Groningen production cap and the impact on market flexibility

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Amsterdam - 9 May 2017

Agenda

- Groningen production history
- Impact of production cap to date
- Market uncertainties

Who we are

ICIS provides market intelligence services to the global petrochemical, energy and fertiliser markets. It is part of the data services division of Reed Business Information (RBI).

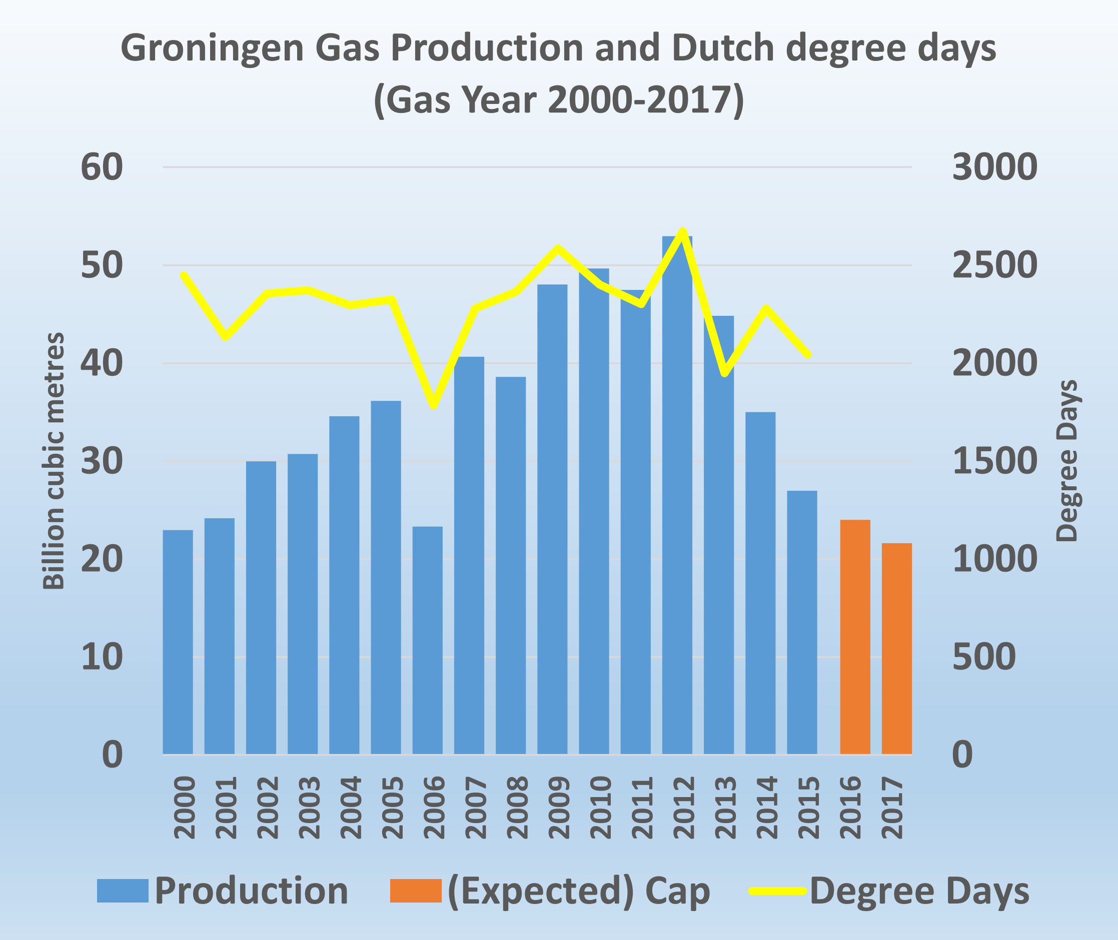
RBI provides business information, critical data services and workflow solutions across a number of industries. The other major data services include Bankers Accuity, Flight Global and Proagrica. RBI is part of RELX

RELX Group is one of the world's largest professional information companies, employing over 30,000 people in 200 locations worldwide with annual revenues of $8.9bn in 2016. It is a leading provider of workflow solutions in science and medical (Elsever), legal, risk information and analytics (LexisNexis) and business sectors (RBI)

ICIS in Energy

- The most widely used reference for spot OTC gas prices in Europe
- Energy publications cover gas hubs, LNG, power and crude oil.
- The world's longest price history database for European gas and power markets and global LNG trade
- One of largest specialised gas, global LNG and power market reporting and market analysis team.
- ICIS data is the benchmark for European energy market information
  Example from the UK:
  - Ofgem's Wholesale Market Indicators in the UK
  - ICIS sponsored and coordinated Parliamentary Working Group on the UK gas market
  - UK Competition and Markets Authority energy investigation

