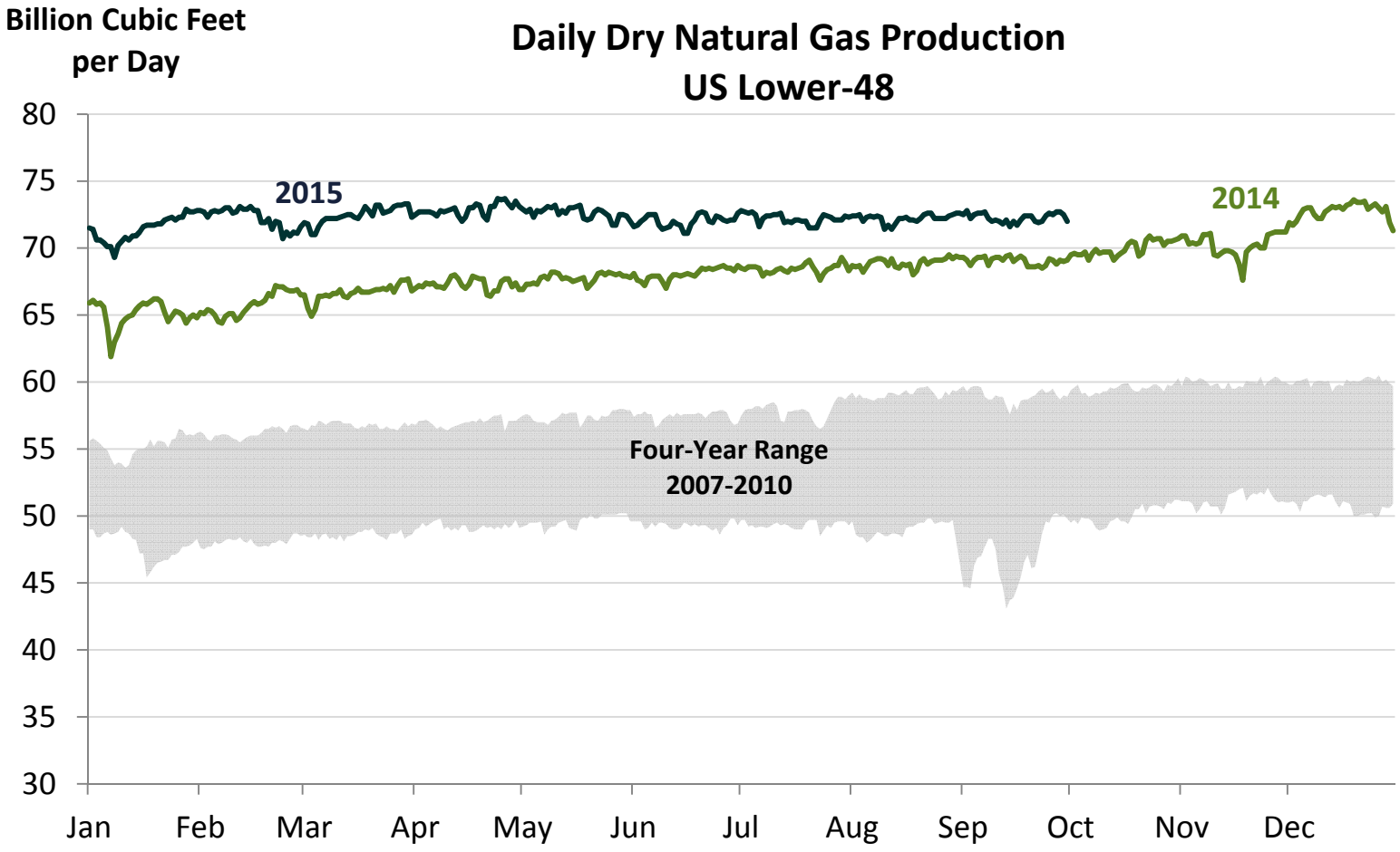
American Gas Association

October 27, 2015

Exploring Expectations for the 2015-16 Winter Heating Season and More

Chris McGill, Vice President, Energy Analysis and Standards

Record Production Levels in 2015

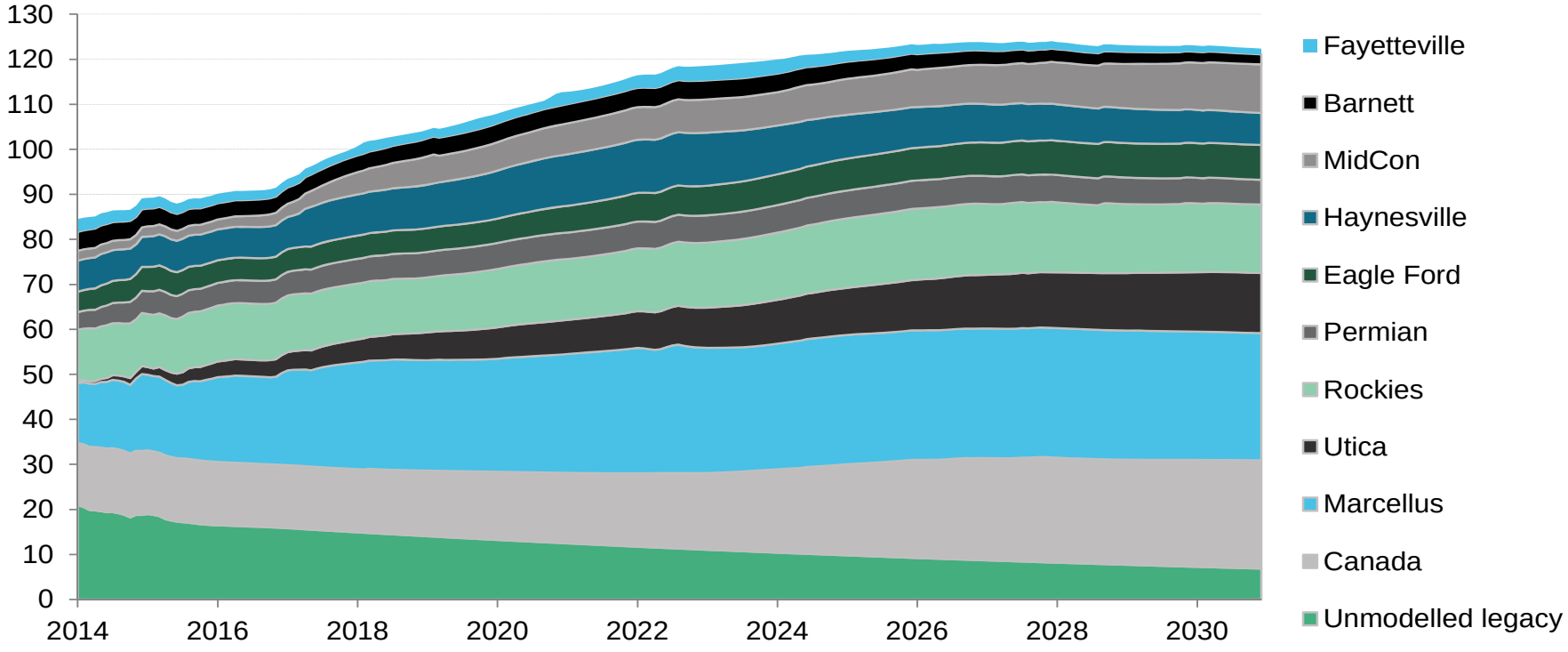


Source: *Bentek Energy LLC*

US & Canadian Dry Gas Production

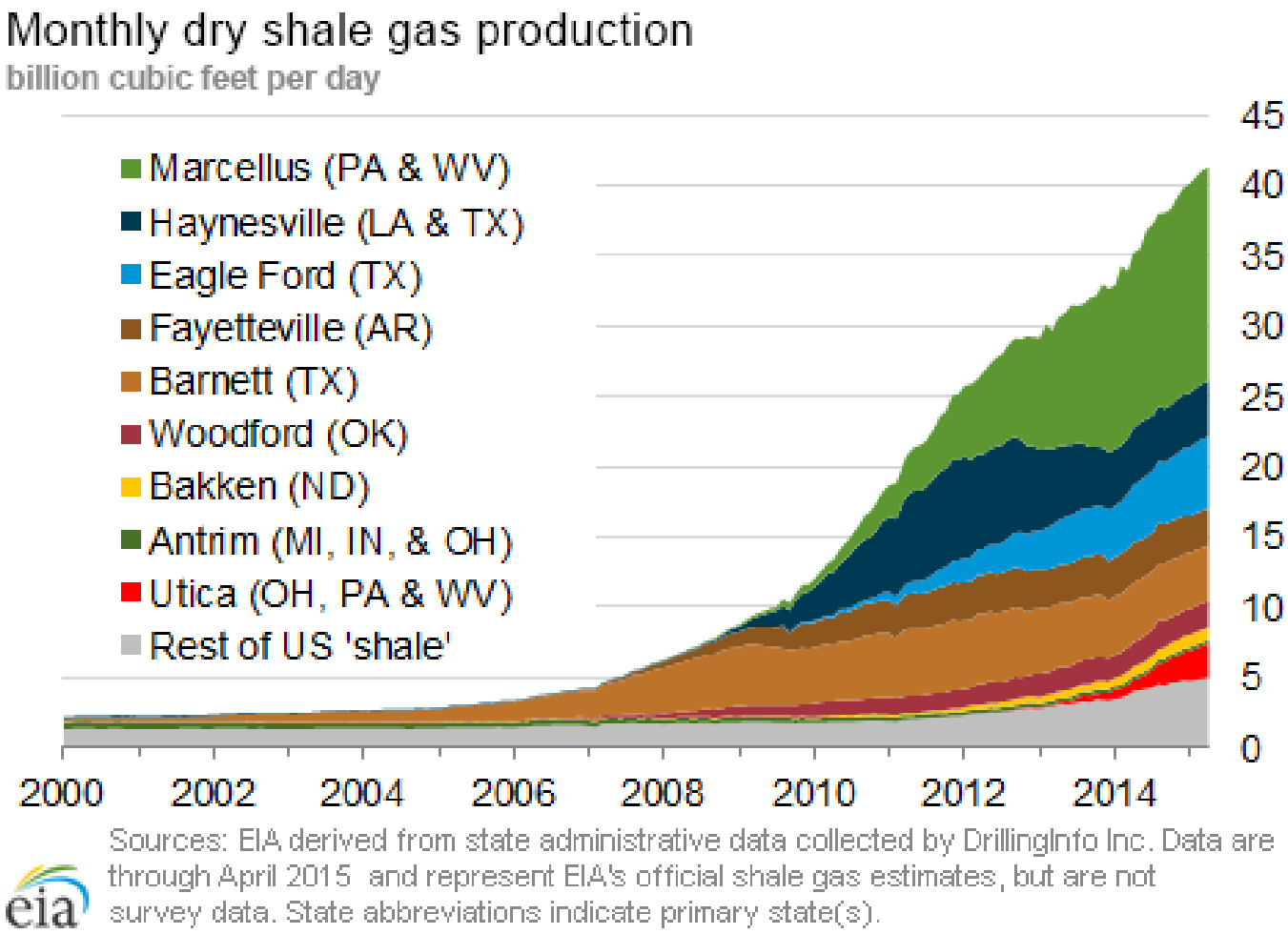
(Bcfd)

- Appalachia leads the way
- The Haynesville and MidCon plays pop back to life when US LNG exports begin
- Canada becomes key by the early/mid-2020s, with LNG exports ramp up



