

# Could we learn from our mistakes in the past?

Comparing gas market forecasts from  
**MAGELAN** model with actual developments  
in reality

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# Agenda



1 Motivation

2 Model Structure

3 Selected Reality Checks for Model Results

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# Motivation



Gas infrastructure: high costs and long lifetimes



Investments heavily rely on forecasts over the next decades  
=> Various models available on the market/academia, but complexity or good data base is no guarantee for „correct“ model results



Some reality checks for model results are published in the literature, but most of them account for more shorter timeframes



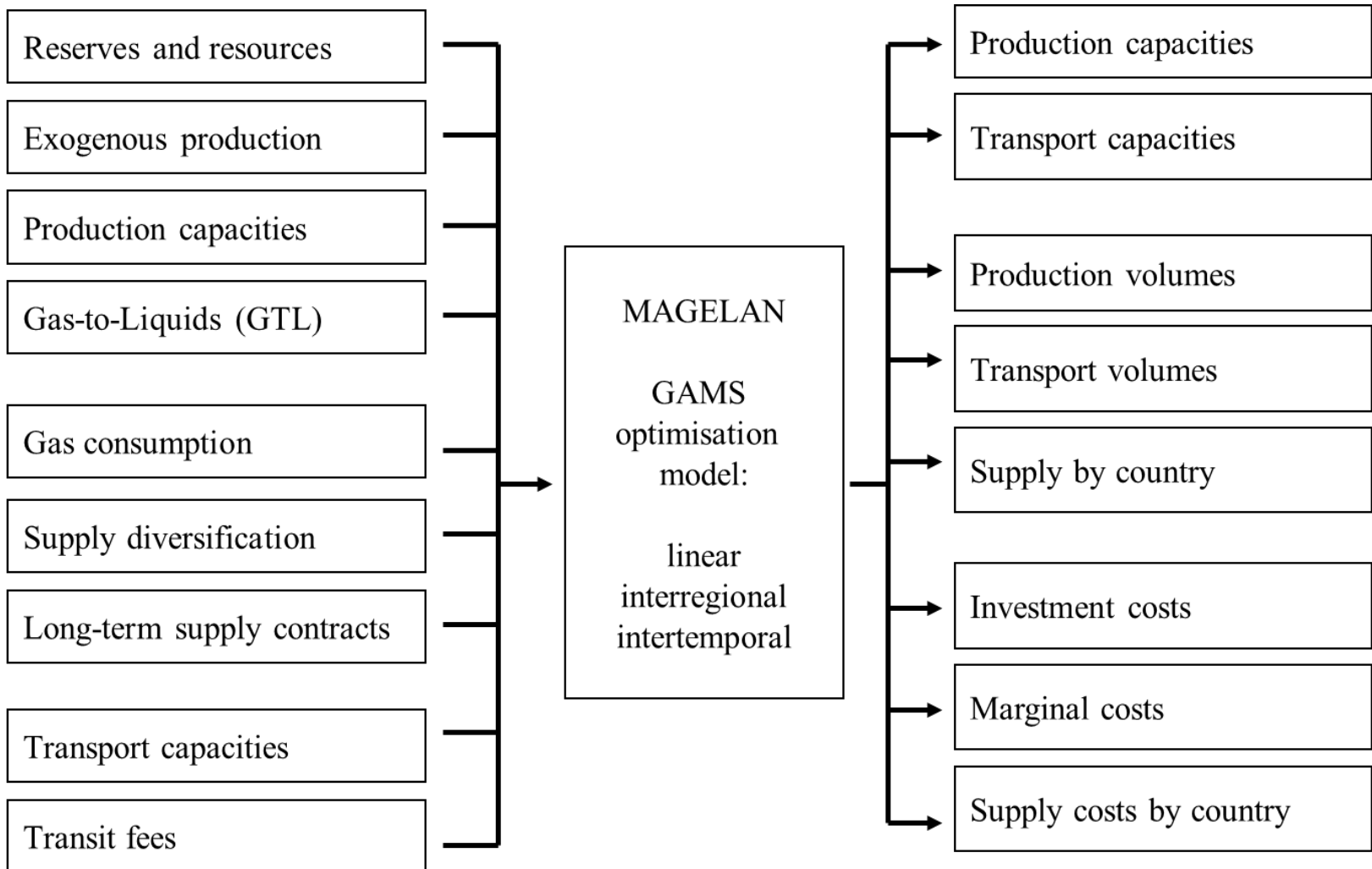
MAGELAN is a worldwide gas supply model, developed in 2005 and used for several industry or public projects



2020 real world figures are available => how did MAGELAN perform???

