The Dutch Gas Market 2020-2030

VOLUME, CAPACITY AND FLEXIBILTY ANALYSIS

PREPARED FOR
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Introduction and Results (1/3)

- The Dutch energy market is experiencing changes that will have an effect on the gas system:
  - Increased uncertainty on future gas demand following measures of the Dutch Government such as phase out of coal, increase in renewable generation and electrification of demand to achieve the environmental targets agreed in the Paris Agreement
  - Reduced production from the Groningen gas field and closure by 2022, although the field is expected to be left in stand-by until 2026 to supply gas in case of disruption or cold weather
  - Uncertainty on the availability of gas storages in the future
- The aim of this study is to investigate whether there will be sufficient volume, infrastructure capacity and flexibility (storages) over the period 2020-2030 given these changes
- We focused on years 2020, 2025 and 2030 under the assumption of prevailing typical weather conditions ("average year") and of severe weather conditions ("cold" year)

Introduction and Results (2/3)

- We have carried out a volume, flexibility and capacity analysis:
  - The volume analysis assesses whether expected volumes of gas supply are able to meet expected gas demand in an average year and in a cold year, taking into account the seasonal swing
  - The flexibility analysis assesses whether expected availability of gas storages is able to accommodate the Load Factor Conversion needed by the gas system
  - The capacity analysis calculates the capacity margin in the peak hour as the difference between available capacity of gas infrastructures to deliver the required gas volumes and the capacity which is actually needed. We calculate capacity margins under a range of infrastructure scenarios

- We perform the analysis separately for the L-gas and H-gas markets, accounting for conversion and blending capacity

Introduction and Results (3/3)

- Our results show that:
  - Available gas infrastructures are able to accommodate required volume over the next 10 years
    - Despite the decrease in export demand of L-Gas, domestic demand of L-gas remains high. It is however possible to import sufficient H- gas to compensate for the loss of gas production from Groningen
    - Current and planned conversion/blending capacity is able to accommodate the required increase in converted gas to supply the L-market
    - According to current projections, no volume supply issue is expected to emerge as long as sufficient L-gas and H-gas (seasonal) storage volume will be available
  - Capacity currently available from infrastructures is able to meet peak demand, but that the current storage facilities are needed to do so
- This presentation details:
  - The data and the methodology we used in our analysis
  - The assumptions and the results of the volume analysis
  - The assumptions and the results of the capacity analysis
- The Annex details data sources and demand scenarios and include additional information to the analysis

Agenda

Volume and Flexibility Analysis: Methodology, Assumptions and Results

Capacity Analysis: Methodology, Assumptions and Results

Annex

Methodology for Volume Analysis: Demand

- Volume analysis aims at assessing there is enough gas flowing into the Dutch network to meet gas demand in the next 10 years in an average year and in a cold year
- To carry out the assessment, we
  - Built the total hourly gas demand for years 2020, 2025 and 2030 separately for the L-gas and the H-gas market for both an average and a cold year
  - Total hourly gas demand is the sum hourly L-gas demand, equal to the sum of internal L-gas demand and of export of L-gas, and H-gas demand, equal to the sum of internal H-gas demand and of transit
  - GTS has provided projected volumes of internal L-gas and H-gas demand, export and transit
    - GTS has provided the volumes of internal L-gas and H-gas demand for three demand scenarios (see Annex for details). Internal demand we used in our assessment is the internal gas demand in the scenario with the highest volume
    - Export demand is the demand of Dutch L-gas coming from Germany, Belgium and France
    - Transit is the transit of H-gas delivered to the Dutch gas system and re-delivered to other countries
  - Based on projected volumes, we calculated hourly L-gas demand and H-gas demand based on historical profile of internal demand

The assessment is based on the highest projected gas demand in the L-gas market and in the H-gas market

Methodology for Volume Analysis: Supply

- Total hourly gas supply is the sum of L-gas supply and H-gas supply
  - L-gas supply (excluding conversion) is the production of L-gas from the Groningen gas field
  - H-gas supply is the sum of domestic production and import
    - Domestic production is production from small gas fields (H-gas)
    - Imports are imports of H-gas volumes from Norway, Belgium and Germany (piped gas) and LNG re-gasified at the Gate terminal
- GTS has provided projected volumes for L-gas and H-gas supply components and on expected use of Groningen. We have calculated hourly supply based on the expected use of Groningen in 2020, historical hourly imports of piped gas and assuming a constant hourly profile for production of small fields and regasification
- As Groningen production will be reduced almost to zero by 2022, L-gas production from Groningen will not be able to meet L-gas demand
  - When L-gas supply is not sufficient to meet demand, H-gas is converted based on available conversion/enrichment capacity and available H-gas volumes
  - We show any excess or shortfall of supply in the H–gas market

The L-gas market and the H-gas market are closely interrelated

Volume Analysis: Assumptions on Demand Volumes

- Demand volumes are the sum of the domestic demand volumes for both the L-gas market and the H-gas market, L-gas export demand volumes and H-gas transit volumes. Analysis has been carried out for the demand scenario with the highest demand in the average year and in the cold year
  - In the average year, the assumed volumes are:
    - Domestic demand is 349 TWh in 2020, 337 TWh in 2025 and 325 in 2030
    - L-gas export demand is 273 TWh in 2020, 91 TWh in 2025 and 0 in 2030
    - H-gas transit demand is 202 TWh in 2020, 111 TWh in 2025 and 164 TWh in 2030
  - In the cold year, the assumed volumes are:
    - Domestic demand is 397 TWh in 2020, 383 TWh in 2025 and 370 in 2030
    - L-gas export demand is increased by 14% compared to the average year (same increase observed in domestic demand of L-gas)
    - H-gas transit demand is increased by 5% compared to the average year

L-Gas export demand is expected to decline to zero by 2030

Supply Side – Production

Groningen

- Production from Groningen is expected to stop almost completely by 2025
- The expected production volume in the average year is
  - 114 TWh in 2020
  - 0.3 TWh in 2025
  - 0 TWh in 2030
- Production volume can increase in a cold year
  - 169 TWh in 2020
  - 1.2 TWh in 2025
  - 0 TWh in 2030

Small Fields

- Expected production from small fields in an average year is equal to
  - 172 TWh in 2020
  - 107 TWh in 2025 and
  - 47 TWh in 2030
- Production volume is assumed to be the same also in a cold year
  - 172 TWh in 2020
  - 107 TWh in 2025
  - 47 TWh in 2030

While some flexibility is available from Groningen, no flexibility appears to be available from small fields

Supply Side – Pipeline Import

- Projected import volumes are equal to:
  - 491 TWh in 2020
  - 371 TWh in 2025
  - 373 TWh in 2030
- Import technical capacity is equal to 78 GW. We assume that import infrastructures are available on average for around 8,000 hours per year. If we annualize actual availability, pipelines are used 91% of the time (= 8000/8760)
- The volume analysis considers the total pipeline import profile, which is the sum of two components
  - Import for the Dutch Market, which is calculated based on the monthly distribution of import observed over the last five years
  - Transit volumes, which are assumed to be such that hourly exit volume equals hourly entry volume (pass-through)

The expected total pipeline import profile shows that imports are higher in summer

Supply Side – LNG Import

- Projected supply volumes from LNG regasification are at the Gate terminal are equal to:
  - 59 TWh in 2020
  - 61 TWh in 2025
  - 68 TWh in 2030

- The expected increase in use of LNG to partially replace decrease in production of Groningen implies an increase in use of existing regasification capacity

The volume of gas from regasified LNG will increase over the next years

Conversion Data

- To match demand for L-Gas and H-Gas, we account for H-gas to L-gas conversion capacity:
  - GTS projections show conversions for 293 TWh in 2020, 329 TWh in 2025 and 214 TWh in 2030
  - Although the market requires less conversion volume over time, the available conversion capacity increases between 2020 and 2025
  - We also account for enrichment (blending) capacity
  - The enrichment capacity is 26.4 GW in 2020, 10.4 GW in 2025 and 0 GW in 2030

Conversion capacity is crucial to meet L-gas demand

Conversion Profile

- In the volume analysis, we convert, in each hour of the year, the H-Gas coming from import and LNG needed to meet the L-Gas demand
  - Data on volumes and use of Groningen takes into account that supply from Groningen has to be minimised and that L-gas demand is met by "pseudo L-gas", i.e. gas from conversion/enrichment, L-gas in storages and then by Groningen production. The difference between L-gas demand and Groningen production is the volume of gas that has to be provided by conversion and storage
  - We assume a relatively flat conversion profile and L-Gas storages allow Load Factor Conversion of "quality converted" volumes
    - When hourly conversion demand (i.e. the volume of gas that needs to be converted to meet L-gas demand) is lower than volumes converted in the hour, the excess converted volumes are injected into L-gas storages
    - On the contrary, when hourly conversion demand is higher than volumes converted in the hour, the potential shortfall is met by gas withdrawn from L-gas storages
  - The conversion profile is an additional source of flexibility:
    - Our analysis assumes that quality conversions have a flat profile and maximize the utilization of L-Gas storages in order to meet the L-Gas demand need for flexibility
    - In the cases in which L-Gas storages are used in full, the conversion profile is adjusted to provide the additional flexibility required by the L-Gas demand

