POWER SUPPLY IN FLORIDA – FUEL COST & SECURITY

Prepared for:
Florida Municipal Electric Association

Mr. Seth Schwartz
President
schwartz@evainc.com

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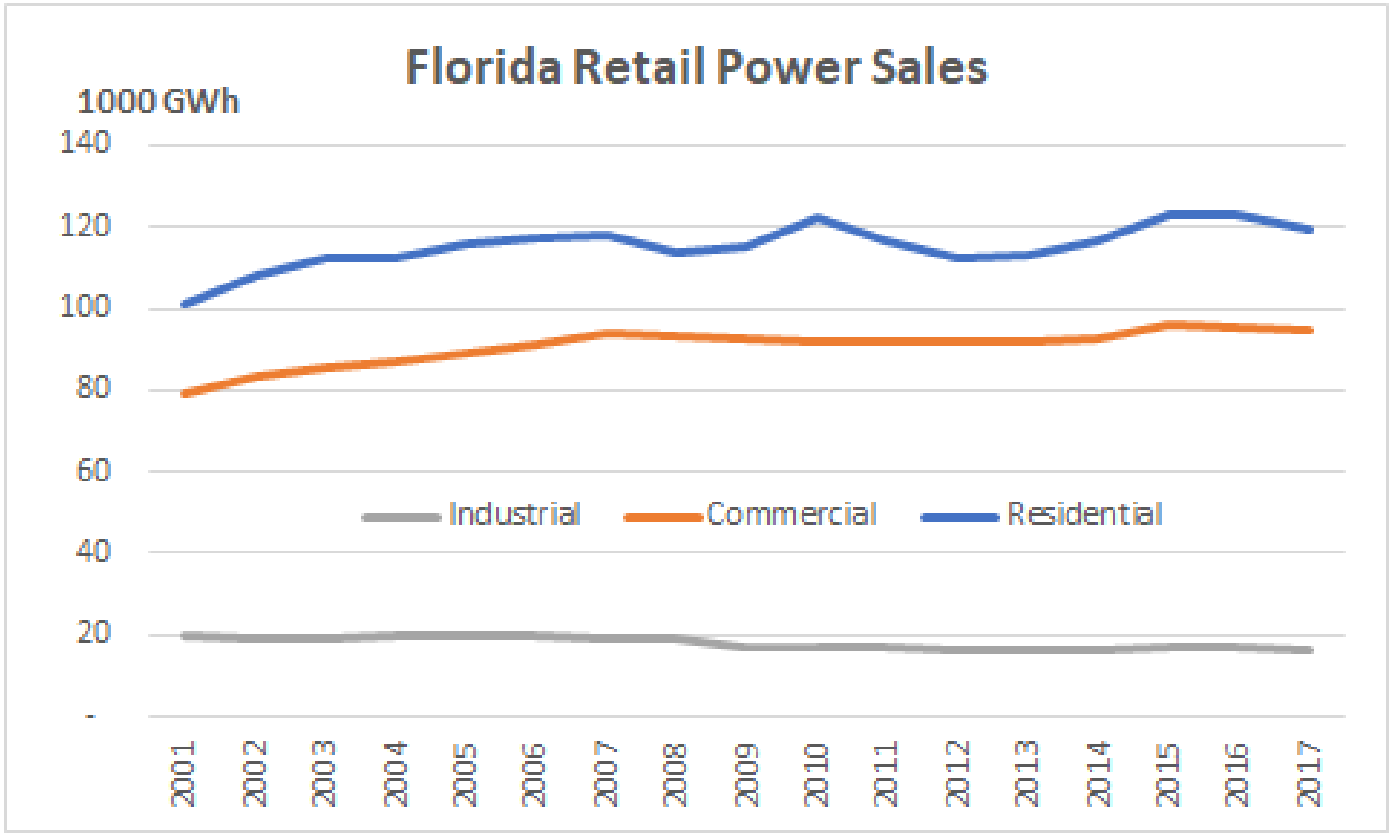
Energy Ventures Analysis
1901 N. Moore St. Arlington, VA 22209
(703) 276 8900

SUMMARY

- **Florida retail power demand growth is very low**
- **Power supply in Florida is increasingly linked to natural gas**
  - Coal generation has been falling and will continue as plants are replaced with gas
  - Renewable power supply is still very small, but solar is growing
  - Nuclear power generation is flat and is unlikely to change
- **Wholesale power costs will be dependent upon natural gas prices**
  - Historically a commodity with volatile pricing
  - Shale gas revolution has increased supply and brought generally stable pricing
- **Cost of solar generation is heavily subsidized**
  - Not cheaper than existing fossil fuel without subsidies – will they ever expire?
- **Coal generation continues to be an important component of Florida power supply**
  - Not enough gas supply to replace coal generation in the US
  - Coal plants provide security with on site fuel storage and stable costs
- **What could go wrong with heavy dependence on natural gas?**
  - Markets – Rapid growth in LNG exports and domestic demand could consume supply
  - Reliability – Florida is dependent on just 3 pipelines; no storage in state
  - Politics – Intense political opposition to fracking and pipelines could limit supply
- **Maintaining diversity of the power supply portfolio is likely to have value over time**

