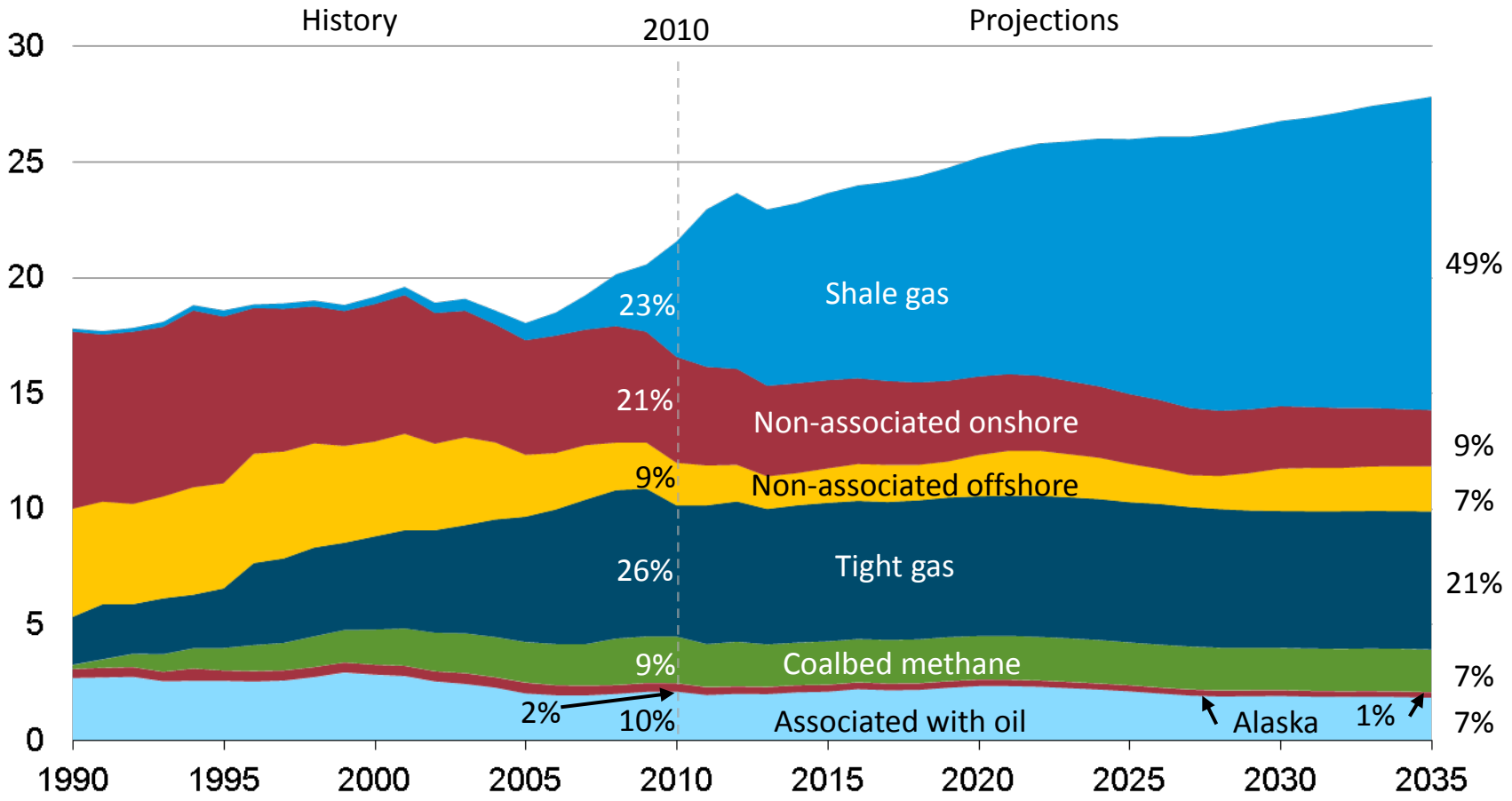
The Americas Supply 1/3 of the World's Gas



*11 %, without U.S. gas production

U.S. Natural Gas Supply by Source

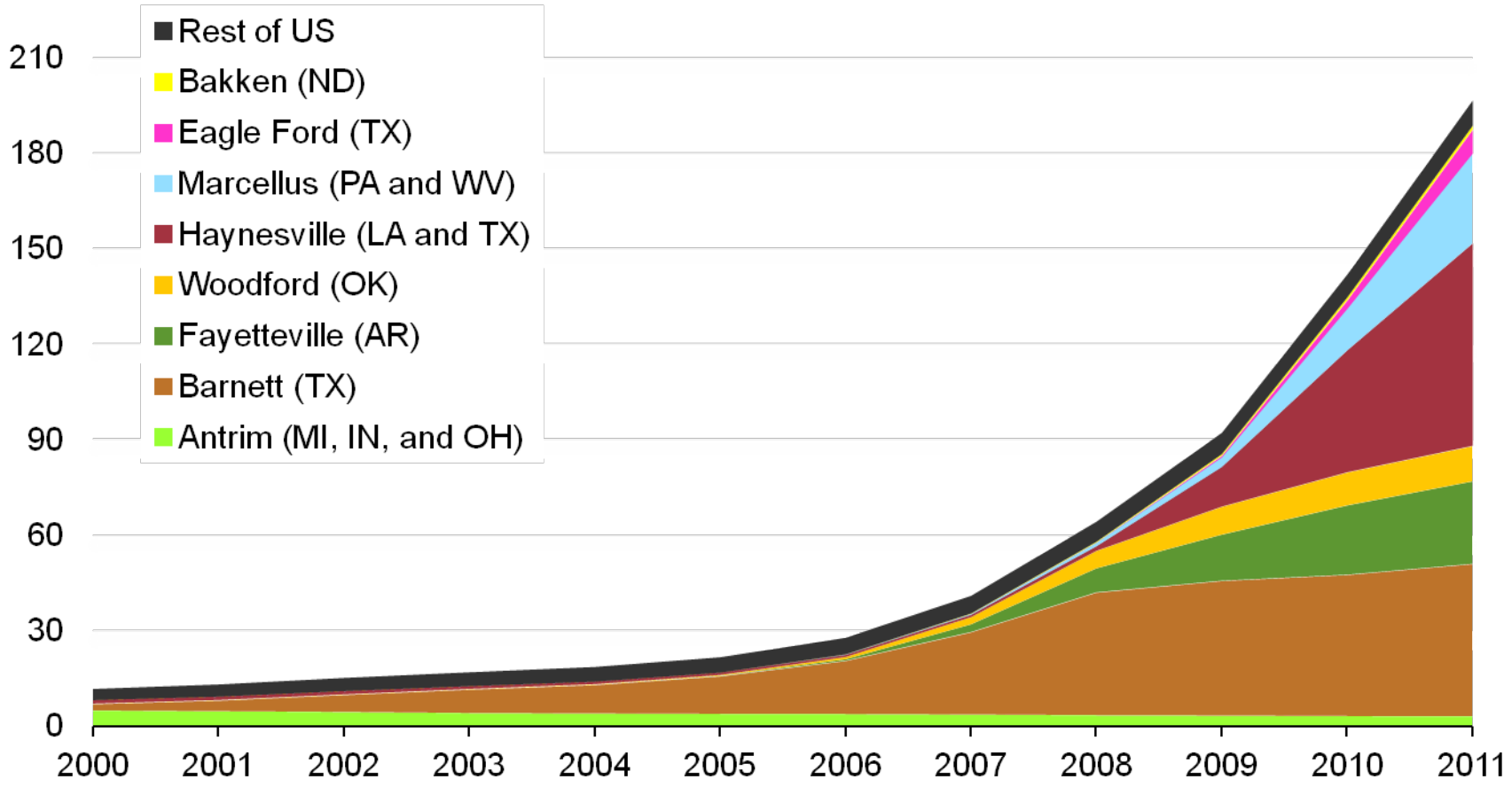
U.S. dry gas production
trillion cubic feet per year



Source: EIA, Annual Energy Outlook 2012

U.S. Shale Gas Production, 2000-2011

Trillion cubic feet



Source: EIA, Lippman Consulting (2010 estimated)

U.S. Secretary of Energy Advisory Board (SEAB)

Select Recommendations to Improve Environmental Performance

U.S. federal agencies

- Improve transparency in shale gas operations
- Measure & disclose air emissions from development
- Disclosure of chemicals used in hydraulic fracturing fluid
- Fund R&D to increase safety and efficiency