Any excess/shortfall of supply is shown in the H-Gas market

Storage Capacity

- We calculated the storage capacity available to the Dutch gas system considering storages in the Netherland and storages in Germany that are connected to the Dutch Network
- Storage facilities are assumed to follow the seasonal withdrawal/injection cycle (withdrawal from October to March, injection from April to September)
  - During the injection hours of the year, once hourly demand is met in both the L-gas market and the H-gas market, the excess supply volumes are stored in the L-gas storages and in the H-gas storages, to be withdrawn during the withdrawal hours of the year.
- The volume of gas provided by storage is shown separately for the L-gas market and the H-gas market in each reference year (2020, 2025 and 2030) and in each scenario (average year/cold year)
  - We assume that there is no gas in storage at the beginning of the injection phase and that shippers have perfect foresight, which means that they injected into storage only the gas that they will supply to their customers over the year. This implies that available working gas space available from storage could not be entirely used if demand is low and that no gas is left in storage at the end of the withdrawal phase

Load Factor Conversion (1/2)

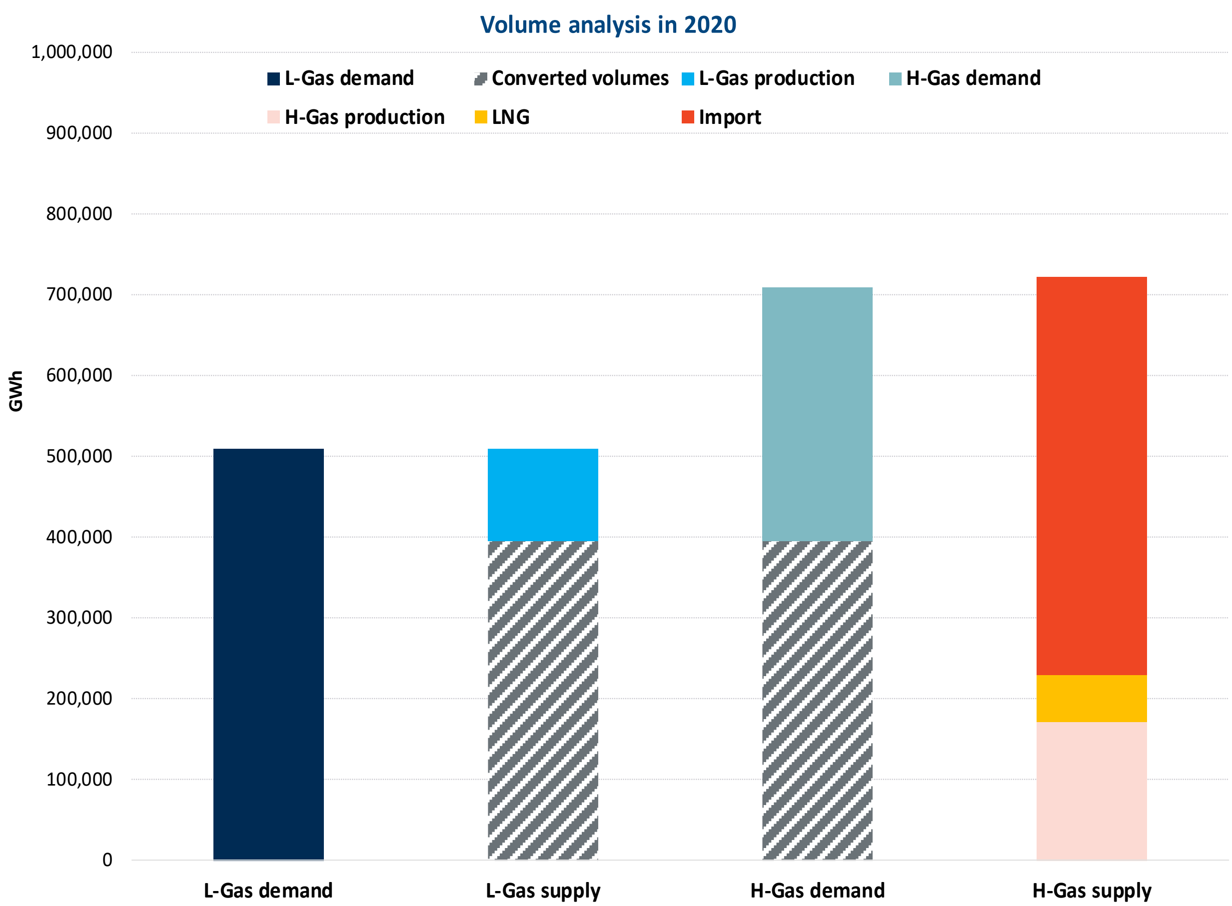
- The modelling of the volume analysis is based on our estimates of hourly total demand (internal demand, L-gas export and H-gas transit) and hourly total supply (pipe import, LNG import and production)
- Differences in the hourly shape of total demand and total supply are accommodated by storage, which provides a Load Factor Conversion service to the system
  - Import (LNG and pipeline) to supply the Dutch market and import reserved to transit have a seasonal profile based on historical monthly import profile
  - Domestic demand and transit exits have a seasonal profile based on historical Load Duration Curves
- Based on the above, the Load Factor Conversion we estimate in our analysis is the total flexibility provided to the system

Load Factor Conversion (2/2)

- We do not know the import profile of additional volumes required for a cold year
  - Hence, we model two different cases:
    - A Low Flexibility Case, where additional import is assumed to be such that hourly exit volume equals hourly entry volume (pass-through) and
    - A Conservative Case, where additional import is in summer and required flexibility is very high. This is the case we represent in the charts that will follow.
- Based on the above, the Load Factor Conversion we estimate in our analysis is the total flexibility provided to the system

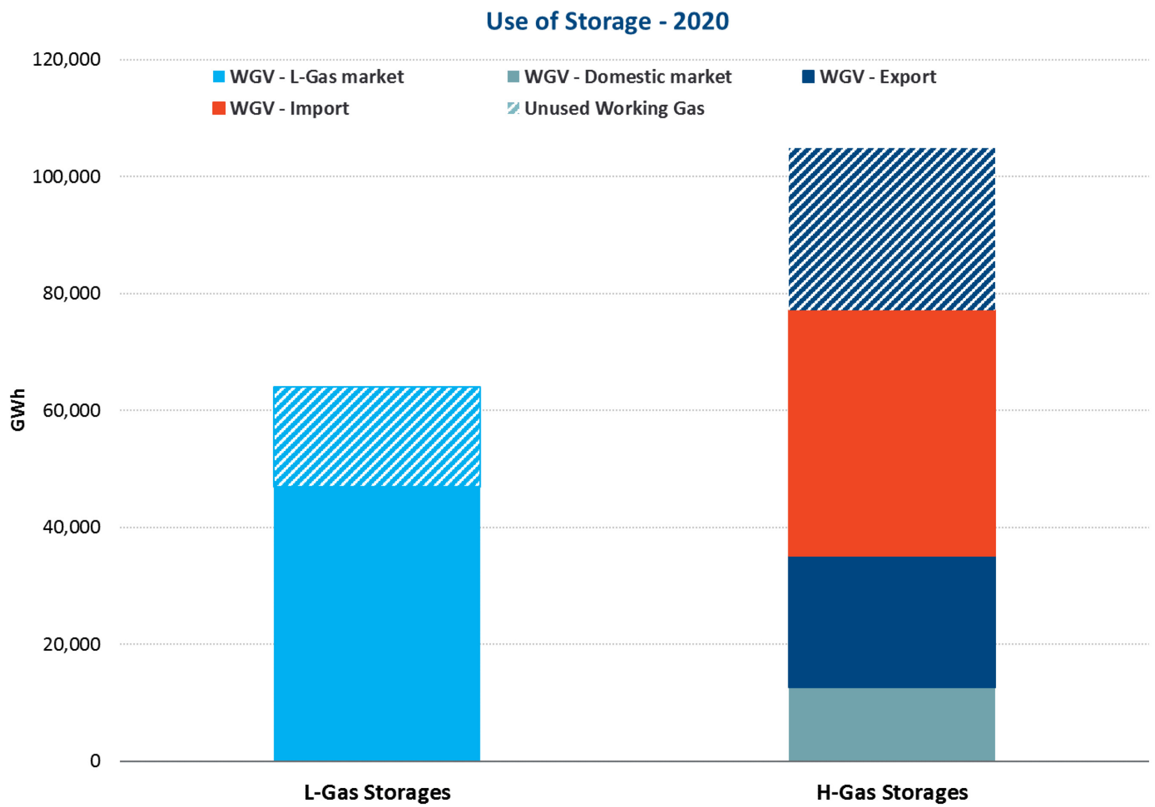
Storages provide Load Factor Conversion to the system

Demand and Supply Volumes – 2020 (Average Year)



In 2020, current projections of available supply allow to meet demand in both the L-Market and the H-market in case of an average year

