

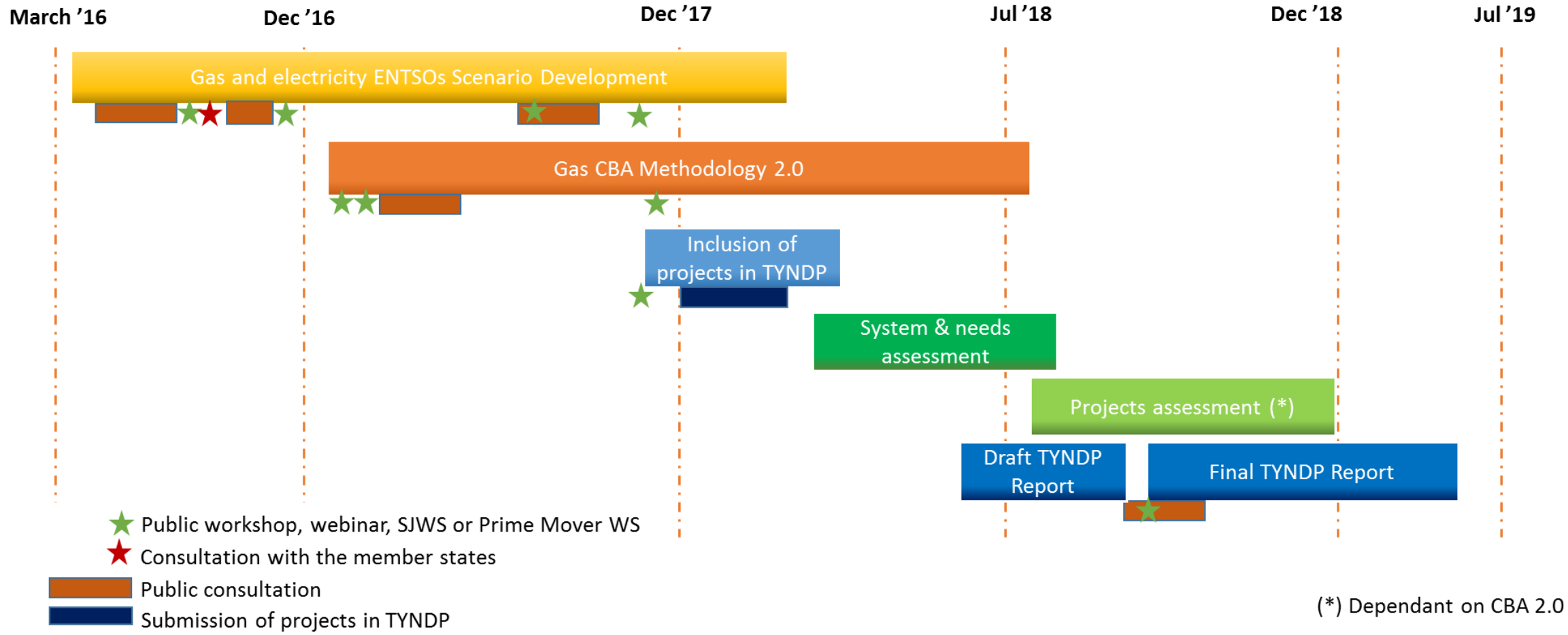
Supply Potentials

TYNDP 2018

Arturo de Onís
System Development Advisor

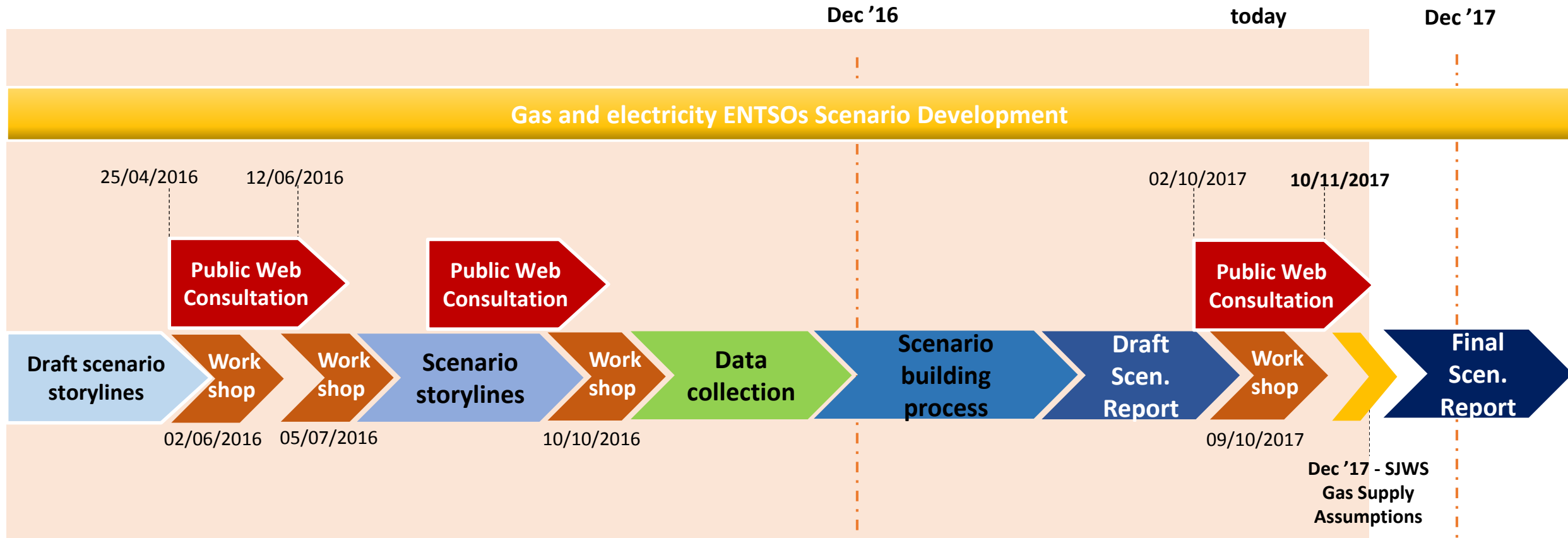


TYNDP 2018 Main Steps Timeline





Scenario Report Work Progress





Scenario Report Work Progress

- **Improvements** from TYNDP 2017:
 - First time approach to Power-to-gas
 - LNG Diversification
 - Introduction of new potential sources
- Current work based on public consultation feedback on Draft Scenario Report:
 - Renewable Gases reviewed based on the Public Consultation feedback
 - Consideration of Turkish Potential
 - Potentials for Russia, Algeria and LNG revised based on WEO 2017 edition

**We welcome your contributions during this workshop
in view of the Final Scenario Report**



Introduction to the use of Potentials

- Frame of the future: supplies are inputs to the modelling.
- Constraints on the levels of supplies are not intended as forecasts but need to be defined in order to avoid unrealistic supply situations.
- The modelling always respects supply ranges between the minimum and the maximum for every source.
- The minimum and maximum supply ranges have a direct use as part of the Supply Adequacy Outlook.
- Resulting supply mixes are an outcome of the modelling.
- The supply mix will depend on the demand scenario.