U.S. state agencies

- Establish standards for waste water disposal
- Measure and test groundwater

Public-private partnerships or mechanisms

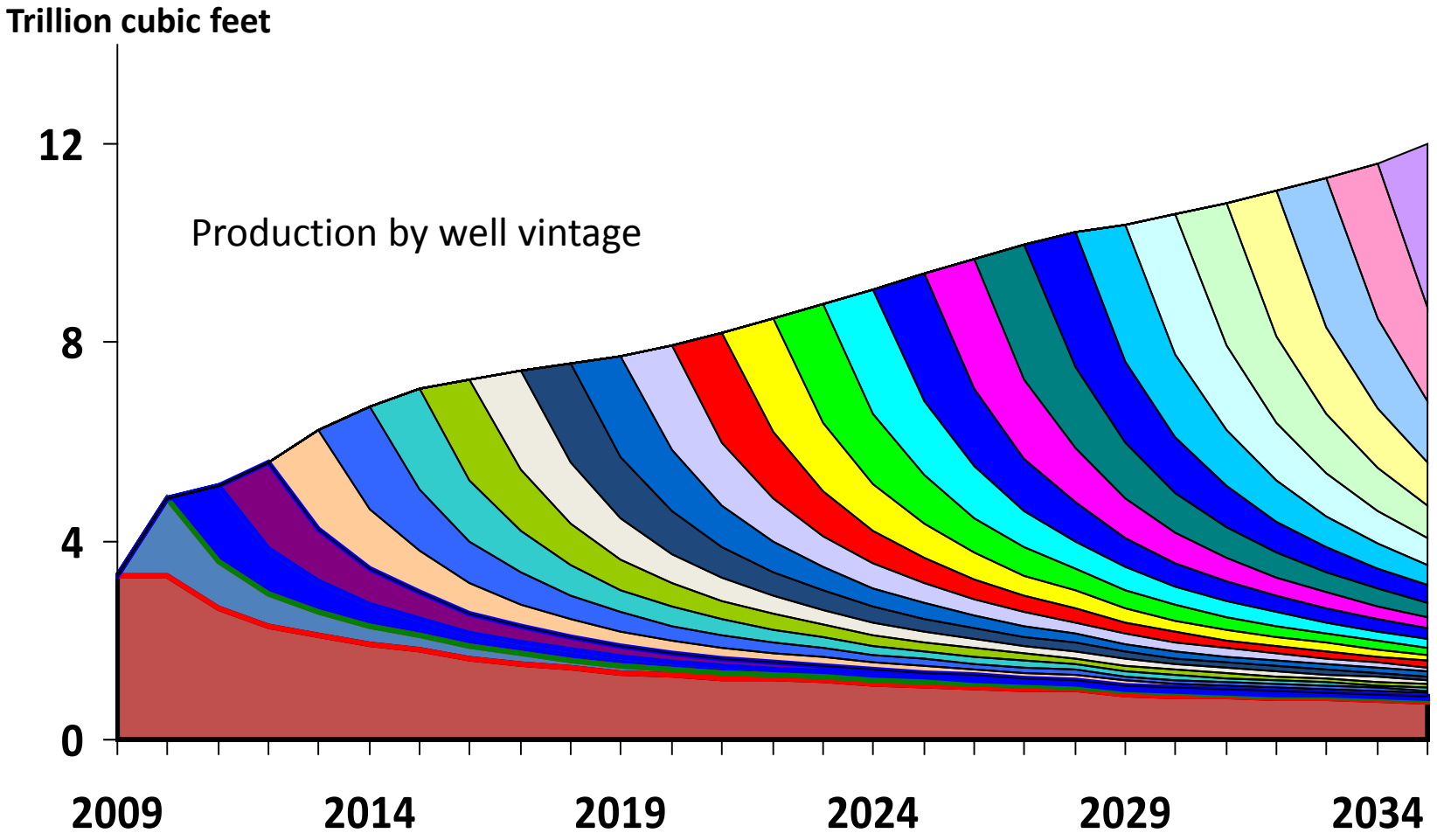
- Comprehensive engagement with all stakeholders
- Establish process to share best practices
    - **FracFocus:** website on chemicals transparency
    - **STRONGER:** evaluates and shares state regulatory policies

Foreign Investment in U.S. Shale Gas & Oil Plays

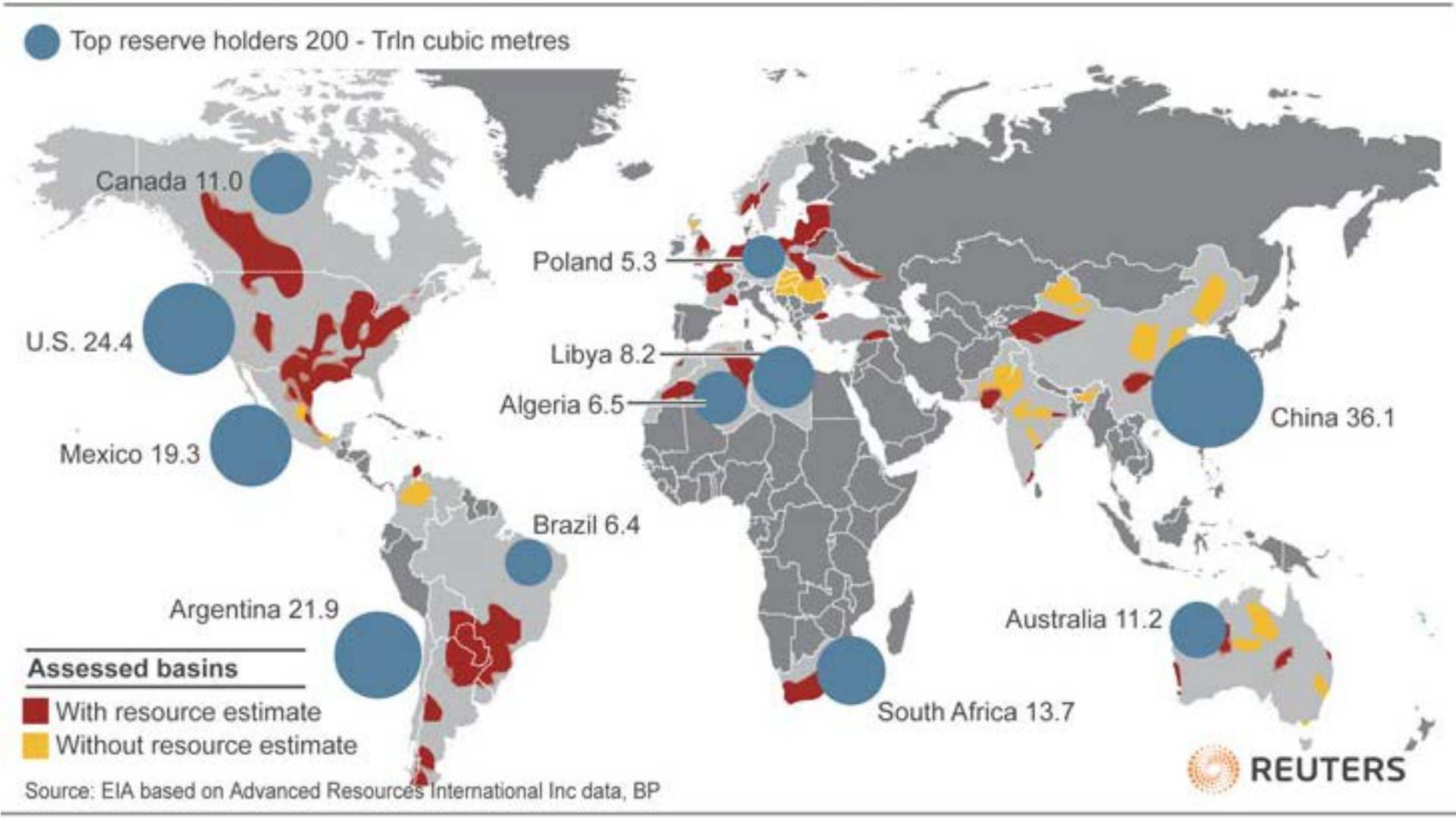
Foreign Partner	Country	Domestic Partner	Shale Play	Deal Amount ($B)	Year
British Gas	UK	EXCO	Marcellus	0.95	2009
StatoilHydro	Norway	Chesapeake	Marcellus	3.38	2009
Reliance	India	Pioneer	Eagle Ford	1.36	2010
Reliance	India	Atlas	Marcellus	1.70	2010
Reliance	India	Carrizo	Marcellus	0.39	2010
Total	France	Chesapeake	Barnett	2.25	2010
CNOOC	China	Chesapeake	Niobrara	0.57	2010
British Gas	UK	EXCO	Haynesville	1.30	2010
Mitsui	Japan	Anadarko	Marcellus	1.40	2010
CNOOC	China	Chesapeake	Eagle Ford	1.08	2011
KNOC	Korea	Anadarko	Eagle Ford	1.55	2011
Marubeni	Japan	Marathon	Niobrara	0.27	2011
Mitsui	Japan	SM Energy	Eagle Ford	0.68	2011
GAIL	India	Carrizo	Eagle Ford	0.10	2011
Total	France	Chesapeake/EnerVest	Utica	2.30	2012
Sinopec	China	Devon	TMS, Niobrara,Utica	2.20	2012
Marubeni	Japan	Hunt Oil	Eagle Ford	1.30	2012
Total……				22.77	

