OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

How would a stop in Russian gas deliveries impact on Austria's economic activity? Results of simulations using an input-output model[1]

Summary

Several sectors of the Austrian economy are highly dependent on natural gas, the vast majority of which is imported from Russia. In 2019, Austrian **households** accounted for a mere **18%** of Austria's total gas consumption; the rest of the natural gas (82%) went to the various industries. In fact, **gas consumption** is **concentrated** in just a **few economic sectors**. At 39.3%, the energy sector is the by far largest user of gas, transforming gas into other forms of energy. Other large-scale users are the producers of basic metals (9.7%), followed by the paper industry (9.2%), the chemical industry (6.8%) and manufacturers of nonmetallic minerals like glass (5.9%). Of the 64 NACE-2 industries, these five sectors account for 71% of Austria's total gas consumption.

A complete stop of gas deliveries from Russia to Austria from early June 2022 would result in an **undersupply of gas for the Austrian economy of 68%** starting from June. The underlying assumptions are as follows. First, Russian natural gas would be partly substituted by liquefied natural gas (LNG) and other energy sources, and second, households would be supplied with gas without restrictions. Based on gas consumption from January to end-May, gas consumption would therefore **contract by 37%** in **2022 as a whole**.

To **estimate the economic impact** of such an undersupply of gas, we have developed an **input-output model**. A complete stop of Russian gas deliveries to Austria from early June, including second-round effects from declining employment and household incomes, would have a negative effect on GDP growth in **2022** of **–3.1 percentage points**.

When we subtract this amount from the 3.5% projected in the OeNB's updated economic forecast of April 1, 2022, we arrive at **GDP growth of 0.4% for 2022**. Note, however, that this figure is surrounded by **substantial downside risks**. In the calculations, we (1) did not assume any additional energy and commodity price increases, (2) did not simulate any indirect effects via trading partners that would likewise be affected by a stop in gas deliveries, and (3) did not assume any additional delivery bottlenecks. In light of these additional transmission channels, **GDP is likely to contract in 2022**. Moreover, **substantial downside risks** relate to the **evolution of the war in Ukraine** and its economic implications.

A stop in Russian gas deliveries would weigh particularly strongly on eight gas-intensive sectors (of the 64 NACE-2 sectors). The economic value added of the **electricity, gas, steam and air conditioning industries** and the **paper industry** would decrease by **37%**, while the contraction of the sectors **mining, water, basic metals, chemicals, coke** and **glass** would range between **20% and 30%**. The effect on all other industries is much less pronounced.

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Natural gas dependency and intermediate goods interdependencies

In 2019, 525,000 terajoules of natural gas were supplied in Austria (table 1)[2]. Most of the gas (94%) was imported. Of the 525,000 terajoules of natural gas, 38% was used for exports and inventory building (and losses) – and therefore not to meet domestic demand for gas. Domestic consumption amounted to 325,000 terajoules, with households consuming 18% and economic sectors the rest (82%). The latter may be broken down into energy (or transformation) use and non-energy (or end) use. Energy use accounted for 94% of gas consumption; i.e. gas is used to operate blast furnaces and to transform energy into electricity and heat. The other 6% is used as a feedstock for non-energy production, e.g. to make fertilizers.

Table 1

Supply and use of natural gas in Austria (2019)

	Terajoule	% of total supply	% of domestic consumption	% of other domestic consumption
Supply	**524,720**	100	-	-
Domestic production	32,237	6	-	-
Imports	492,484	94	-	-
Use	**524,720**	100	-	-
Exports	94,220	18	-	-
Changes in inventories	105,675	20	-	-
Losses	111	0	-	-
Domestic consumption	**324,714**	**62**	**100**	-
Households	59,050	11	18	-
Other domestic consumption (e.g. industry, services)	**265,664**	**51**	**82**	**100**
Energy use	250,798	48	77	94
Energy transformation (D35)	98,453	19	30	37
Energy use (e.g. industry, services)	152,344	29	47	57
Non-energy use	14,866	3	5	6

Source: Statisitics Austria.

Table 2 lists the 20 industries with the highest **gas consumption**. Gas consumption is concentrated in a few industries. At 39.3%, **the energy sector** is the largest gas consumer by a wide margin. Next are **basic metals** (9.7%), followed by **paper** (9.2%), **chemicals** (6.8%) and **glass** (5.9%). Of the 64 NACE-2 industries, these five sectors account for 71% of Austria's total gas consumption.

