



# Shale Gas in China : a strong delay for a take-off?

Gas markets Committee

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# HUGE POTENTIAL & INCENTIVES *VERSUS* UNCERTAINTIES ON GAS DEMAND



- **High potential resources and NOC's fracking success:**
  - **Huge shale gas resources** : 36 tcm (IEA 2013)
  - **Technical and economic challenges on shale production** (drilling, uncertainties on potential recoverable resources, operating environment) **continue to be met**
- **Chinese government incentives :**
  - **NDRC Gas prices reforms from 2011** to incentivize legislation favouring gas in upstream activities
  - **13<sup>th</sup> five year plan targets :**
    - **shale gas production targets** : 30 bcm in 2020 and 90 bcm in 2040
    - Increasing gas-fired capacity from 66GW in 2015 to 110 GW in 2020
- **Uncertainties on gas demand growth :**
  - **On one hand Increasing gas needs**
    - driven by industry, buildings, transport and power generation
    - **Important gas import contracts signed** : since 2014 and 2006 for pipes and LNG to up 2040
  - **On the other hand a drastic drop in gas demand rate growth since 2014 :**
    - **From 14%/y between 2007-2013** to 8% then to **2,5% in 2015**
    - **Lost of gas competitiveness with regard to other energies** (gas price reforms, reduction on oil, LPG and coal prices since 2014)

# Could we still expect a rapid Chinese shale boom?

- Will the expected Chinese shale gas boom be doomed to fail or to postpone?
  - Which impact could we expect on gas imports?
  - Will it be more interesting to :
    - import more LNG in a context of lower prices? To import more gas by pipe?
- Or to
- develop more shale gas which can be harder/more expensive to produce

# Study Objective & Methodology



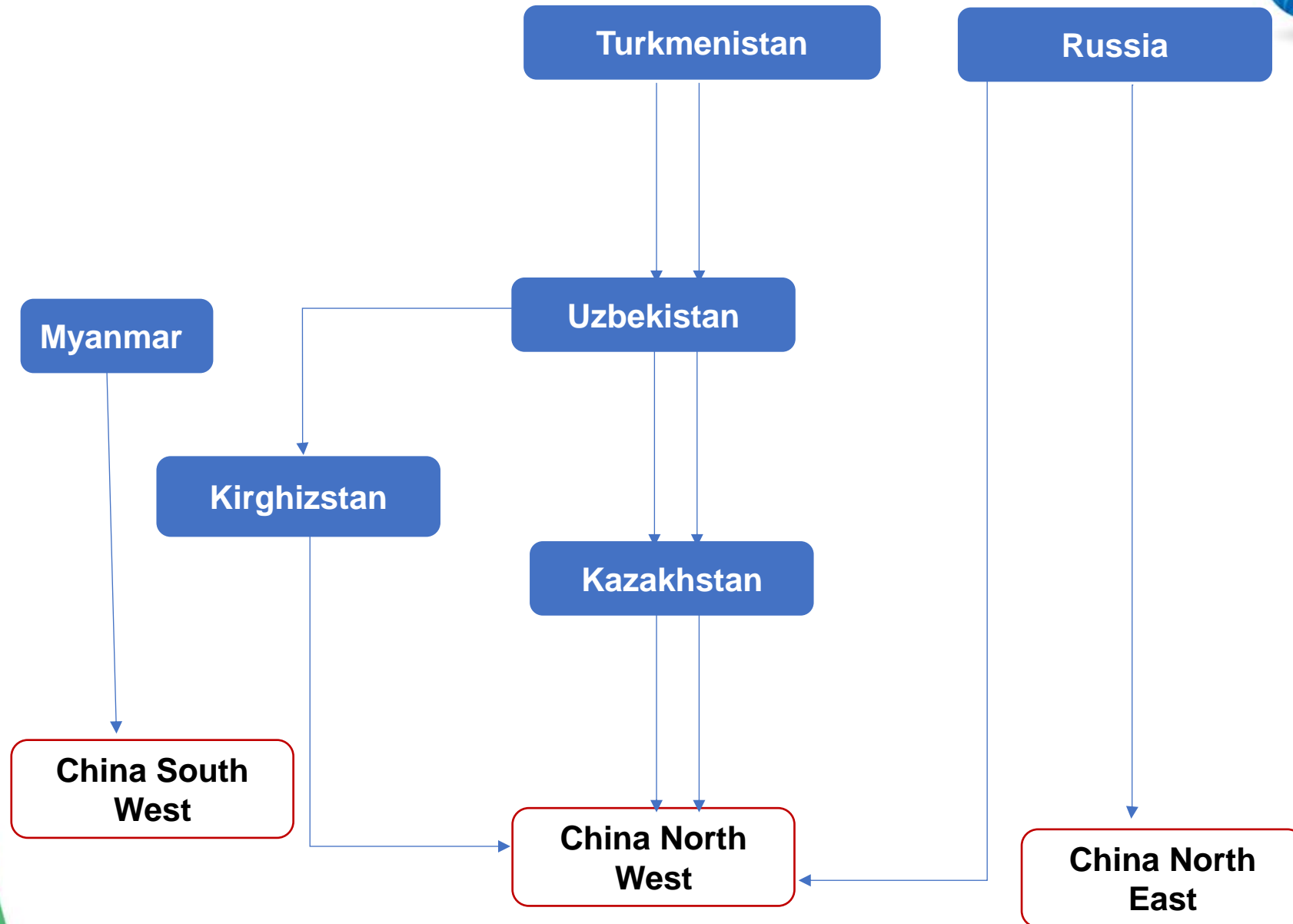
## ➤ Objective :