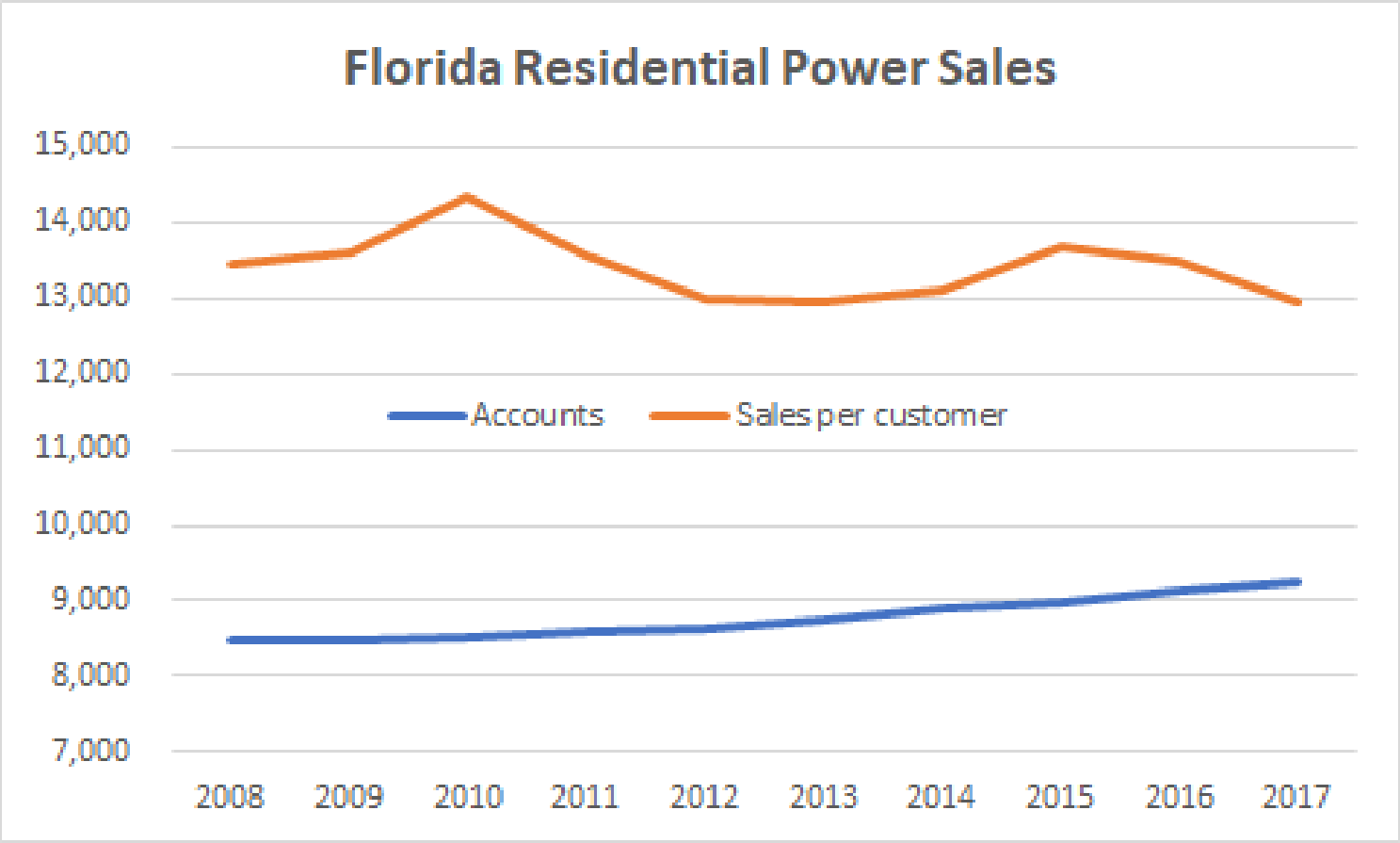
FLORIDA RETAIL POWER SALES GROWTH HAS SLOWED TO A CRAWL

- **Since 2007, very slow growth in residential & commercial sales has been offset by a decline in the already small industrial demand**