To assess the economic impact of a cut in gas deliveries, we must, first and foremost, consider the manufacturing sector's dependency on natural gas and potential substitution of other energy sources for gas. However, it is difficult to answer this technical question without any in-depth knowledge of the respective production processes. We use **gas consumption per unit of value added ("gas intensity") as a proxy**. At 16.1 terajoules per million EUR of value added, **electricity, gas, steam and air conditioning supply** records the highest gas intensity, followed by the **paper** industry (10.5), **mining** (8.4), **water supply** (6.0), **basic metals** (5.9), **chemicals** (5.6) and **glas**s (5.3). These sectors are therefore most vulnerable to cuts in the gas supply. All other sectors have a markedly lower gas intensity.

[2] Statistics Austria publishes energy balances and energy accounts that provide data on the supply and use of energy. We use the energy accounts, which comprise detailed data at the level of the 64 NACE-2 sectors. Such data are available up to 2019. Energy balances, which are less disaggregated, are available up to 2020 already.

Table 2

Overview of the 20 industries in Austria with the highest gas consumption (2019)

No.	NACE code	Industry	Value added			Natural gas consumption[1)]			Gas intensity	Employment		
			EUR million	%	%, cumulative	Terajoule (TJ)	%	%, cumulative	TJ / EUR million	Jobs, thousand	%	%, cumulative
1	D35	Electricity, gas, steam and air conditioning	6,126	1.6	1.6	98,453	39.3	39.3	16.1	28	0.6	0.6
2	C24	Man. of basic metals	4,149	1.1	2.7	24,372	9.7	49.0	5.9	38	0.8	1.3
3	C17	Man. of paper and paper products	2,194	0.6	3.2	23,046	9.2	58.2	10.5	17	0.3	1.7
4	C20	Man. of chemicals and chemical products	3,030	0.8	4.0	17,066	6.8	65.0	5.6	19	0.4	2.1
5	C23	Man. of other non-metallic mineral produc	2,793	0.7	4.8	14,895	5.9	70.9	5.3	31	0.6	2.7
6	C10-12	Man. of food products	6,542	1.7	6.5	11,967	4.8	75.7	1.8	87	1.8	4.5
7	H49	Land transport and transport via pipeline	9,602	2.5	9.0	10,300	4.1	79.8	1.1	136	2.7	7.2
8	B	Mining and quarring	1,025	0.3	9.2	8,589	3.4	83.2	8.4	7	0.1	7.3
9	N80-82	Public administration and defence; compu	17,683	4.6	13.8	6,062	2.4	85.6	0.3	272	5.5	12.8
10	C19	Man. of coke and refined petroleum	1,008	0.3	14.1	5,522	2.2	87.8	5.5	2	0.0	12.9
11	E36	Water collection, treatment and supply	679	0.2	14.3	4,069	1.6	89.5	6.0	3	0.1	12.9
12	C25	Man. of fabricated metal products	6,587	1.7	16.0	3,232	1.3	90.7	0.5	81	1.6	14.6
13	C16	Man. of wood	2,991	0.8	16.8	2,272	0.9	91.7	0.8	34	0.7	15.3
14	C21	Man. of pharmaceutical products	2,680	0.7	17.5	2,232	0.9	92.5	0.8	17	0.3	15.6
15	C13-15	Man. of textiles	1,001	0.3	17.7	1,538	0.6	93.2	1.5	17	0.3	15.9
16	C28	Man. of machinery and equipment n.e.c.	9,207	2.4	20.1	1,509	0.6	93.8	0.2	87	1.8	17.7
17	C29	Man. of motor vehicles, trailers and semi-t	4,602	1.2	21.3	1,462	0.6	94.3	0.3	39	0.8	18.5
18	F	Construction	23,137	6.0	27.3	1,354	0.5	94.9	0.1	320	6.5	25.0
19	C22	Man. of rubber and plastic products	2,613	0.7	28.0	1,330	0.5	95.4	0.5	31	0.6	25.6
20	G46	Wholesale trade	21,300	5.5	33.6	1,283	0.5	95.9	0.1	227	4.6	30.2
		Other industries	255,246	66.4	100.0	10,230	4.1	100.0	0.0	3453	69.8	100.0
		Total	384,193	100.0	100.0	250,783	100.0	100.0	0.7	4945	100.0	100.0

1) Energy (or transformation) use.

Source: Statistics Austria.

Interdependencies with gas-dependent sectors

Table 3 highlights direct interdependencies with Austria's 10 most gas-dependent sectors. We calculated the interdependencies by summing up, based on the 2018 input-output table, both total deliveries by supplier industries to each of these 10 most gas-dependent sectors and total deliveries from each of the 10 sectors to customer industries.