Groningen production history

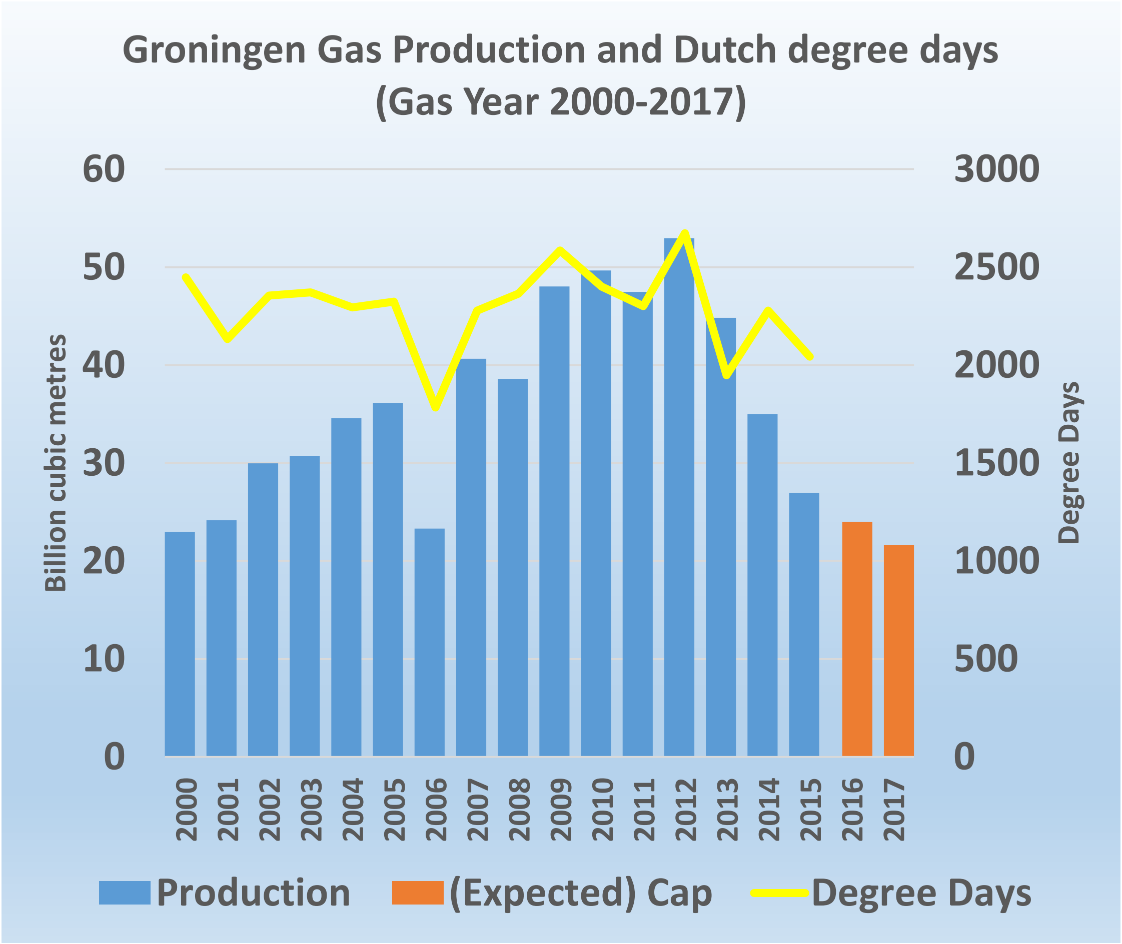


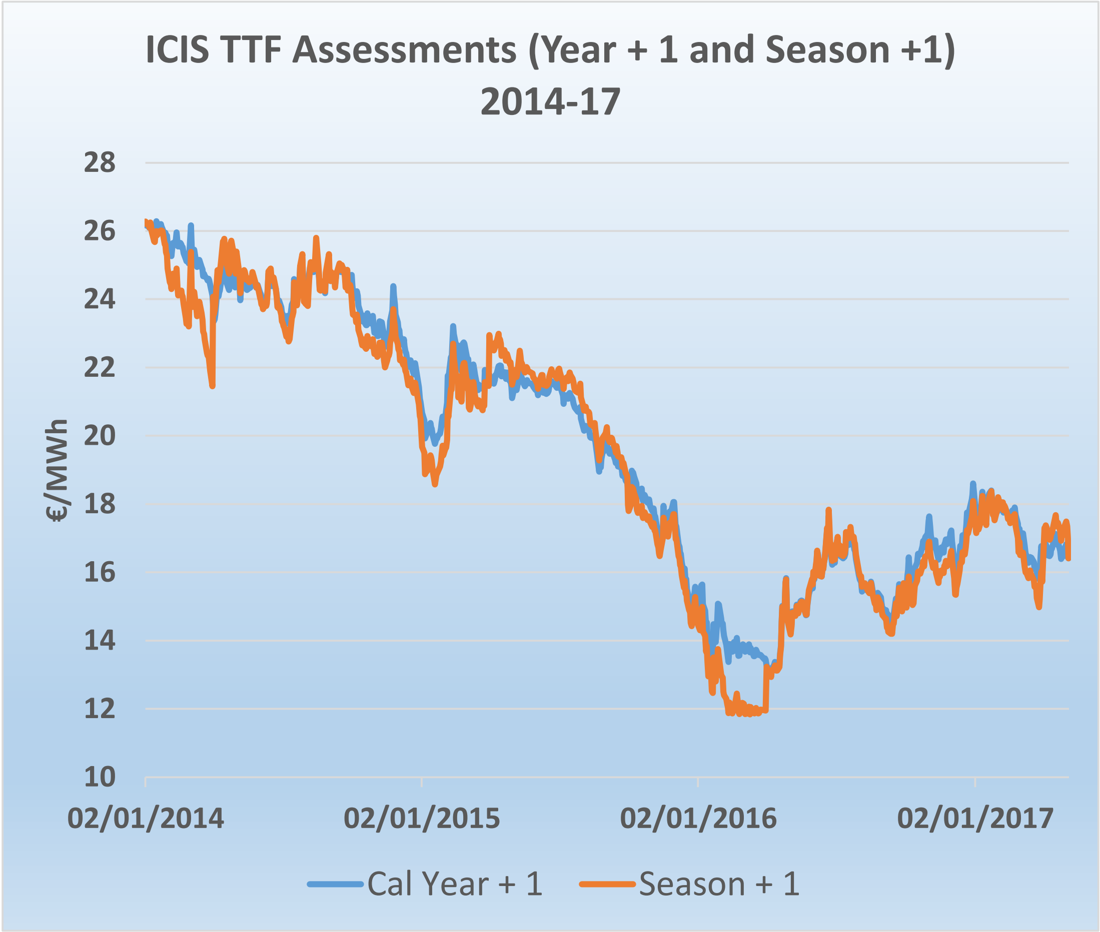
Source: NAM, Dutch government, Royal Dutch Meteorological Institute, ICIS calculations