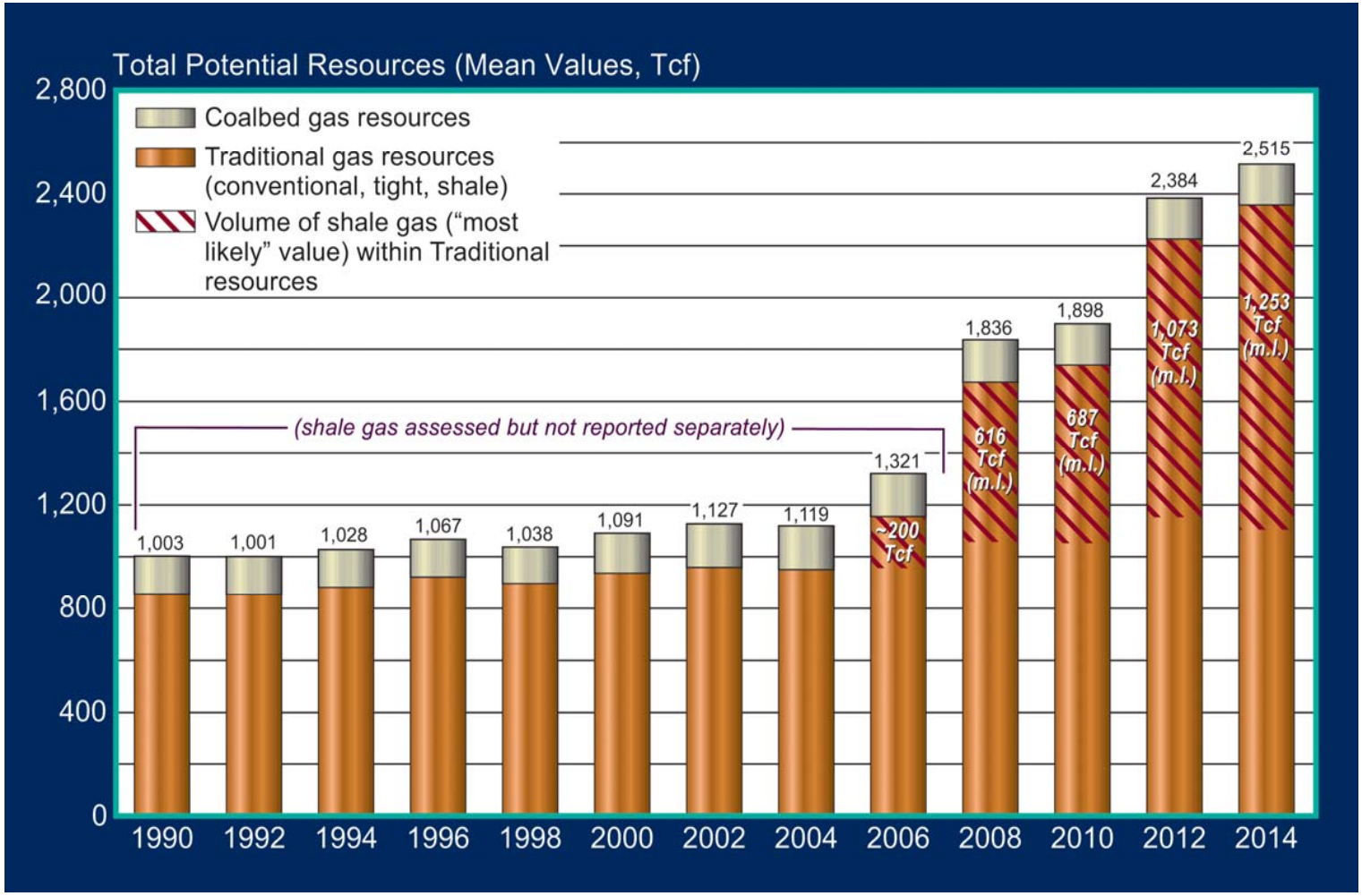
Source: Bloomberg New Energy Finance

US Shale Gas Production



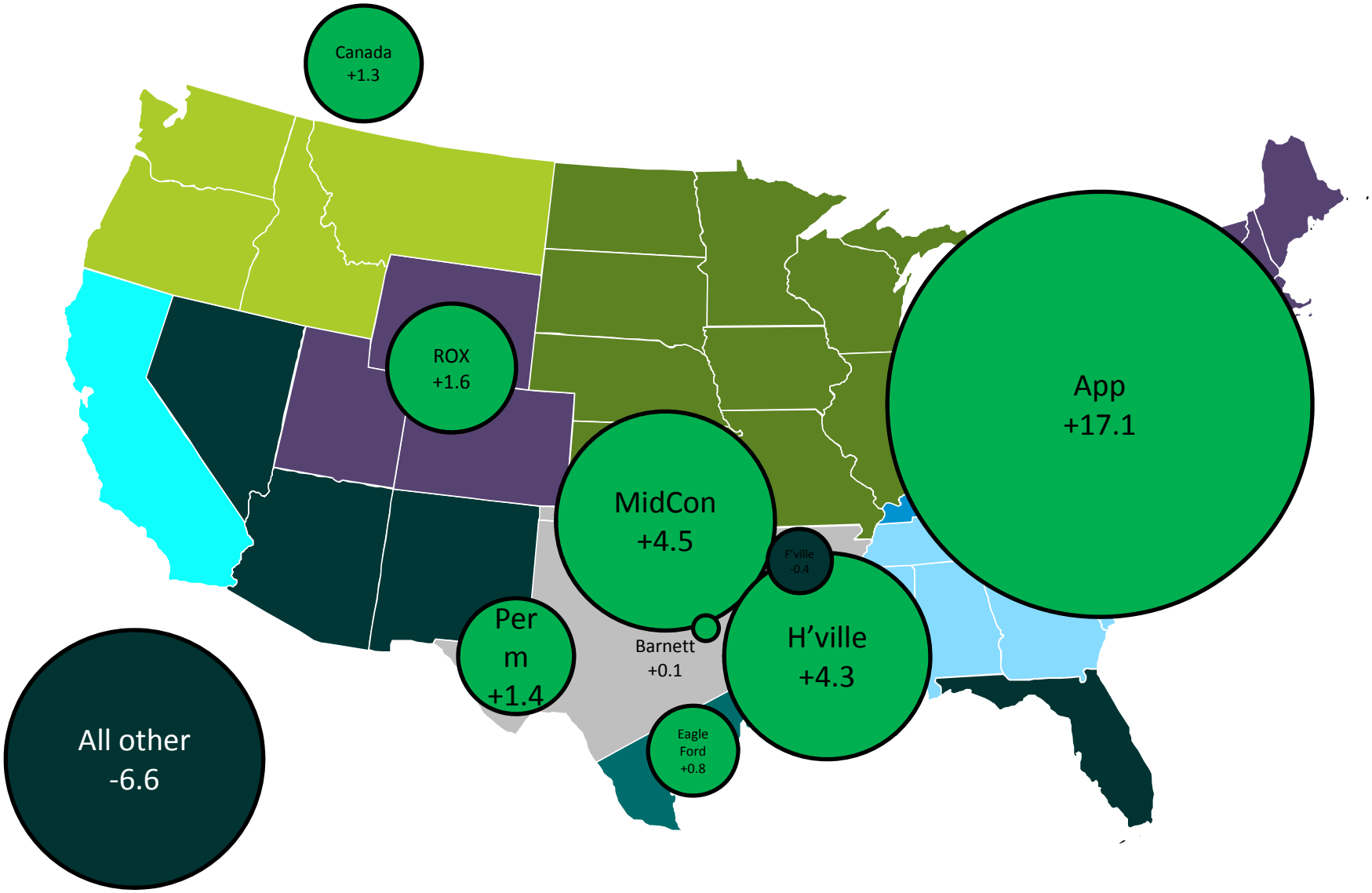
Source: US Department of Energy, Energy Information Administration.

PGC Resource Assessments, 1990-2014



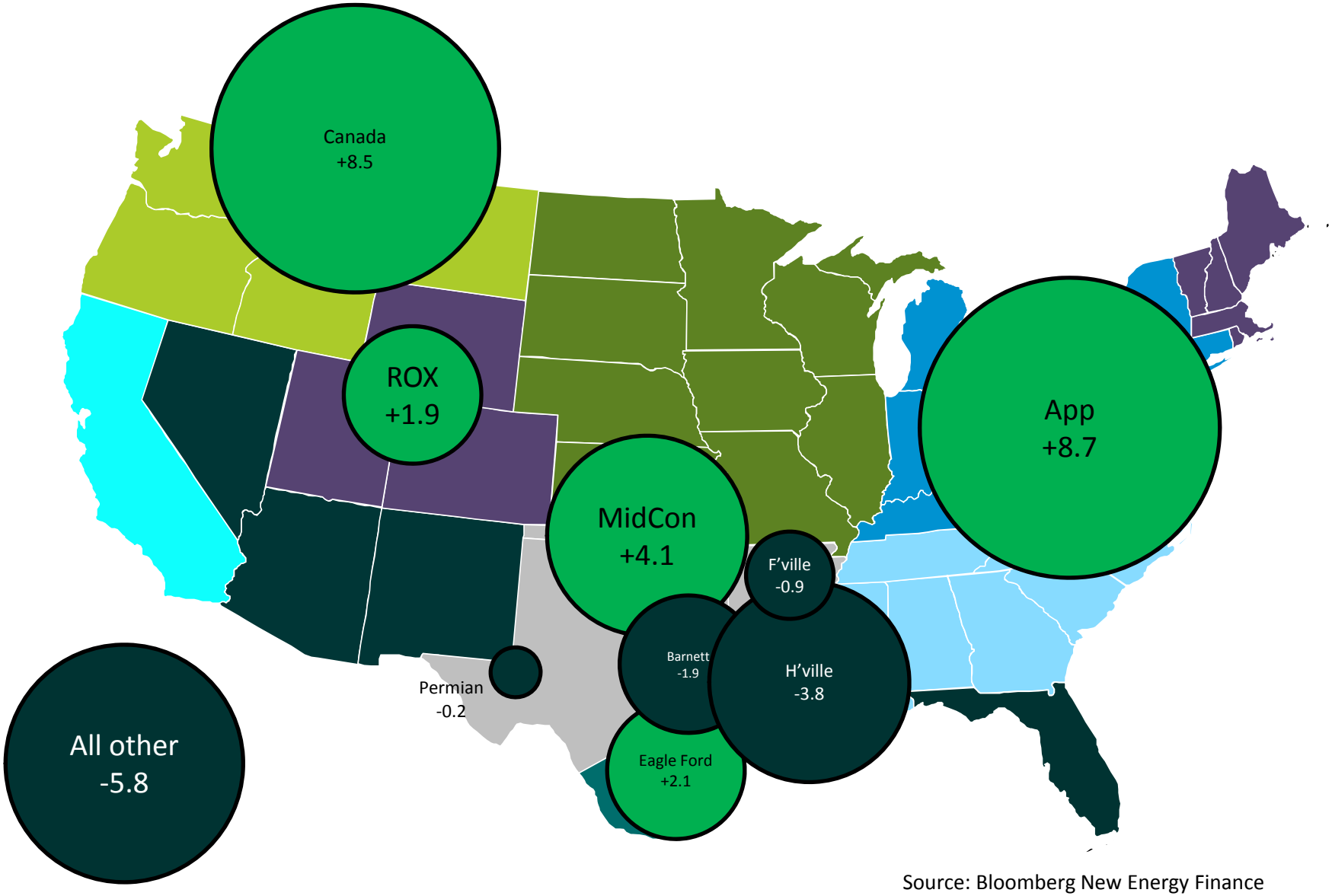
Data Source: Potential Gas Committee, Colorado School of Mines, April 2015