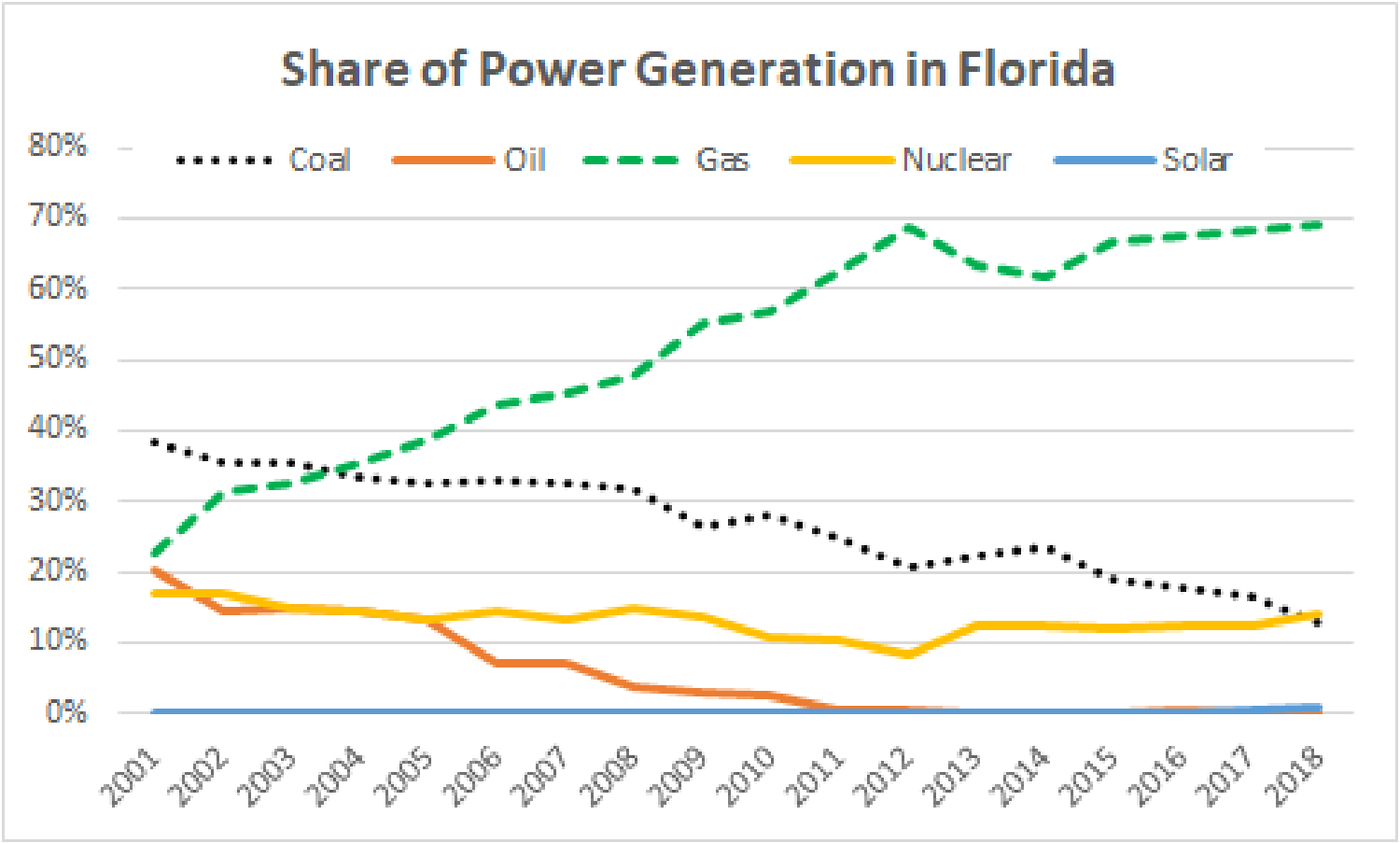
FLORIDA RESIDENTIAL POWER SALES GROWTH REFLECTS EFFICIENCY

- **The number of residential accounts has been growing at an average of 1.0% annually with population growth**
- **However, sales per customer have fallen from 13,438 kWh/year in 2008 to 12,933 in 2017**
- **Efficiency gains are likely to continue, limiting load growth**



FLORIDA POWER GENERATION MIX IS MOVING TO NATURAL GAS

- **Natural gas now supplies 70% of in-state Florida power**
- **Since 2007, share of power supplied by coal has fallen from 33% to 13%**
- **Nuclear power is stable at 12% - 15%**
- **Solar power is just 1% of Florida power supply – wind is zero**