Selected timeline of events impacting Groningen gas production

Date	Event
GY2010-2013	Groningen production averages nearly 49bcm/year. Pressure builds on government to reduce seismic activity in the region
Feb 2015	16.5bcm cap on production between Jan-July '15
June 2015	2015 annual cap of 30bcm and GY 2015 cap of 33bcm
Nov 2015	Dutch court enforces 27bcm cap on GY2015
Sept 2016	Dutch parliament approves 24bcm/year 5-year production plan
Jan 2017	Dutch court provisionally rules against further restriction on Groningen production.
April 2017	Dutch government takes fresh advice, announces it will lower cap to 21.6bcm in GY 2017

Groningen production history

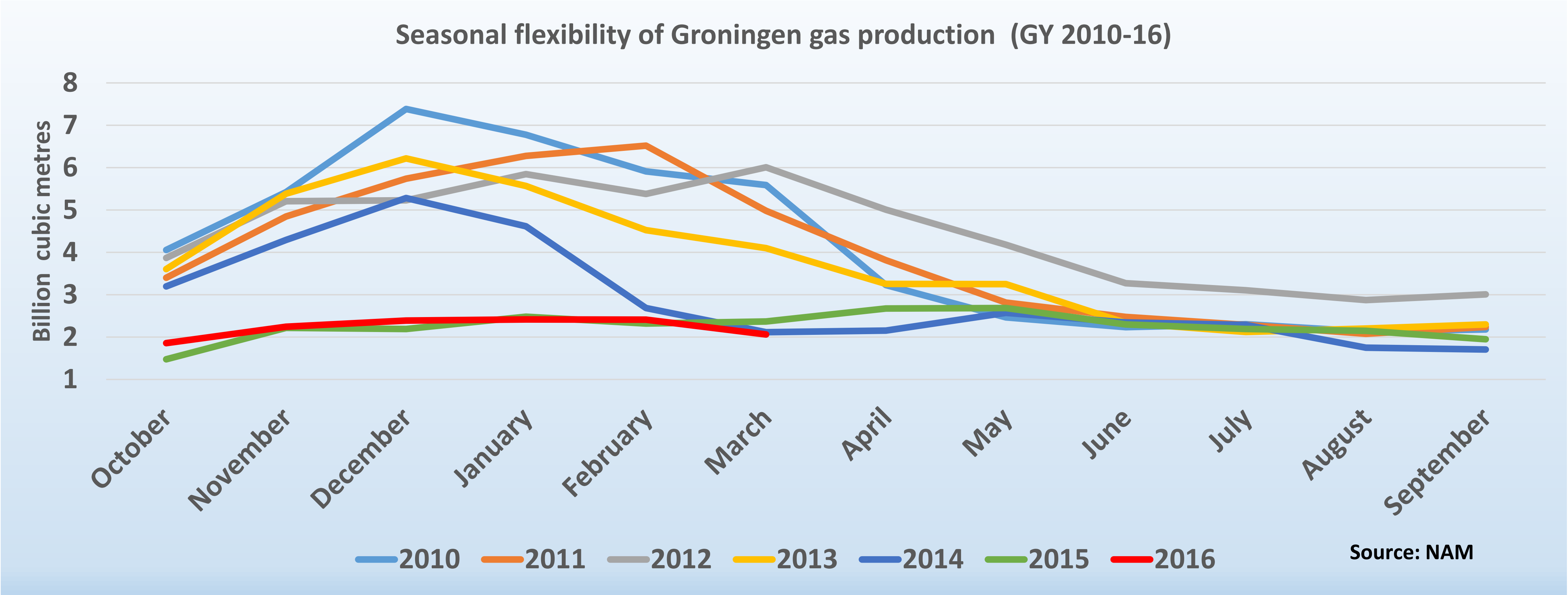




Source: NAM, Dutch government, Royal Dutch Meteorological Institute, ICIS calculations