- To find the gas supply (conventional, unconventional (shale, CBM), imports (pipe, LNG)) that will satisfy a low Chinese gas demand scenario to 2040

## ➤ Approach adopted :

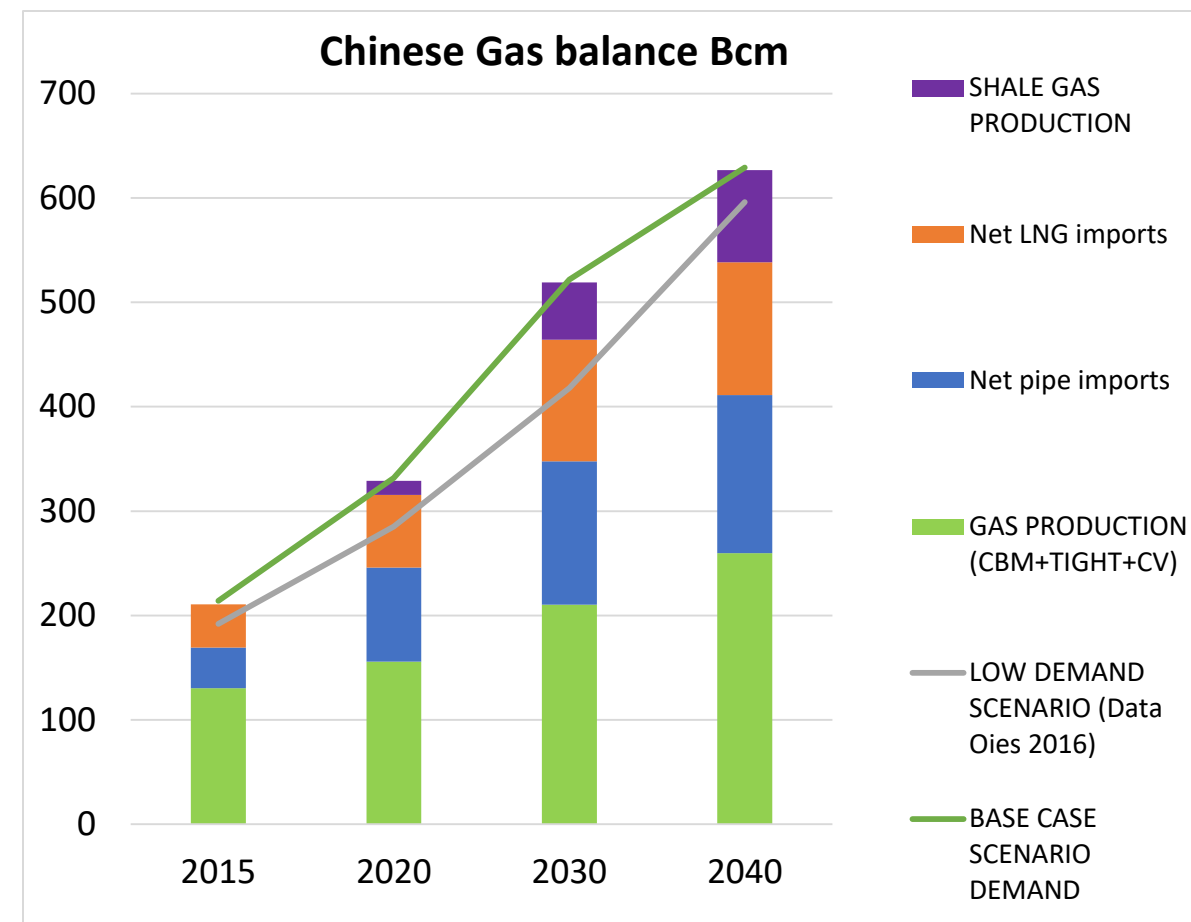
- To fix gas demand (exogenous to the model) in order to calculate flows, marginal costs
- Tool used : World Gas Model (Nexant) data of May 2016