Change in Production, 2014-2020



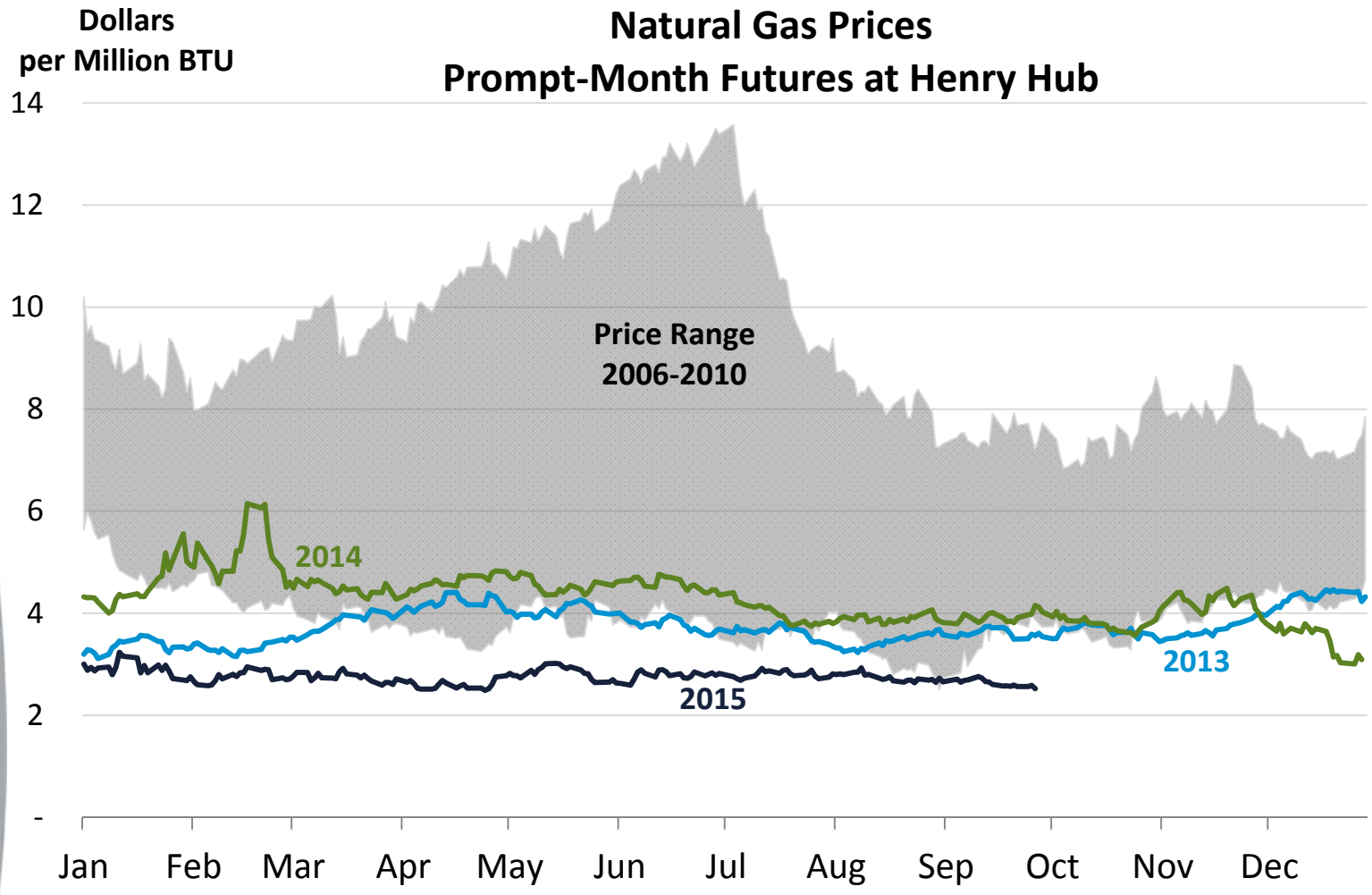
Source: Bloomberg New Energy Finance

Change in Production, 2020-2030



Source: Bloomberg New Energy Finance

Relatively Low and Stable Natural Gas Prices



Source: Energy Information Administration

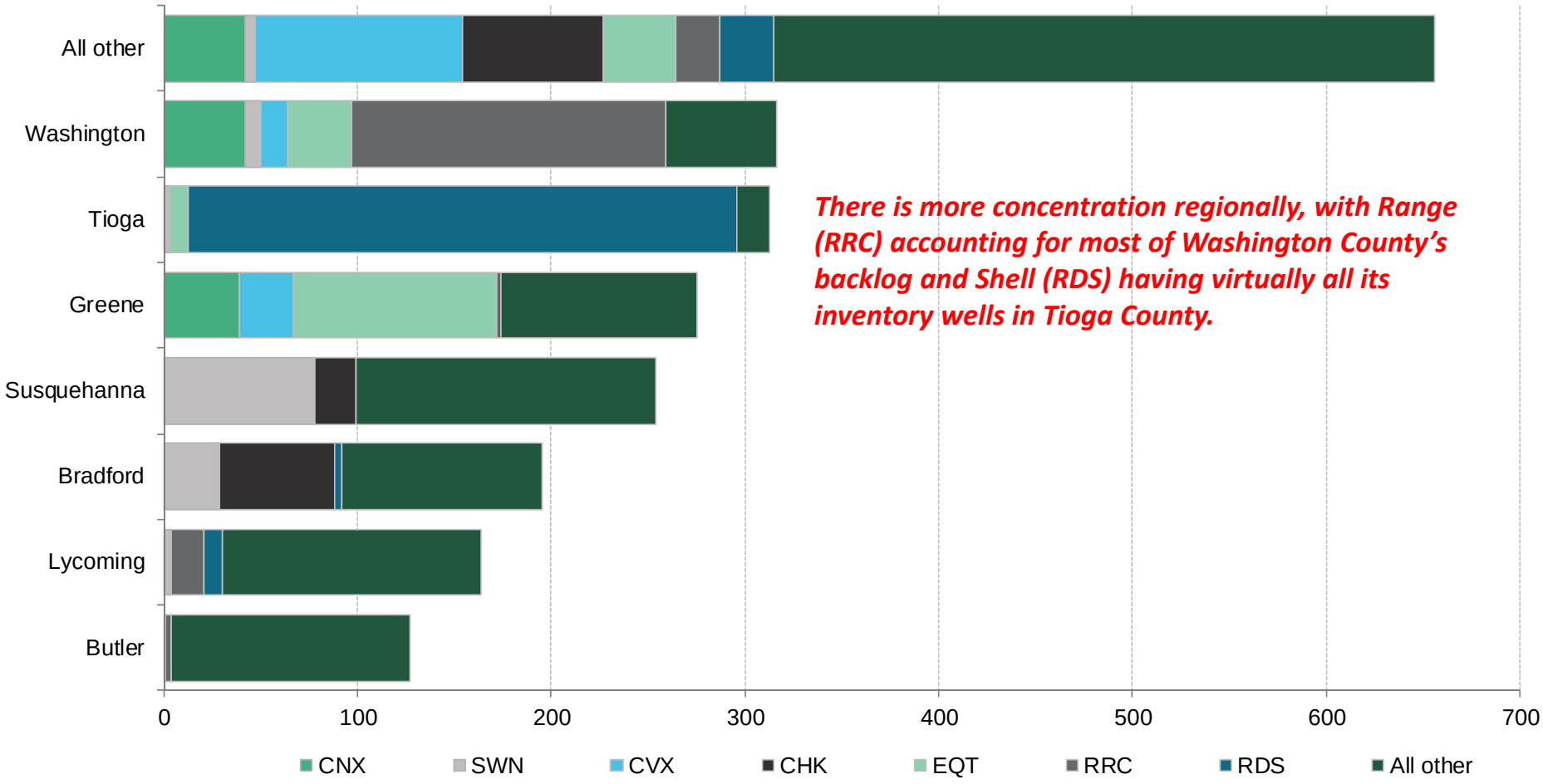
Will price-induced declines in domestic oil production hurt natural gas market?

Probably not.