Source: EIA, from trade press reports as of January 9, 2012

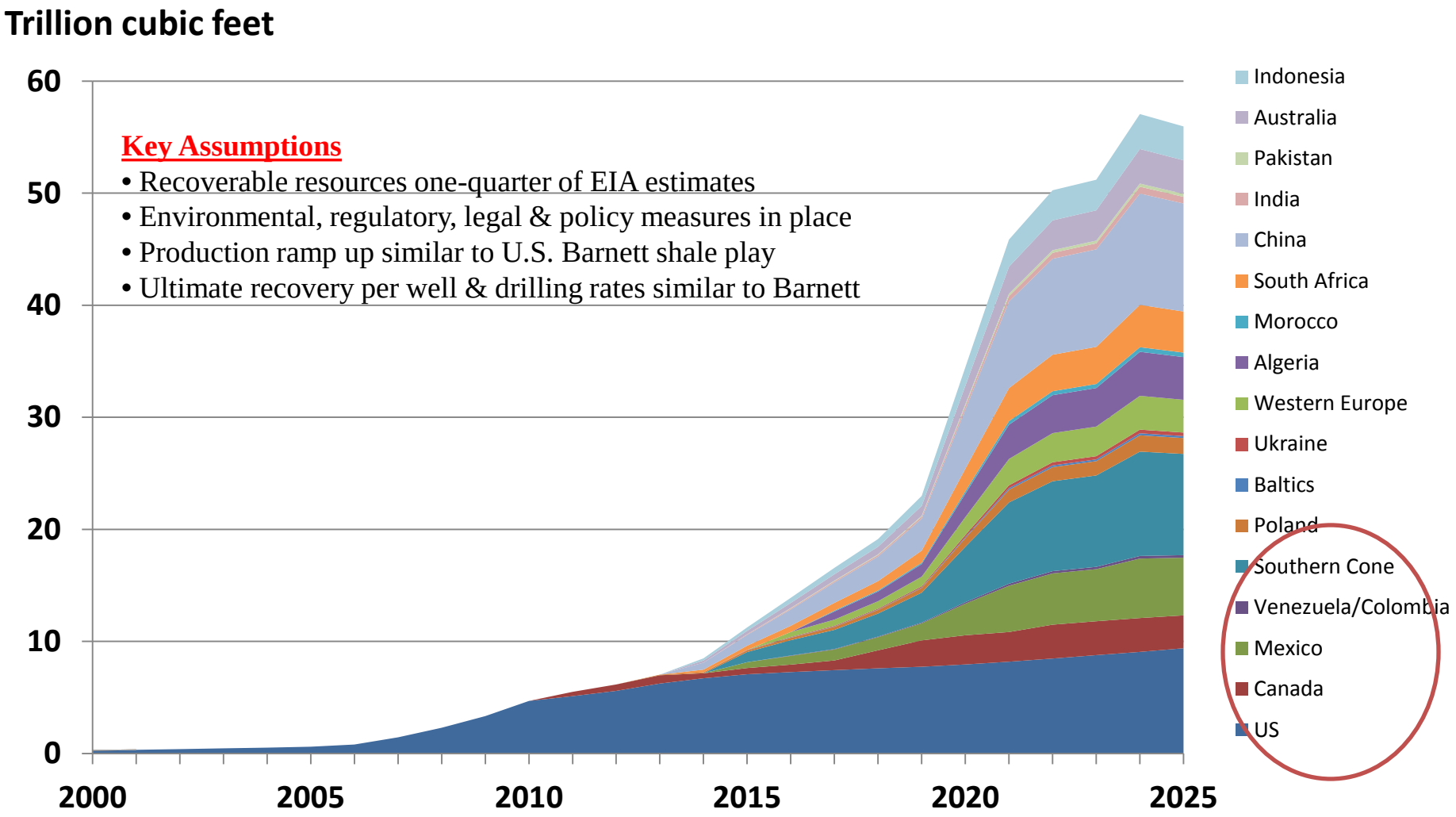
Projected U.S. Shale Gas Production, 2009-2035



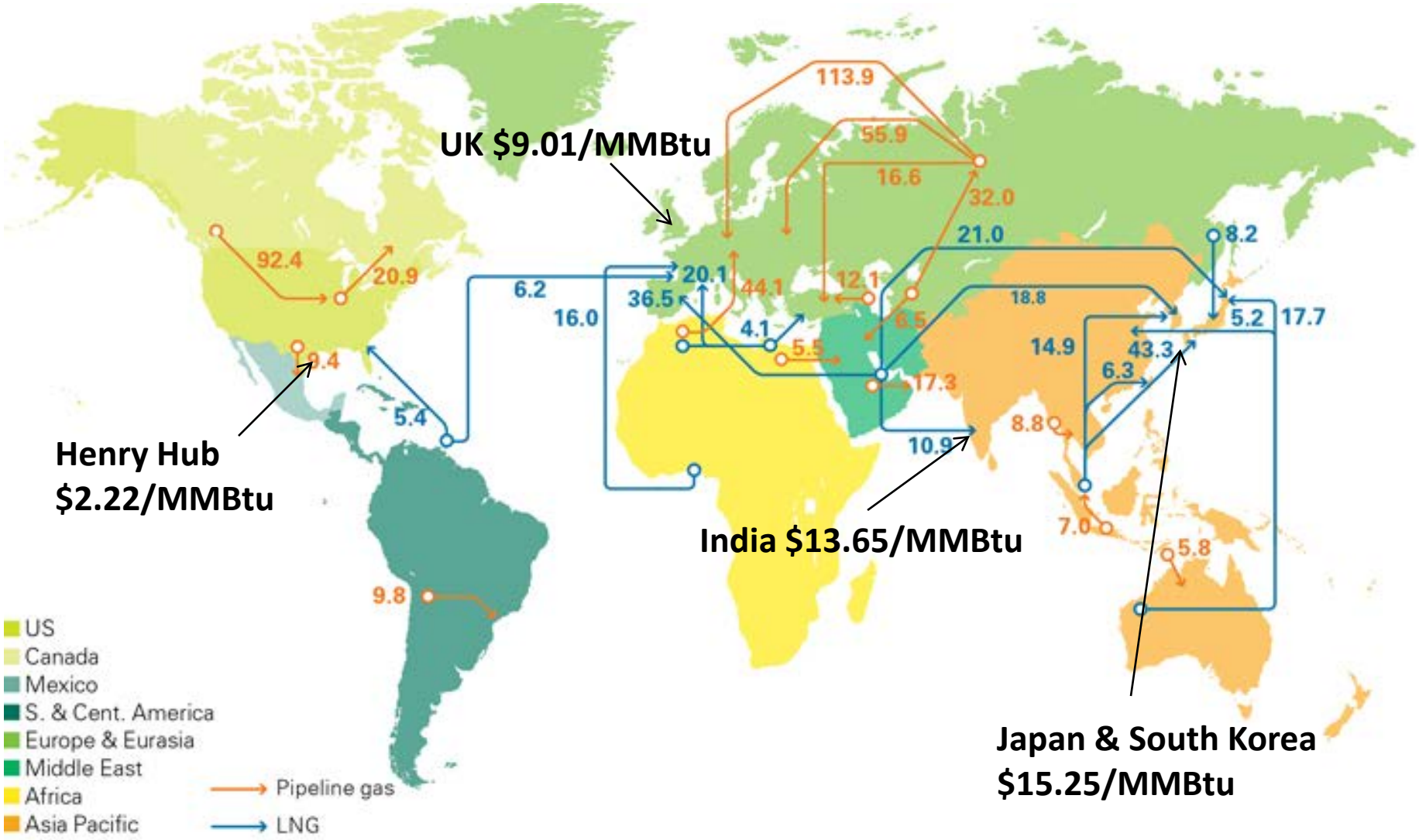
Global Shale Gas Basins & Possible Resources