Supply results will be a combination of the potentials and network constraints



Introduction to the Supply Potentials

1. Indigenous production (National Production & Renewable Gases)

- Data Collection: use of TSO figures for system assessment

2. Import sources:

- **Pipeline:** Algeria, Azerbaijan, Libya, Norway, Russia and Turkey
- **LNG net exporting regions:** Middle East, North Africa, S.S. Africa, S. America, N. America, Australia and Other

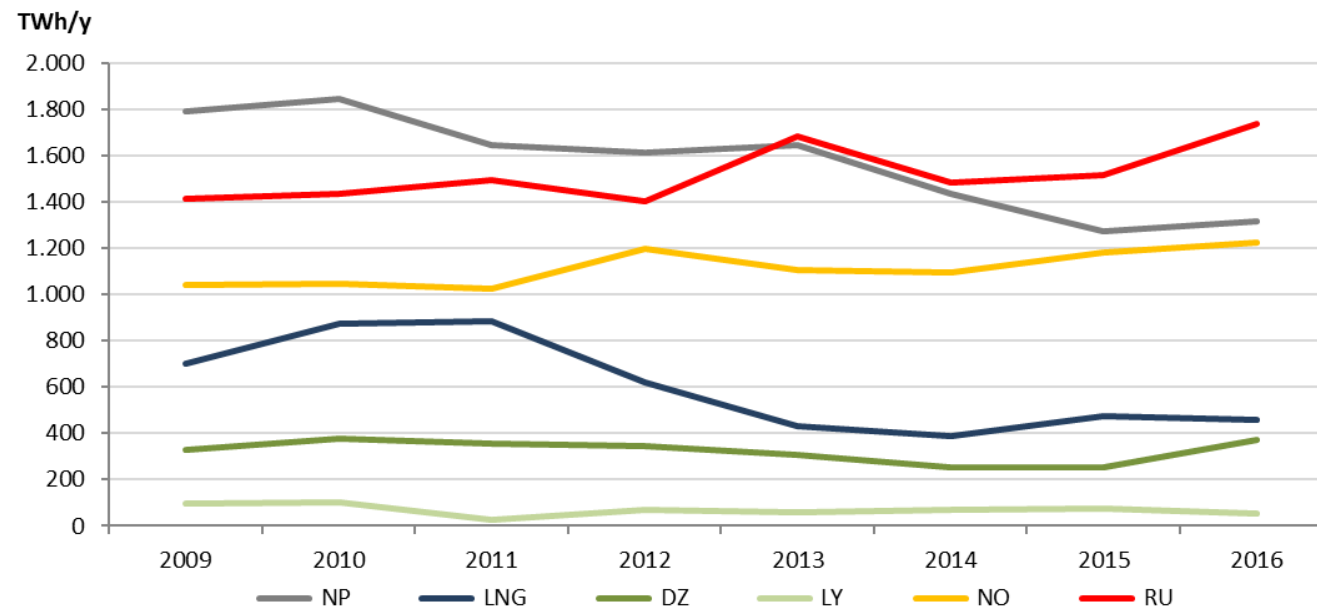
3. Other potential import sources not directly used in the assessment:

- Egypt, Iran and Turkmenistan



Imports current status overview

- **Russia:** main gas supplier of the EU and second largest reserves in the world
- **Norway:** second largest gas supplier of the EU, supplying Europe for over 40 years
- **Algeria:** third largest gas supplier of the EU, world top ten reserves
- **Libya:** currently the smallest pipeline supplier of the EU
- **LNG:** sustained fall since 2011, stabilized from 2014 to 2016





Supply Potential Russia

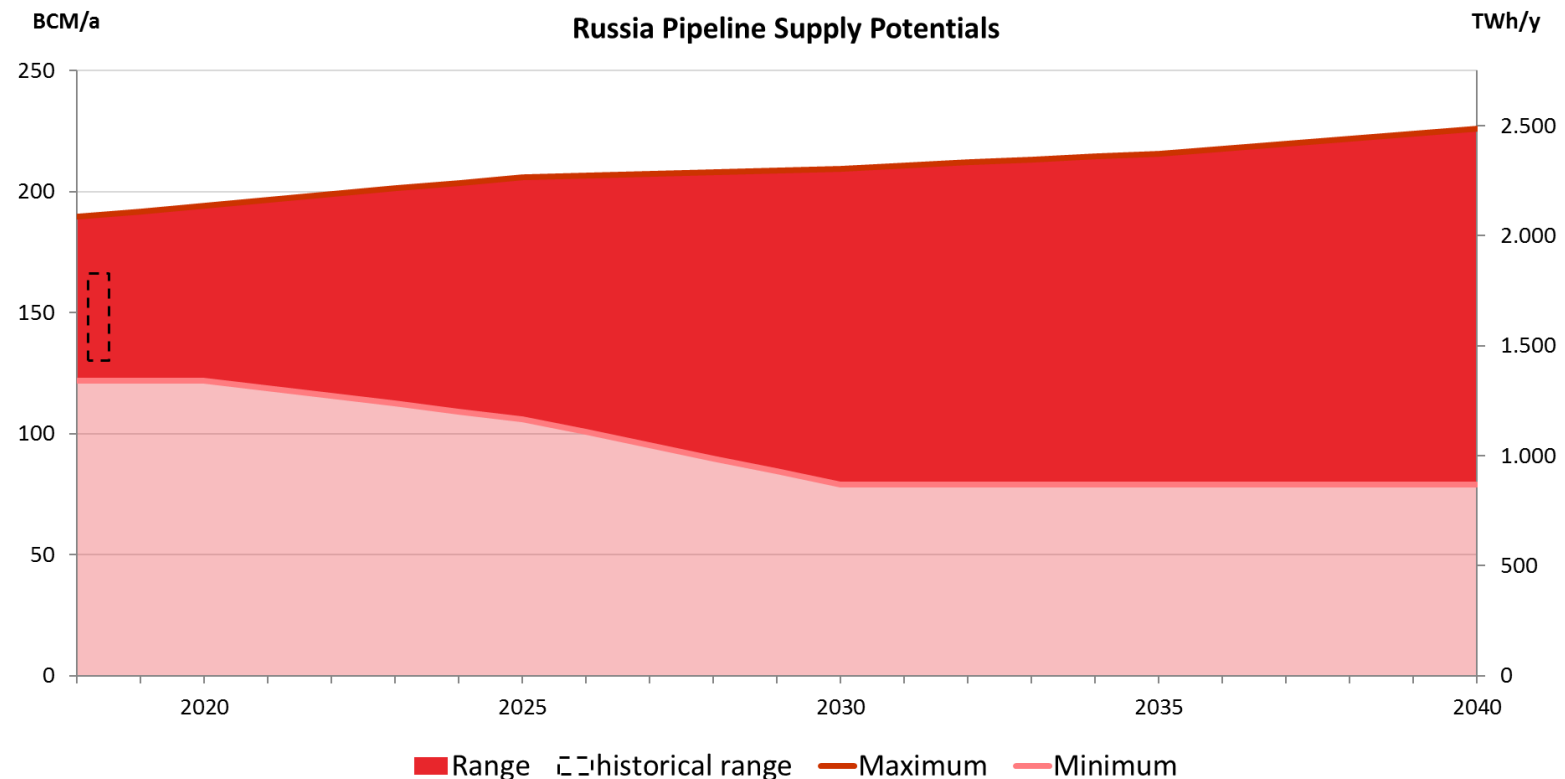


Russia: Maximum updated based on WEO 2017* Russian production and minimum based on study from Oxford Institute (TYNDP 17).