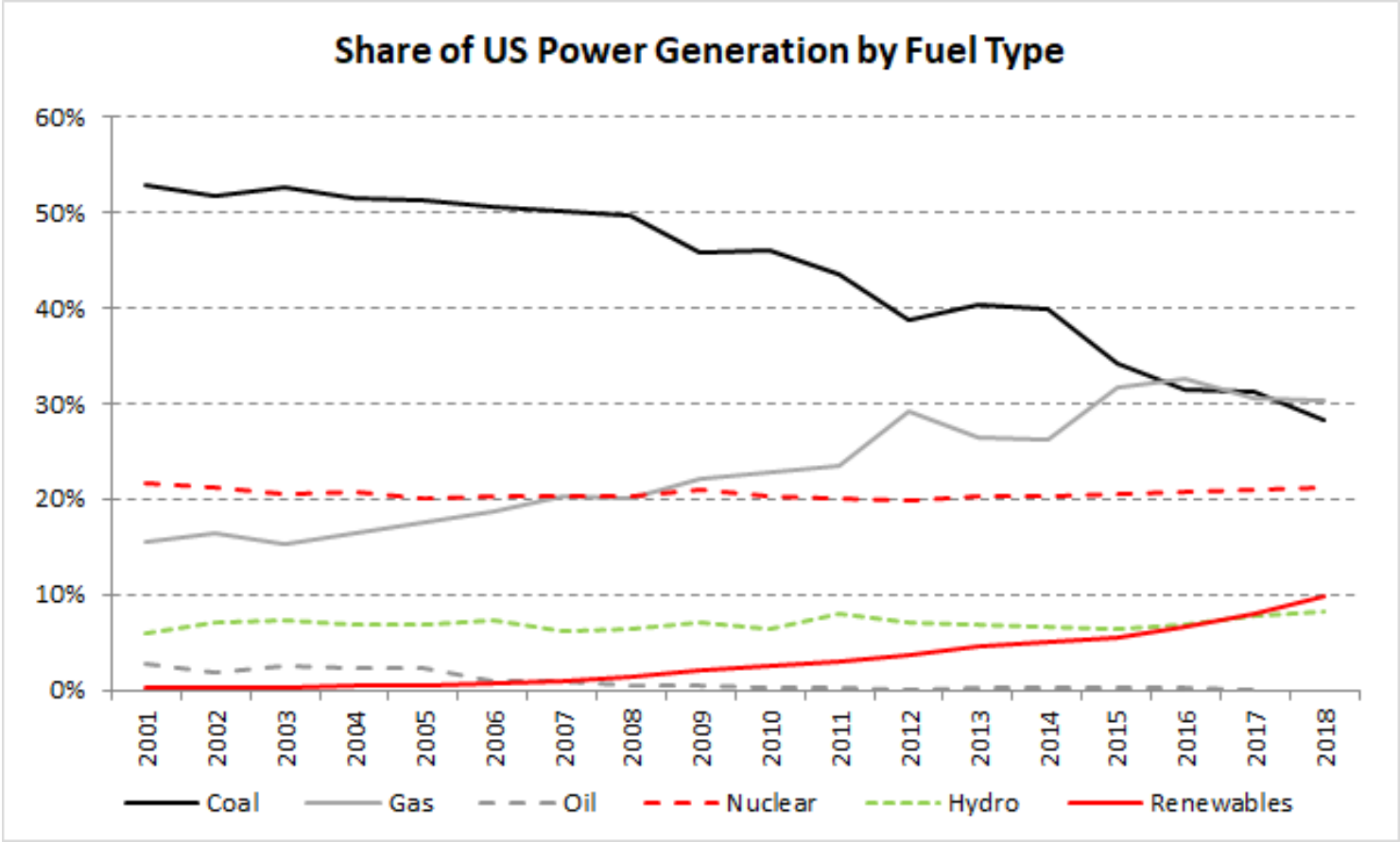
COAL PLANT ARE RETIRING IN FLORIDA AT A RAPID PACE

- **Out of 9,500 MW of total Florida coal capacity in 2014, about half will be retired or converted to natural gas by 2022**
- **FPL has bought out the coal plants providing purchased power and closed them**
  - Cedar Bay, Indiantown; St. Johns River
- **One-third of Florida coal generation in 2017 will be retired or switched to gas by 2022**
- **By 2022, coal will supply at most 10% of Florida power supply**
- **Natural gas will supply at least 75% of power in Florida**

Utility	Plant	Unit	Capacity MW	Retire Year
Southern - Gulf	Scholz	1	46	2015
Southern - Gulf	Scholz	2	46	2015
Southern - Gulf	Lansing Smith	1	162	2016
Southern - Gulf	Lansing Smith	2	195	2016
Cogentrix	Cedar Bay	1	250	2016
Jacksonville Electric	St. Johns River	1	638	2018
Jacksonville Electric	St. Johns River	2	638	2018
Duke Energy Florida	Crystal River	1	383	2018
Duke Energy Florida	Crystal River	2	491	2018
Ares	Indiantown	1	330	2019
Tampa Electric	Big Bend	1	395	2020
Tampa Electric	Big Bend	2	395	2020
Seminole Electric	Palatka	1	664	2022
			4,633	