The left-hand side of table 3 shows the most important **supplier industries** that deliver intermediate goods to the 10 most gas-dependent sectors.[3] Apart from the value of the deliveries (EUR million), we provide the percentage of the deliveries in total production of the supplier industries and the number of jobs (thousand) that would be affected absent the demand for these deliveries. We calculated the latter by multiplying the share of deliveries to the affected industry with total employment of the supplier industry. A cut in production made necessary by a ban on natural gas imports would translate into reduced demand for the respective industry.

The right-hand side of table 3 shows **industries further down the production chain**, i.e. customer industries. Apart from the value of the deliveries (EUR million), we show the percentage of the deliveries in the production of the downstream industries. In contrast to the supplier industries, it is not possible to **directly relate the percentages to output losses** should (part of) the intermediate goods deliveries stop, as **technical substitution options** may come into play. Even intermediate goods of insignificant value may halt production if they cannot be replaced by other goods or imports (e.g. BMW factories idled for lack of wire harnesses). Table A1 presents details on the interdependencies with the 10 most gas-dependent industries.

[3] In most industries, companies depend on intermediate goods from other companies of the same sector. Such intrasectoral interlinkages have been excluded in table 3.

Table 3

Interdependencies of industries in Austria with the 10 most gas-dependent sectors (2018)

Affected supplier industries					Affected customer industries			
Industry		Deliveries		Affected jobs in case of a total import ban (thousand)	Industry		Deliveries	
Code	Name	EUR million	% of production		Code	Name	EUR million	% of production
01	Agriculture and hunting	3,450	54.1	97	41-43	Construction	3,823	6.6
46	Wholesale trade	2,951	8.0	18	55-56	Accommodation and food service activities	2,582	8.8
35	Electricity, gas, steam and air conditioning supply	2,745	8.9	3	46	Wholesale trade	1,335	3.6
68B	Real estate activities	2,295	7.7	6	24	Man. of basic metals	1,307	7.1
52	Warehousing and support activities for transportation	1,934	17.2	10	25	Man. of fabricated metal products	1,213	8.4
64	Financial services	1,616	10.6	8	20	Man. of chemicals and chemical products	1,065	7.5
41-43	Construction	1,524	2.6	8	10-12	Man. of food products	1,033	4.6
33	Repair and installation of machinery and equipment	1,512	18.9	5	23	Man. of other non-metallic mineral products	851	13.9
69-70	Legal and accounting activities	1,501	7.8	12	28	Man. of machinery and equipment n.e.c.	847	3.7
49	Land transport and transport via pipelines	1,420	8.4	11	49	Land transport and transport via pipelines	761	4.5
77	Rental and leasing activities	1,278	13.8	39	01	Agriculture and hunting	742	11.6
37-39	and waste collection	1,026	13.8	3	17	Man. of paper and paper products	593	9.0
05-09	Mining and quarring	910	46.4	3	86	Human health activities	577	2.2
78	Employment activities	871	13.5	2	68B	Real estate activities	569	1.9
19	Man. of coke and refined petroleum products	832	16.9		84	Public administration and defence; compulsory social security	542	2.2
80-82	Other business services	731	7.6	1	85	Education	542	2.8
45	Trade and repair of motor vehicles	719	7.4	6	87-88	Residential care and social activities	499	5.5
73	Advertising and market research	699	10.7	4	16	Man. of wood	491	5.7
71	Architectural and engineering activities	526	4.6	3	22	Man. of rubber and plastic products	470	7.8
17	Man. of paper and paper products	516	7.8	1	47	Retail trade	440	1.9
00	Other industries	4,803	1.2	36	00	Other industries	5,529	1.7

Source: Statistics Austria (input-output tables 2018).

How would gas delivery restrictions impact on industries? Results of simulations using a dynamic input-output model

We use a dynamic input-output model to estimate how the Austrian economy would be affected by restrictions on gas deliveries. Input-output tables shed light on the production and distribution of goods at the sectoral level. They highlight supply interlinkages between individual economic sectors. Input-output models drawing on these tables usually help simulate the effects of demand shocks. By contrast, traditional input-output models fail to adequately capture supply shocks. One big problem is assuming a fixed production structure without any substitution options (Leontief production function). Under this assumption, an x% reduction of an intermediate good of a given sector reduces production by the same amount (x%). However, in most cases substitution options exist (at least in the medium to long term), which is why the effects of supply shocks such as a cut in the supply of natural gas are overestimated.

Overview of the dynamic input-output model

The model used for this study draws on work by Henriet et al. (2011) and Pichler et al. (2021). The companies of a sector produce their output in line with a Cobb-Douglas production function with exogenous capital stock and labor while drawing on intermediate goods inventories.