Main pipelines:

- **Nord Stream:** twin offshore pipeline, 55 bcma
- **YAMAL-Europe:** 33 bcma via Belarus
- **Brotherhood** (Urengoy-Ushgorod): transit through Ukraine, 100 bcma
- **Other:** around 67.5 bcma

Pipeline Gas Supply Potential for Russia				
bcma	2020	2025	2030	2040
Max	194	206	210	226
Min	122	106	79	79





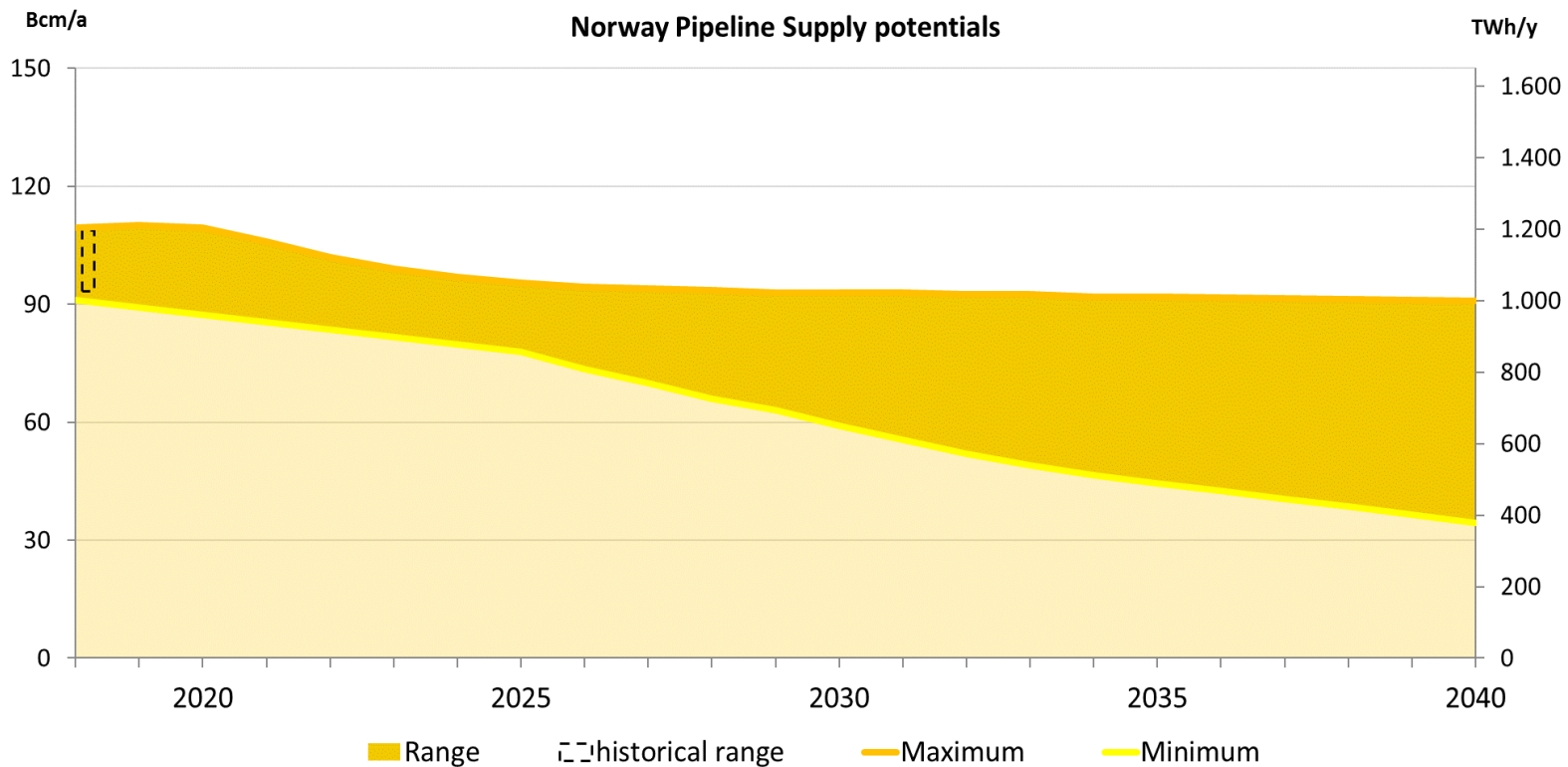
Supply Potential Norway



Norway: Min and Max source is publicly available information from the National Petroleum Directorate: Expected volumes of gas sales from Norwegian fields.

EXPORT CAPACITY OF THE GASSCO OFFSHORE SYSTEM		
Pipeline	Country	Capacity (Msm ³ /d)
Europipe	Germany	46
Europipe II	Germany	71
Franpipe	France	55
Norpipe	Germany, the Netherlands	32
Tampen Link	UK	10-27
Vesterled	UK	39
Zeepipe	Belgium	42
Langeled	UK	72-75
Gjøa	UK	17

Pipeline Gas Supply Potential for Norway				
bcma	2020	2025	2030	2040
Max	110	96	93	91
Min	87	78	59	41