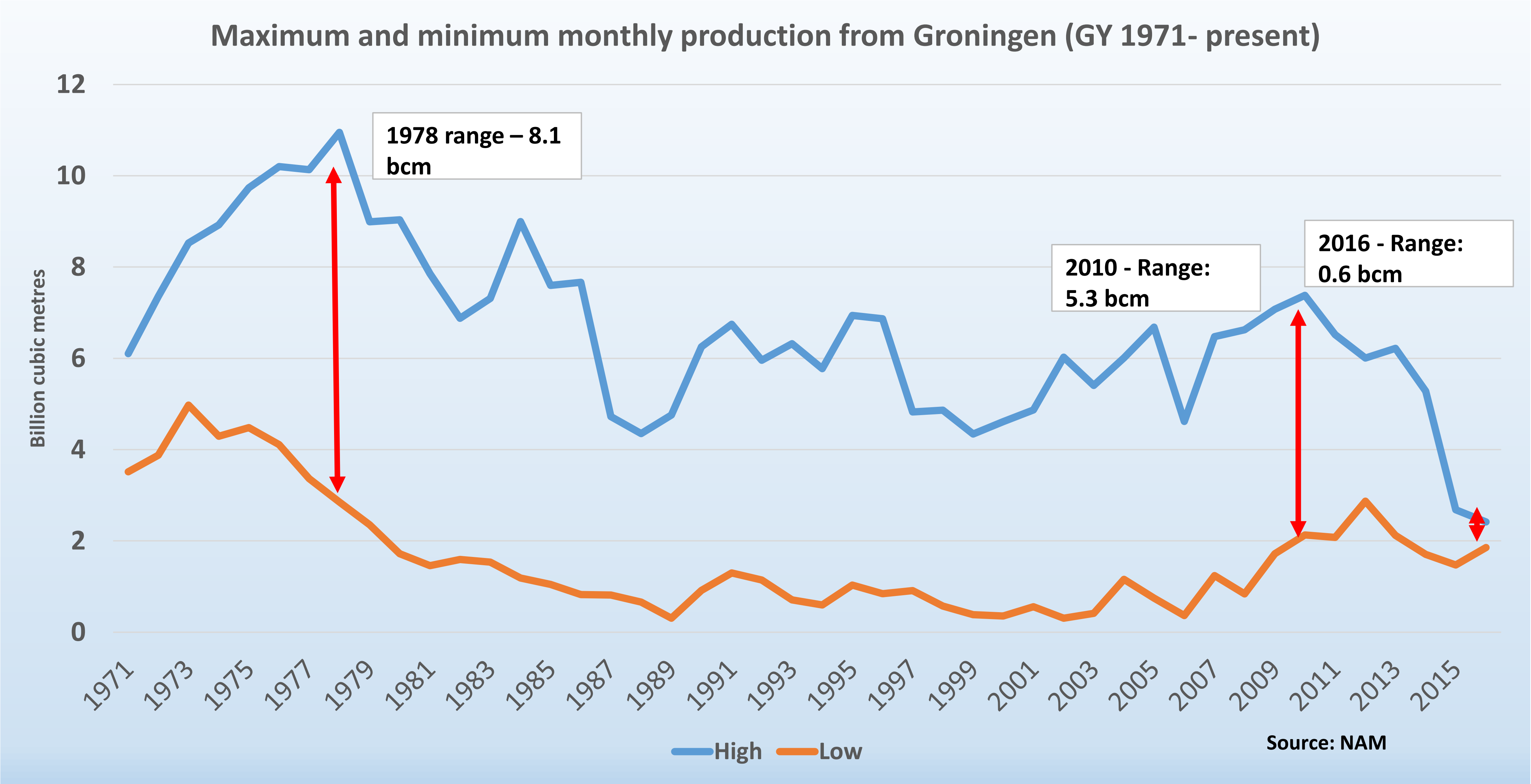
Source:, ICIS

Groningen production – seasonal flexibility

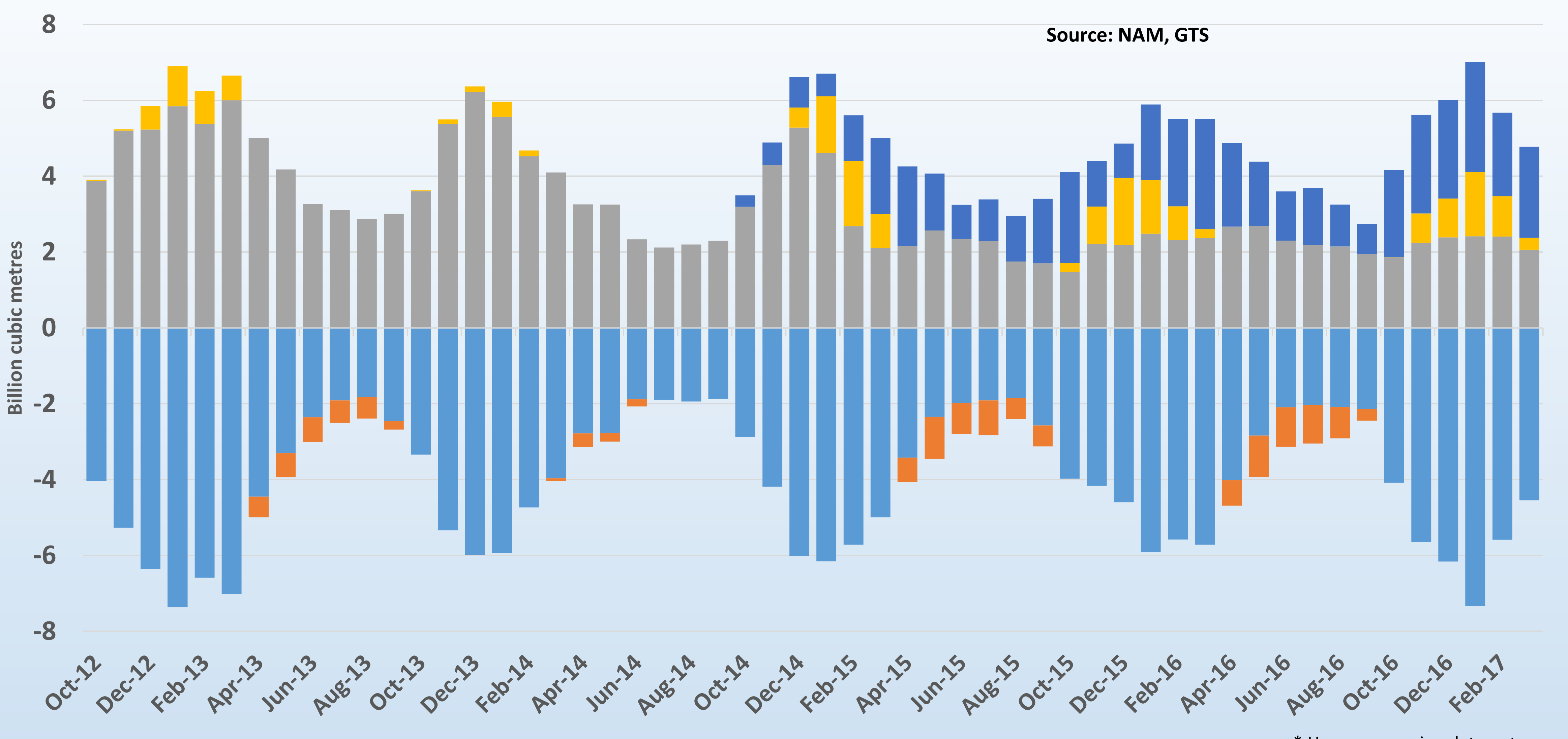


- Groningen's range in monthly output was more than 5bcm (2 – 7.4bcm/month) in GY 2010.
- Fell to just 1.2bcm in GY 2015 (1.5bcm – 2.7bcm) and only 500 million cubic metres so far in GY 2016.