Low-cost natural gas resources are available at current or slightly higher prices.

Growth in Northeast gas production is likely to offset declines in associated natural gas production should oil production decline.

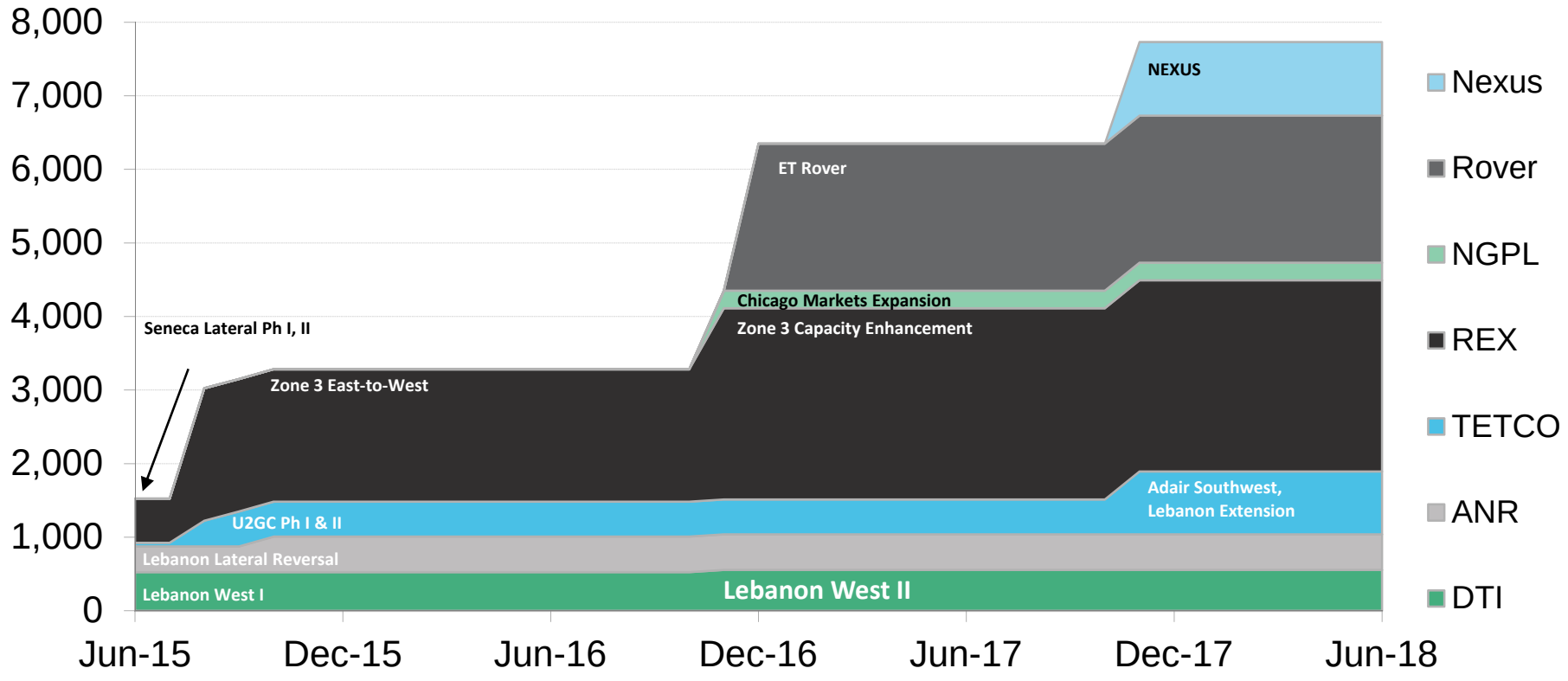
PA well backlog as of end-January 2015



There is more concentration regionally, with Range (RRC) accounting for most of Washington County's backlog and Shell (RDS) having virtually all its inventory wells in Tioga County.