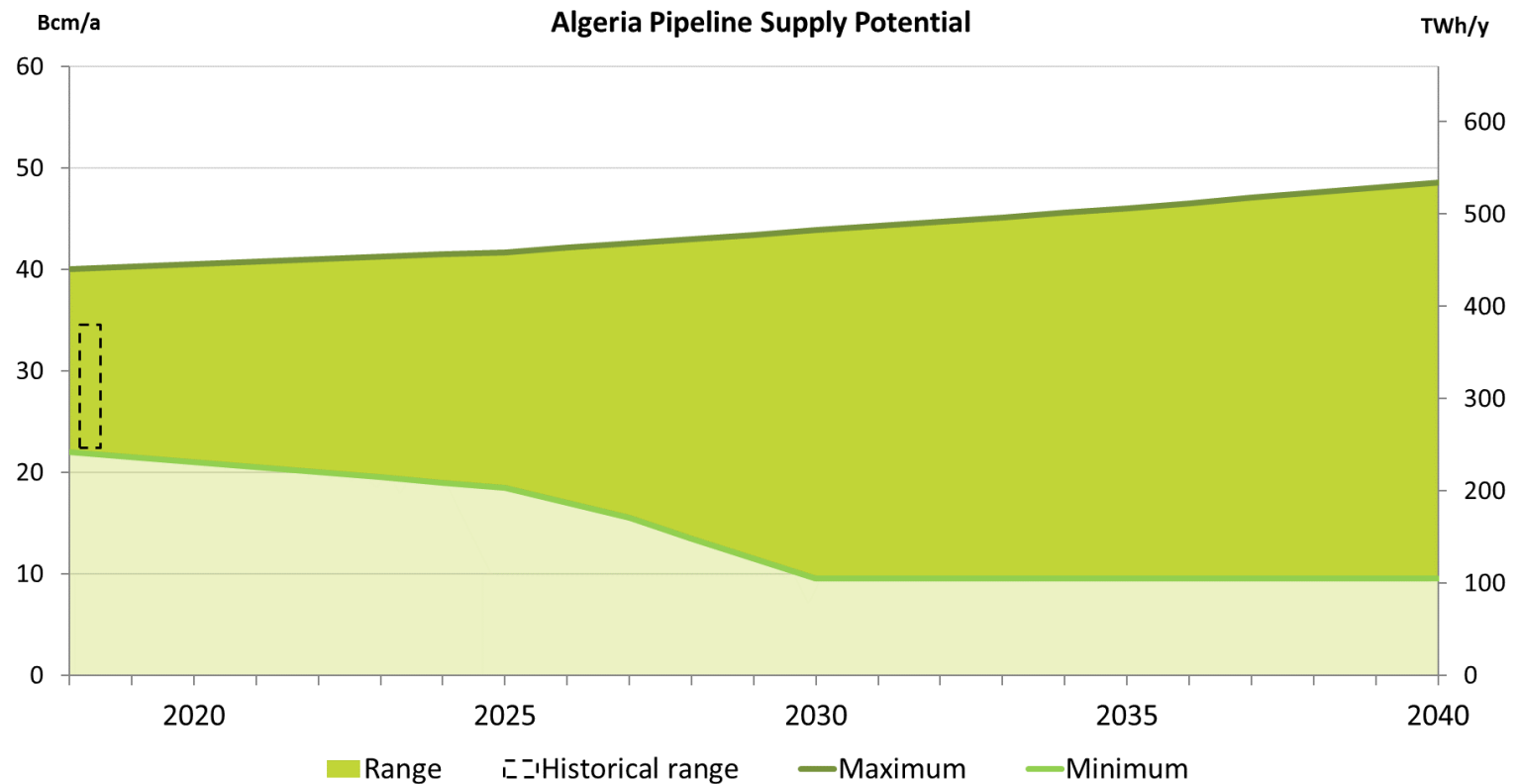
Supply Potential Algeria

Algeria: Max updated based on WEO 2017* Algerian production, applying the maximum historical share to EU, and Minimum based on study from Oxford Institute.

Three Pipelines:

- **Pipeline Enrico Mattei (GEM):**
33 bcma via Tunisia
- **Maghreb Europe Gasoduc (MEG):**
12 bcma via Morocco
- **MEDGAZ:** 8 bcma directly to Spain

Pipeline Gas Supply Potential for Algeria				
bcma	2020	2025	2030	2040
Max	45	44	46	45
Min	21	19	10	10





Supply Potential Libya

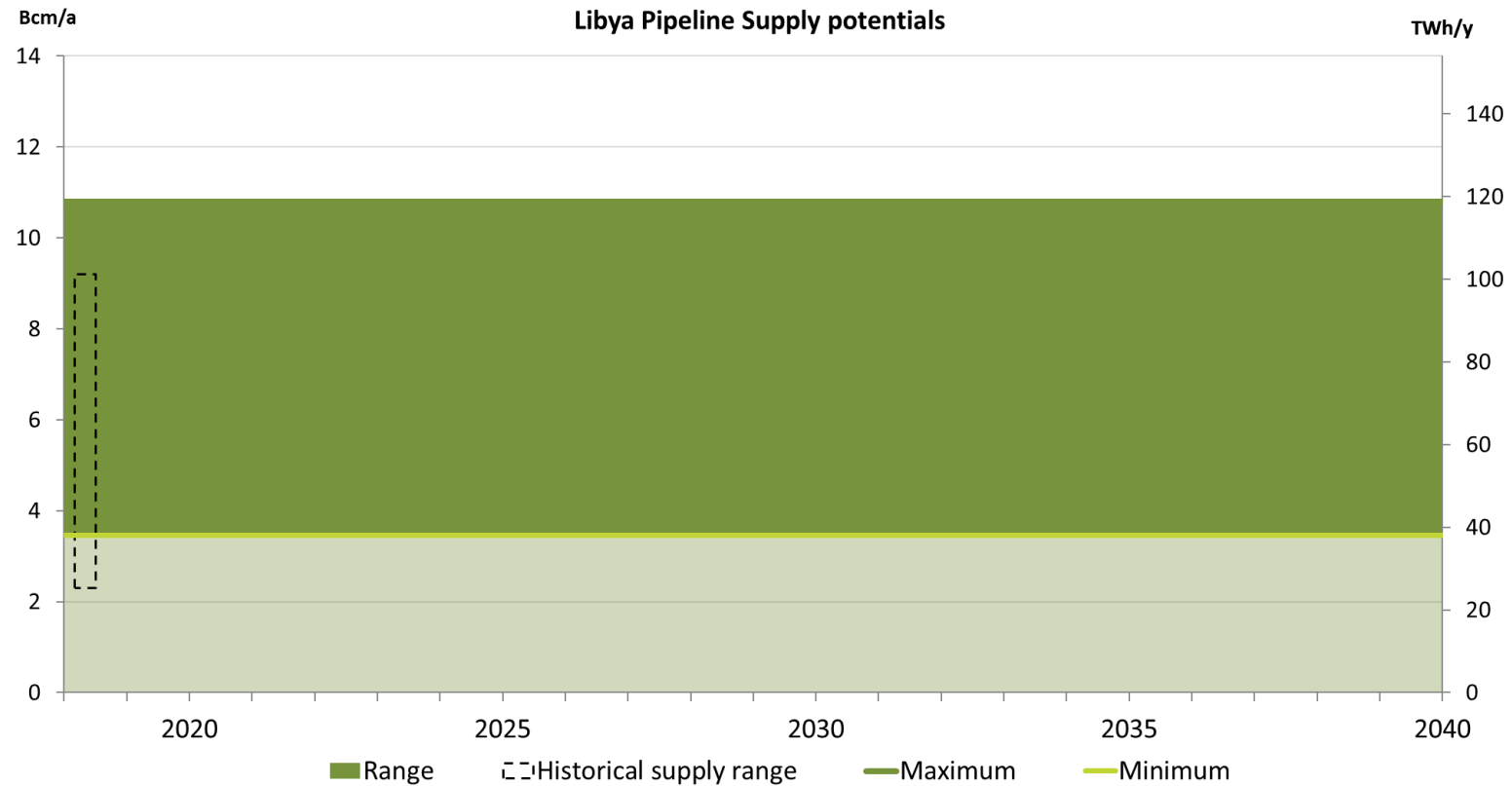


Libya: Max 90% load factor and Min averaged between lowest historical year and 2011 (exceptional year).

Pipeline:

- **Green Stream Pipeline:**
520 km connecting Libya to Italy via Sicily, **17 bcma**

Pipeline Gas Supply Potential for Libya				
bcma	2020	2025	2030	2040
Max	10,8	10,8	10,8	10,8
Min	3,5	3,5	3,5	3,5