What is important here is a deviation from the Leontief production function. Depending on their relevance, the (domestic and imported) intermediate goods are rated *critical*, *important* and *noncritical*. The Leontief production function continues to apply to *critical* intermediate goods, i.e. the elasticity of production for a given intermediate good is 1. *Noncritical* intermediate goods do not temporarily impact on production (elasticity = 0). The elasticity of *important* intermediate goods lies between 0 and 1. These values must be determined for each sector and for each intermediate good by using a 64x64 matrix. Pichler et al. (2021) commissioned experts of IHS Markit to produce a **relevance matrix** for the sectors of the World Input-Output Database. The bulk (77%) of intermediate goods was rated noncritical, and only 16% were rated critical. Critical inputs were mostly energy, telecommunications, transportation and other business services. The sectors that need particularly many critical

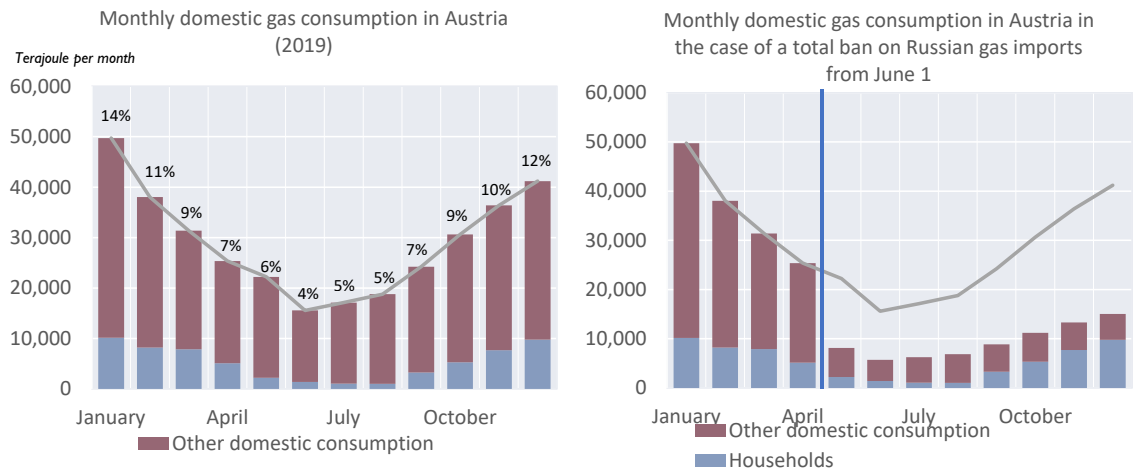
intermediate inputs for production include the basic materials sector, construction and publishing. If shortages of critical or important intermediate inputs or other restrictions hinder a sector to meet its demand for necessary production inputs, this will lead to rationing. Such a supply shock is then rippling across other sectors.

As to the relevance of intermediate inputs, we drew on the work of Pichler et al. (2021). As to the relevance of gas imports, we based that on the gas intensity of production (see table A2). For the two most gas-intensive sectors (energy and paper), we assumed an elasticity of 1 (Leontief). For the other sectors, we calculated the elasticity be relating their gas intensity to that of paper (10.5 terajoules per EUR million). Being a special case, the energy sector (16.5) was not used as a benchmark.

Assumptions underlying the simulation

The first aim of the simulation is to assess the effects that a stop in gas imports from June 1 would have on the gas supply for the economic sectors. To this end, we first look at the monthly distribution of gas consumption. The left panel of chart 2 shows domestic gas consumption across the 12 months of the year 2019.[4] In 2019, the period from January to end-May accounted for 48% of total annual gas consumption. Households held a share of 53%; other domestic consumption came to 46%.

Chart 2



Source: Statistics Austria, author`s calculations.

Table 4 shows the assumptions underlying the use of natural gas in the case of a complete stop of Russian natural gas from early June onward. For confidentiality reasons, the energy statistics do not include any data on gas imports by country of origin. In line with media reports, 80% of the natural gas used for domestic consumption hails from Russia. Given that domestic gas production accounts for 10% of domestic consumption, Russian gas covers 72% of Austria's domestic gas consumption. The shortfall from June 1 is therefore assumed to equal this percentage. Domestic production cannot be stepped up to compensate for this shortfall. In line with Bachmann et al. (2022), we assume that only a small percentage (5%) will be covered by LNG in the course of 2022. Furthermore, we assume that it will be possible to replace one-third of the gas consumption of the energy sector (D35) necessary for

[4] A monthly breakdown is only available for Austria's aggregate domestic gas consumption. Households' monthly consumption was disaggregated based on figures for Germany; other domestic consumption was calculated as a residual.

energy transformation (i.e. some 10% of total domestic consumption) by other energy sources (above all oil). Overall, from June onward, 57% less gas would be available for domestic consumption (–72% + 10% +5%).