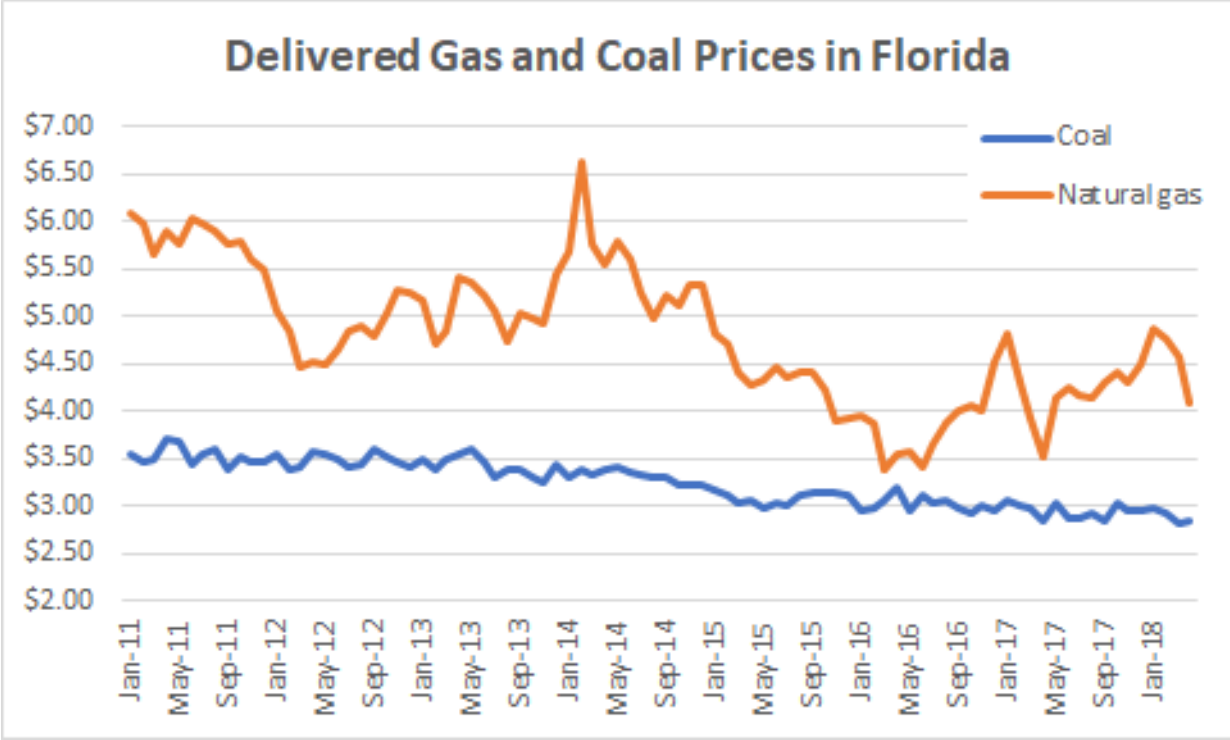
FLORIDA'S DASH TO GAS IS AHEAD OF THE NATION AS A WHOLE

- **Since 2007, share of power supplied by coal has dropped from 50% to 28%**
  - Natural gas share rose from 20% to 30%
  - Non-hydro renewables (wind and solar) increased from 1% to 10%
  - Nuclear and hydro have been flat
- **These trends will continue into the foreseeable future**



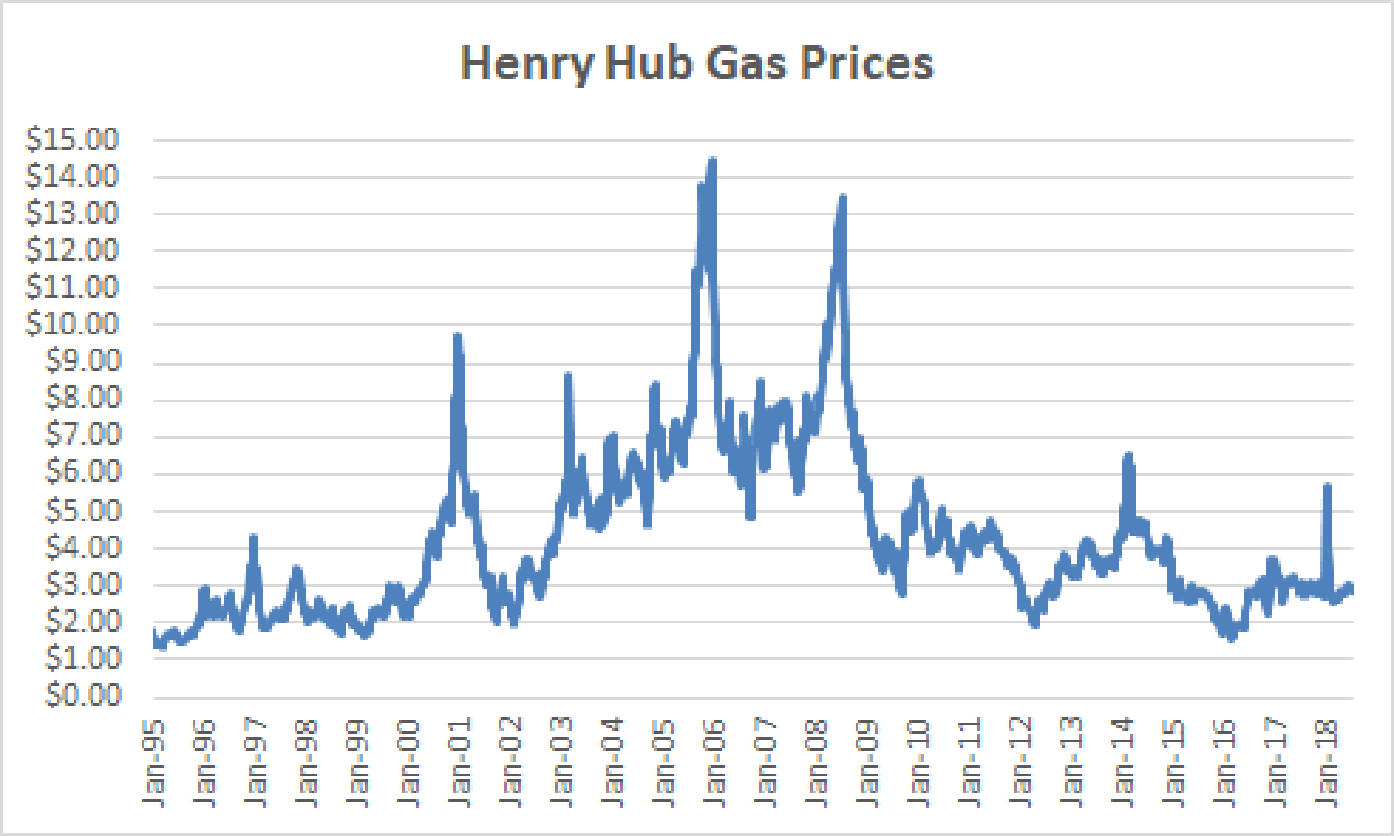
RISKS OF HIGH DEPENDENCE ON NATURAL GAS FOR POWER SUPPLY