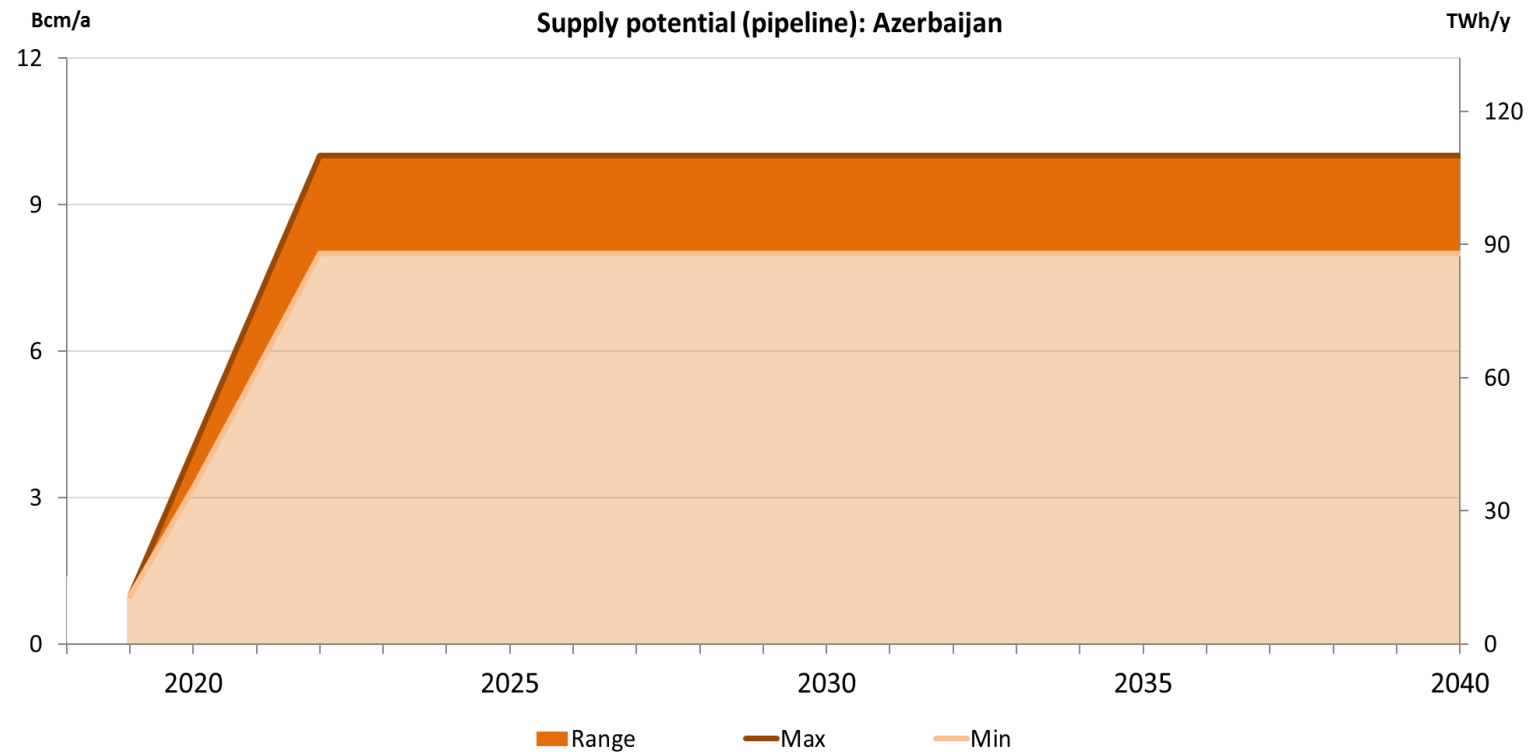


Supply Potential Azerbaijan

Azerbaijan: Min and Max based on volumes contracted by Southern Europe countries expecting supply via TANAP and TAP projects (TYNDP 17).

Pipelines:

- **TAP:** 880 km and **10 bcm**
- **TANAP:** 1800 km via Turkey, **16 to 31 bcma**



Pipeline Gas Supply Potential for Azerbaijan				
bcma	2020	2025	2030	2040
Max	4	10	10	10
Min	3	8	8	8

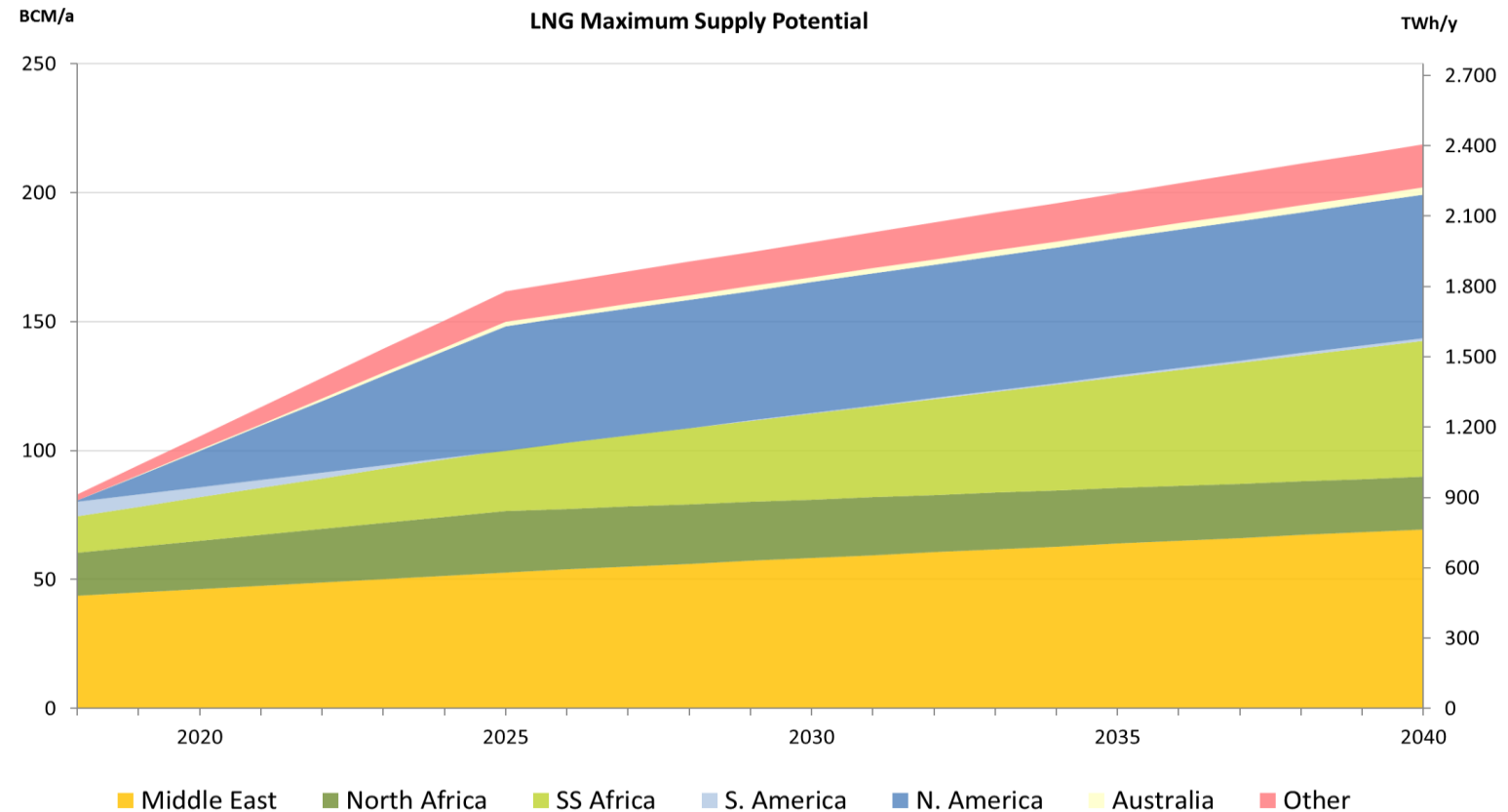


LNG Supply Potentials Maximum

LNG diversification: updated based on the WEO 2017* trading matrix.