Source: Bloomberg New Energy Finance, PA DEP

Pipeline Projects Going to Midwest (MMcfd)

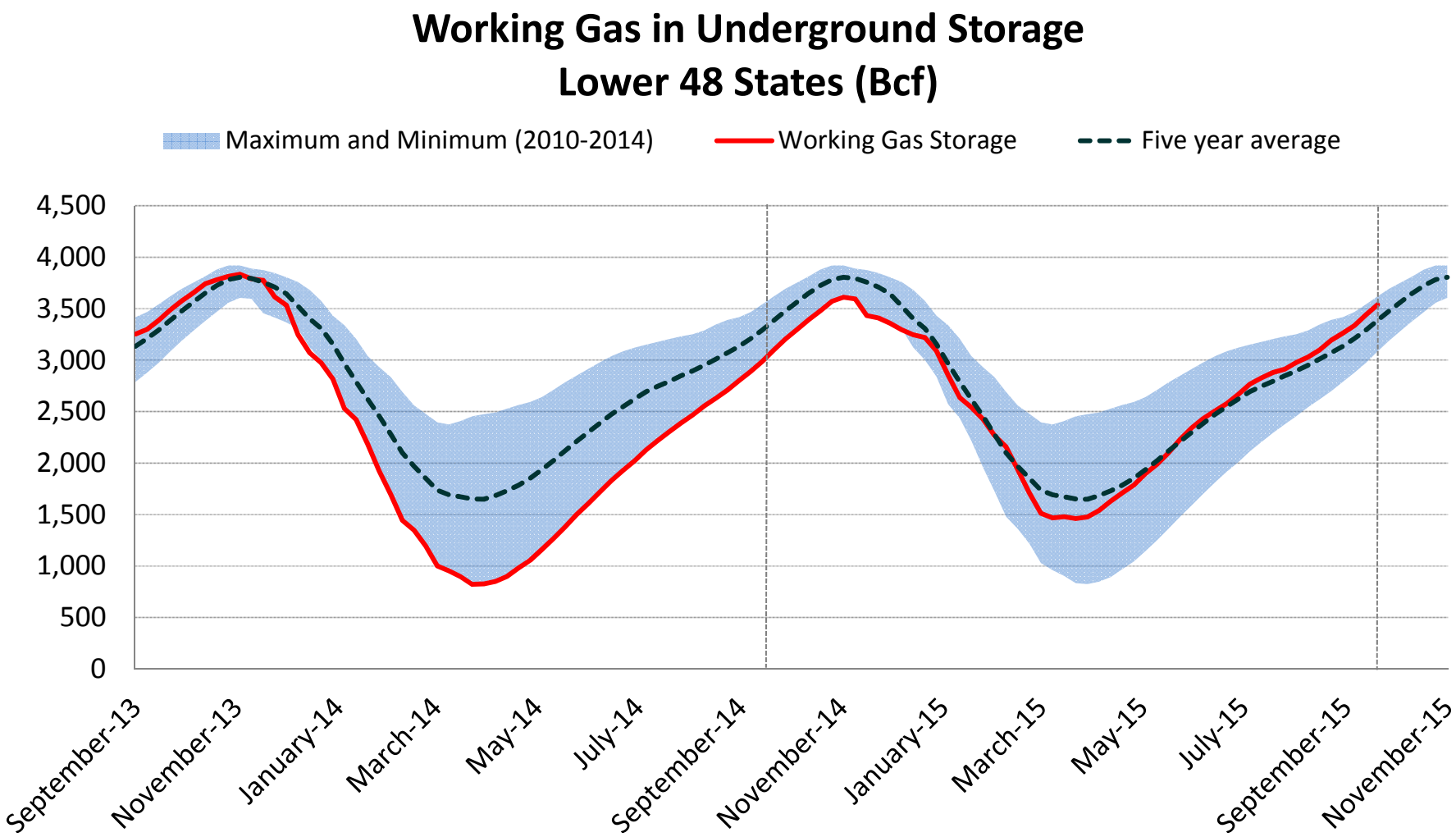


Source: Bloomberg New Energy Finance

Sample of Pipeline Projects Moving Marcellus/Utica Gas

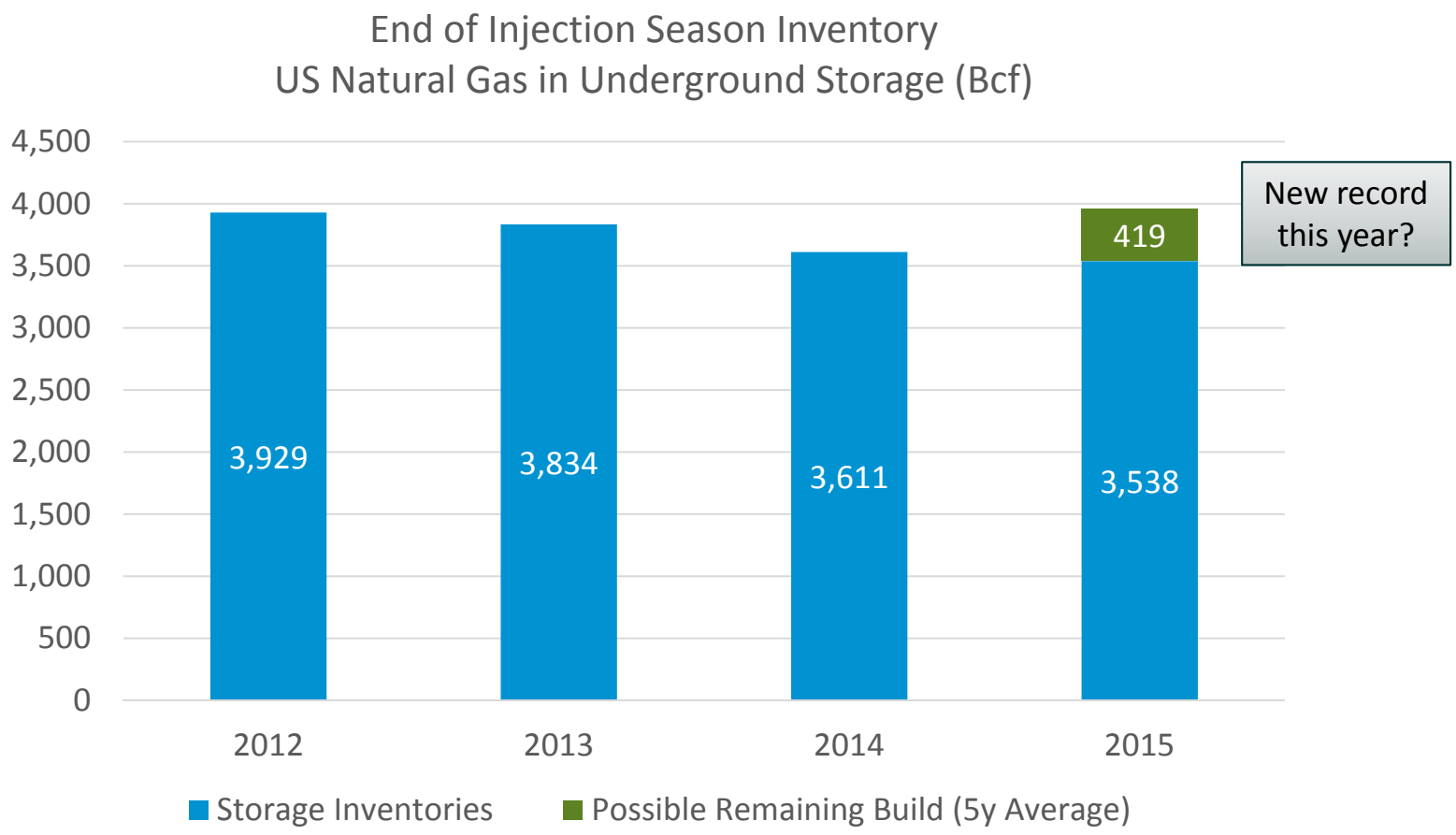
- **Nexus Pipeline** – Appalachian shale gas to high-demand markets in the U.S. Midwest and Ontario, Canada
  - Spectra Energy, DTE Energy; 1.5 BCF/Day
- **Atlantic Coast Pipeline** – Move Appalachian shale primarily to Virginia and North Carolina for both electric generation and for use in heating homes
  - Dominion, Duke Energy, Piedmont Natural Gas, and AGL Resources; 1.5 BCF/Day
- **Penn East Pipeline** – Move Appalachian gas production to markets in New Jersey, eastern and southeastern Pennsylvania and surrounding states
  - AGL Resources, NJR Pipeline Company, PSEG Power, LLC, South Jersey Industries, Spectra Energy Partners, and UGI Energy Services; 1.1 BCF/Day
- **Constitution Pipeline** – Transports Appalachian gas to Iroquois Gas Transmission and Tennessee Gas Pipeline systems in New York State
  - Williams, Cabot Oil and Gas, Piedmont Natural Gas, and WGL Holdings; .65 BCF/Day
- **Rover Pipeline LLC** – Transport Appalachian gas to U.S. Midwest, Northeast, East Coast, Gulf Coast, as well as Canada. Direct deliveries to Ohio, West Virginia, Michigan, and into the Dawn Hub in Ontario, Canada
  - Energy Transfer Partners; 3.25 BCF/Day
- **Rockies Express Zone 3 Capacity Enhancement** - REX flow reversal provides direct access to Appalachian gas supply for western Ohio, Indiana, Illinois, Missouri
  - 0.8 BCF/Day (Bringing total East to West capacity to 2.6 BCF/Day)
  - REX is jointly owned by Tallgrass Development, Sempra U.S. Gas and Power, and Phillips 66
- **ANR Lebanon Lateral** – Reverse flow on existing pipeline to flow Appalachian gas westward, connecting to mainline ANR in Indiana
  - TransCanada Corp. owns ANR Pipeline Company; as much as 1.6 BCF