# Supply constraints

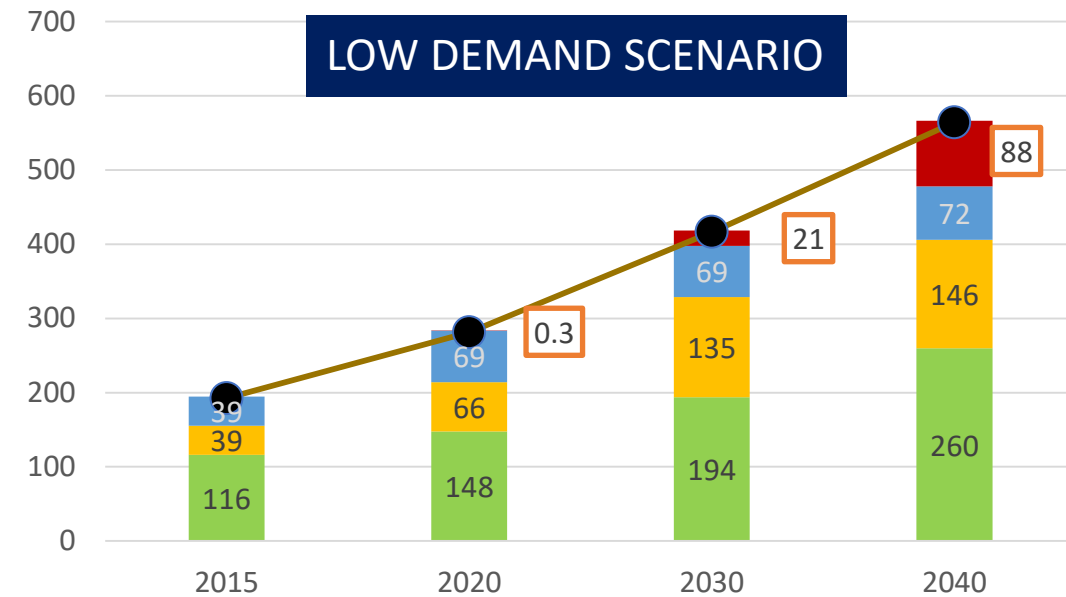
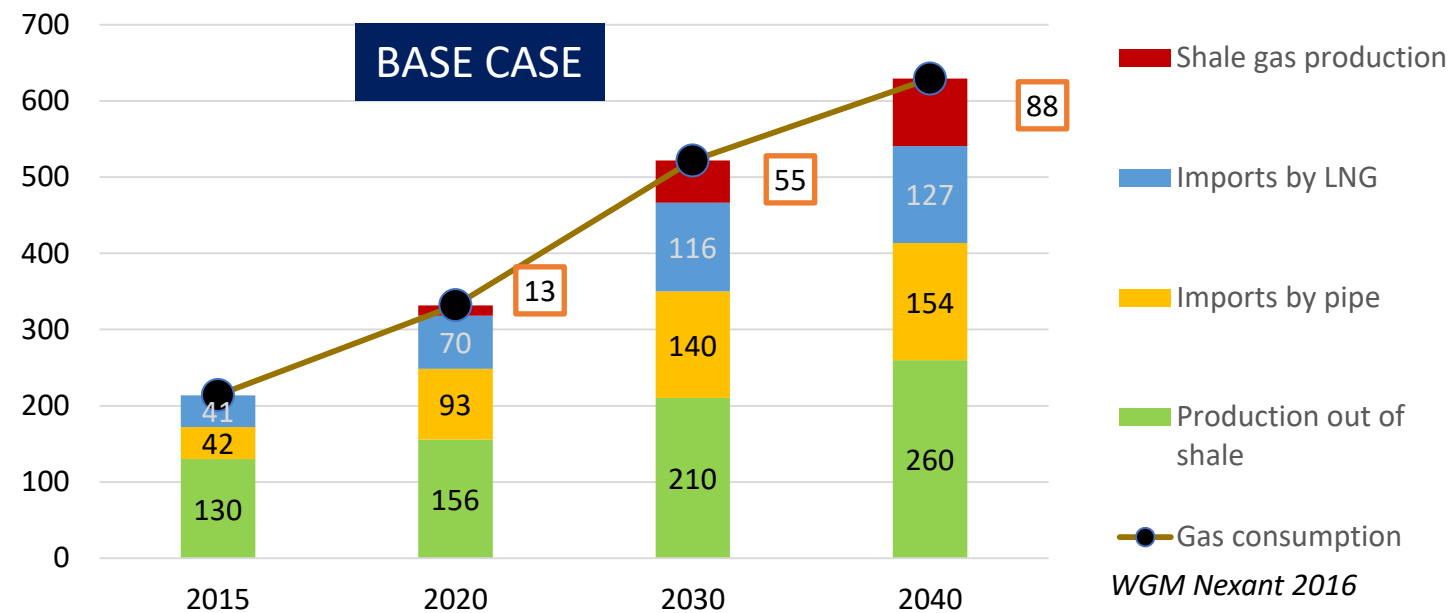


# Scenarios studied

Demand scenarios	Shale gas production scenario
	MEDIUM SHALE PRODUCTION
BASE CASE (Scenario medium demand AIE NPS 2016)	<p><b>Gas Demand</b></p> <p>214 Bcm IN 2020</p> <p>521 Bcm IN 2030</p> <p>629 Bcm IN 2040</p> <p><b>Shale gas production</b> LRMC ~7\$/MMBtu</p> <p>30 Bcm IN 2020</p> <p>90 Bcm IN 2040</p>
	<p><b>Gas Demand</b></p> <p>192 Bcm IN 2020</p> <p>418 Bcm IN 2030</p> <p>564 Bcm IN 2040</p> <p><b>Shale gas production</b> LRMC ~7\$/MMBtu</p> <p>30 Bcm IN 2020</p> <p>90 Bcm IN 2040</p>



# Results : gas balance decreasing



➤ A decrease of 16% in cumulated terms on gas demand between 2015 and 2040 involves reduction of 233 Bcm on gas supply :

➤ **-10% (- 86 bcm) on gas production, with :**

- **-31% (-48 bcm) on shale gas production**
- **-5% (-48 bcm) on out of shale gas production (conventionnal+CBM)**