- **23 existing terminals**
- **9.5 Mio m³ LNG Declared Total Maximum Inventory**
- **209 bcma Declared Total Reference Send-Out**

Maximum Gas Supply Potential LNG				
bcma	2020	2025	2030	2040
Middle East	46	53	58	69
North Africa	19	24	23	20
SS Africa	17	24	33	53
S. America	4	0	0	1
N. America	14	48	51	56
Australia	0	2	2	3
Other	5	12	14	17
Total	106	162	181	219





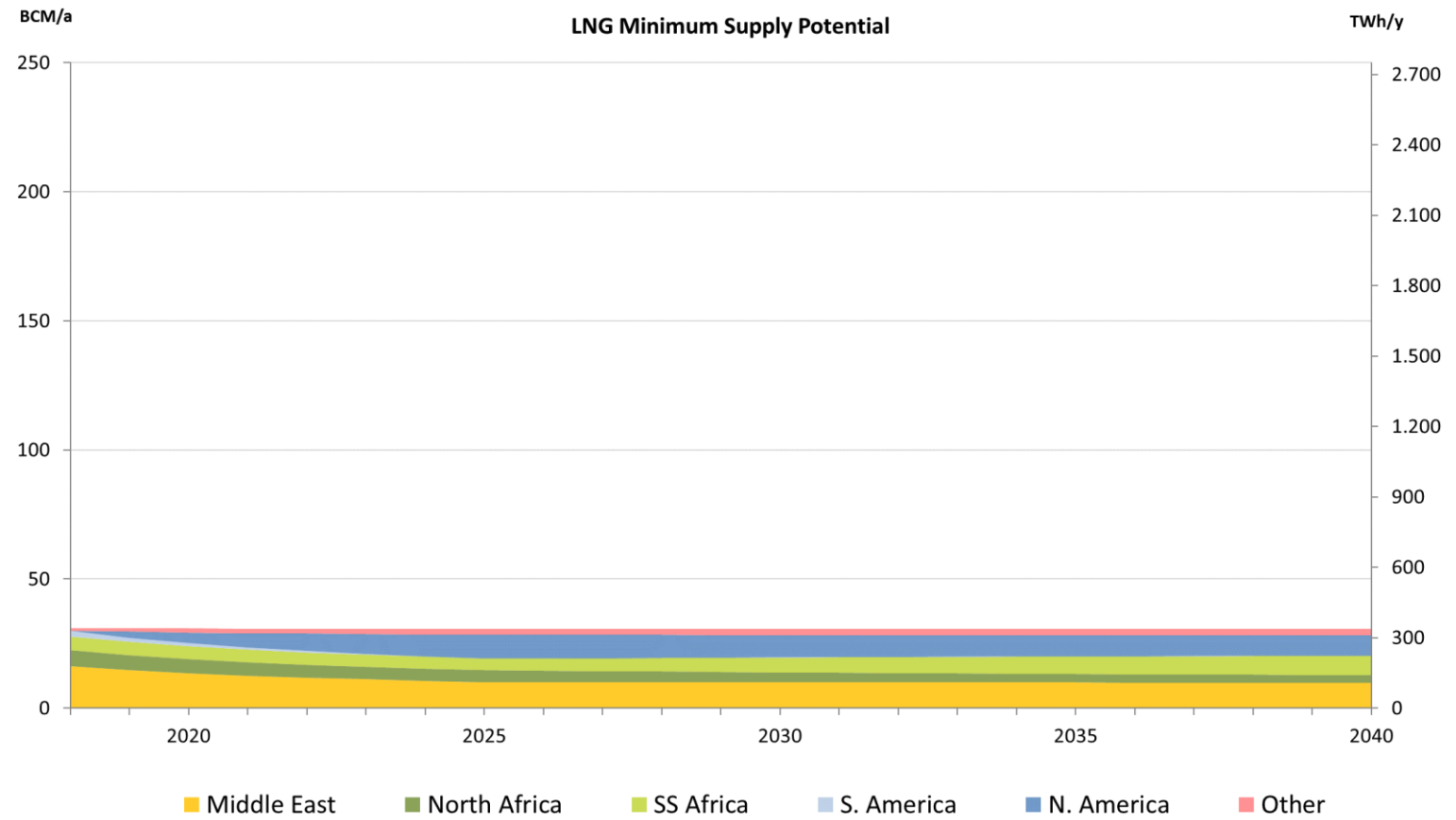
LNG Supply Potentials Minimum



LNG minimum: 70% of the lowest import year based on a 30% further reduction observed from 2011.

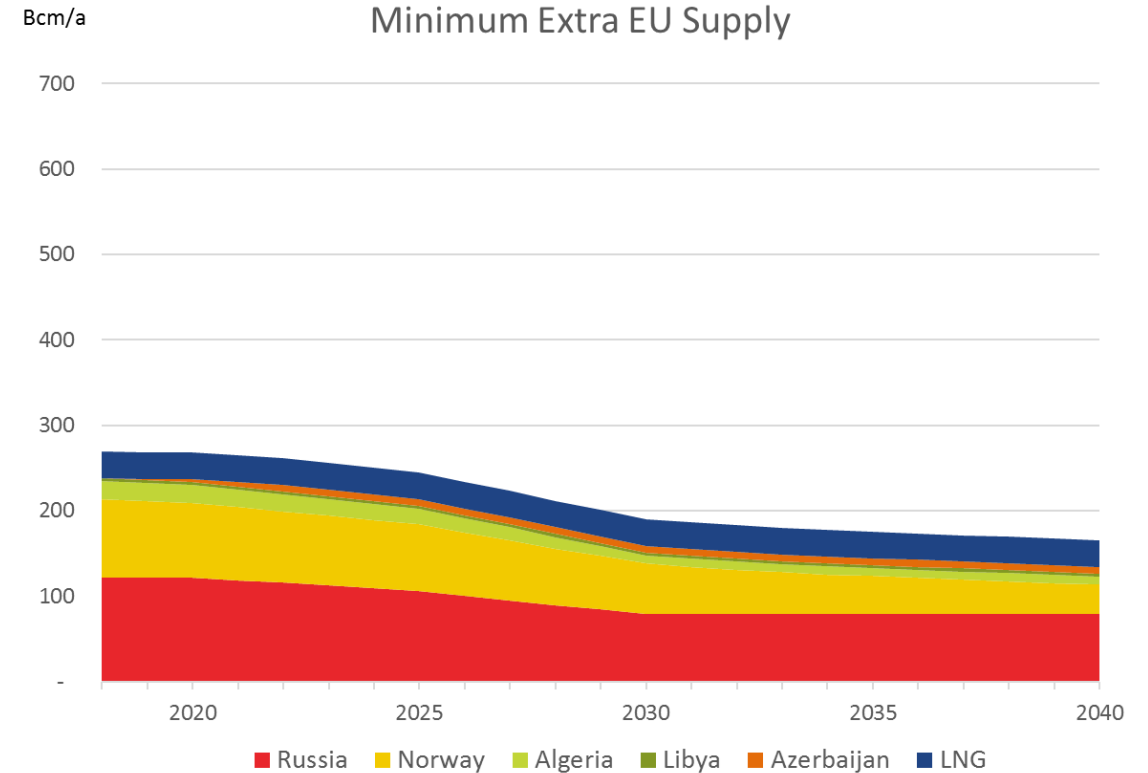
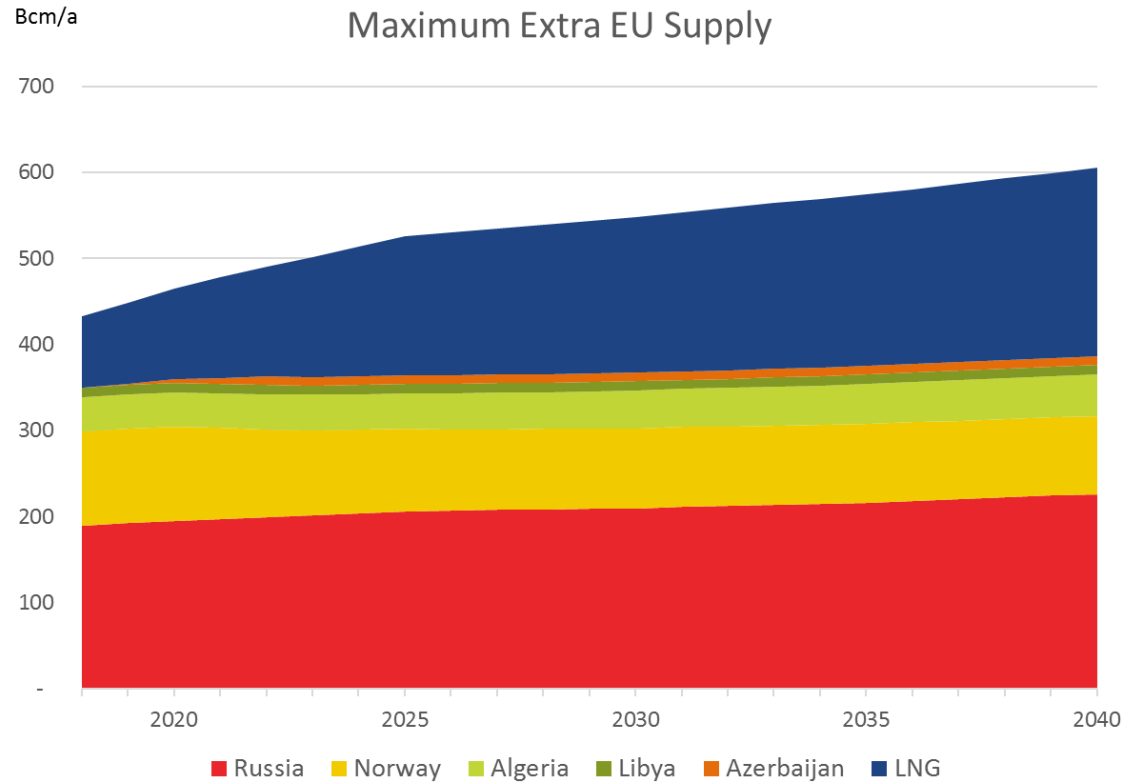
- **23 existing terminals**
- 9.5 Mio m³ LNG Declared Total Maximum Inventory
- 209 bcma Declared Total Reference Send-Out