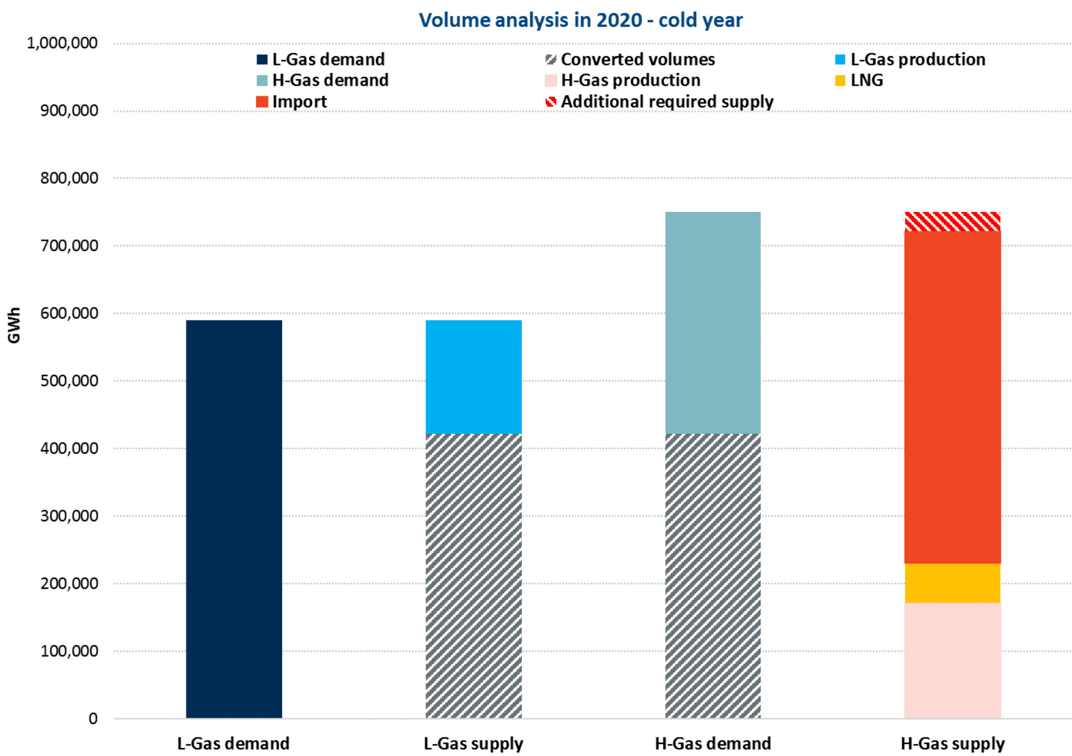
Role of Storage – 2020 (Average Year)



- The chart shows L-gas and H-gas Working Gas Volumes in the year (solid area) compared to the total working gas available.
- L-gas Working Gas Volumes amount to about 47 TWh and H-gas Working Gas Volumes to about 77 TWh

WGV-Export: volume of working gas needed to accommodate seasonality of export
WGV-Import: volume of working gas needed to accommodate reverse seasonality of import

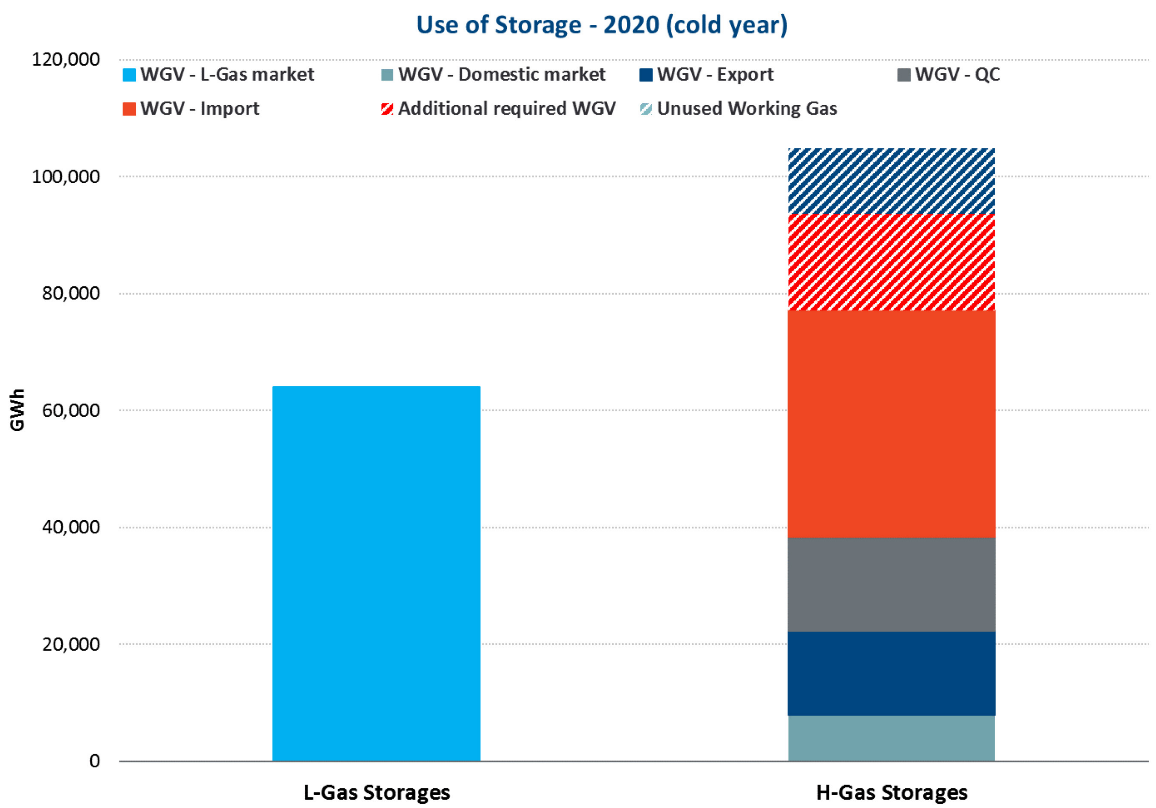
Demand and Supply Volumes – 2020 (Cold Year)



In a cold year, additional imports, compared to the levels currently projected, are required to meet demand (+ 28 TWh). The additional import can be sustained by the network

- **Expected average load factor of the system would increase from 79% to 84%**
- **If we assume that all additional import will be met by increasing import from Norway and Germany (Gaspool) only, the load factor of those import points would increase to 100% (over 8,000 hours). This implies the risk of congestions as import pipelines operates close to technical capacity. If interconnection with NCG area is used as entry point, the load factor for all entry points will amount to 90%**

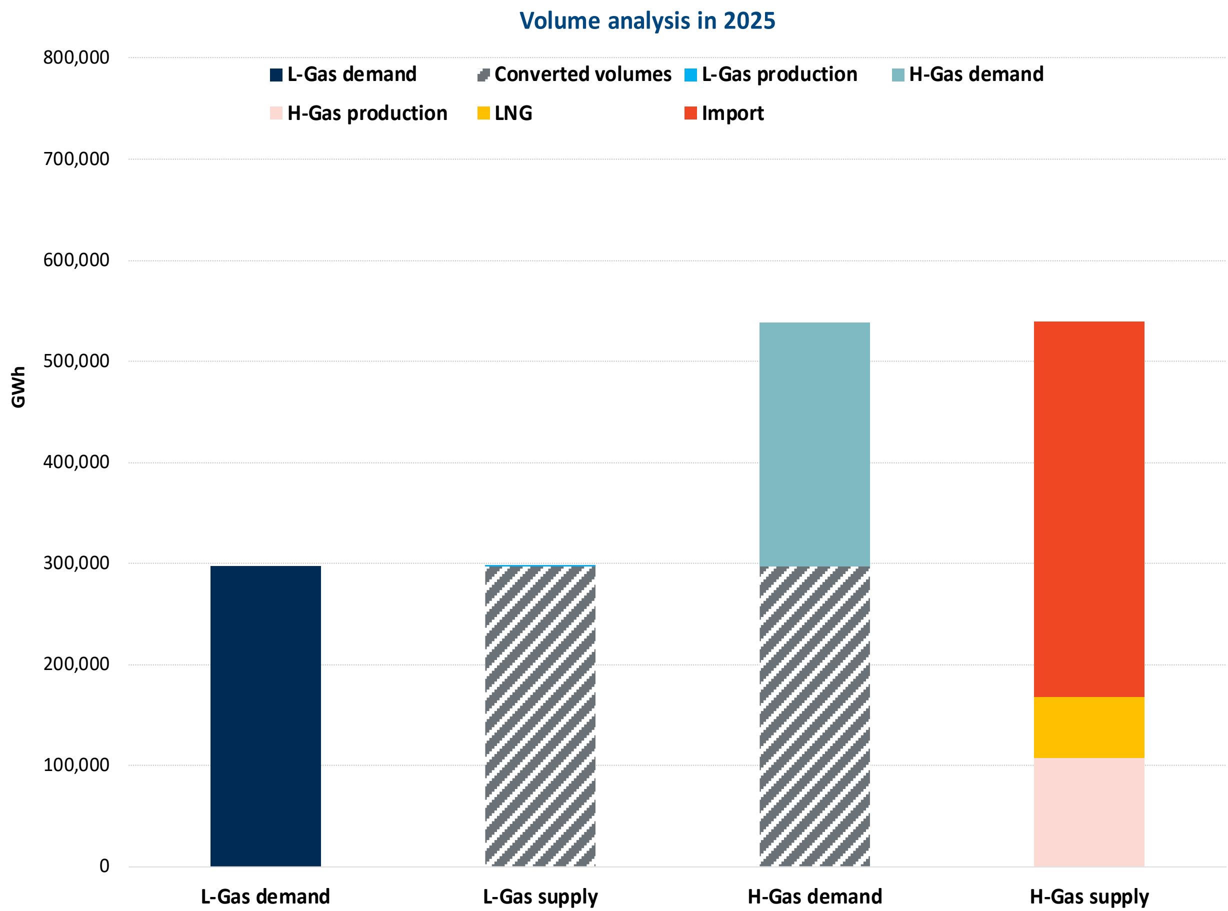
Role of Storage – 2020 (Cold Year)