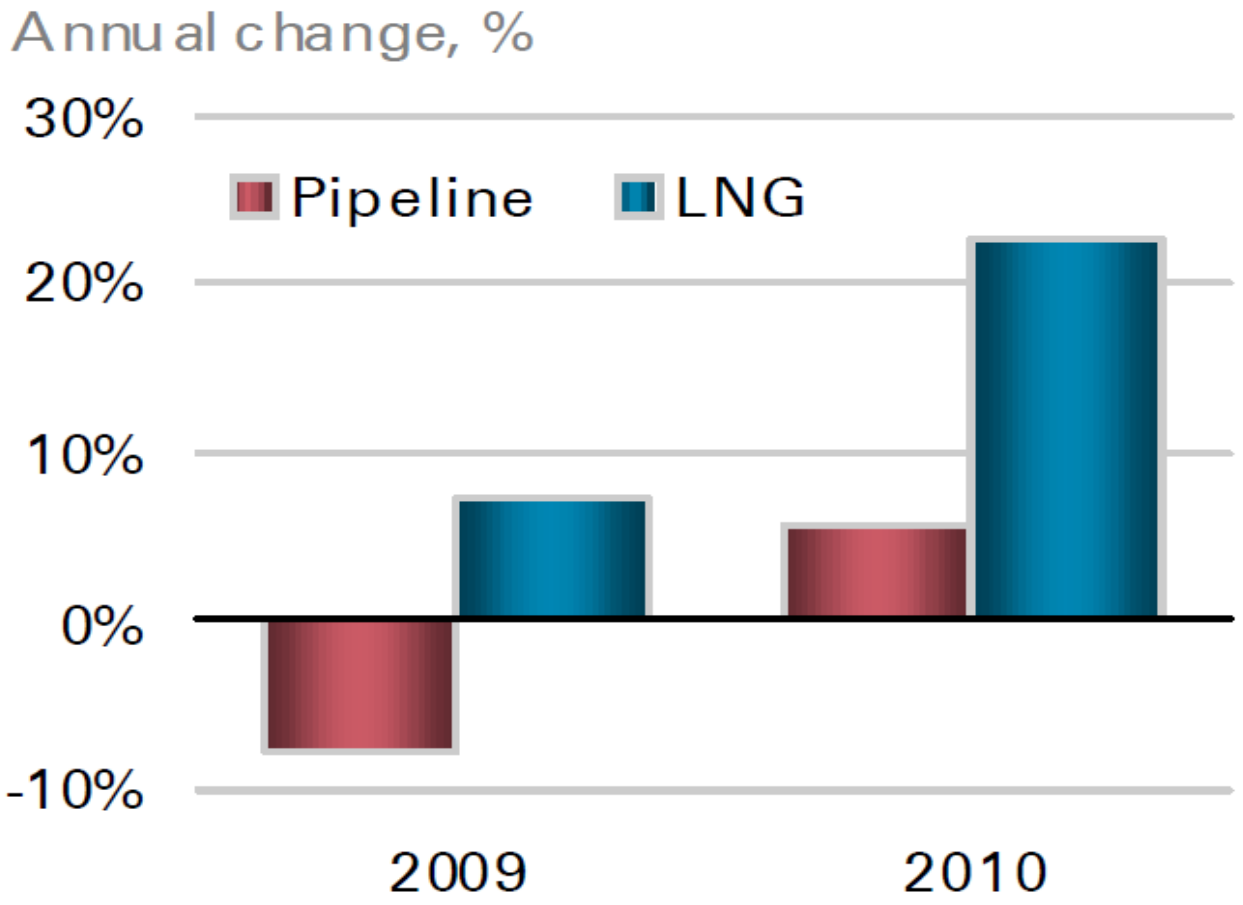
Possible Impact on Global Gas Market



World Gas Trade & Landed LNG Prices (April 2012)