2

# Model Structure



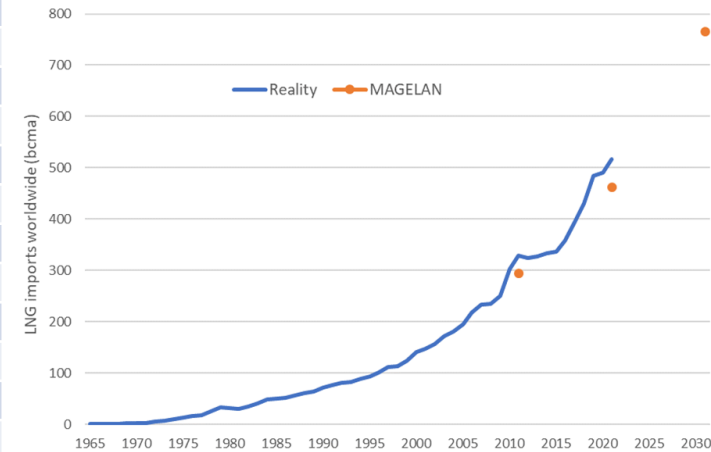
# Selected Reality Checks – Production Volumes by Country

	(all figures in bcma)	Reality 2004	MAGELAN 2020	Reality 2020	Difference 2020
1	Russia	634	829	693	<b>136</b>
2	USA	533	513	948	<b>-435</b>
3	Canada	184	273	158	<b>115</b>
4	Iran	85	267	253	14
5	Qatar	39	234	185	49
6	Algeria	80	139	85	54
7	Turkmenistan	59	134	82	52
8	Indonesia	75	126	59	67
9	Norway	83	131	110	21
10	Venezuela	27	100	18	<b>82</b>
11	Saudi Arabia	66	96	103	-7
12	Malaysia	62	91	73	18
13	Nigeria	22	77	50	27
14	UK	96	63	40	23
15	Australia	35	65	154	<b>-89</b>
16	Netherlands	78	66	20	46
17	Egypt	33	67	62	5
18	Argentina	45	62	45	17
19	Uzbekistan	59	47	45	2
20	Kazakhstan	20	46	24	22
	Other	462	555	787	<b>-232</b>
	World	2777	3981	3994	-13

Source: Seeliger (2006); BGR (2022)

# Selected Reality Checks – LNG

	(all figures in bcma)	Reality 2004	MAGELAN 2020	Reality 2020	Difference 2020
1	Qatar	24	91	104	-13
2	Iran	0	55	0	55
3	Indonesia	34	44	20	24
4	Venezuela	0	37	0	37
5	Nigeria	13	36	28	8
6	Algeria	26	29	14	15
7	Malaysia	28	29	32	-3
8	Australia	12	19	105	-86
9	Trinidad & Tobago	14	19	14	5
10	Egypt	0	17	2	15
11	UAE	7	16	8	8
12	Russia	0	12	40	-28
13	Oman	9	12	11	1
14	Brunei	10	9	8	1
15	Bolivia	0	8	0	8
16	Yemen	0	8	0	8
17	Libya	1	7	0	7
18	Norway	0	6	4	2
19	Equatorial Guinea	0	5	4	1
20	USA	2	3	60	-57
21	Peru	0	2	5	-3
22	Angola	0	0	6	-6
23	Cameroon	0	-	1	-1
24	Papua New Guinea	0	-	11	-11
	World	180	464	479	-15



# Selected Reality Checks – Pipelines

- In 2005, many discussions arise about two potential new pipeline routes took :
  - **Nord Stream** from Russia (Barents Sea) to Germany via Baltic Sea
  - **Nabucco** from Iran (South Pars) to Central Europe via Turkey including branch from Azerbaijan (and maybe Turkmenistan later on)

bcma	2005	2020	2030
Nord Stream	0	23	23
Nabucco	0	26	101

Reality:  
55 bcma in 2020 and  
without war in Ukraine  
110 bcma in 2022

Reality:  
only branch from Azerbaijan  
to Turkey (6 bcma in 2020,  
12 in 2022) opened so far

Source: Seeliger (2006). p. 139

## Discussion

- **Shale Gas Revolution** => heavy impact on many important model results => not foreseeable in that dimensions
- **Demand** => perfect match, despite various crisis => demand forecasts seems to be even more important in future (e.g. phase out of gas in many countries due to climate policy)
- **Model Structure** => China, India, Brazil etc. only exogenous given with high impact on results => could be (somehow) reduced with implementation as endogenous nodes
- **Security of Supply:**
  - Nord Stream in reality driven by political decisions not by economics or security measures
  - Nabucco blocked by political tension with Iran

=> difficult to implement „non-rational political agenda“



# References

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- IGU (2022): World LNG Report 2022. International Gas Union: London.
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- Seeliger, A. (2023): Modelling Natural Gas Markets: Could We Learn from our Mistakes in the Past? - A Reality Check for MAGELAN. SWK E<sup>2</sup> Working Paper 1/2023. SWK E<sup>2</sup> Institut für Energietechnik und Energiemanagement der Hochschule Niederrhein: Krefeld.