WGV-Export: volume of working gas needed to accommodate seasonality of export
WGV-Import: volume of working gas needed to accommodate reverse seasonality of import
WGV-Conversion: volume of working gas needed to accommodate seasonality of quality conversions

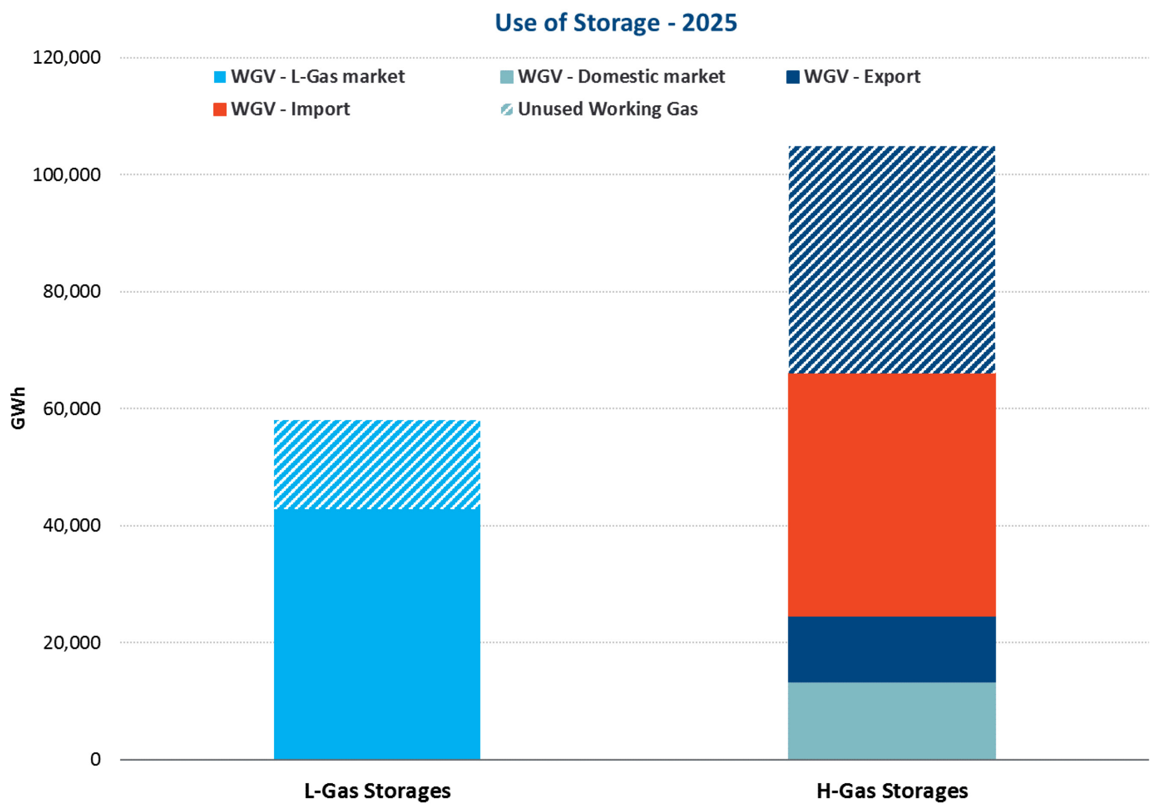
- **In 2020, in case of a cold year the total available working gas volume of L-gas storage facilities is used, for a total of 64 TWh**
- **The additional import required to meet demand requires availability of additional working gas volume in H-gas storage facilities of around 16 TWh, for a total of 93 TWh (Conservative Case)**

Demand and Supply Volumes – 2025 (Average Year)



In 2025, current projections of available supply meet volume demand in both the L-Market and the H-market in an average year

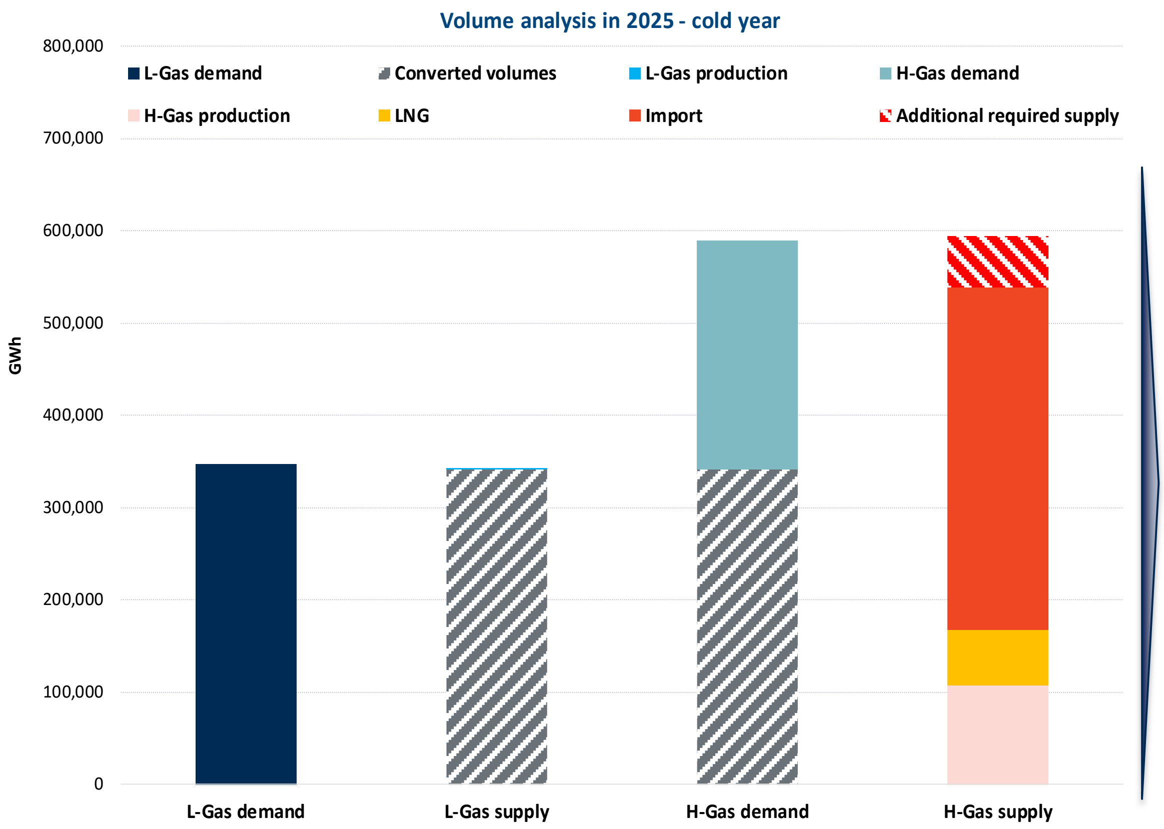
Role of Storage – 2025 (Average Year)



- In 2025, L-gas Working Gas Volumes amount to about 43 TWh and H-gas Working Gas Volumes to about 66 TWh

WGV-Export: volume of working gas needed to accommodate seasonality of export
WGV-Import: volume of working gas needed to accommodate reverse seasonality of import