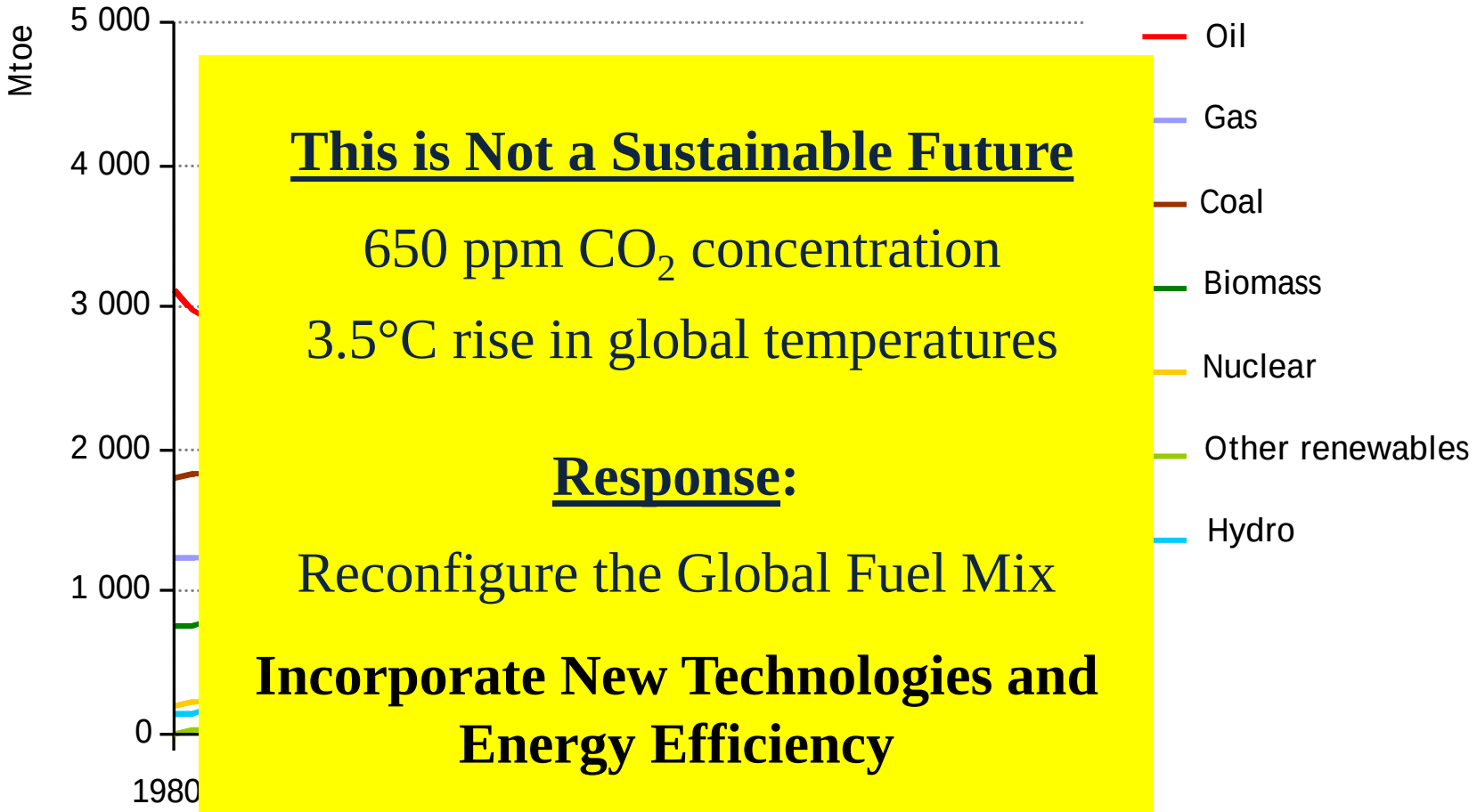


Evolving Global Gas Trade Dynamics: LNG preferred



Source: BP Statistical Review of World Energy

World Primary Energy Demand by Fuel in the IEA's GAS Scenario



<u>This is Not a Sustainable Future</u>

650 ppm CO_2 concentration

3.5°C rise in global temperatures

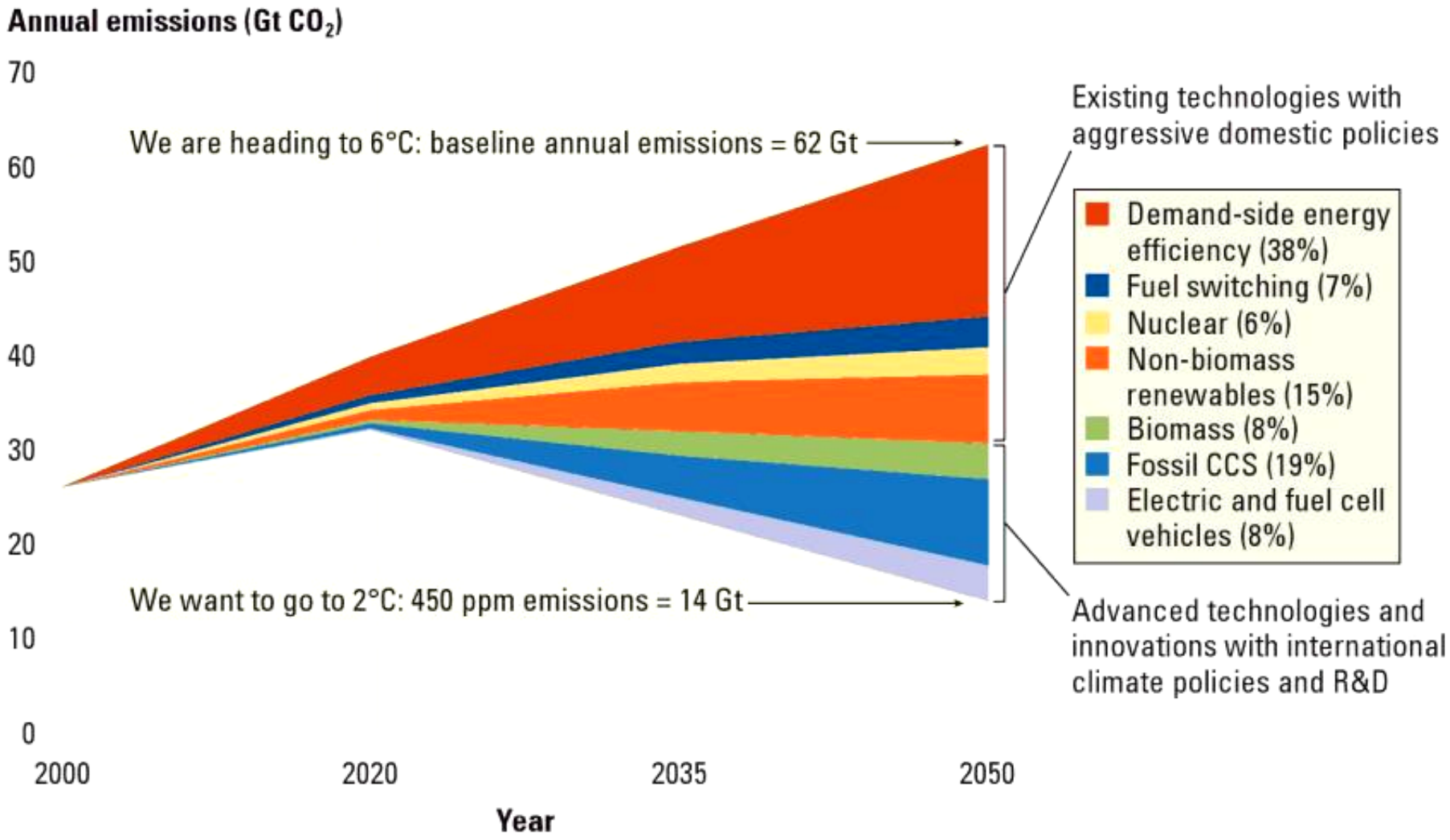
<u>Response</u>:

Reconfigure the Global Fuel Mix

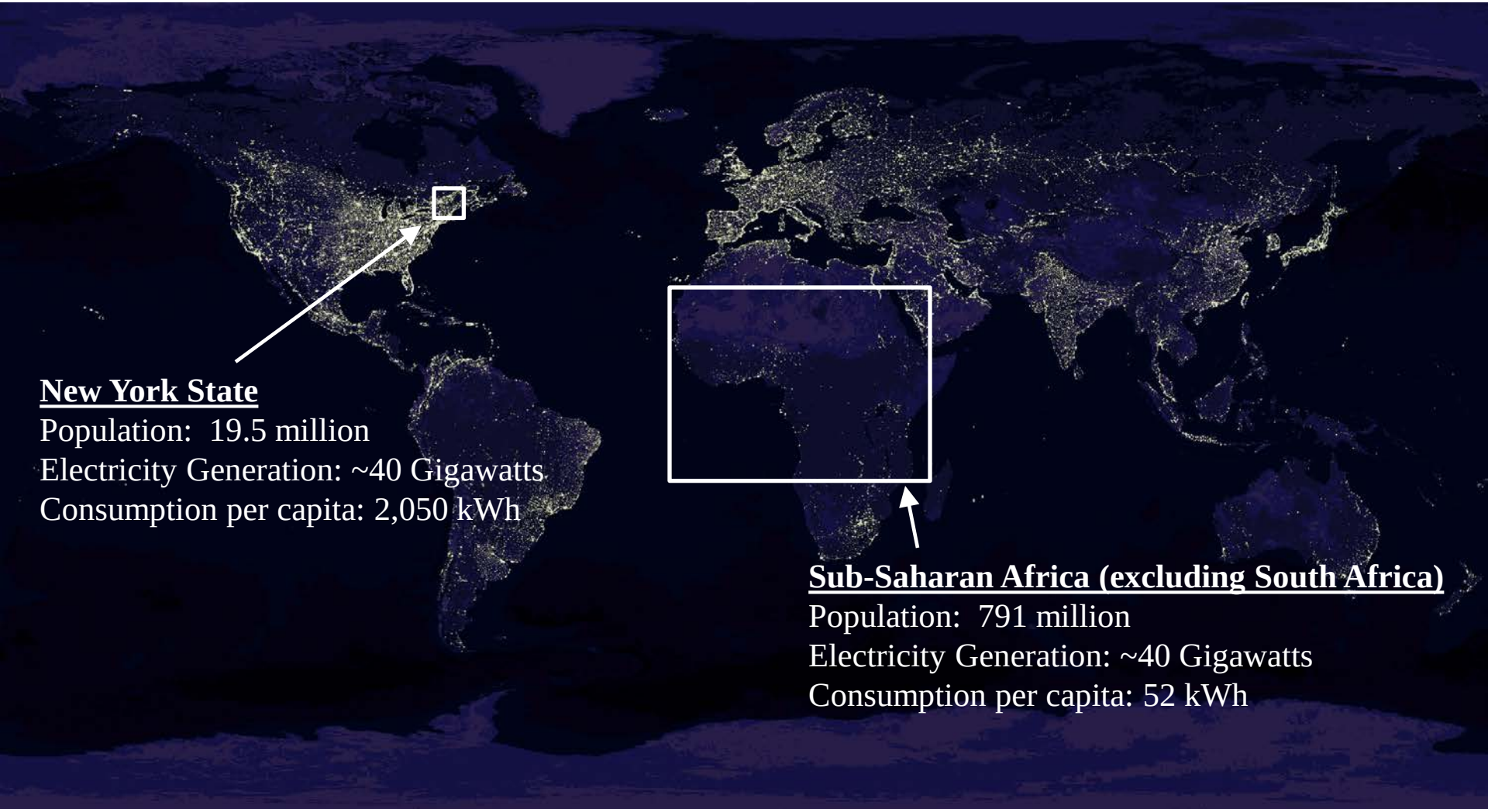
Incorporate New Technologies and Energy Efficiency

Develop Commercial Markets for Clean Tech; Strong Power Markets

Demand-side Energy Efficiency has Greatest Potential for CO_2 Emissions Reduction