➤ **-22% (-148 bcm) on gas imports, with :**

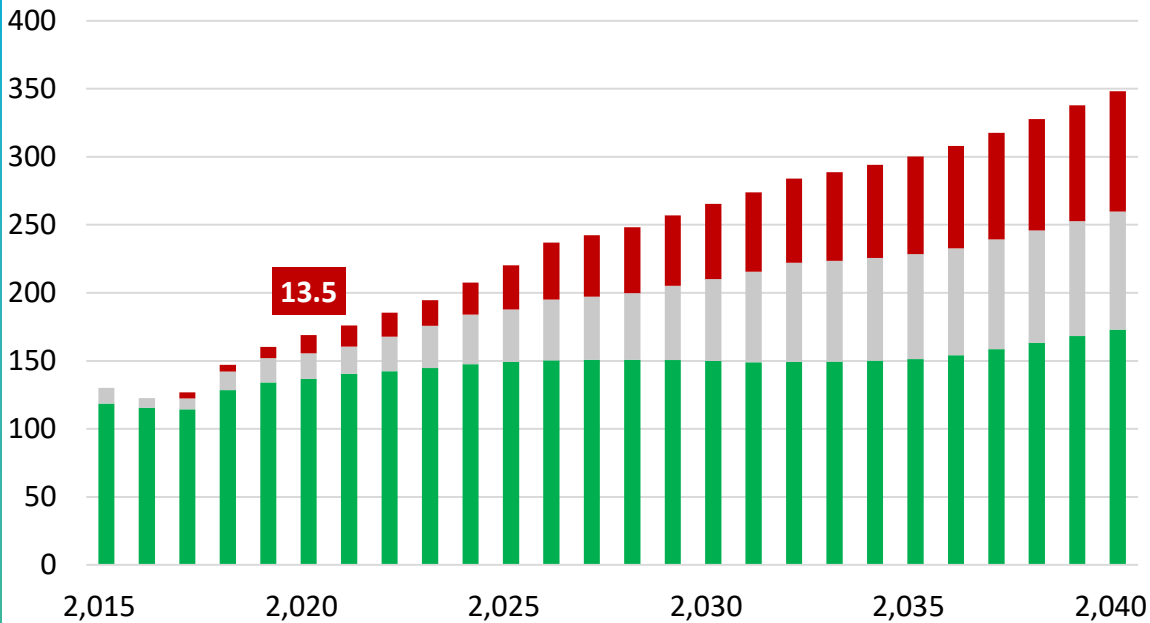
- **-10% (-43 bcm) by pipe**
- **-30% (-105 bcm) by LNG**



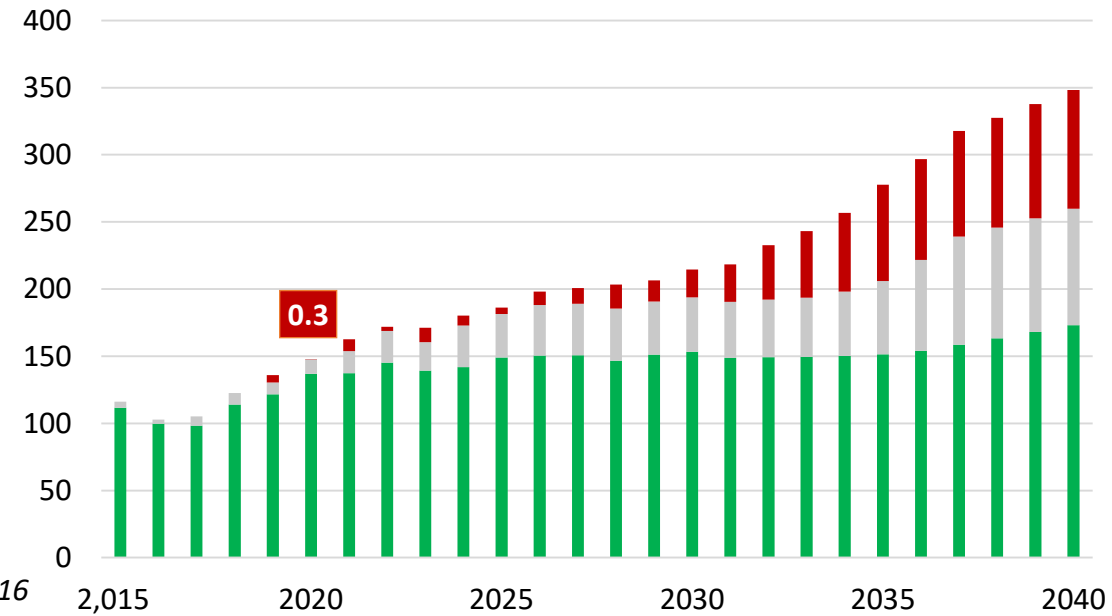
# Results : shale gas production reduced and postponed