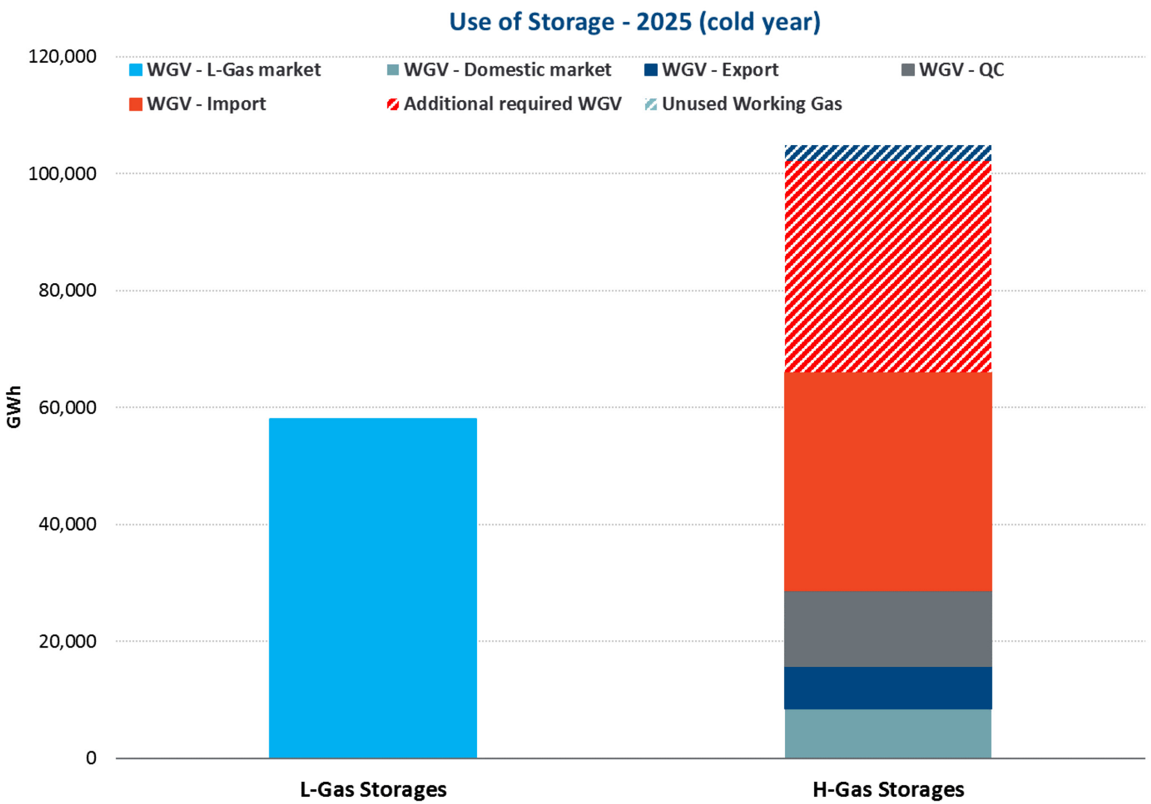
Demand and Supply Volumes – 2025 (Cold Year)



In a cold year, additional imports, compared to the levels currently projected, are required to meet demand (+ 61 TWh)

- **The expected average load factor of imports would increase from 60% to 69%**
- **If we assume that additional import will be met by only by increasing imports from Norway and Germany (Gaspool) the load factor of those import points will increase from 79% to 93%. If interconnection with NCG area is used as entry point, the load factor for all entry points will amount to 82%**

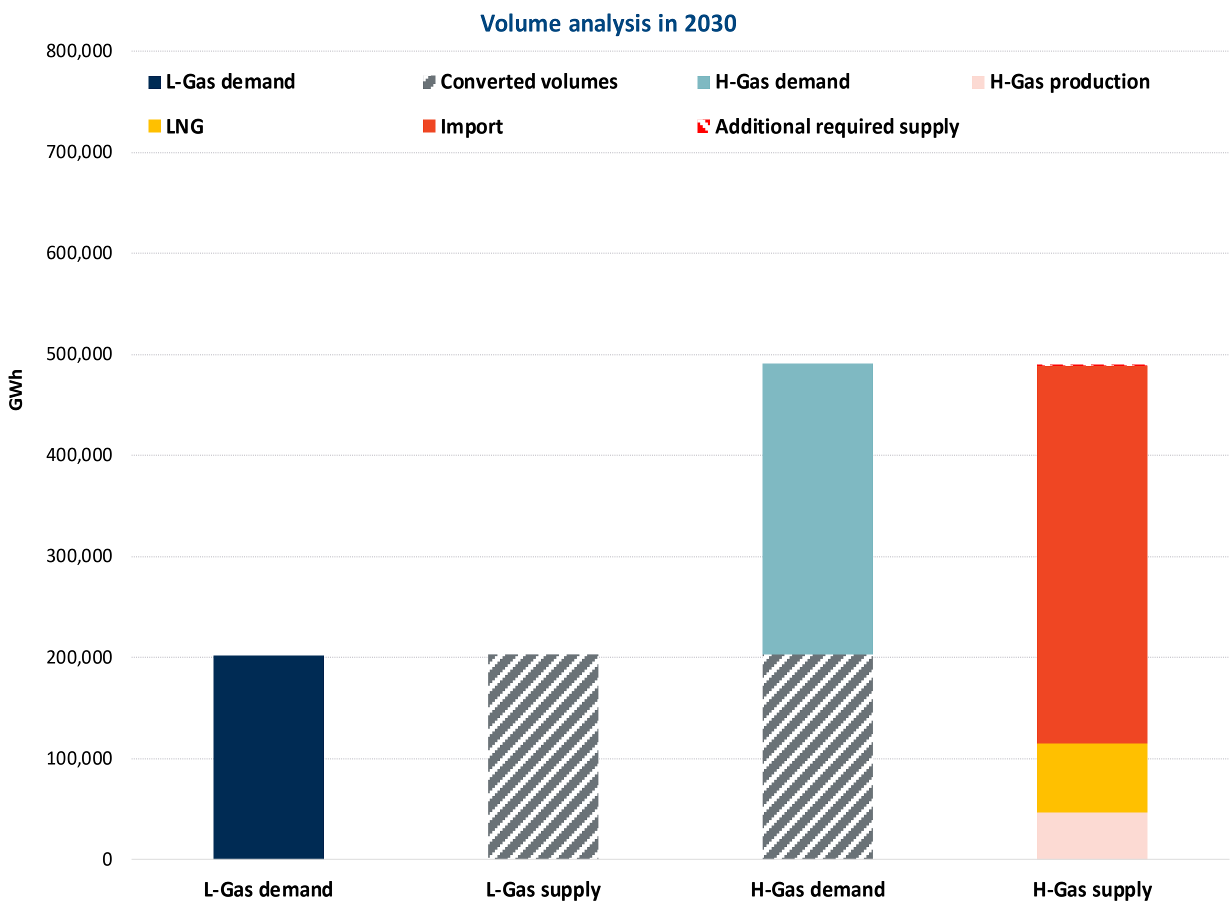
Role of Storage – 2025 (Cold Year)



- In 2025, in case of a cold year, the total available working gas volume of L-gas storage facilities is used, for a total of 58 TWh
- The additional import required to meet demand requires availability of additional working gas volume in H-gas storage facilities of around 36 TWh, for a total of 102 TWh (Conservative Case)

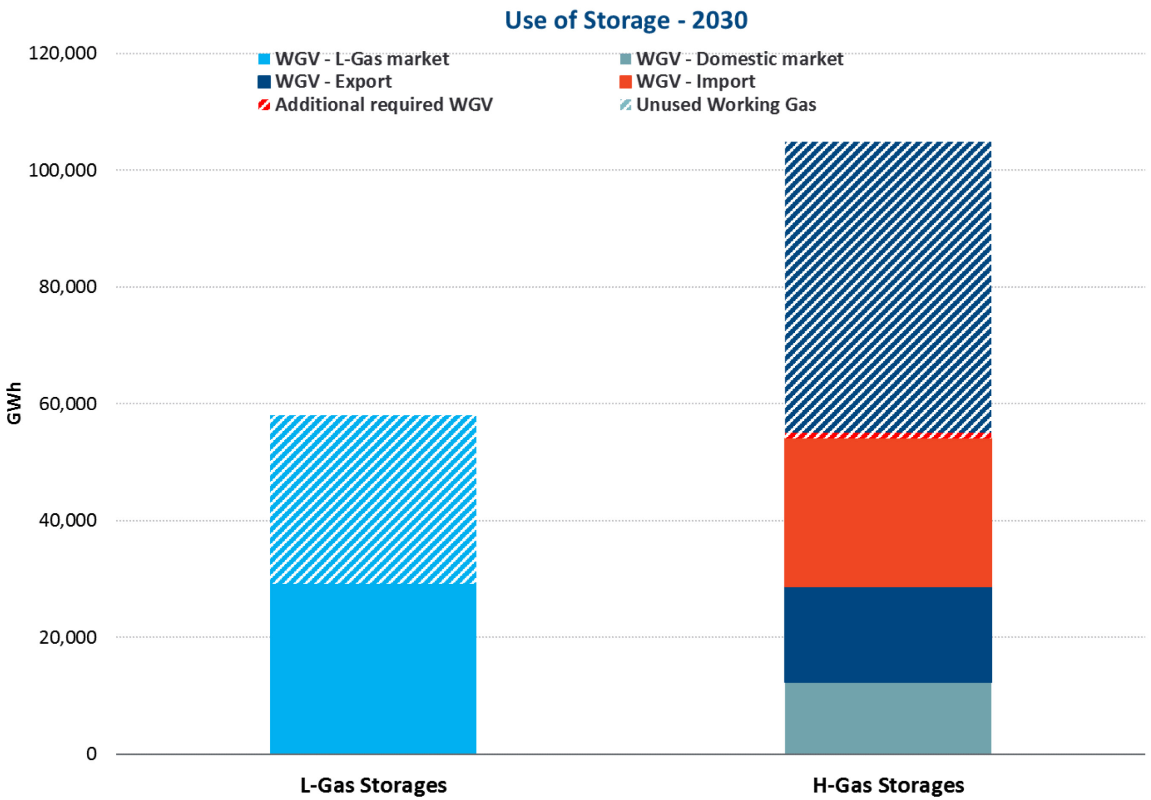
WGV-Export: volume of working gas needed to accommodate seasonality of export
WGV-Import: volume of working gas needed to accommodate reverse seasonality of import
WGV-Conversion: volume of working gas needed to accommodate seasonality of quality conversions