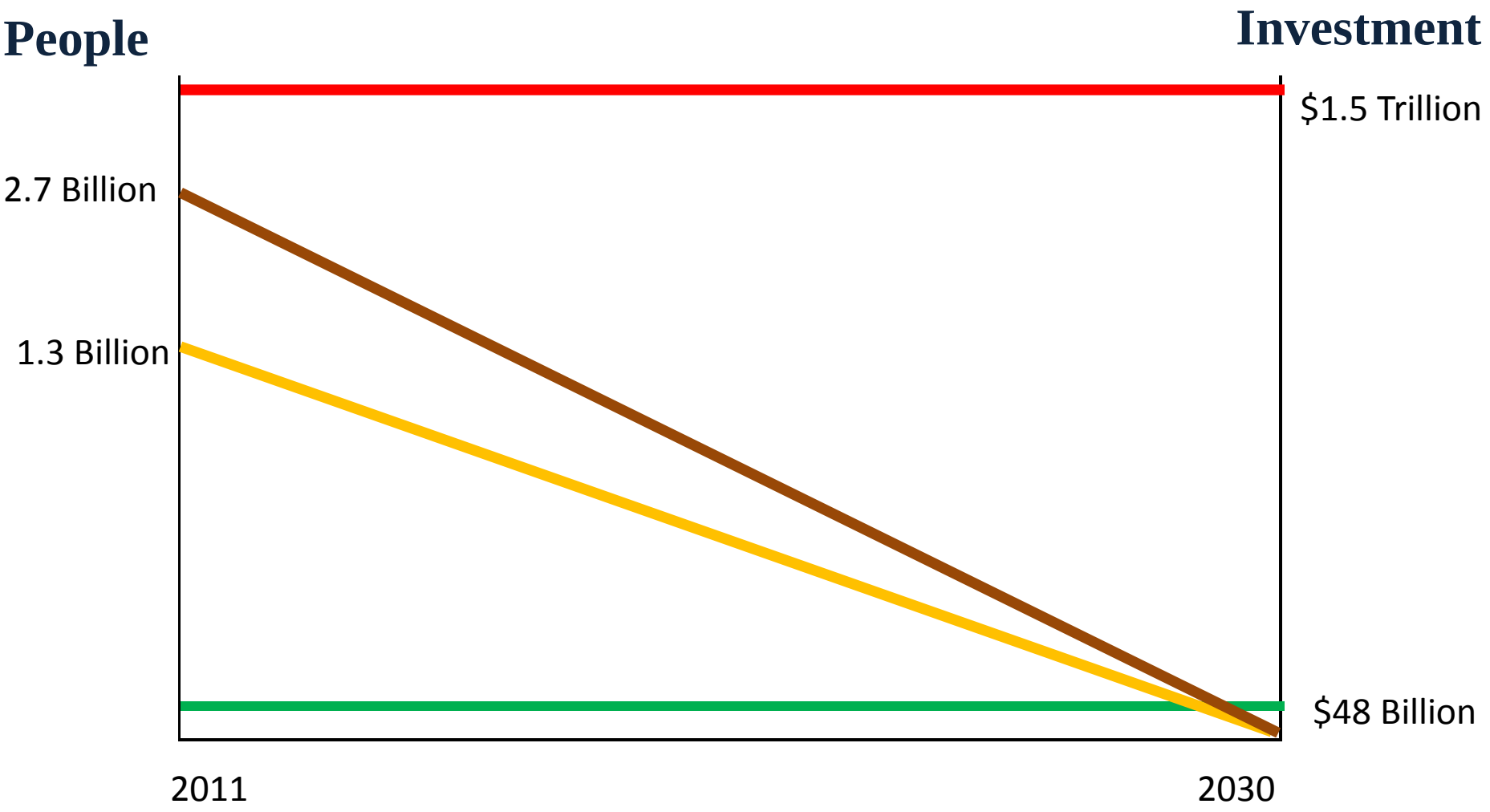


The World at Night

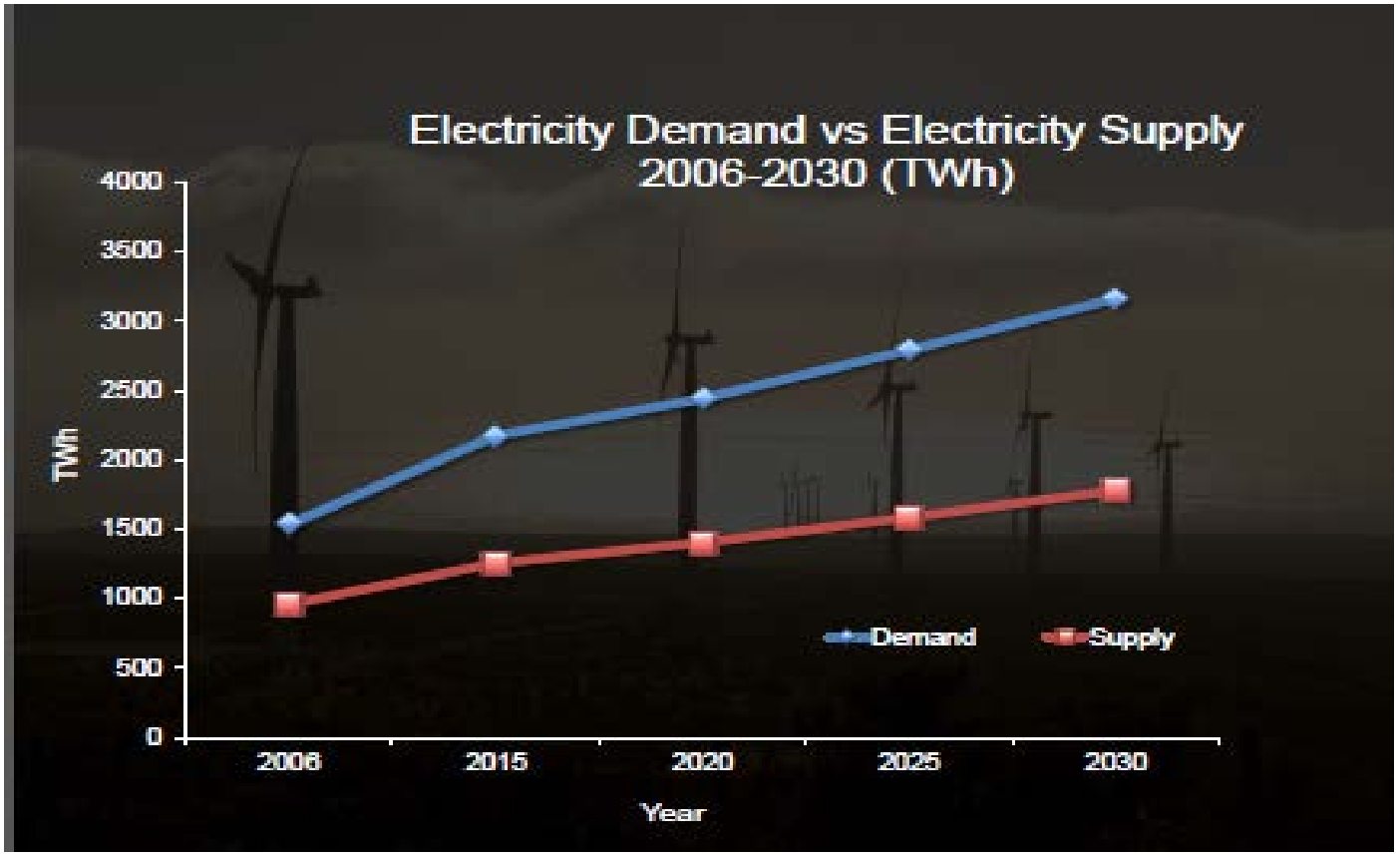


Investment for Access:

3% of total investment needed by 2030



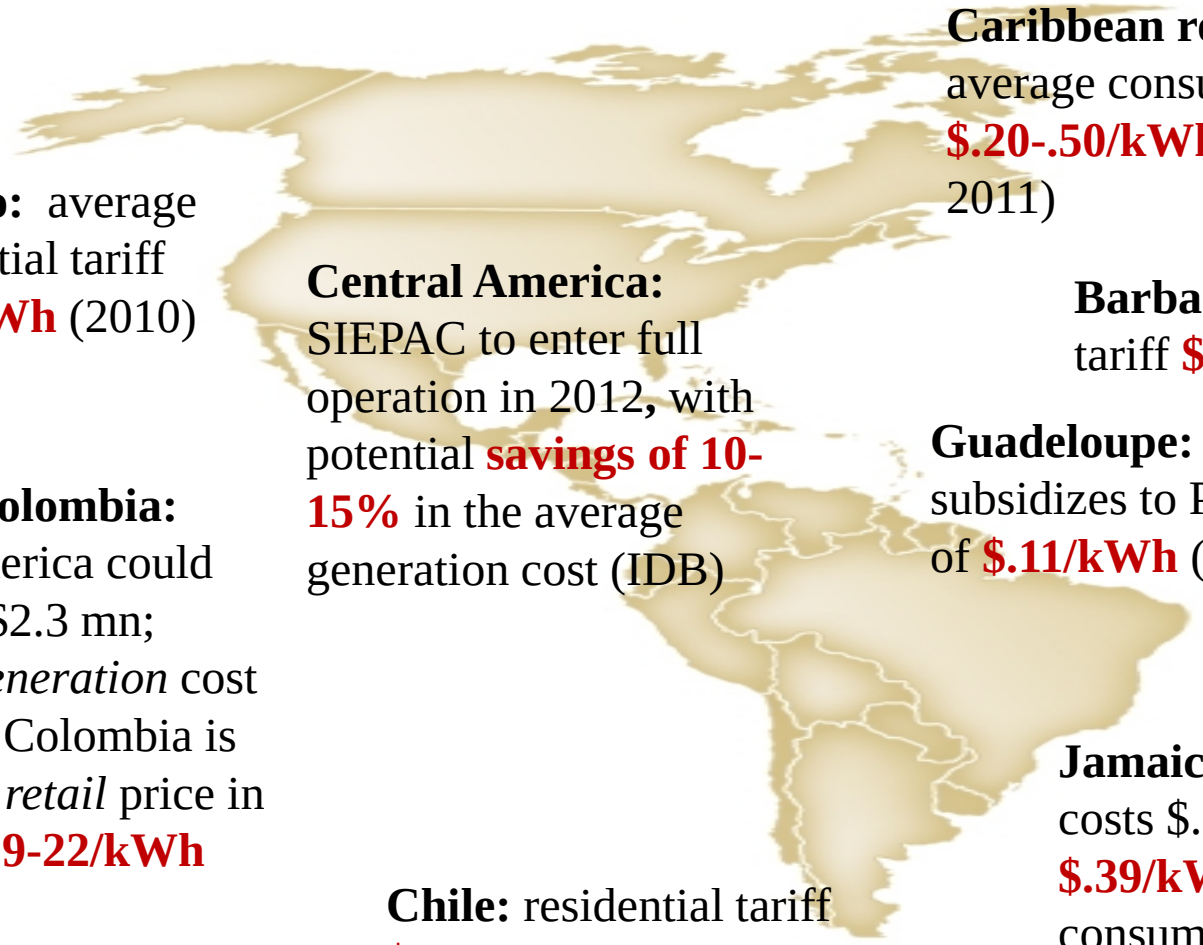
The Americas Need Power Investment to Support Economic Growth