Households are assumed to be supplied with gas without any restrictions, which is why the gas supply for other domestic consumption would fall by 68%. In 2022 as a whole, total domestic consumption would decline by 30%, while other domestic consumption, which is relevant for calculating the effect on GDP, would decrease by 37%.[5]

Table 4

Use of natural gas in Austria in the case of a stop of Russian gas imports from early June

	2019	2022 1)				
		January to May2)	June to December		2022 as a whole	
	Thousand terajoules	Thousand terajoules		*Reduction in %*	Thousand terajoules	*Reduction in %*
Domestic consumption	325	0	140	-57	140	-57
Households	59	0	59	*0*	59	*0*
Other domestic consumption (e.g. industry, services)	266	0	81	*-70*	81	*-70*

1) Data on gas consumption (energy balances) are availabe from Statistics Austria up to 2020. The energy accounts by sector used for this study are, however, only available up to 2019.

2) = 48% of the gas supply and total domestic gas consumption; household consumption: 53%, and other domestic consumption: 46% (based on 2019 figures).

Source: Statisitics Austria (energy accounts).

Results

The model-based simulations show that, in the case of a **stop of gas imports from June 1**, **GDP growth** would **contract by 3.1 percentage points** in **2022**.

When we subtract this amount from the 3.5% projected in the OeNB's updated forecast of April 1, we arrive at **GDP growth of 0.4% for 2022**. The figures do **not** reflect any **price effects**, however. Should all imports of Russian energy be halted, energy prices would soar even further. Purchasing power losses and shutdowns in the manufacturing sector would then impact on GDP growth. **When we consider these price effects, GDP growth is likely to turn negative in 2022**.

A stop in Russian gas deliveries would weigh particularly strongly on eight gas-intensive sectors (of the 64 NACE-2 sectors). The economic value added of the **electricity, gas, steam and air conditioning industries** and the **paper** industry would decrease by 37%, while the contraction of the sectors **mining**, **water**, **basic metals**, **chemicals**, **coke** and **glass** would range between **20% and 30%**. Despite their high gas consumption in absolute terms, at –4%, **food products** are much less affected (see chart 1 and table A2). Intermediate goods interdependencies will result in spillovers across sectors. Sectors in the earlier stages of production will be hit by the setback in demand, while sectors further down will suffer from the reduced supply of intermediate goods. The sectors with low gas intensity

[5] These assumptions match the assumptions used for the alternative scenarios of the OeNB's updated economic forecast released on April 1. Small deviations in the results stem from differing assumptions on gas inventories and the timing of the stop in gas deliveries. https://www.oenb.at/dam/jcr:07bedaf9-a9a6-4bc0-8aa1-f2435d60d54e/20220231_interimsupdate_oesterreichprognose_vor_dem_hintergrund_des_ukrainekriegs.pdf (in German only)

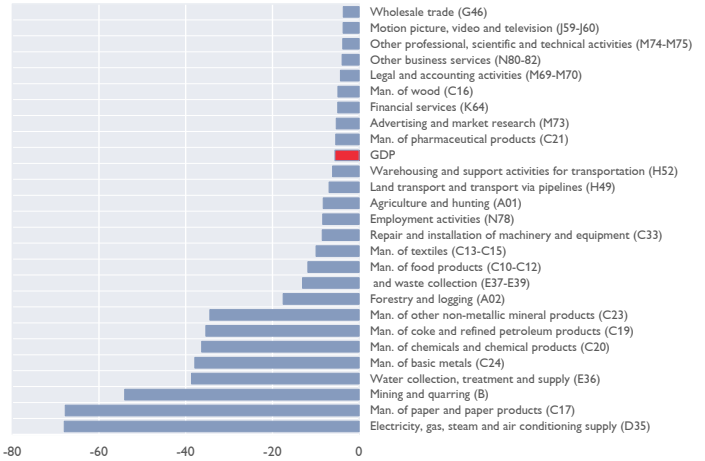
that will be hit indirectly to a noticeable extent will be, above all, **forestry** (6%) and **sewage and waste** (–5%).

The composition of the indirectly affected downstream industries in the model (chart 1 and table A2) differs from the most interdependent industries in line with the input-output table (table 3 and table A1). It is impossible to infer from the input-output table how relevant intermediate goods are to (short-term) production. By contrast, this information is an input (relevance matrix) for the model results.