Demand and Supply Volumes – 2030 (Average Year)



In 2030, forecasted demand in the L-Market and the H-market in the average year is 1 TWh higher than current supply projections. This increase has no material impact on the average load factor of import pipelines (60%)

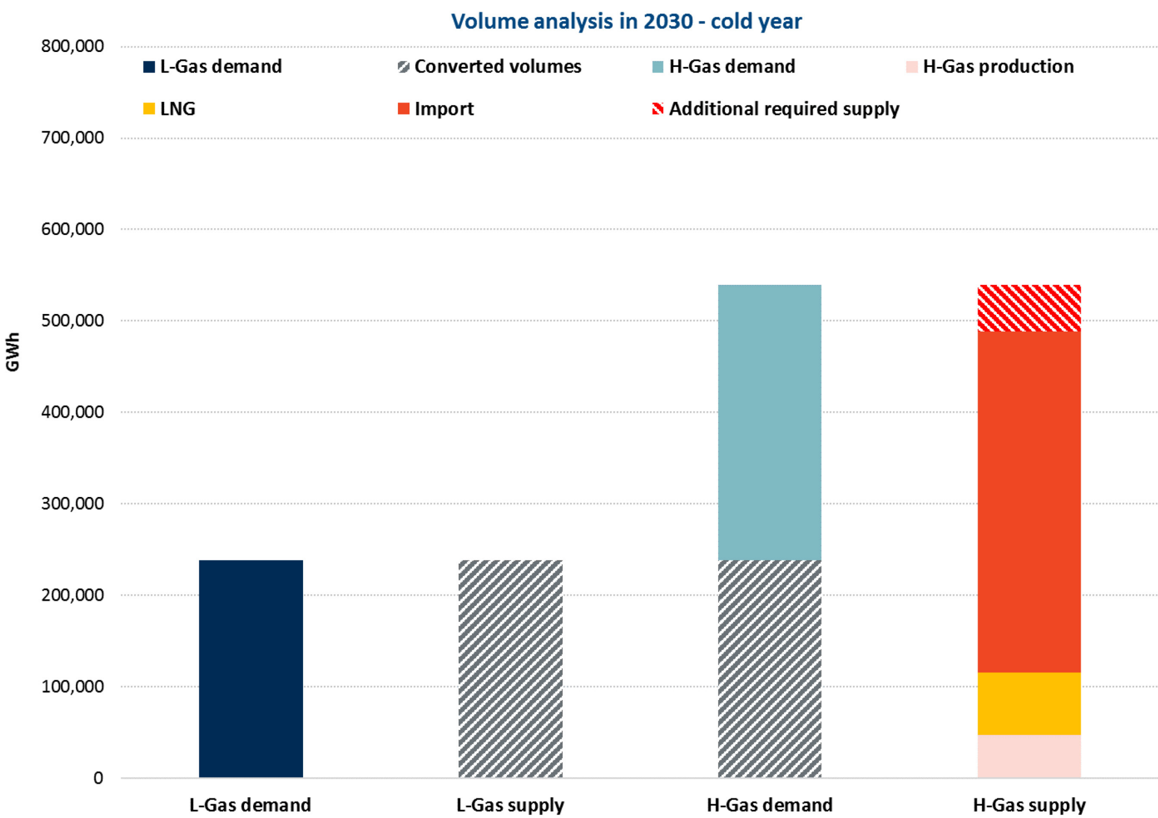
Role of Storage – 2030 (Average Year)



- In 2030, L-gas Working Gas Volumes from storages amount to about 29 TWh
- H-gas Working Gas Volumes amount to about 54 TWh
- The additional import required to meet demand requires additional H-gas Working Gas Volumes of 1 TWh (Conservative Case)

WGV-Export: volume of working gas needed to accommodate seasonality of export
WGV-Import: volume of working gas needed to accommodate reverse seasonality of import

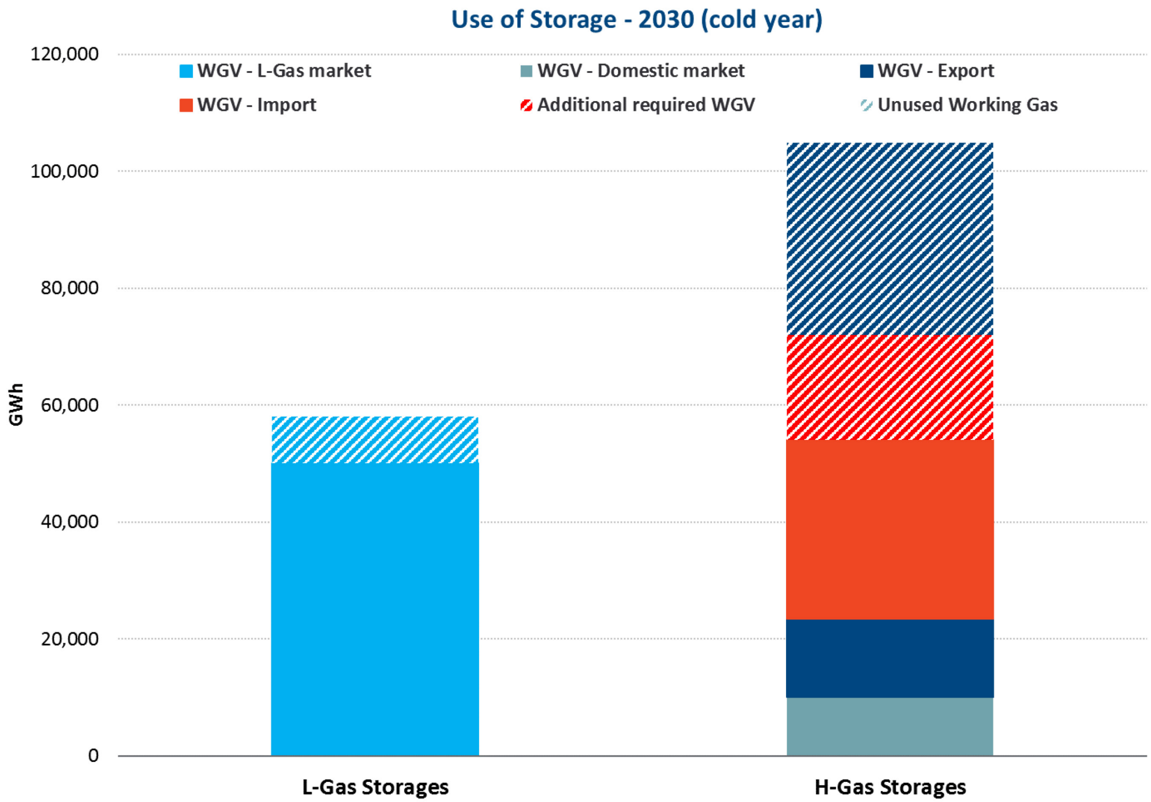
Demand and Supply Volumes – 2030 (Cold Year)



In 2030, forecast demand in the L-Market and the H-market in the cold year is 51 TWh higher than current supply projections. This will

- **Increase the expected average load factor of import pipelines from 60% to 68%**
- **If we assume that additional import will be met by increasing import from Norway and Germany (Gaspool) the load factor of those import points will increase from 82% to 93%. If interconnection with NCG area is used as entry point, the load factor for all entry points will amount to 83%**

Role of Storage – 2030 (Cold Year)



WGV-Export: volume of working gas needed to accommodate seasonality of export
WGV-Import: volume of working gas needed to accommodate reverse seasonality of import

- **In 2030, in case of a cold year, the working gas volume required in L-gas storage facilities increase by 21 TWh, for a total of 50 TWh**
- **The additional import required to meet demand requires requires availability of additional working gas volume in H-gas storage facilities of around 18 TWh, for a total of 72 TWh (Conservative Case)**

Conclusions on Volume Analysis

- In the next 10 years, an increase of imported H-gas (either piped gas or LNG) is required to compensate decreased domestic production, therefore increasing dependency on imports
  - Existing infrastructures are able to accommodate the required increase in H-gas import (compared to import volumes currently projected) over the time horizon of the analysis
  - Projected conversion/enrichment capacity appears to be sufficient to accommodate requested conversion volumes
  - Storages will provide the required flexibility to the Dutch system to meet total volume demand in hours when consumption is high
  - Our analysis takes into account the Load Factor Conversion provided to the whole system related to the differences in the hourly total demand and total supply
- According to current projections, no volume supply issue is expected to emerge as long sufficient L-gas and H-gas (seasonal) storage volume will be available

The L-market and the H-market will become more and more interconnected

Agenda

Volume and Flexibility Analysis: Methodology, Assumptions and Results

Capacity Analysis: Methodology, Assumptions and Results

Annex

Methodology for Capacity Analysis - Demand

- The capacity analysis assesses the supply capacity margin over demand in the peak hour calculate as the difference between capacity available at peak from supply infrastructure and peak demand:

	Capacity, GW		
	2020	2025	2030
Domestic Demand - Design Case			
L-gas	137	128	126
H-gas	27	32	28
Export Demand (L-Gas)	68	41	0
Transit Demand (H-Gas)	45	34	51
Peak demand - L-Gas	205	169	126
Peak demand - H-Gas	73	66	79

- The table summarizes the demand capacity we considered
- Peak domestic capacity demand is equal to the capacity demand in the Design Case, plus peak hour export and transit demand
- Expected peak hour export and transit is based on GTS data

Methodology for Capacity Analysis - Supply

- The capacity analysis assesses the supply capacity margin over demand in the peak hour calculate as the difference between capacity available at peak from supply infrastructure and peak demand

Supply source	Type of Gas	Capacity, GW		
		2020	2025	2030
Production - Groningen	L-gas	55.7	9.8	0.0
Production - small fields	H-gas	21.5	13.4	5.9
Import	H-gas	77.6	77.6	77.6
LNG	H-gas	16.6	16.6	16.6
LNG peak shaver	L-gas	12.7	12.7	12.7
Storage				
EnergyStock	L-gas	17.6	17.6	17.6
Grijpskerk	H-gas	30.0	30.0	30.0
Norg (Langelo)	L-gas	30.9	30.9	30.9
Bergermeer	H-gas	23.1	23.1	23.1
Alkmaar	L-gas	14.7	14.7	14.7
Jemgum, Astora (H-gas)	H-gas	6.1	6.1	6.1
Etzel, Crystal (H-gas)	H-gas	3.9	3.9	3.9
Etzel, EKB (H-gas)	H-gas	9.0	9.0	9.0
Jemgum, EWE (H-gas)	H-gas	2.9	2.9	2.9
Nuttermoor, EWE (H-gas)	H-gas	2.9	2.9	2.9
Etzel, OMV (H-gas)	H-gas	4.5	4.5	4.5
EPE (L-gas)	L-gas	12.7	3.9	3.9
Network buffering	L-gas	2.0	2.0	2.0

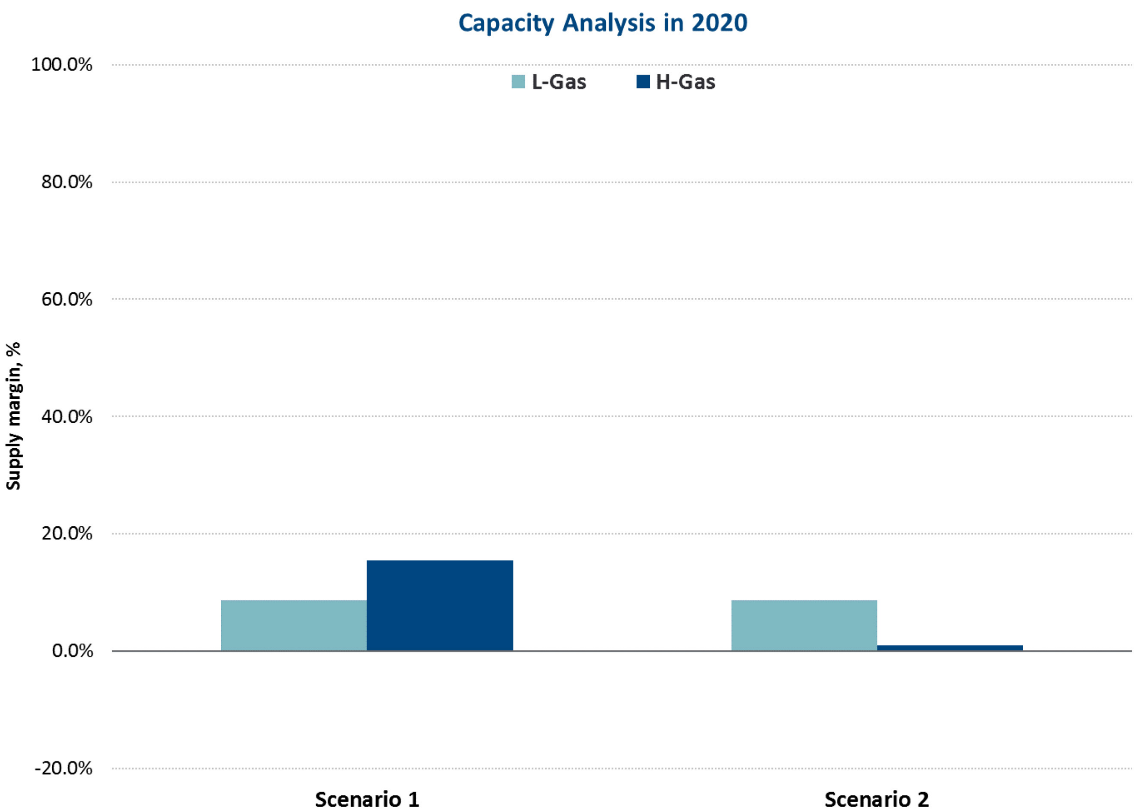
- The table summarizes the supply capacity considered
- Maximum available supply capacity is used at peak, equal to the technical capacity
- The analysis considers also the maximum capacity offered by the conversion and enrichment facilities, in order to meet peak demand in the L-Gas market

Assumptions and Scenarios

- We have assessed whether gas infrastructure capacity available at peak is able to meet forecasted peak gas demand under different supply scenarios, which differentiate based on expected availability of import and storage capacity
- The capacity margin at peak is calculated separately for the L-market and the H-market as the difference between available capacity and peak demand expressed as a percentage of peak demand, and weighted for the relative size of the two markets

Scenario	Description
Scenario 1 (all infrastructures available)	Capacity of gas infrastructures (import and export capacity, LNG regasification and storage) does not change over the period 2020-2030
Scenario 2 (disruption of largest import capacity)	The largest import capacity (entry from Norway) is not available starting from 2020
Scenario 3 (closing of storage facilities)	Norg and Grijpskerk storage fields are not available starting from 2025
Scenario 4 (disruption of import capacity and closing of storage facilities)	The largest import capacity (entry from Norway) and the Norg and Grijpskerk storage fields are not available starting from 2025

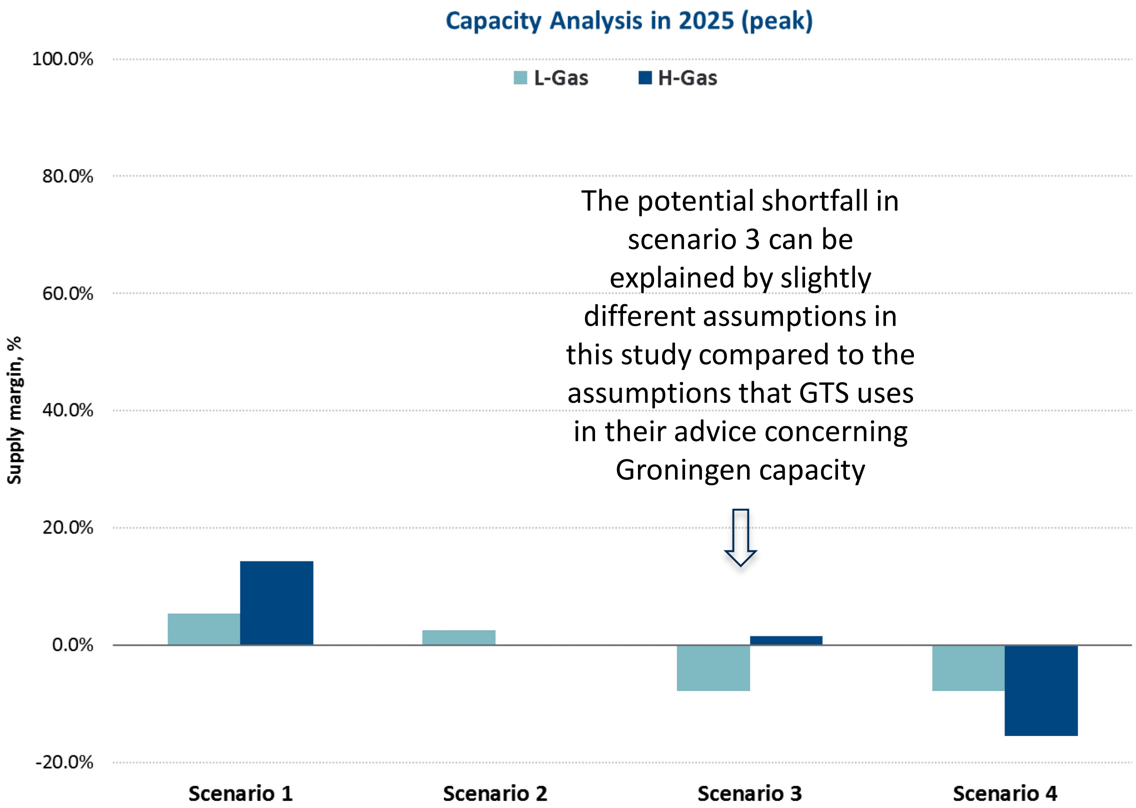
Capacity Margin: Design Case 2020



Source: Brattle analysis on data from Gasunie and Storage Europe database.