Source: IDB

Energy Poverty: Access and Affordability

93% electrified, but 31 million citizens without access



Caribbean region: average consumer tariff **$.20-.50/kWh** (WB 2011)

Mexico: average residential tariff **$.09/kWh** (2010)

Central America: SIEPAC to enter full operation in 2012, with potential **savings of 10-15%** in the average generation cost (IDB)

Barbados: consumer tariff **$.32/kWh** (2010)

Guadeloupe: France subsidizes to Paris price of **$.11/kWh** (2010)

Panama-Colombia: Central America could save up to $2.3 mn; marginal *generation* cost of hydro in Colombia is **$.05/kWh;** *retail* price in Panama **$.19-22/kWh**

Jamaica: Generation costs $.24/kWh and **$.39/kWh** residential consumer price (2011)

Chile: residential tariff **$.18/kWh** (2011)

Connecting the Americas 2022

Commercial Opportunities in the Caribbean

Challenges/Context:

- High dependence on oil and highest cost of electricity in the world
- Electricity demand expected to double in next 20 years
- Small isolated electricity markets

Electricity integration:

- **St. Kitts and Nevis and Dominica *may* have over 600 MW combined of geothermal potential**
- lowers electricity costs
- increases reliability
- lower reserve margins
- facilitates renewable energy with larger markets
- increased resilience to climate and weather events

Attachment: Technically Feasible Caribbean Electrical Grid Interconnection Opportunities and Benefits

Interconnection	MW	Km	Energy Generation	Estimated Savings (cents/kWh)*
Dominica – Martinique	100	70	Geothermal exported from Dominica.	13.3/ displacing distillate 1.5/ displacing pipeline gas
Dominica – Guadeloupe	100	70		
Nevis – Puerto Rico	400	400	Geothermal exported from Nevis.	14.5/displacing HFO -0.7/displacing LNG
Nevis – US Virgin Islands	80	320		1.5/displacing distillate
Nevis – St. Kitts	50	5		13.4/displacing distillate
Saba – St. Maarten	100	60	Geothermal exported from Saba.	12.2/displacing distillate
DR – Haiti	250	563	DR export of HFO fueled steam plants or gas-fueled CC.	-2.3/HFO export displacing distillate 9.6/gas export displacing distillate
Puerto Rico – DR	400	150	Not analyzed but expected to be surplus capacity in Puerto Rico	Not analyzed

Source: World Bank, 2011, *Caribbean Regional Electricity Supply Options: Towards Greater Security, Renewables, and Resilience.*

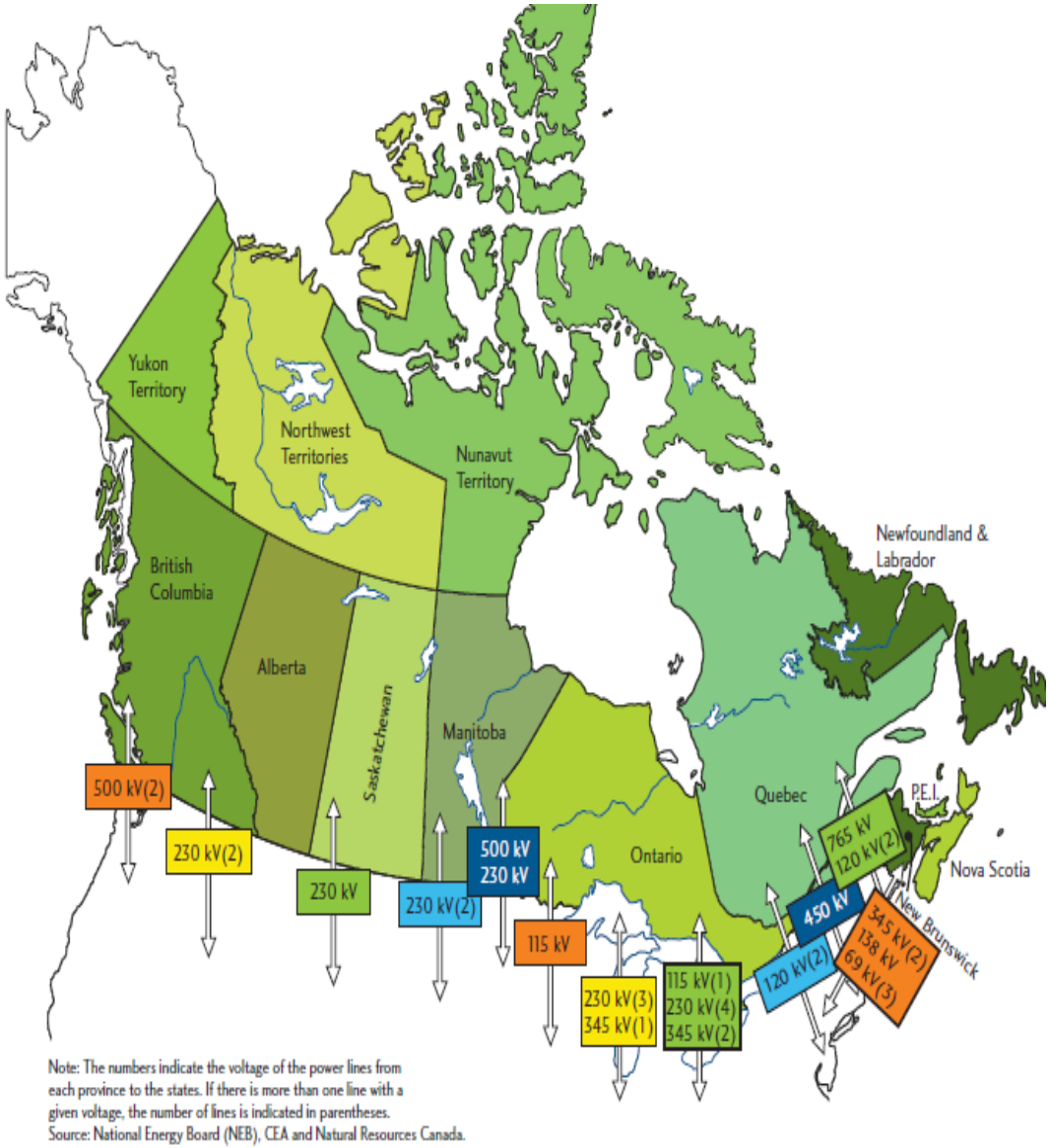
North America: U.S.-Canada

- Over 30 transmission lines crossing the U.S.-Canada border

- With the exception of Quebec, the U.S. is interconnected with Canada through synchronous ties

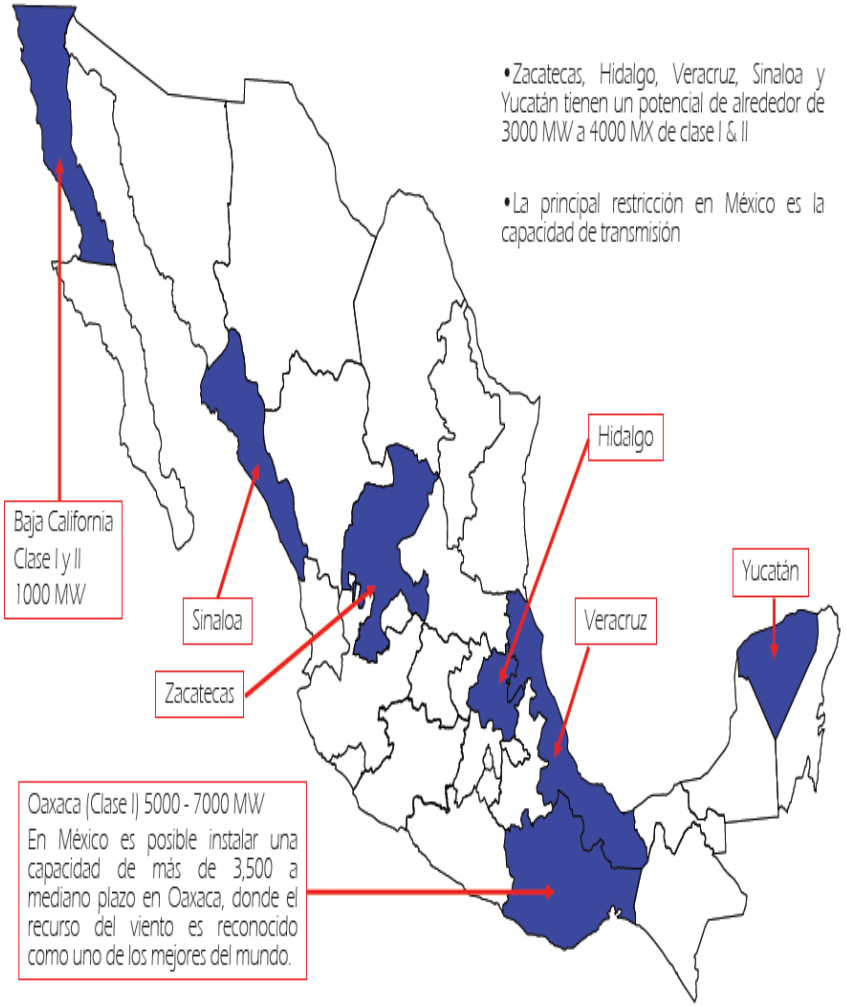
- Complimentary load profiles: U.S. exports in winter and imports in summer

Example: Manitoba Hydro and Minnesota Power approved a 250 MW PPA for Manitoba supplies of hydropower and North Dakota wind farms supply power



Mexico – Wind and Other Potential RE Export Opportunities into U.S. market

- In 2010, Mexico installed 316 MW of new wind power capacity, taking the total up to 519 MW, which represents a 156% increase over 2009.
- The Mexican government estimates wind power potential at around 71 GW.
- More supportive legal and regulatory framework, availability of new transmission capacity in the Oaxaca, significant wind turbine price reductions, and renewed access to financing.