Chart 1

Impact (June to December 2022) of a stop in Russian gas deliveries to Austria from June 1

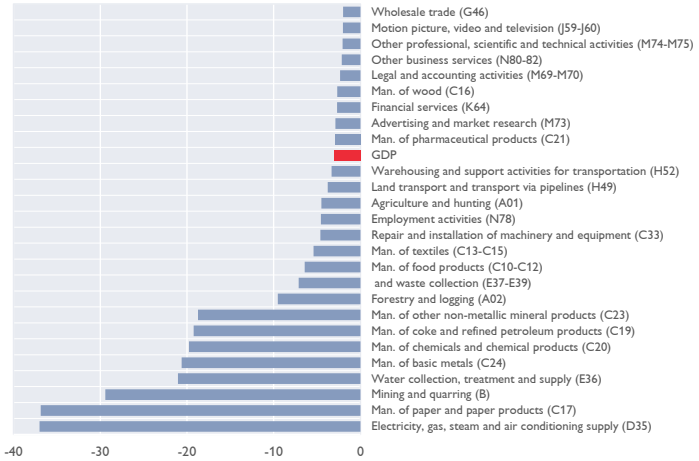
Change in value added, %



Source: Author's calculations.

Impact (in 2022 as a whole) of a stop in Russian gas deliveries to Austria from June 1

Change in value added, %



The simulation results present a static outcome upon completion of all adjustment processes (intermediate goods interdependencies, employment adjustment, second-round effects via household incomes).[6] The following factors must be considered when we interpret the model-based results:

We did not consider *effects of international trade interlinkages in the case of a stop of imports to all EU countries*.

We did not consider *changes in the price of natural gas and other energy sources* following a stop in gas deliveries.

Substitutability of gas as input factor for production: The key assumption in the calculations is the extent of the substitutability of gas by other energy sources. This is a technical question and depends on a given company's production processes. Using the sectoral gas intensity in the model represents a rough approximation, which is surrounded by a large degree of uncertainty.

Relevance of intermediate goods interdependencies: The input-output table captures in monetary form the aggregated intermediate goods interdependencies among sectors. While we replaced the unrealistic assumption of a fixed production structure without any substitution options by using the relevance matrix of Pichler et al. (2021), the matrix is likewise just a rough approximation at the sectoral level. At the level of company- and product-specific production processes, large deviations may occur.

Gas rationing: In the model, we assumed that all sectors are equally hit by reduced gas deliveries. A complete stop of Russian gas imports would trigger rationing in line with Austria's gas emergency plan (alert level 3 = emergency level). Rationing could differ strongly from sector to sector depending on a sector's criticality. We did not consider such effects in this study; but we could calculate them with the model.

Households' gas consumption: We did not consider households' direct consumption in the scenario.

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[6] The dynamic input-output model was implemented on a daily basis, which is why it can be used to calculate adjustment paths. In the current version, the relevant parameters (above all the size of inventories) have not yet been calibrated. For this reason, we do not show the adjustment paths. This does not impact on the static outcomes, though.

Annex

Table A1

Interdependencies of industries in Austria with the 10 most gas-dependent sectors (2018)