- **Power generation costs are driven by the price of a volatile commodity**
  - Power costs in Florida will increase due to factors unrelated to Florida
  - When the winter is cold in the Northeast, power costs will increase
- **Gas supply will not be adequate to meet total power demand during the winter**
  - Distillate fuel oil backup will be required to provide reliability
- **Only 3 pipelines serve the Florida peninsula providing risk of supply interruption**
  - High pipeline costs cause delivered gas prices to be $4.00 - $5.00 per mmBtu; coal is below $3.00



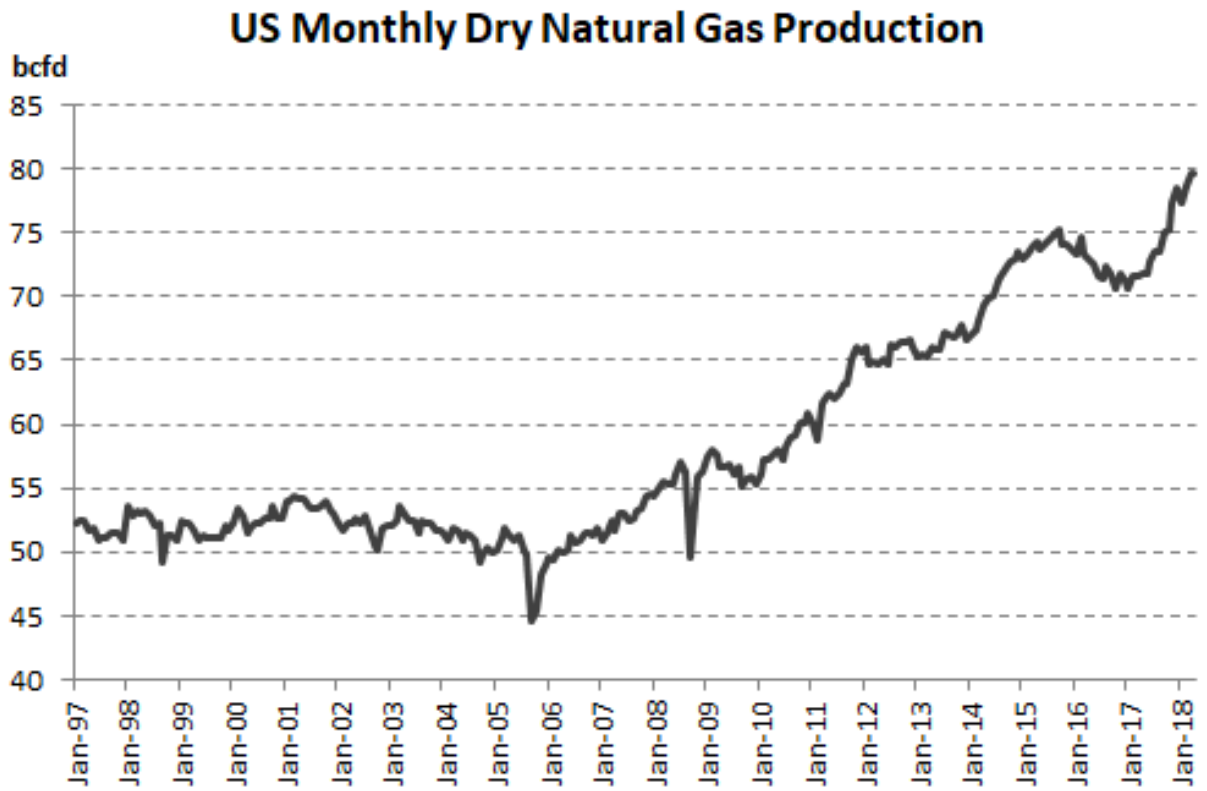
WILL NATURAL GAS STAY CHEAP AND ABUNDANT FOREVER?