Groningen production – seasonal flexibility

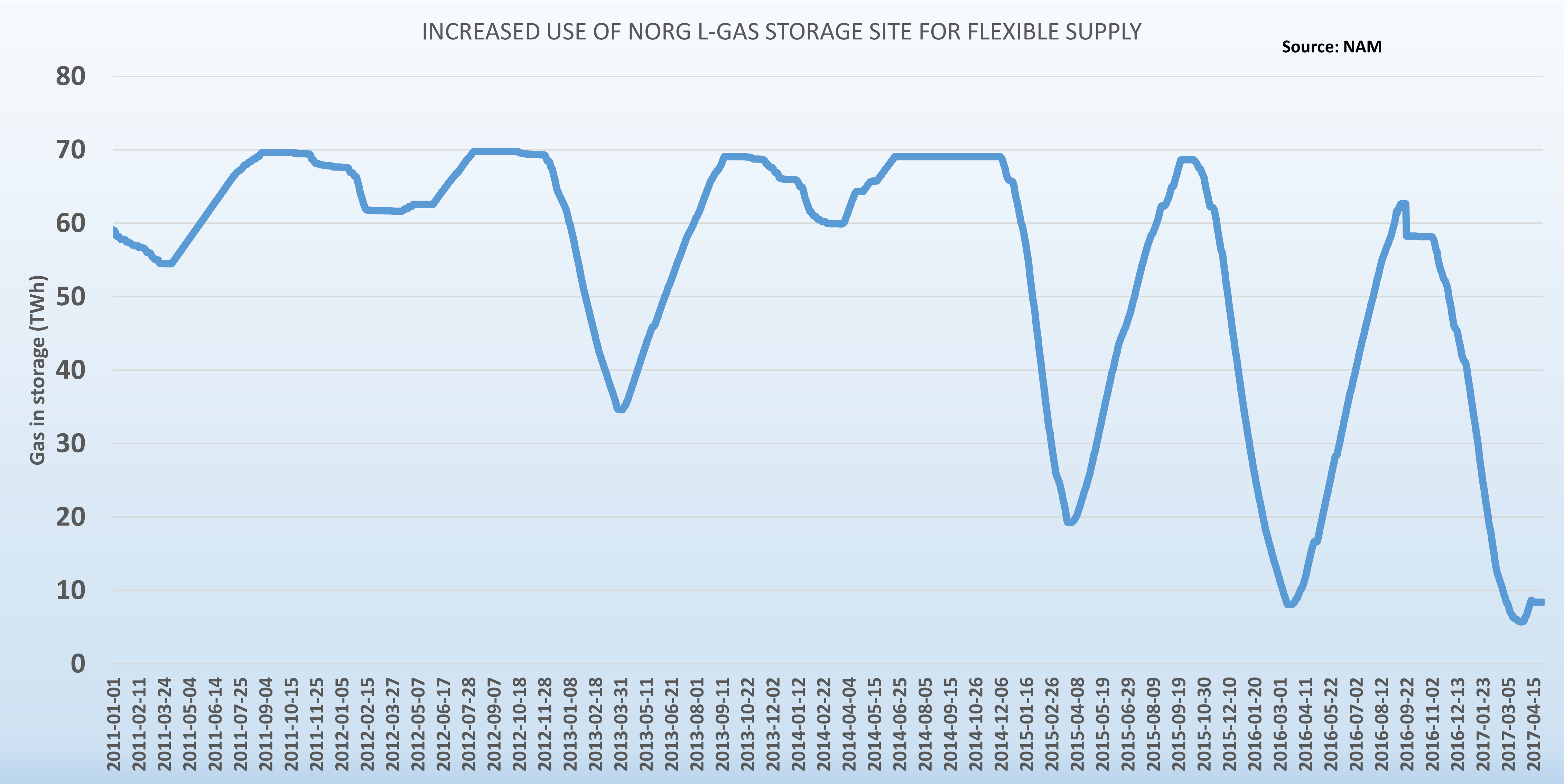


Storage and H-gas conversion replacing seasonal production flexibility