Affected supplier industries					Affected customer industries			
Industry		Deliveries		Affected jobs in case of a total import ban	Industry		Deliveries	
NACE code	Name	EUR million	% of production		NACE code	Name	EUR million	% of production
Electricity, gas, steam and air conditioning supply (D35)								
33	Repair and installation of machinery and equi	495	6.2	1.7	24	Man. of basic metals	572	3.1
78	Employment activities	434	6.7	0.9	49	Land transport and transport via pipeline	457	2.7
52	Warehousing and support activities for trans	351	3.1	1.8	20	Man. of chemicals and chemical products	451	3.2
37-39	Sewerage and waste collection	339	4.6	1.0	86	Human health activities	387	1.5
64	Financial services	213	1.4	1.0	85	Education	365	1.9
00	Other industries	1,309	0.2	9.1	00	Other industries	4,315	0.7
Manufacturing of basic metals (C24)								
46	Wholesale trade	597	1.6	3.6	25	Man. of fabricated metal products	868	6.0
35	Electricity, gas, steam and air conditioning sup	572	1.9	0.5	28	Man. of machinery and equipment n.e.c.	522	2.3
25	Man. of fabricated metal products	398	2.7	2.2	41-43	Construction	360	0.6
37-39	Sewerage and waste collection	373	5.0	1.2	29	Man. of motor vehicles, trailers and semi-	220	1.3
19	Man. of coke and refined petroleum product	360	7.3	0.1	27	Man. of electrical equipment	217	2.0
00	Other industries	1,661	0.3	12.0	00	Other industries	355	0.1
Manufacturing of paper and paper products (C17)								
46	Wholesale trade	337	0.9	2.0	20	Man. of chemicals and chemical products	240	1.7
35	Electricity, gas, steam and air conditioning sup	302	1.0	0.3	10-12	Man. of food products	220	1.0
02	Forestry and logging	248	10.0	2.8	18	Printing and reproduction of recorded me	154	8.8
49	Land transport and transport via pipelines	175	1.0	1.4	47	Retail trade	60	0.3
37-39	Sewerage and waste collection	173	2.3	0.5	16	Man. of wood	54	0.6
00	Other industries	720	0.1	5.1	00	Other industries	618	0.1
Manufacturing of chemicals and chemical products (C20)								
35	Electricity, gas, steam and air conditioning sup	451	1.5	0.4	22	Man. of rubber and plastic products	225	3.7
46	Wholesale trade	419	1.1	2.5	72	Scientific research and development	87	0.7
17	Man. of paper and paper products	240	3.6	0.6	24	Man. of basic metals	80	0.4
49	Land transport and transport via pipelines	219	1.3	1.8	41-43	Construction	76	0.1
41-43	Construction	136	0.2	0.7	19	Man. of coke and refined petroleum proc	70	1.4
00	Other industries	845	0.1	6.2	00	Other industries	600	0.1
Manufacturing of other non-metallic mineral products (C23)								
05-09	Mining and quarring	269	13.7	0.9	41-43	Construction	2,525	4.4
46	Wholesale trade	253	0.7	1.5	68B	Real estate activities	124	0.4
35	Electricity, gas, steam and air conditioning sup	249	0.8	0.2	84	Public administration and defence; compu	51	0.2
49	Land transport and transport via pipelines	225	1.3	1.8	22	Man. of rubber and plastic products	45	0.7
41-43	Construction	169	0.3	0.9	10-12	Man. of food products	41	0.2
00	Other industries	793	0.1	5.8	00	Other industries	333	0.1
Manufacturing of food products (C10-C12)								
01	Agriculture and hunting	3,418	53.6	96.0	55-56	Accommodation and food service activiti	2,190	7.5
46	Wholesale trade	878	2.4	5.3	01	Agriculture and hunting	457	7.2
69-70	Legal and accounting activities	389	2.0	3.2	87-88	Residential care and social activities	219	2.4
49	Land transport and transport via pipelines	369	2.2	3.0	86	Human health activities	73	0.3
59-60	Motion picture, video and television	360	13.1	2.0	20	Man. of chemicals and chemical products	53	0.4
00	Other industries	3,104	0.5	20.0	00	Other industries	145	0.0
Land transport and transport via pipelines (H49)								
52	Warehousing and support activities for trans	1,031	9.2	5.2	46	Wholesale trade	1,067	2.9
77	Rental and leasing activities	623	6.7	19.1	10-12	Man. of food products	369	1.6
45	Trade and repair of motor vehicles	546	5.6	4.9	41-43	Construction	248	0.4
33	Repair and installation of machinery and equi	460	5.8	1.6	23	Man. of other non-metallic mineral produ	225	3.7
35	Electricity, gas, steam and air conditioning sup	457	1.5	0.4	20	Man. of chemicals and chemical products	219	1.5
00	Other industries	2,179	0.3	14.4	00	Other industries	2,081	0.4
Mining and quarring (B)								
35	Electricity, gas, steam and air conditioning sup	136	0.4	0.1	41-43	Construction	281	0.5
33	Repair and installation of machinery and equi	61	0.8	0.2	23	Man. of other non-metallic mineral produ	269	4.4
52	Warehousing and support activities for trans	58	0.5	0.3	19	Man. of coke and refined petroleum proc	259	5.3
49	Land transport and transport via pipelines	55	0.3	0.4	35	Electricity, gas, steam and air conditioning	198	0.6
41-43	Construction	49	0.1	0.3	24	Man. of basic metals	62	0.3
00	Other industries	318	0.1	2.3	00	Other industries	179	0.0
Public administration and defence; compulsory social security (O84)								
68B	Real estate activities	1,312	4.4	3.5	69-70	Legal and accounting activities	66	0.3
64	Financial services	563	3.7	2.6	66	Other financial and insurance activities	22	0.6
77	Rental and leasing activities	423	4.6	12.9	64	Financial services	22	0.1
41-43	Construction	368	0.6	2.0	41-43	Construction	11	0.0
35	Electricity, gas, steam and air conditioning sup	272	0.9	0.2	65	Insurance, reinsurance and pension fundin	10	0.1
00	Other industries	2,417	0.4	16.2	00	Other industries	138	0.0
Manufacturing of coke and refined petroleum products (C19)								
05-09	Mining and quarring	259	13.2	0.9	24	Man. of basic metals	360	2.0
20	Man. of chemicals and chemical products	70	0.5	0.1	51	Air transport	274	7.3
46	Wholesale trade	62	0.2	0.4	49	Land transport and transport via pipeline	261	1.5
41-43	Construction	59	0.1	0.3	41-43	Construction	178	0.3
49	Land transport and transport via pipelines	46	0.3	0.4	01	Agriculture and hunting	124	1.9
00	Other industries	191	0.0	1.4	00	Other industries	1,062	0.2

Source: Statistics Austria (input-output tables 2018).