BASE CASE

LOW DEMAND SCENARIO



WGM Nexant 2016



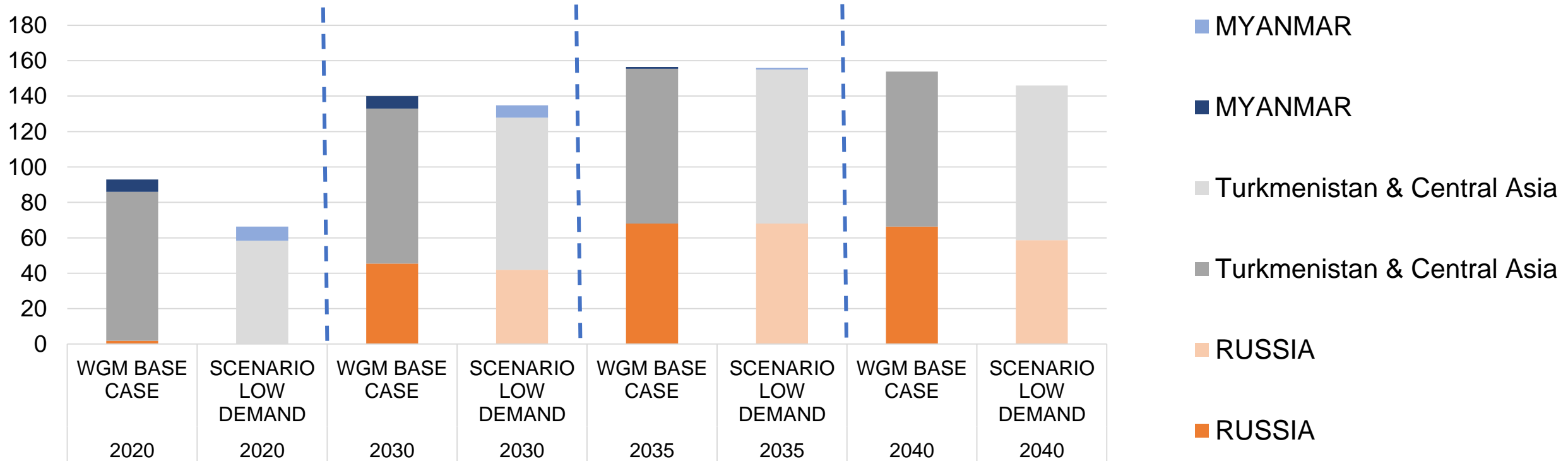
In the low scenario demand, the shale gas target fixed by NDRC in 2014 (30 bcm for 2020 and 90 bcm and 2040) is :

- Not achievable : 0,26 bcm in 2020 (-99%) and 20,7 bcm in 2030
- Postponed by almost a decade
- Maintained for 88 bcm despite of gas demand slowdown