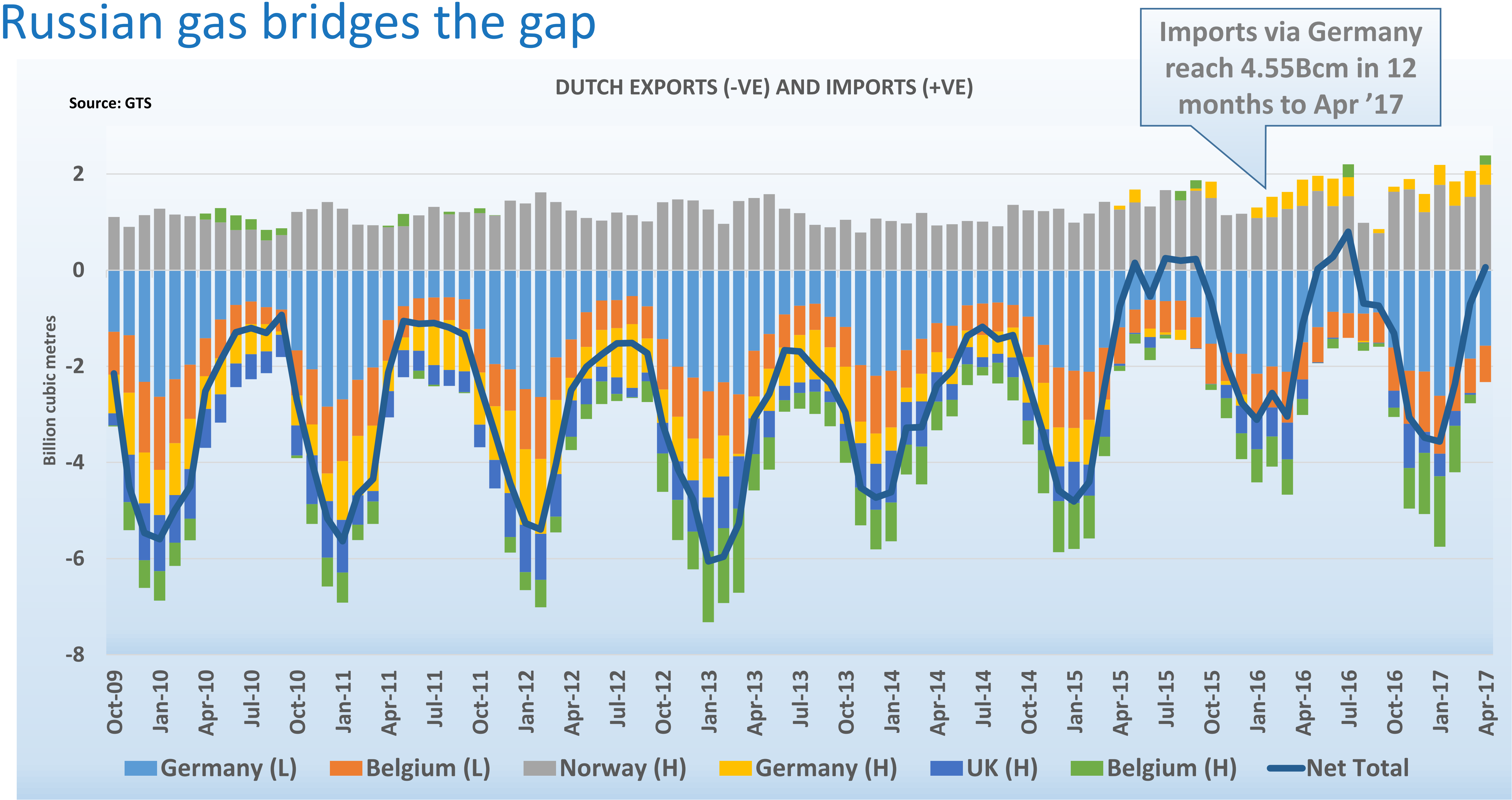


* H-gas conversion data not available before Oct 14

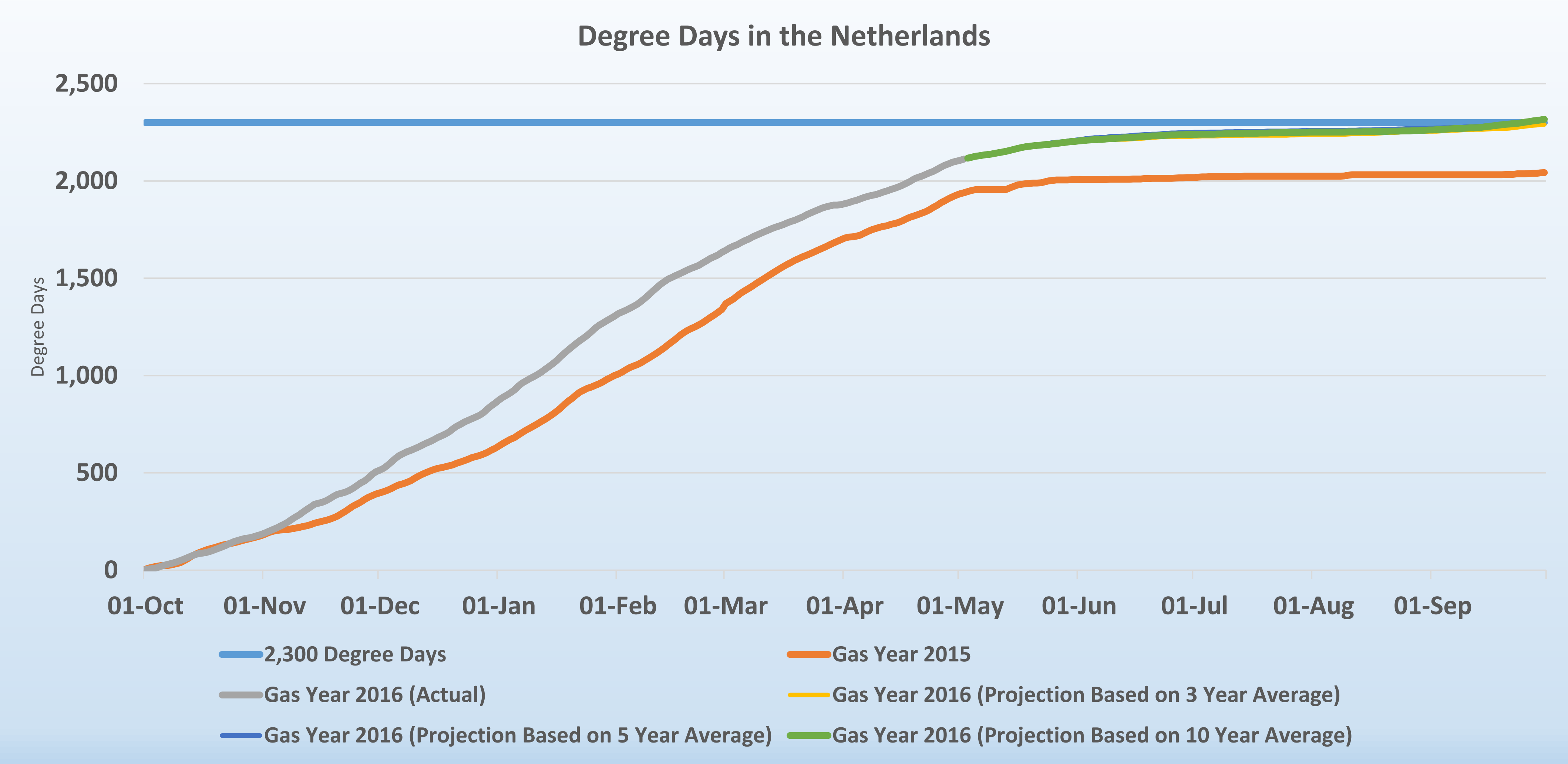
Increased use of Norg L-gas storage site