- **A brief history of natural gas prices**
  - 1986 – 1999: Deregulation created excess capacity and kept prices about $2.00
  - 2000 – 2008: Growing demand from new CCGT plants consumed supply and pushed prices over $6.00
  - 2009 – 2017: The Shale Gas Era; growing supply from hydraulic fracturing has kept prices below $4.00
    - Prices slumped below $3.00 in mild winters of 2012, 2015 and 2016; cold spells push prices over $6.00
- **The market now thinks $3.00 is the new normal for long-term gas prices**



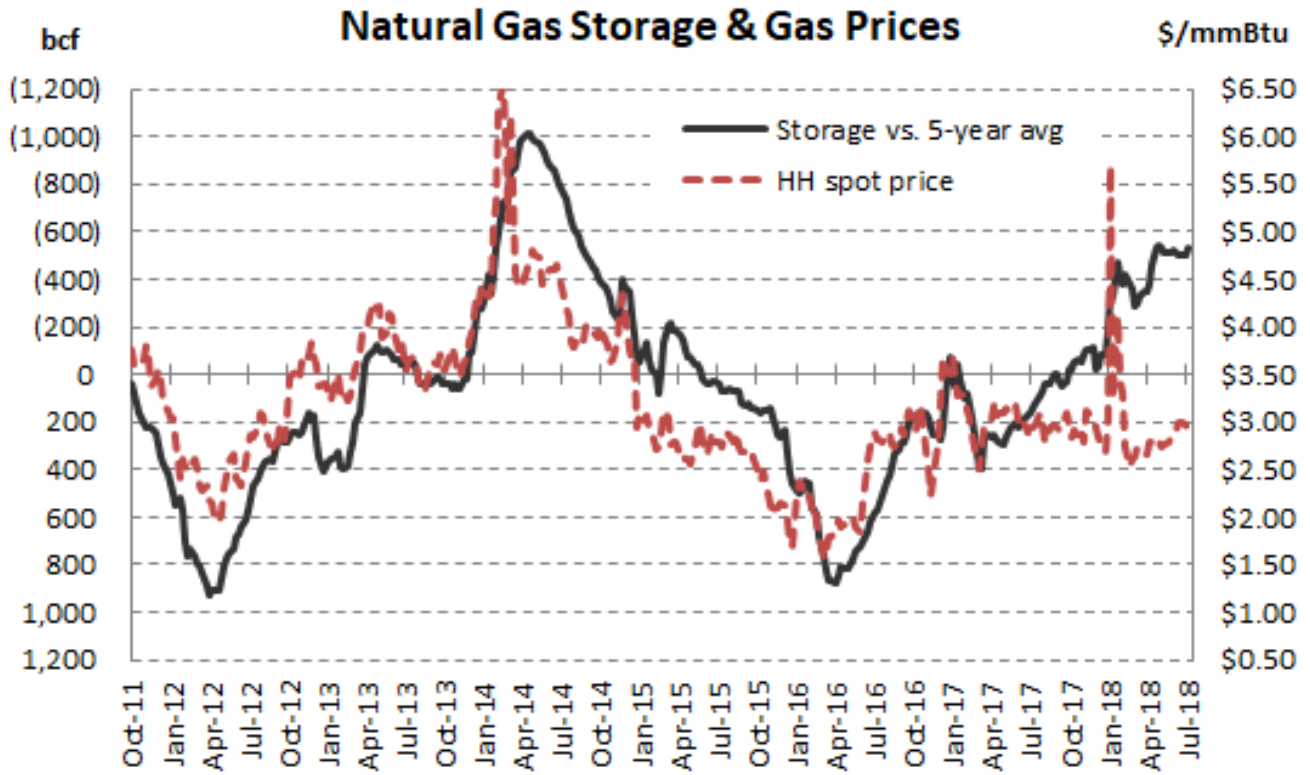
THE CHANGE IS NATURAL GAS PRODUCTION GROWTH FROM SHALE GAS

- **Norm was 50 – 55 bcfd before shale gas – rising demand meant high prices**
  - Imports from Canada and LNG filled the gap in supply
- **Hydraulic fracturing and horizontal drilling have unlocked huge gas reserves at low costs**
  - Almost all of the supply growth has come from the Marcellus & Utica shales in PA, WV & OH
- **Lack of pipeline capacity limited supply but new projects have allowed growth to resume**