Table A2

Impact of a stop in Russian gas deliveries to Austria from June 1, 2022

	Decline in value added, %		Relevance of gas 1)
	June to Dec. 2022	2022 as a whole	
GDP	−5.7	−3.1	-
Electricity, gas, steam and air conditioning supply (D35)	−68	−37	1.00
Man. of paper and paper products (C17)	−68	−37	1.00
Mining and quarring (B)	−54	−29	0.79
Water collection, treatment and supply (E36)	−39	−21	0.57
Man. of basic metals (C24)	−38	−21	0.56
Man. of chemicals and chemical products (C20)	−36	−20	0.53
Man. of coke and refined petroleum products (C19)	−35	−19	0.52
Man. of other non-metallic mineral products (C23)	−34	−19	0.51
Forestry and logging (A02)	−12	−6	0.02
and waste collection (E37-E39)	−10	−5	0.03
Man. of food products (C10-C12)	−7	−4	0.17
Man. of textiles (C13-C15)	−5	−3	0.15
Repair and installation of machinery and equipment (C33)	−5	−3	0.01
Employment activities (N78)	−4	−2	0.00
Agriculture and hunting (A01)	−4	−2	0.02
Land transport and transport via pipelines (H49)	−3	−2	0.10
Warehousing and support activities for transportation (H52)	−3	−2	0.00
Man. of pharmaceutical products (C21)	−2	−1	0.08
Advertising and market research (M73)	−13	−7	0.00
Financial services (K64)	−2	−1	0.00
Man. of wood (C16)	−3	−2	0.07
Legal and accounting activities (M69-M70)	−18	−10	0.00
Other business services (N80-82)	−8	−5	0.05
Other professional, scientific and technical activities (M74-M75)	−2	−1	0.00
Motion picture, video and television (J59-J60)	−2	−1	0.00
Wholesale trade (G46)	−2	−1	0.01
Printing and reproduction of recorded media (C18)	−1	−1	0.05
Rental and leasing activities (N77)	−3	−1	0.00
Water transport (H50)	−1	−0	0.01
Telecommunications (J61)	−3	−2	0.00
Other financial and insurance activities (K66)	−3	−2	0.00
Man. of rubber and plastic products (C22)	−8	−5	0.05
Man. of fabricated metal products (C25)	−0	−0	0.05
Real estate activities (L68)	−0	−0	0.00
Repair of computers and personal and household goods (S95)	−4	−2	0.00
Insurance, reinsurance and pension funding (K65)	−2	−1	0.00
Postal and courier activities (H53)	−2	−1	0.01
Fishing and aquaculture (A03)	−1	−0	0.03
Trade and repair of motor vehicles (G45)	−0	−0	0.01
Publishing activities (J58)	−2	−1	0.00
Air transport (H51)	−3	−1	0.00
Travel agencies & tour operator reservation services (N79)	−2	−1	0.00
Accommodation and food service activities (I)	−2	−1	0.01
Imputed rents (L68A)	−6	−3	0.00
Activities of households as employers of domestic personnel (T97)	−3	−2	0.00
Other personal service activities (S96)	−4	−2	0.02
Retail trade (G47)	−5	−3	0.00
Sports activities and amusement and recreation activities (R93)	−1	−0	0.02
Public administration and defence; compulsory social security (O84)	−4	−2	0.03
Architectural and engineering activities (M71)	−4	−2	0.00
Man. of motor vehicles, trailers and semi-trailers (C29)	−2	−1	0.03
Construction (F)	−4	−2	0.01
Activities of membership organisations (94S)	−3	−1	0.00
Arts and entertainment activities (R90-92)	−2	−1	0.00
Man. of electrical equipment (C27)	−3	−2	0.02
IT services (J62-J63)	−1	−1	0.00
Residential care and social activities (Q87-88)	−8	−5	0.00
Man. of machinery and equipment n.e.c. (C28)	−2	−1	0.02
Man. of furniture & other man. (C31-C32)	−3	−2	0.01
Human health activities (Q)	−3	−2	0.01
Education (P85)	−5	−3	0.00
Man. of other transport equipment (C30)	−2	−1	0.01
Man. of computer, electronic and optical products (C26)	−3	−2	0.01
Scientific research and development (M72)	−1	−1	0.00

1) The relevance of gas reflects the elasticity of demand given a % cut in gas imports. A value of 1 reflects a fixed-proportions (Leontief) production function; a value of 0 means that gas imports do not impact on production.

Source: Author's calculations..