Mesoamerica

Mexico-Guatemala and Central America (SIEPAC)

País	KMS
Guatemala	283
El Salvador	286
Honduras	274
Nicaragua	307
Costa Rica	493
Panamá	150
Total	1793

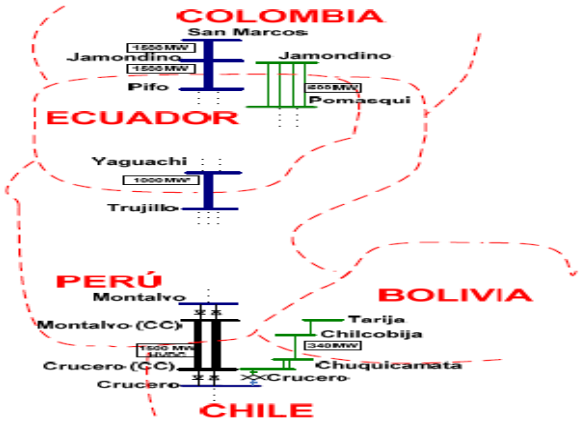
300 MW de capacidad + 300 MW
28 bahías en 15 subestaciones
Cable OPGW de 36 fibras

SIEPAC to enter full operation in 2012, with potential savings of 10-15% in the average generation cost (IDB).

Panama-Colombia (planned)

- Allows cheaper Colombian hydro into Central America, beginning with 300 MW and doubling to 600 MW in Phase II.
- Central America could save up to $2.3 mn annually; marginal generation cost of hydro in Colombia is $.05/kWh; retail price in Panama $.19-22/kWh (IDB)

The Andes



• Colombia can export excess, cheaper hydro into Andean region and Chile.

• Colombia, Ecuador, and Peru possess more than half of the hydropower potential outside of Brazil, and have developed only 10% of their hydroelectric potential.

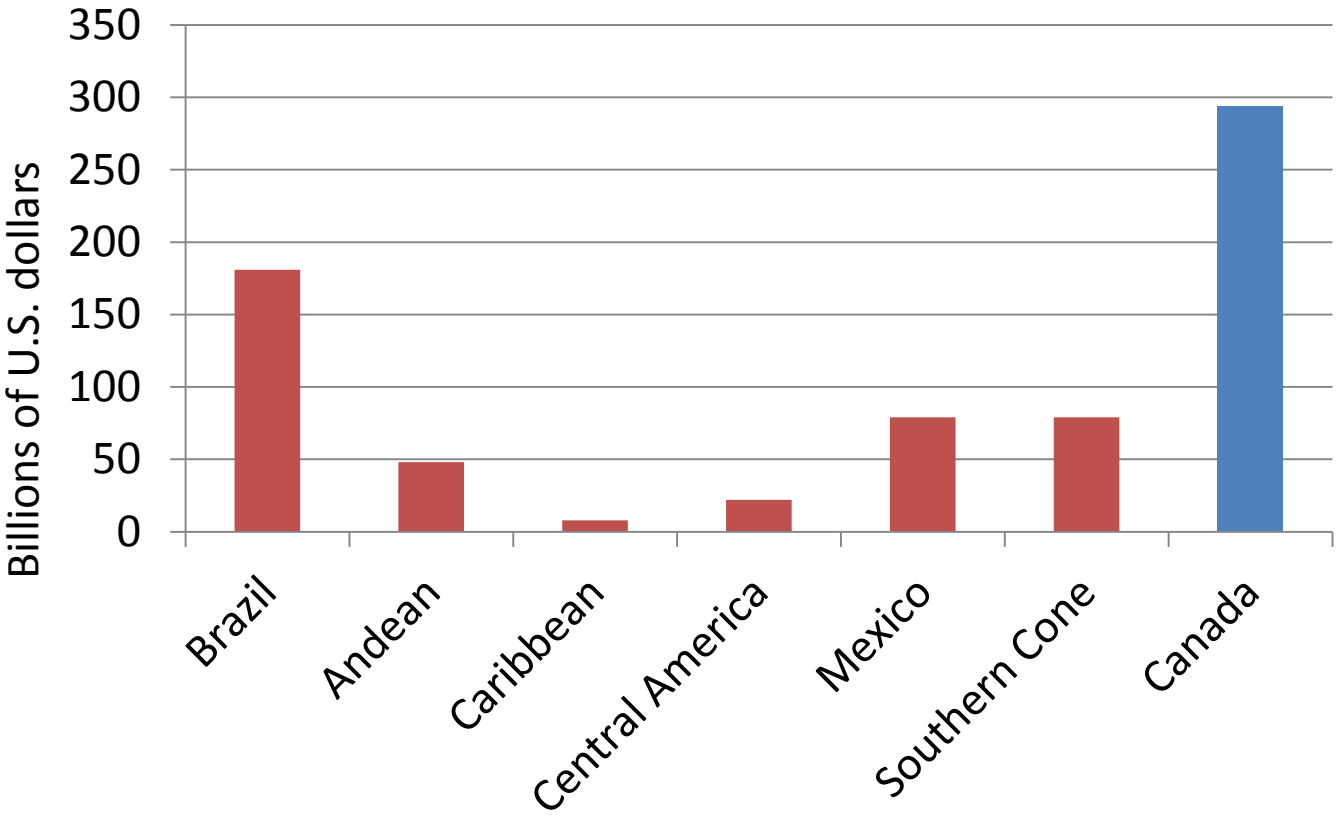
• UNDP and IDB supporting feasibility studies for infrastructure and regional market and regulatory harmonization

Southern Cone

• Brazil is region's largest electricity producer and accounts for roughly half of existing cross-border trade in electricity.

• Brazil needs to double generation capacity over 10 years and is investing in hydro and other projects with Guyana, Paraguay, Peru to meet demand.

Electricity Investments Needed by Sub-region: 2008-2030

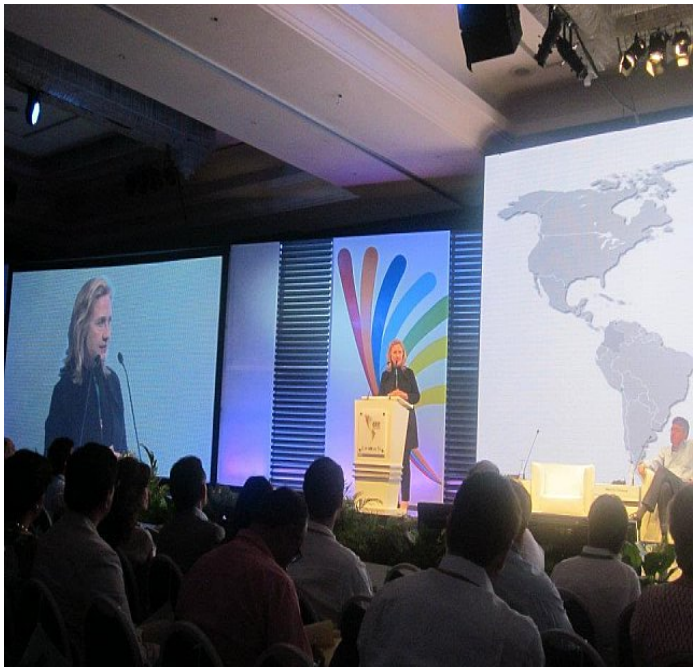


The Edison Foundation estimates that the United States will require $1.5-2 trillion in electricity investments by 2030:

Source: World Bank; Conference Board of Canada (Canada)

Connecting the Americas 2022

"Not only can we can make power more affordable, reliable, and efficient, but we can make it more economically viable to add renewable energy to the mix." – Secretary of State Clinton



Possible Next Steps

- ECPA Ministerial
- Increased Support for regional work
- Possible Regulators Forum
- Identify opportunities for U.S. private sector