Minimum Gas Supply Potential LNG				
bcma	2020	2025	2030	2040
Middle East	14	10	10	10
North Africa	5	5	4	3
SS Africa	5	5	6	7
S. America	1	0	0	0
N. America	4	9	9	8
Australia	0	0	0	0
Other	2	2	2	2
Total	31	31	31	31





Aggregated Maximum & Minimum Ranges



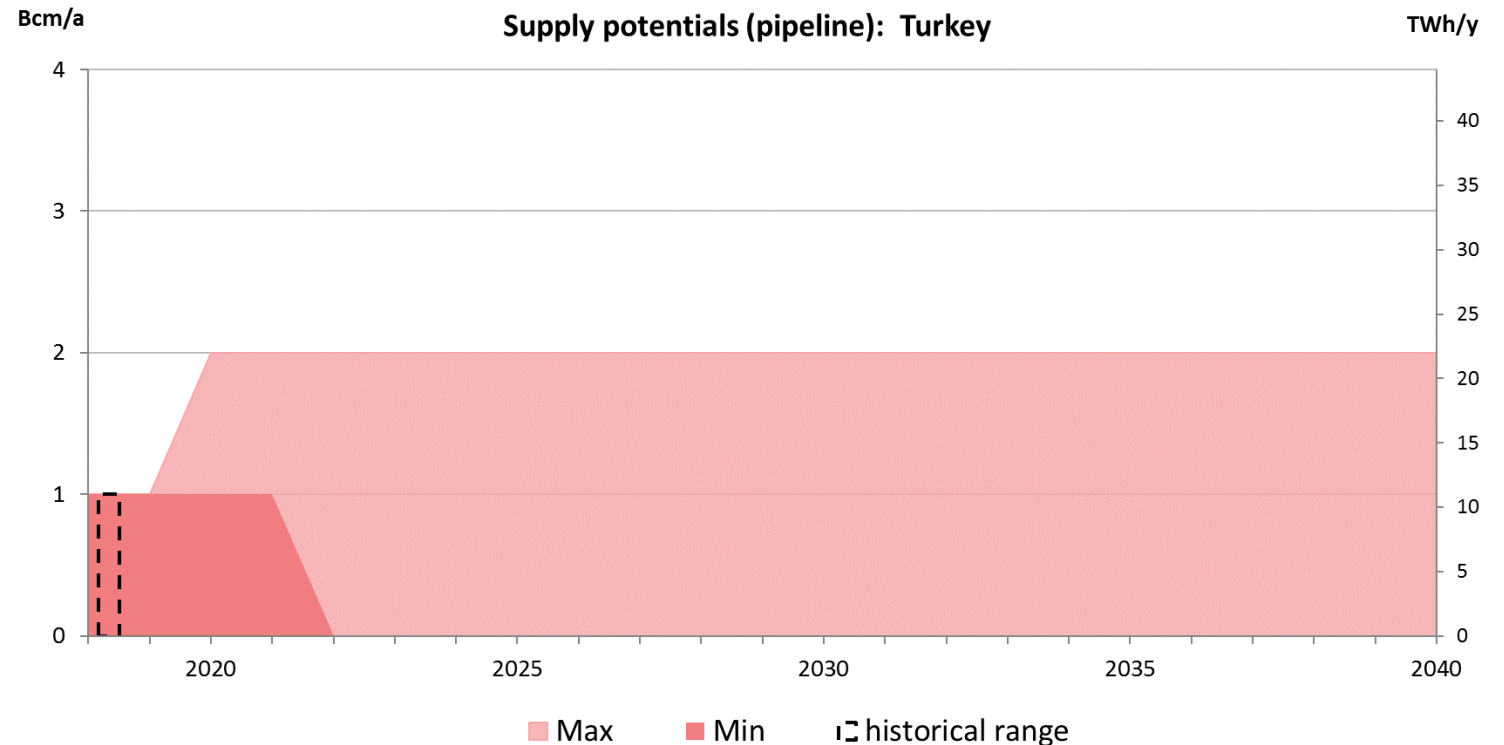
The import range defines the flexibilities for the gas imports. Combining it with the demand and production figures will lead to the supply and demand adequacy

New Supply Potential Turkey

Turkey: Max and Min based on Turkey's Energy Profile and Strategy (Ministry of Foreign Affairs)

Turkish Portfolio:

- LNG
- Russia
- Iran
- Azeri
- Other



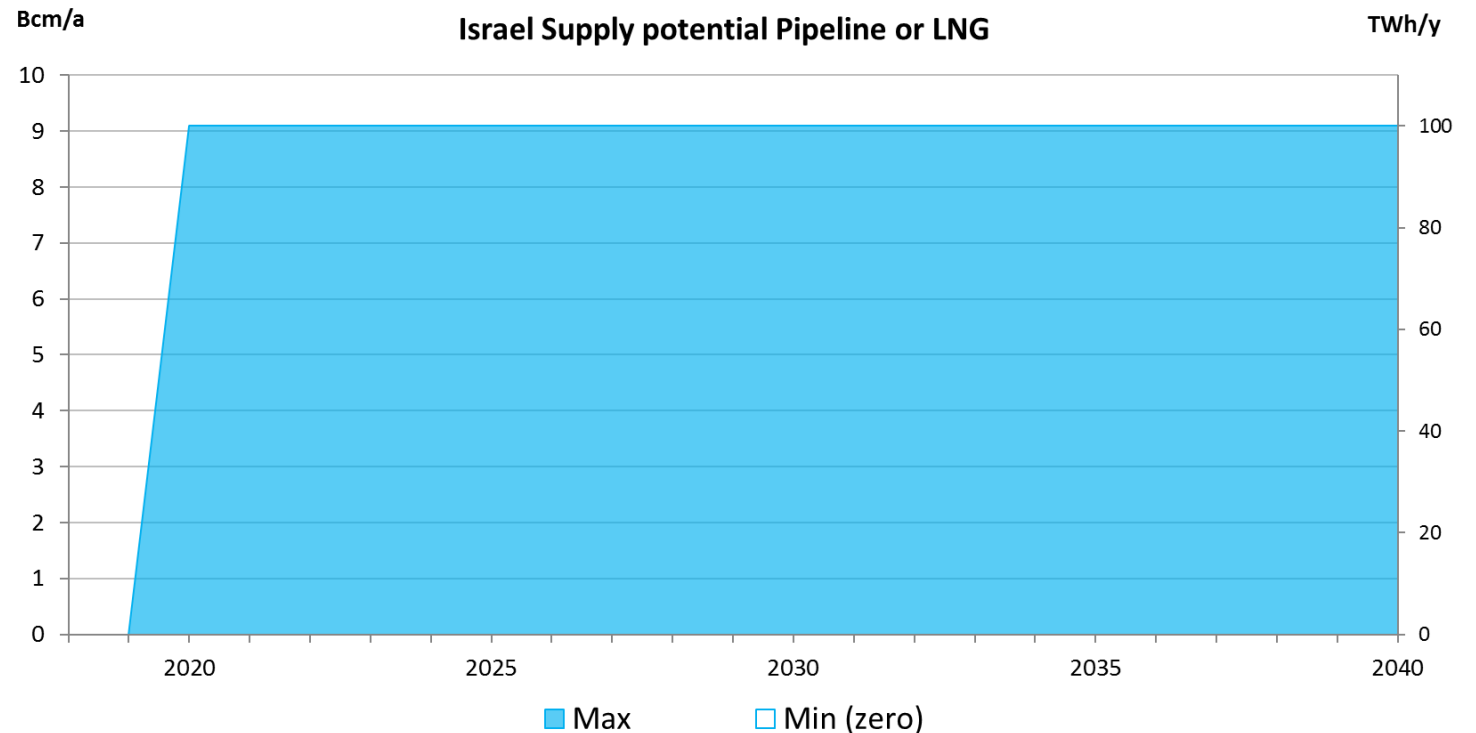
Turkish portfolio potential is currently delivering 1 bcma to Greece and could also reach Bulgaria

New Supply Potential Israel

Israel: Current developments in the Leviathan field include **9 bcma** surplus to be exported abroad of Israel's neighboring countries perimeter. Source: **Delek Group**

Israeli Potential:

- **LNG** via Egypt
- **Pipelines**
 - > Via Turkey
 - > East-Med Project

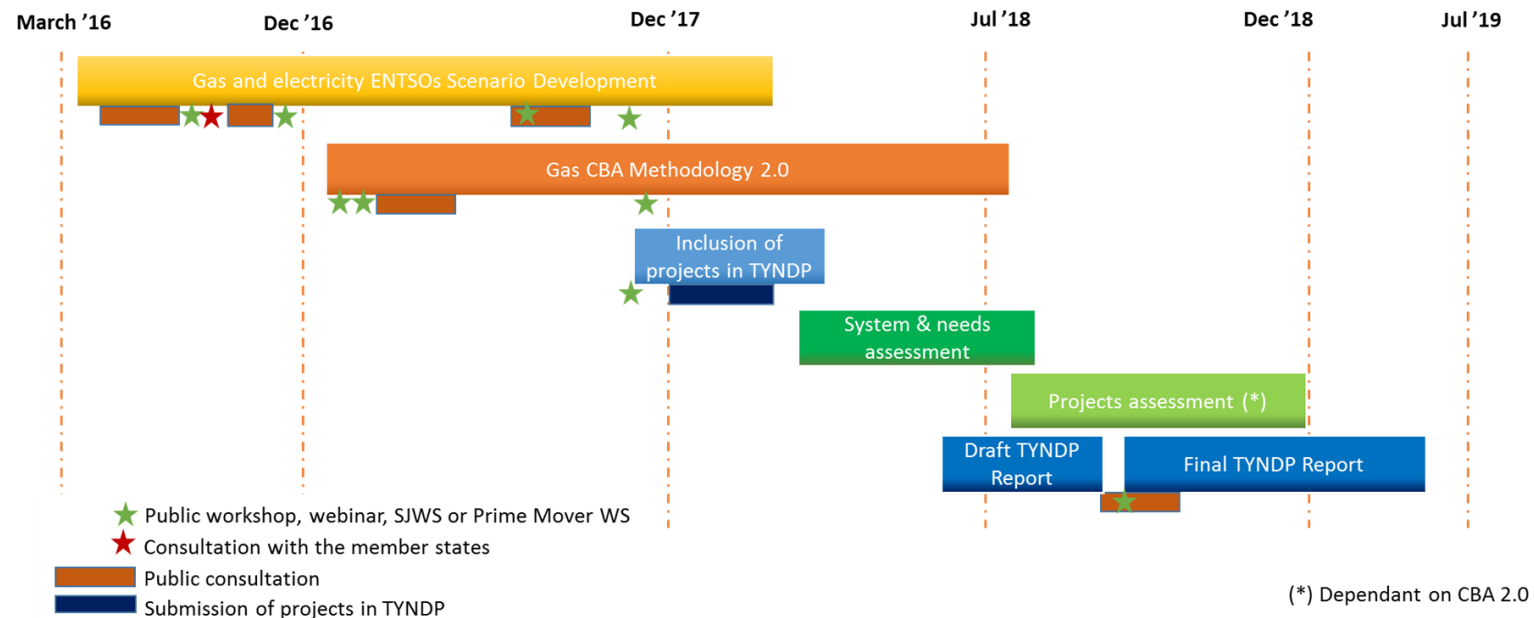


Israel potential will be subject to the submission of projects linking the source to the EU



Next Steps

- Project Collection coming soon: 31st January to 28th February 2018
- Finalised Scenario Report March 2018
- Modelling SJWS spring 2018





Thank You for Your Attention

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Data Sources Summary



- **Russia** Oxford Institute (Min) and WEO 2017 (Max)
- **Norway** Norwegian NPD
- **Algeria** Oxford Institute (Min) and WEO 2017 (Max)
- **Libya** Own Methodology
- **Azeri** TYNDP 2017
- **LNG** WEO 2017 NPS Net Exporting Regions split

- **New Potentials:**
 - Israel Delek Group Israel
 - Turkey Turkey's Energy Profile and Strategy (M.F.A.)