# Results : net PIPE imports decreasing



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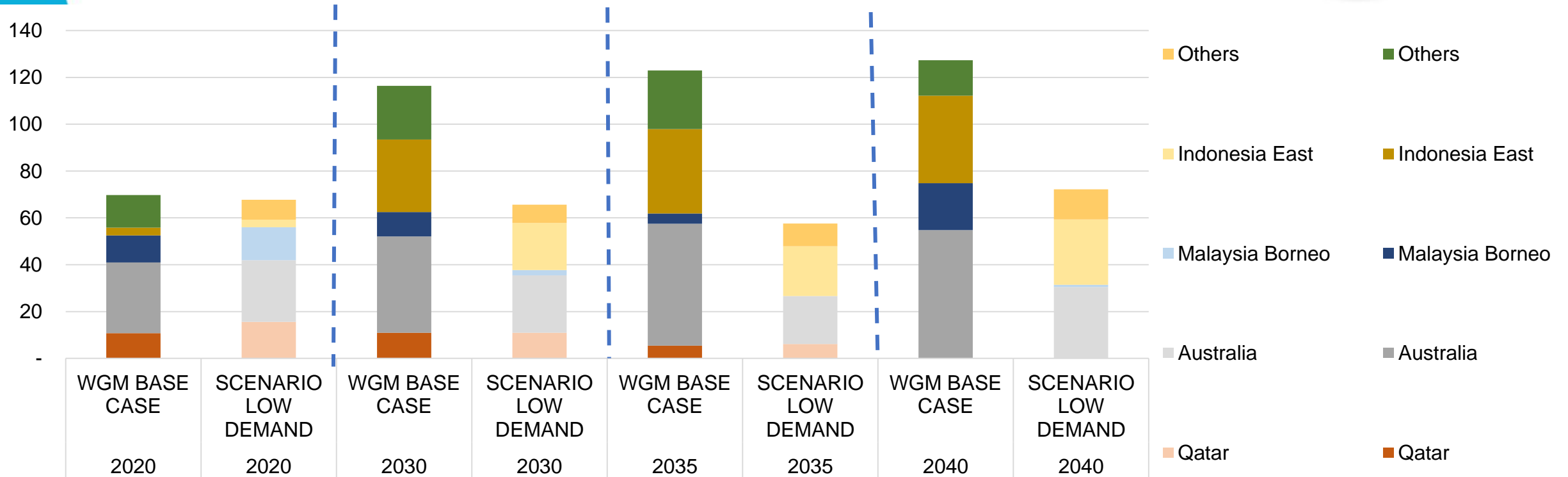
• **A decrease in pipe imports from 2020, less after 2030**

*WGM Nexant 2016*

• **Key factors** : Surge in shale gas production from 2030 (Low demand scenario)

- ToP Contracts signed from 2014 until 2039
- Contracts prices more expansive for LNG (for ex. Australia)

# Results : net LNG imports decreasing



• **LNG imports decrease from 2030**

*WGM Nexant 2016*

• **Key factors :**

- Surge in shale gas production from 2030 (Low demand scenario)
- ToP Contracts signed from 2006 until 2039
- Contracts prices more expansive for LNG (for ex. Australia)

# Could we still expect a rapid Chinese shale boom?

- Will the expected Chinese shale gas boom be doomed to fail or to postpone?

Even if China is assessed as having the largest shale gas resources in the world, a slowdown on its gas consumption growth will probably, according to our model, **reduce and postpone targets of shale gas production for almost a decade**

- Which impact can we expect on gas imports?

**LNG imports are more impacted than pipe imports** as the price contracts are more expensive (cf WGM results), but an opportunity could appear with US and Australian new capacities to compete central Asian volumes

- Will it be more interesting to : import more LNG in a context of lower prices? To import more gas by pipe? Or to develop more shale gas which can be harder/more expensive to produce

**The growth in gas demand is reduced in the scenario LD but the volumes are growing** : this involves a stronger production (conventional and shale) and stronger gas pipe and LNG imports. Although potential for growth is significant (China will still be a great consumer, producer and importer of Natural gas, at the expense of coal), uncertainty is high as economic growth, unconventional production and pipe imports from Russia are the key factors that will drive LNG demand in the future

**Possible more arbitrages between shale and gas imports** : a reduction in shale gas cost (7→5\$/MMBtu) and an increase in gas contract prices (to 10-12\$/MMBtu) should incentivise China for more shale domestic volumes

# THANK YOU FOR YOUR ATTENTION

*the original, fully referenced version of this study can be downloaded from the IGU website <https://www.igu.org/igu-magazines> publication of March 2017*