Russian gas bridges the gap



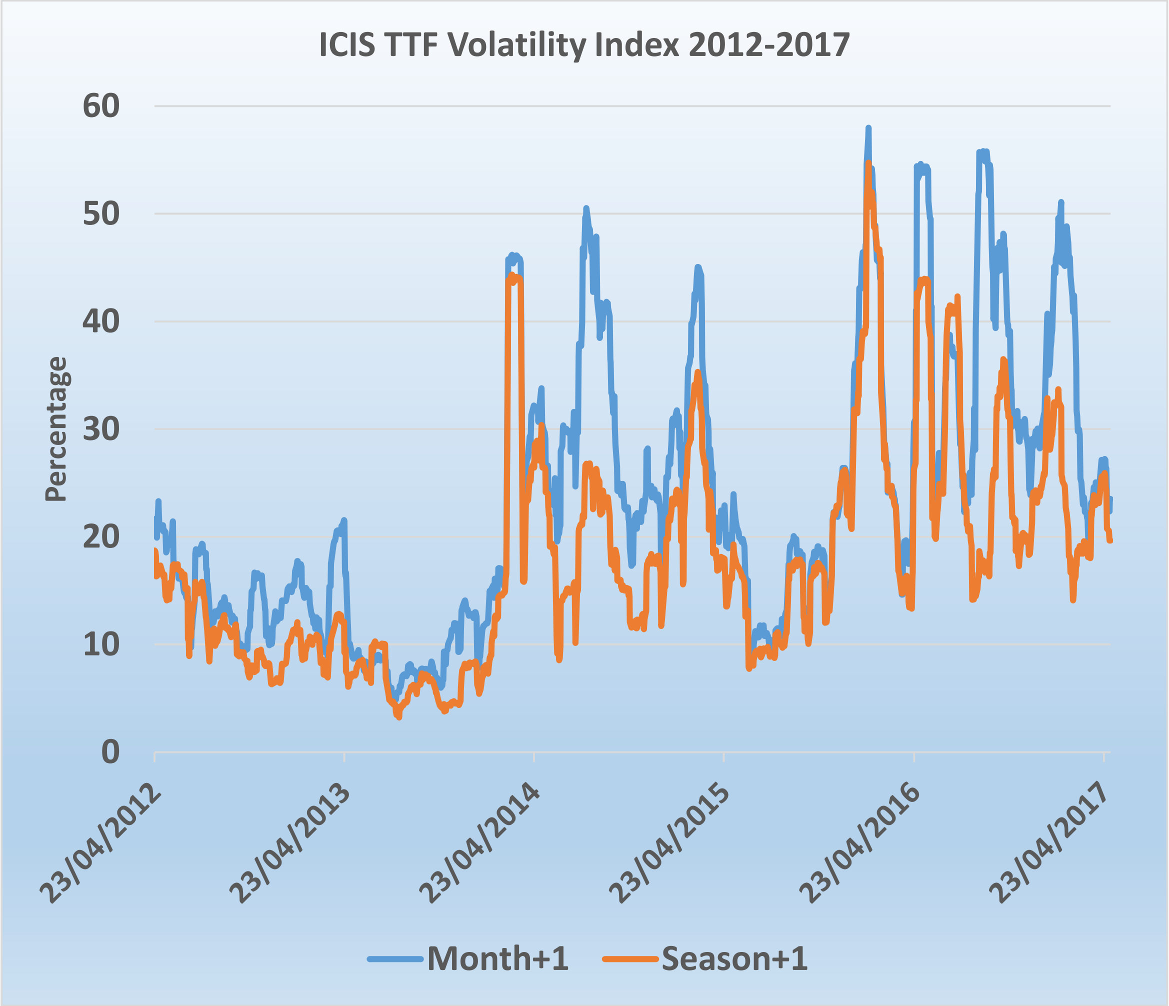
Groningen’s limited flexibility adds to market uncertainty



Source: Royal Netherlands Meteorological Institute; Dutch economy ministry; ICIS calculations