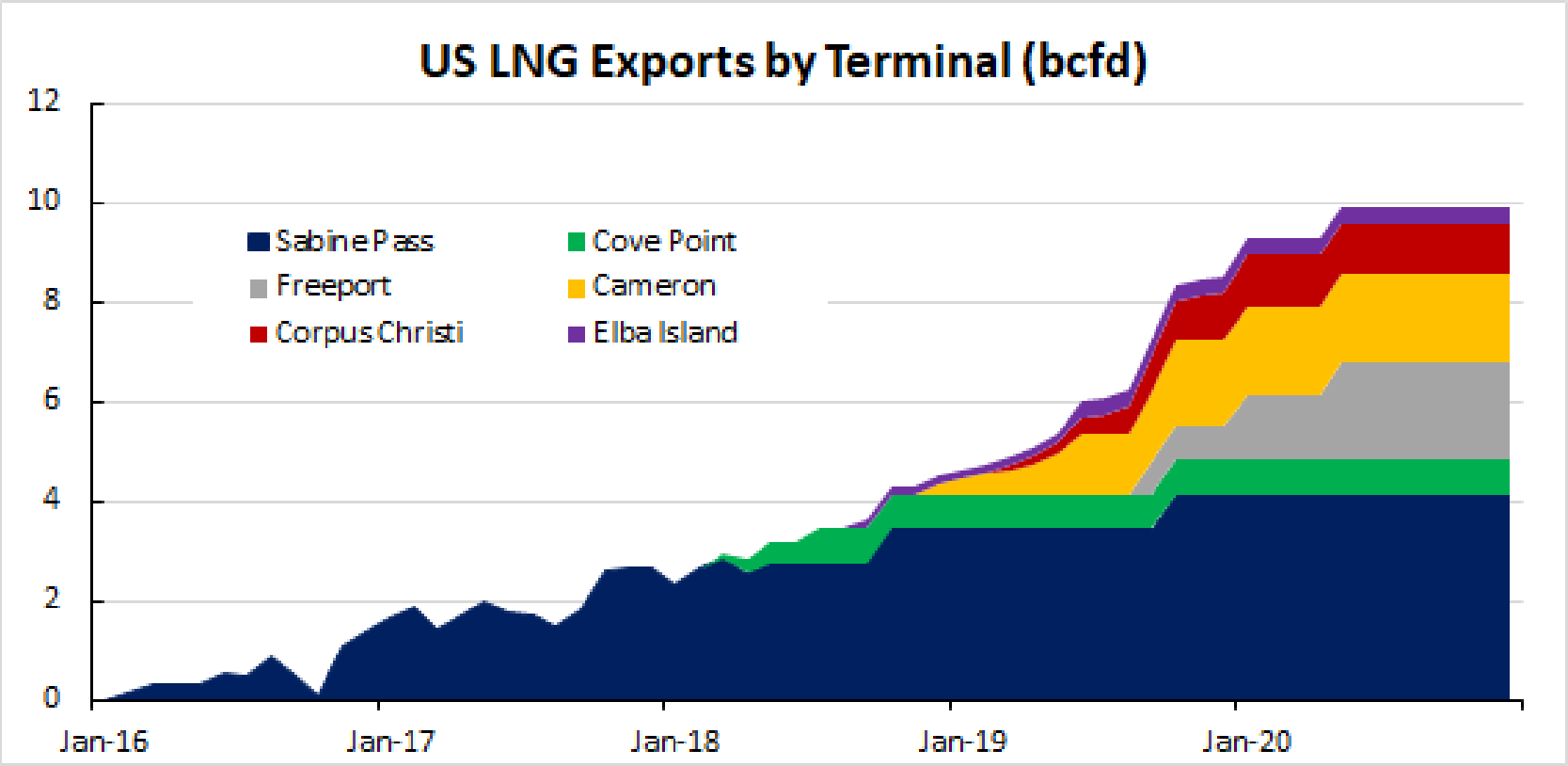
NATURAL GAS MARKETS HAVE SHRUGGED OFF STORAGE DEFICIT IN 2018

- **Historical correlation of storage surplus/deficit and spot prices separated this winter**
  - Correlation indicated "normal" gas prices were about $3.50 per mmBtu
- **Return of cold weather in 2018 cut working gas storage to lowest level since cold 2014**
  - Cold March – April weather extended storage withdrawal through April 20th
  - Storage still 528 bcf below 5-year average in July 2018
- **Market doesn't care; surge of gas supply has prices range-bound at $2.50 - $3.00 per mmBtu**



US LIQUEFIED NATURAL GAS EXPORTS WILL GROW RAPIDLY

- **LNG terminals under construction will have capacity to export 10 bcfd by the end of 2020**
  - Sabine Pass terminal is shipping over 2.0 bcfd and will expand to 3.5 bcfd
  - Cove Point began exports in March 2018
- **LNG terminals have fixed throughput contracts to pay for capacity**
- **Future volumes depend upon spread between world price and US price**
  - Spot price spread needs to be +$1.30 per mmBtu to Europe and Asia to cover variable costs



FLORIDA'S INVESTOR-OWNED UTILITIES ARE LEADING THE SHIFT TO GAS & SOLAR

- **Power supply plans: retire coal, build CCGT and solar**
- **Florida Power & Light**
  - Retire Cedar Bay, Indiantown and St. Johns River coal
  - Build CCGT at Port Everglades (1,300 MW) and Okeechobee (1,700 MW)
  - Building 75 MW solar centers at a rapid pace
- **Duke Energy Florida**
  - Retire Crystal River 1-2 coal; Build 1,800 MW Citrus County CCGT
- **Tampa Electric**
  - Retire & replace Big Bend 1-2 coal with new CCGT; build new solar
- **Going-forward cost comparison**
  - Existing coal costs $35 - $50 per MWh
  - New CCGT costs $30 - $35 per MWh to operate; plus $20 - $25 per MWh capital
  - New solar costs $35 per MWh after 30% federal subsidy – full cost over $50 per MWh
- **Impact on retail rates**
  - With no growth in sales, earnings can only grow by increasing the rate base
  - Large shift in costs from depreciated capital to new capital increases rate base and profitability
  - Rate increases are partly offset by lower fuel and operating costs