Working Gas in Underground Storage



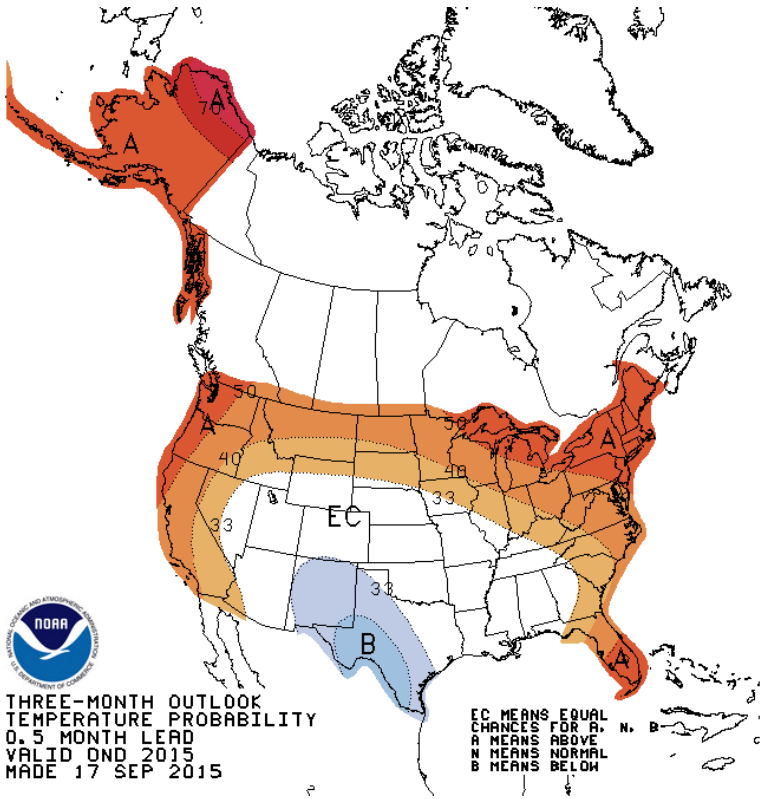
Source: US Department of Energy, Energy Information Administration.

If storage build continues at even average pace, inventories will set new record.

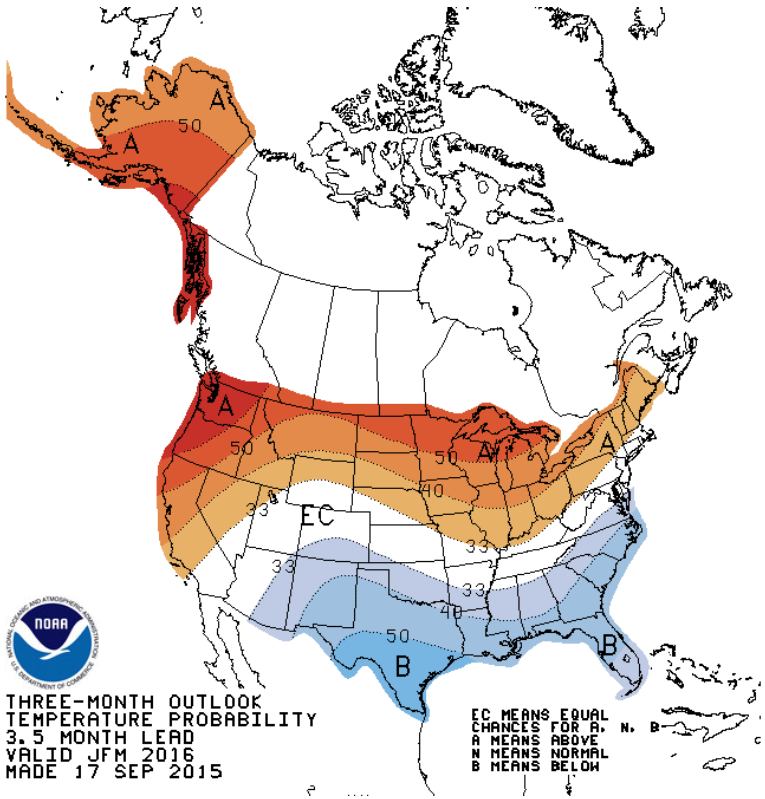


Domestic Temperature Forecasts

NOAA Forecast
October-December



NOAA Forecast
January-March



Source: NOAA.gov

EPA's Proposed Clean Power Plan:

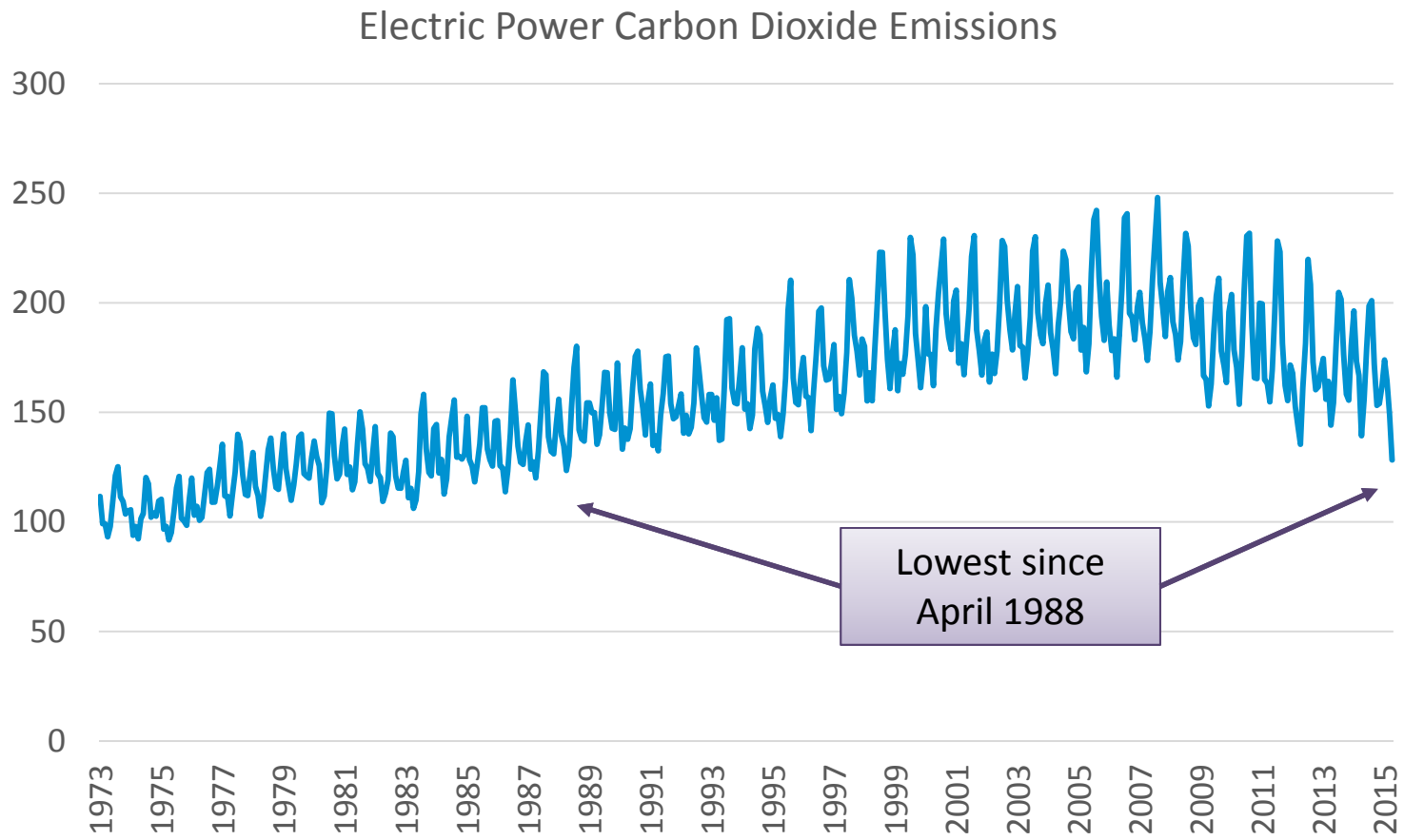
Goal Setting for Each State

EPA Has Set Goals for Each State Based on Reductions Achievable with Three "Building Blocks"

1. Power Plant Heat Rate Improvements
2. Shift Dispatch to Cleaner Affected Units
   (Natural Gas Combined Cycle Turbines)
3. Increased Use of Renewable and Nuclear Plants

Pleasants Power Plant, Belmont, WV

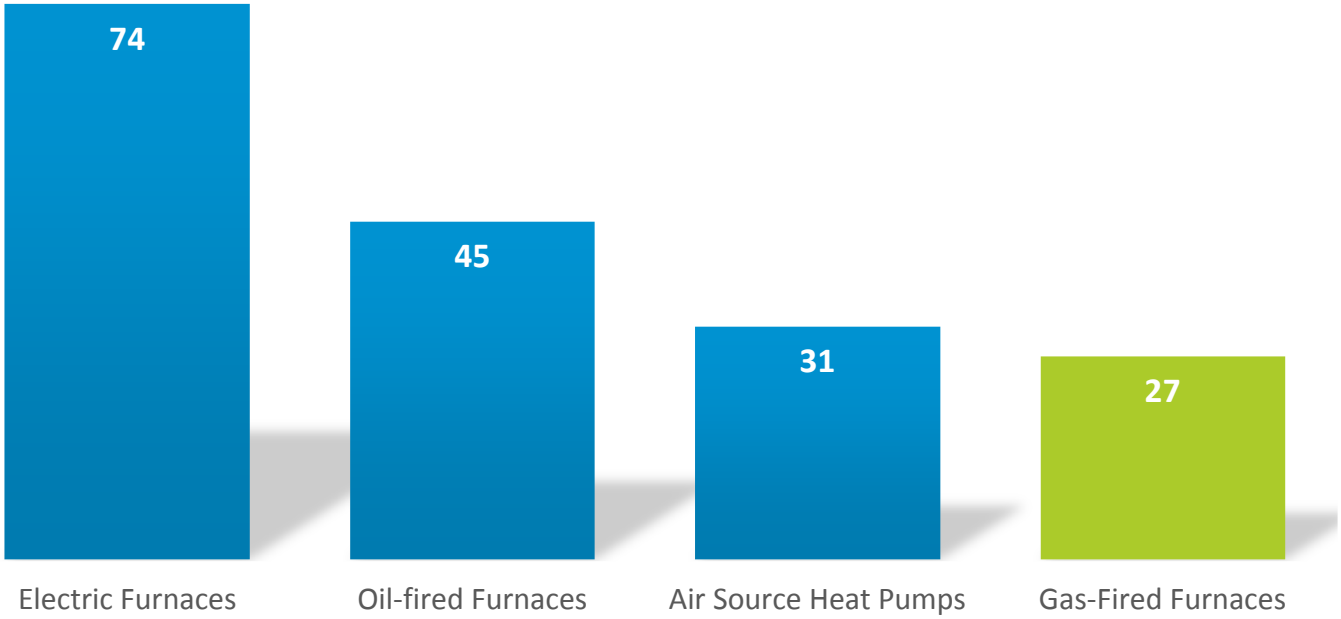
Electric sector CO2 emissions reach 27-year low in April as natural gas overtakes coal share for power generation



Source: Energy Information Administration

Natural Gas Used Directly In Homes and Businesses Reduces Greenhouse Gas Emissions

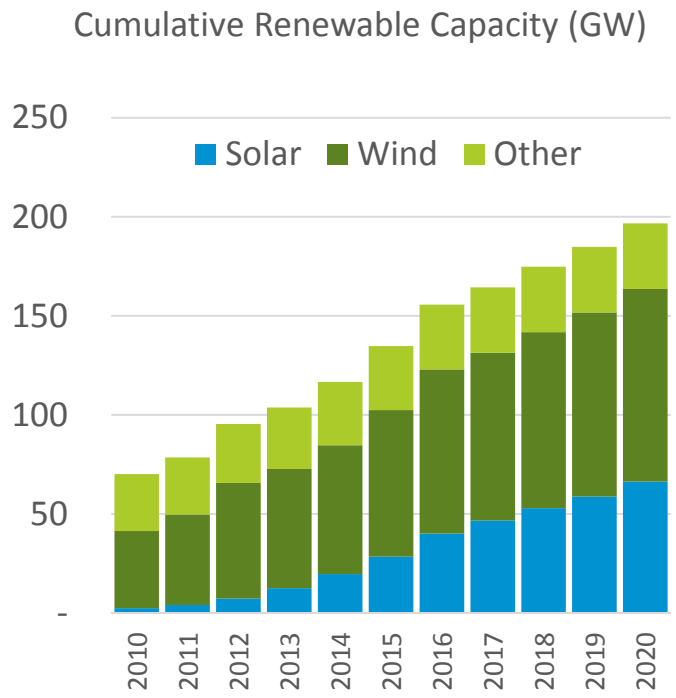
Space Heating System Carbon Dioxide Emissions
(Ton CO2 per 100 MW Useful Energy Consumption)

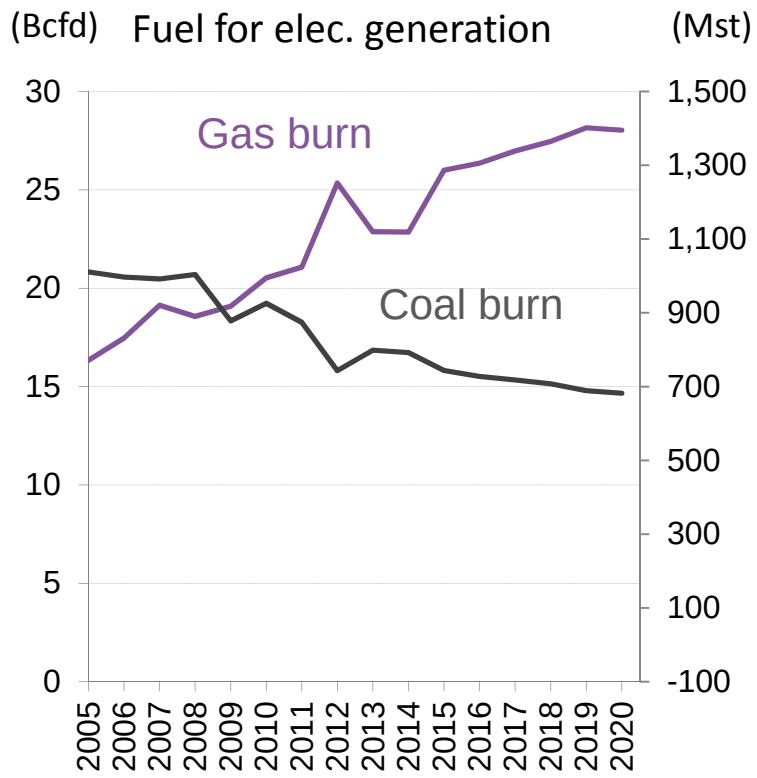


Source: MIT *Future of Natural Gas*
Appliance efficiencies Energy STAR compliant.

How much does this reinforce existing trends?