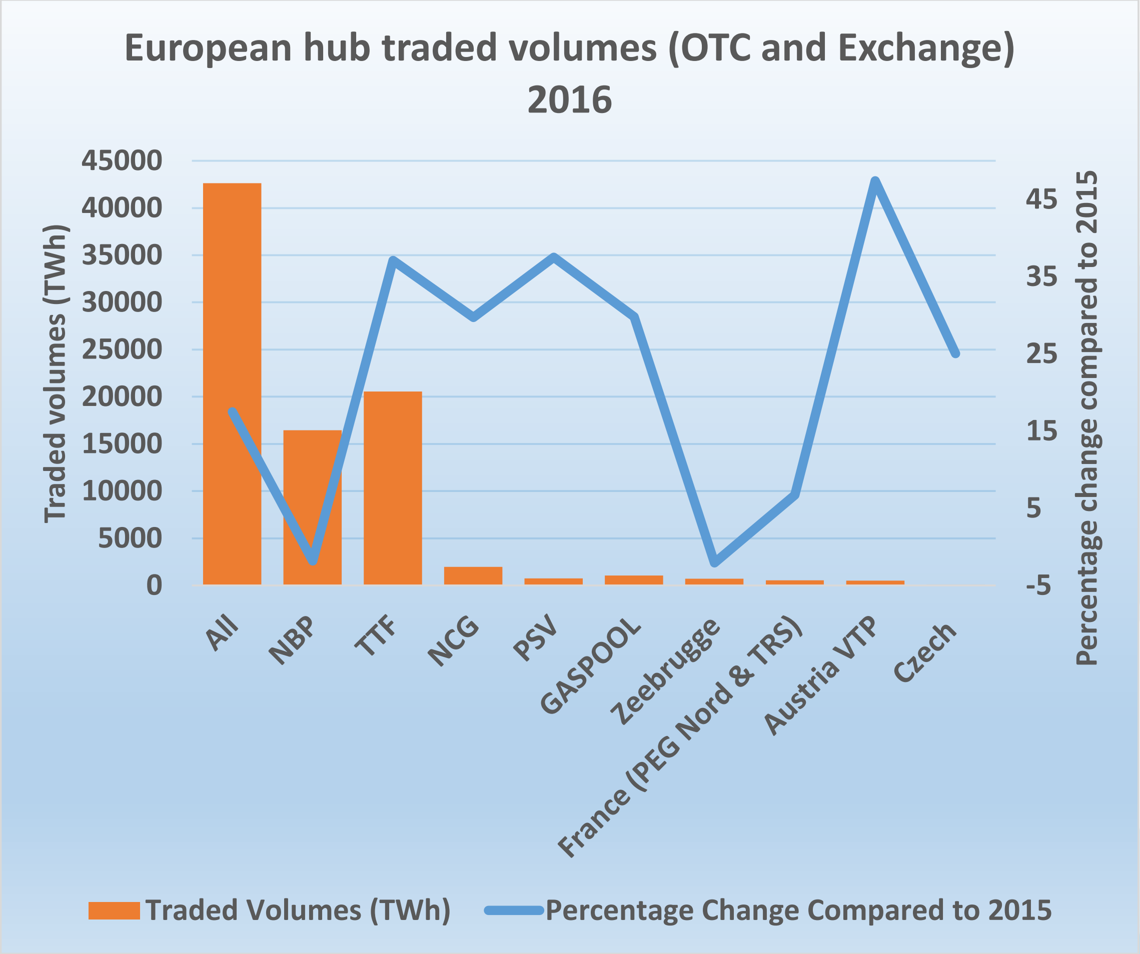
Dealing with uncertainty

- Managing the degree-day cap
- More cuts to the GY2017 21.6bcm/year production target and beyond?
- New government policy?
- Opportunities for Russian and US LNG suppliers and owners of flexible assets.



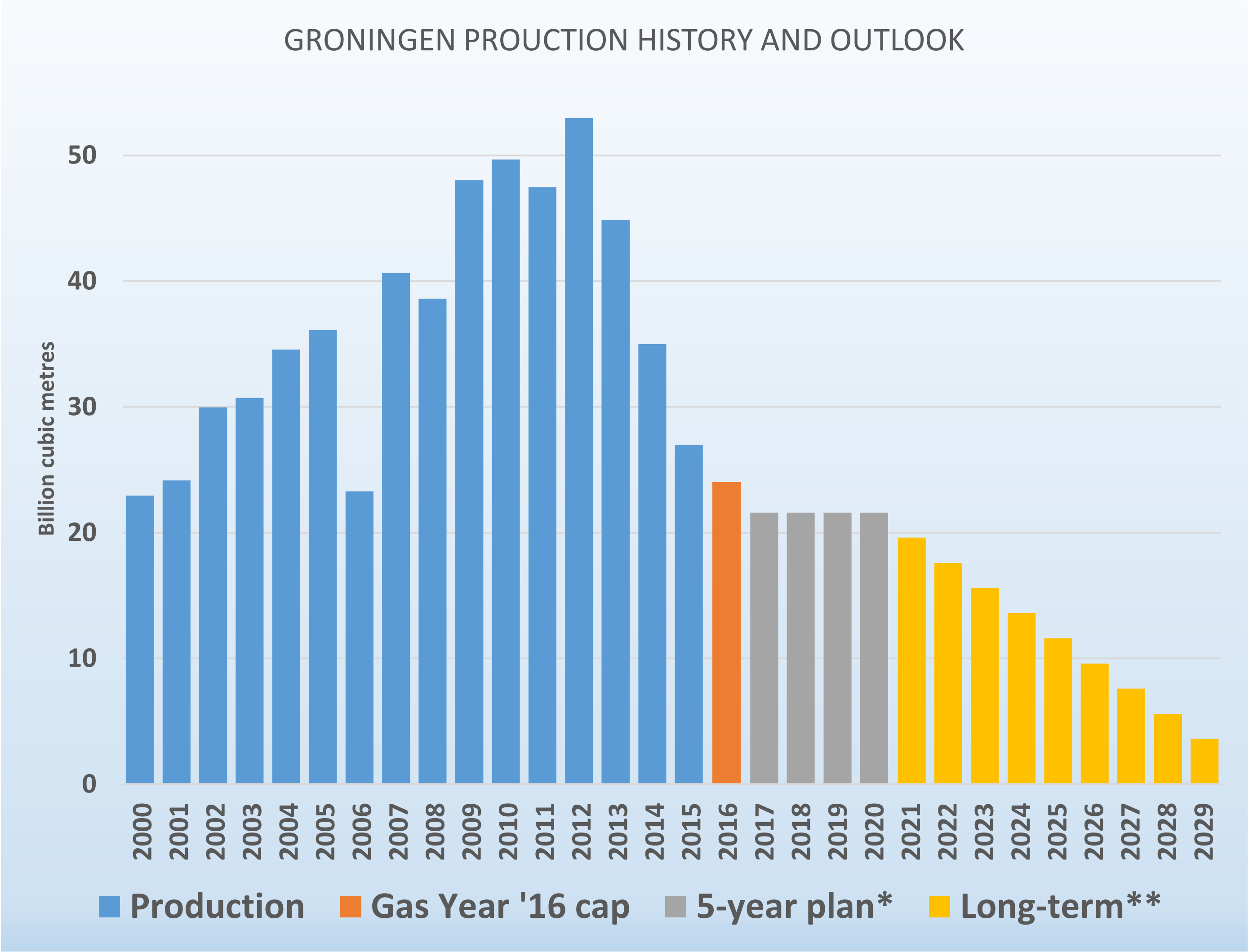
TTF liquidity – the road to market ascendency

- TTF total (OTC and exchange) volumes surge by nearly 40% in 2016 to approx. 1.9tcm, buoyed by market conditions and structural changes.
- TTF accounted for nearly 50% of all EU traded volumes in 2016.
- More contracts move to hub-pricing, disproportionality benefits TTF with increasing hedging activity on the curve.
- TTF is a crucial venue for global LNG forward hedging, which has and will continue to support further growth on the far curve.



Source: ICIS (OTC volumes), ICE, PEGAS, CME (exchange volumes)

Outlook



* Subject to annual review
** Unconfirmed

- Long-term contracts run to 2030 but the volumes drop quickly next decade.
- Dutch government to make a decision about whether or not to build a new nitrogen plant which would increase H-gas conversion capacity by 50% for the period from GY 2021 onwards. Would allow for a faster drop off in Groningen production
- Grid conversion in Germany and Belgium is beginning and will accelerate in the next decade.
- L-gas interconnectors will be converted to transport H-gas

Thank you…..

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