In 2020 capacity demand at peak is met in both the L-market and the H-market

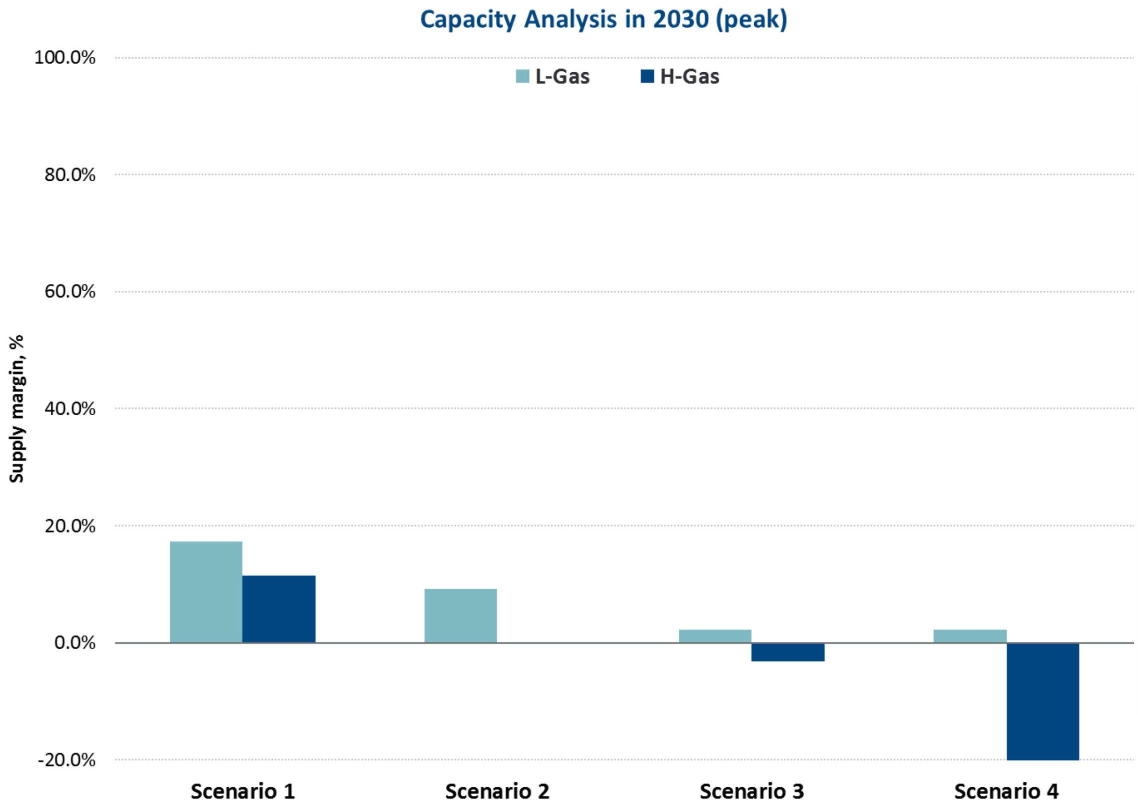
Capacity Margin: Design Case 2025



Source: Brattle analysis on data from Gasunie and Storage Europe database.

- **Peak demand is met when all infrastructures are available (Scenario 1) and in case of disruption of import from Norway (Scenario 2)**
- **Peak demand is not met in the L-gas market if Norg and Grijpskerk are both unavailable (Scenario 3)**
- **H-gas shortfall appears when import from Norway is also disrupted (Scenario 4)**

Capacity Margin: Design Case 2030



Source: Brattle analysis on data from Gasunie and Storage Europe database.

- **Peak demand is met when all infrastructures are available (Scenario 1) and in case of disruption of import from Norway (Scenario 2)**
- **Decrease in gas demand is such that peak capacity demand in the L-gas market can be met in Scenario 3**
- **Peak demand is not met in the H-gas market in Scenarios 3 and 4, due to unavailability of storage infrastructure and import**

Conclusions on Capacity Analysis

- Capacity demand in the Design Case is always met except in 2025 and 2030 when significant unavailability of infrastructures is considered
  - The N-1 criteria (unavailability of import from Norway) is met in the L-gas and H-gas markets in all scenarios with existing infrastructure (Scenarios 1 & 2)
  - Unavailability of Norg and Grijpskerk implies a shortfall of peak capacity in the L-market in 2025. This implies that a choice might have to be made on whether to meet flexibility demand from the domestic market or from transit. A shortfall appears when Norg, Grijpskerk and import from Norway are not available
  - In 2030 gas demand is expected to decline to a point where available capacity will meet peak demand. When Norg and Grijpskerk are not available, peak capacity cannot be met. A shortfall appears when Norg, Grijpskerk and import from Norway are not available

Agenda

Volume and Flexibility Analysis: Methodology, Assumptions and Results

Capacity Analysis: Methodology, Assumptions and Results

Annex

Data Sources – Volume Analysis

Source		Description of Data
Volume analysis - Demand		
GTS	[1]	L-gas demand and H-gas demand for 2020, 2025 and 2030 in three scenarios (Climate Agreement, Alternative Transition and Foundation for System Integration) for an average year and for a cold year, in TWh
	[2]	H-gas transit from 2020 to 2030, in TWh
	[3]	Load Duration Curves (LDCs) for years 2015-2019 (average years) and for thermal year 2012/2013 (cold year)
Volume analysis - Supply		
GTS	[4]	Annual production from Groningen from 2020 to 2030
	[5]	Annual production from small fields from 2020 to 2030
	[6]	Import flows from 2020 to 2030, in TWh
	[7]	Volume of gas from regasified LNG from 2020 to 2030, in TWh
	[8]	Annual converted/enriched volumes of H-gas into L-gas from 2020 to 2030, in TWh

Notes
[1]:

Climate Agreement (KA): All actions required to achieve the target of a maximum increase in warming of 1.5°C compared to pre-industrial era are implemented.

Alternative Transition (AT): Transition to a decarbonised economy is slower than in the KA scenario. Although Green gas becomes a viable alternative, roll-out of wind and PV is slower than in the KA scenario.

Foundation for System Integration (FSI): Wind and PV generation increases faster than expected. Use of blue hydrogen in gas-fired power stations, electric transport increases and in industry Power-to-Heat becomes a viable option.

Data Sources – Capacity Analysis

Source		Description of Data
Capacity analysis - Demand		
GTS	[1]	Design case for domestic capacity demand for 2020, 2025 and 2030 in the Climate Agreement, Alternative Transition and Foundation for System Integrationin the Design Case, in GW Design case for export capacity demand for the period 2020-2030, in GW
Capacity analysis -Supply		
GTS	[2]	Technical capacity of import points, in GW
	[3]	Capacity profile of Groningen production in an average year and in the design case, in percentage of total production
	[4]	Peak capacity production of small fields in the design year, in GW
	[5]	Technical regasification capacity, in GW
Gas Storage Europe	[6]	Working gas technical capacity, in TWh
	[7]	Withdrawal technical capacity, in GWh/day

Notes

[1]:

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Design Case: Capacity demand at a temperature of -17°C.

[6]-[7]: Gas Storage Europe, Storage map as of 1 July 2018.

Demand and Peak Demand Scenarios

Scenario	Year volume [TWh]						Peak Capacity [GW]		
	Volumes Average Year (TWh)			Volumes Design Case (TWh)			Design Case (GW)		
	2020	2025	2030	2020	2025	2030	2020	2025	2030
KA Scenario									
L-Gas	237	206	200	279	243	235	136.8	128.0	125.0
H-gas	112	131	121	118	137	127	27.4	31.9	28.2
Total	349	337	321	397	383	365	164.2	160.0	153.2
AT Scenario									
L-Gas	237	207	203	279	244	238	136.8	128.4	126.2
H-gas	112	131	123	118	137	129	27.4	31.9	28.4
Total	349	337	325	397	383	370	164.2	160.3	154.6
FSI Scenario									
L-Gas	237	194	177	279	230	209	136.8	122.7	114.8
H-gas	112	126	105	118	132	110	27.4	30.3	25.6
Total	349	325	301	397	369	341	164.2	154.0	144.0

Source: GTS

The AT Scenario is the scenario where demand volumes and peak capacity are higher

Storage

Storage facility	Type of gas	Technical Withdrawal Capacity, GW	Working Gas, TWh
EnergyStock	L-gas	17.6	3.0
Grijpskerk	H-gas	30.0	27.7
Norg (Langelo)	L-gas	30.9	48.7
Bergermeer	H-gas	23.1	45.7
Alkmaar	L-gas	14.7	4.9
Jemgum, Astora	H-gas	6.1	6.9
Etzel, Crystal	H-gas	3.9	2.4
Etzel, EKB	H-gas	9.0	11.2
Jemgum, EWE	H-gas	2.9	4.0
Nuttermoor, EWE	H-gas	2.9	1.8
Etzel, OMV	H-gas	4.5	5.3
EPE (*)	L-gas	12.7	7.4

Facilities located in the Netherlands

Facilities located in Germany connected to the Netherlands

(*) Withdrawal capacity assumed to decline to 3.9 by 2025.

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