Coal retirements are accelerating and gas and renewables are filling the gap

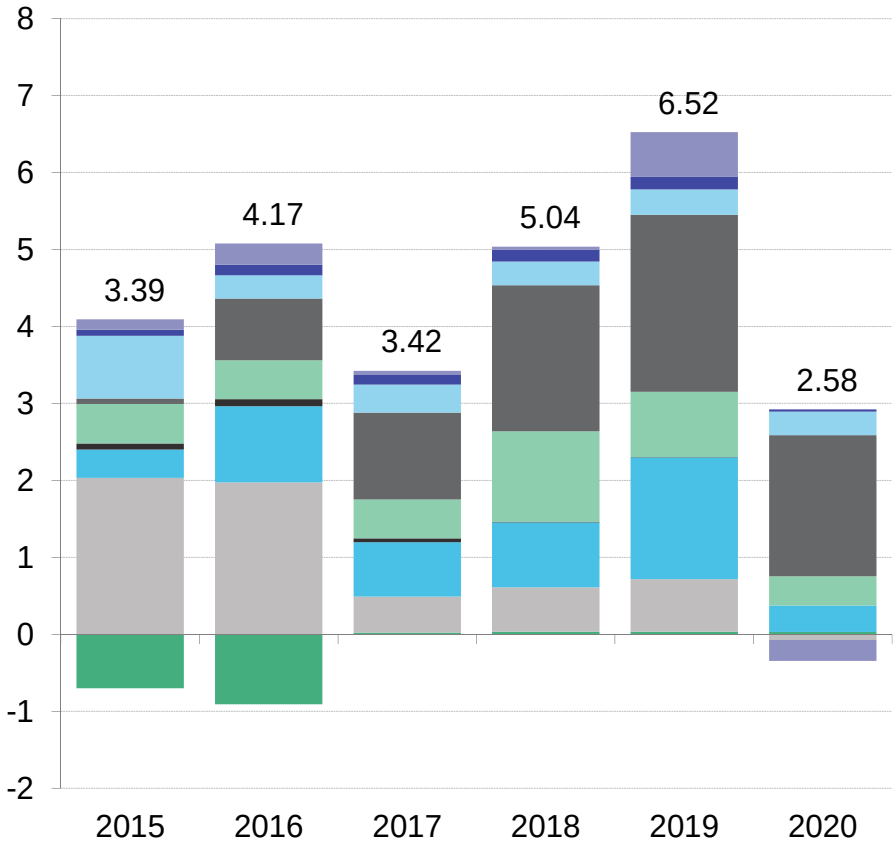




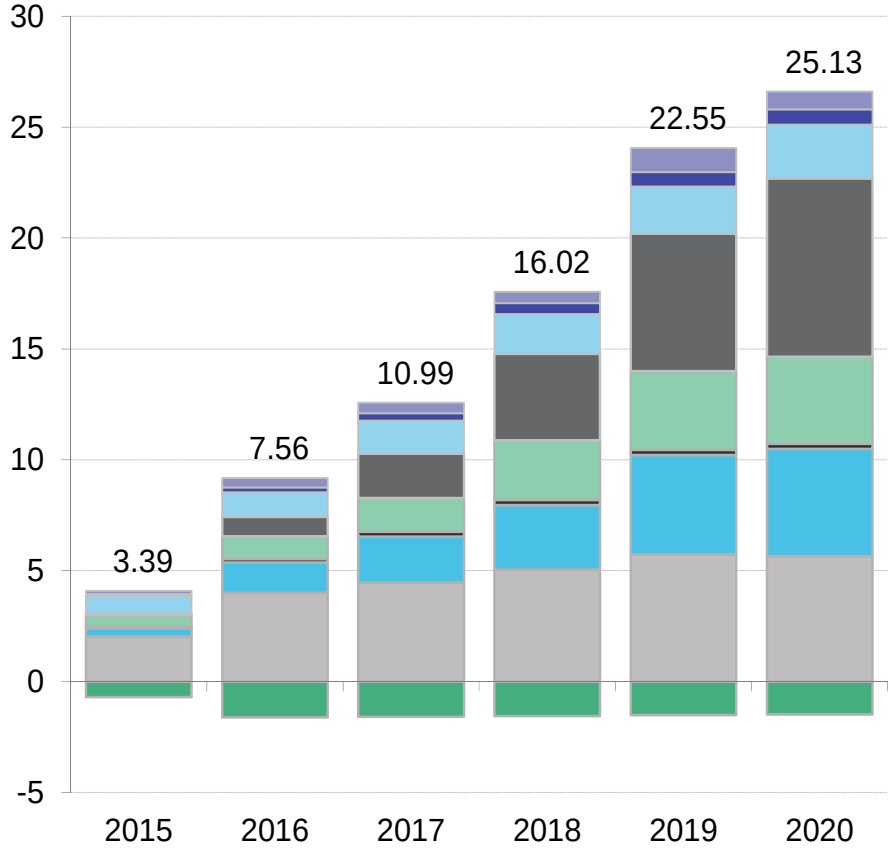
Source: Energy Information Administration

Natural gas growth likely in North America during next few years.

Year-on-year (Bcfd)

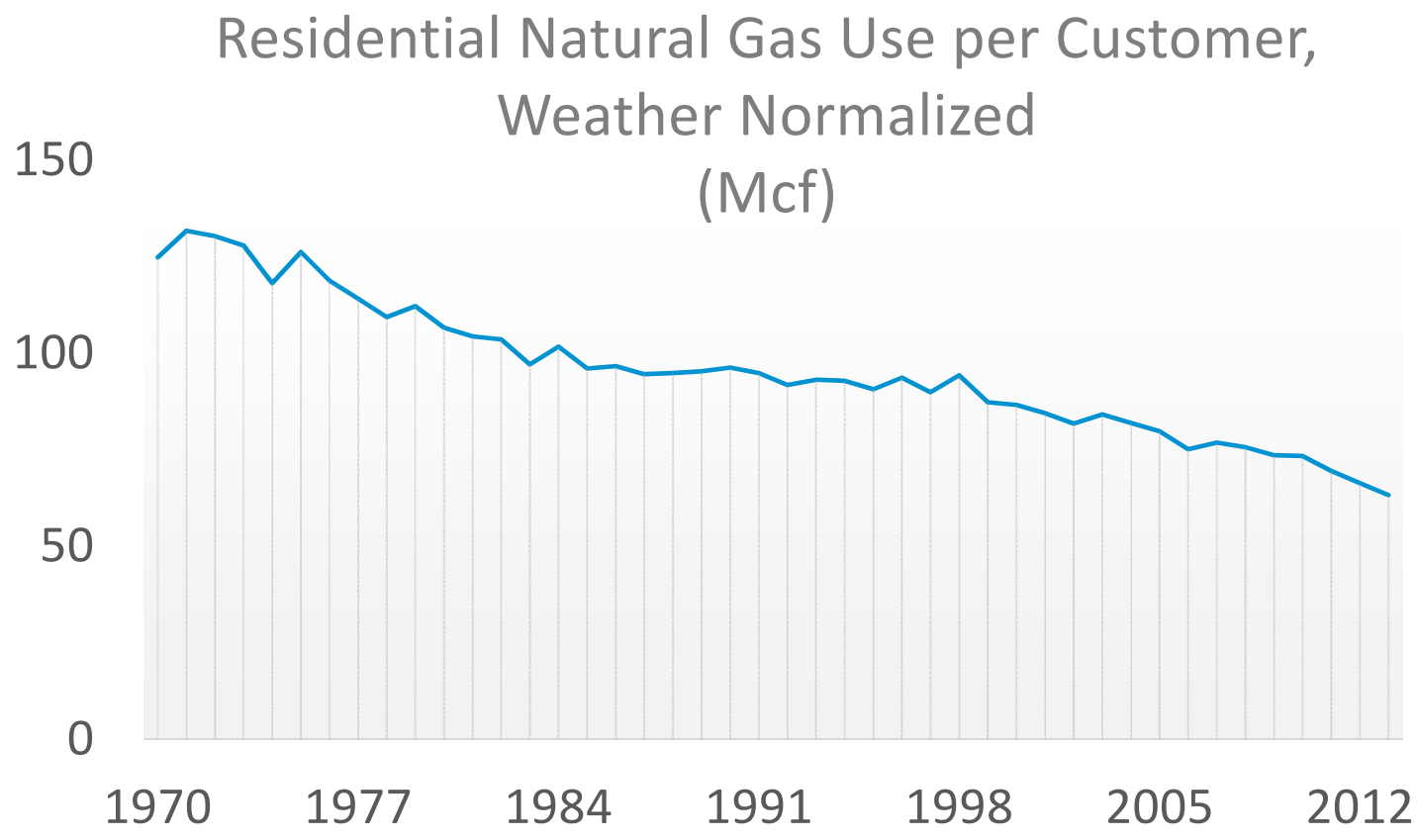


Cumulative growth from 2014 (Bcfd)



Source: Bloomberg New Energy Finance

Average household consumption of natural gas has *dropped by half* since 1970.



Source: Energy Information Administration, AGA Calculations

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