



# JRC SCIENTIFIC INFORMATION SYSTEMS AND DATABASES REPORT

## The European Natural Gas Demand database (ENaGaD)

*An archive of daily time series  
from 2015 to 2020*

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## **Abstract**

The report describes the “European Natural Gas Demand” (ENaGaD) database composed of daily time series of the national demand of natural gas for each of the 25 European Member States with a transmission system and some European Countries. The series are compiled and presented from 2015 to 2020 in energy unit of measurement. Values are mainly collected from the transparency platform of National Transmission System Operators in compliance to Regulation (EC) No 715/2009. Whenever possible, the daily demand is further divided in consumption by electricity and heat producers, consumption by industrial users and by households. The ENaGaD database is available from the Joint Research Centre Data Catalogue at <https://data.jrc.ec.europa.eu/>. ENaGaD is also available from the data sharing platform Zenodo with DOI [10.5281/zenodo.5109726](https://doi.org/10.5281/zenodo.5109726).

## 1 Introduction

The liberalisation process, started in September 2009 with the entering into force of the so-called “Third Energy package”, aimed at improving the functioning of the internal energy market and resolving certain structural problems. Within the boundary of the EU natural gas sector, the Third Energy package provided the means to secure a genuine, well-functioning, open and efficient internal gas market. One key aspect addressed by the EU legislation has significantly changed the way natural gas undertakings operate. This aspect is transparency.

Transparency is an essential pre-requisite for, but also underpins, a well functioning, effective and efficient internal energy market. Accurate and timely information provision by market actors over the physical status and efficiency of the EU gas system is necessary to enable market participants to assess the overall demand and supply situation, to value wholesale prices, and to react to unforeseen short-term dynamics, increasing a more efficient allocation of resources, risk hedging and new entry.

In this respect, Directive 2009/73/EC of the European Parliament<sup>(1)</sup> concerning common rules for the internal market in natural gas and Regulation (EC) No 715/2009<sup>(2)</sup> on conditions for access to the natural gas transmission networks lay down the foundations of a transparent EU gas market. Chapter 3 of Annex I of Regulation (EC) No 715/2009 (and its amendments) defines basic transparency rules and obligations for gas national Transmission System Operators (TSOs), underground gas Storage System Operators (SSOs) and LNG System Operators. The Regulation pushed natural gas undertakings to create their own data transparency platform on the company’s web page. The adoption of the obligations has been different among the stakeholders, with differences in the interpretation of the Regulation, on how information is published and how much information is disclosed. The establishment of the European Network of Transmission System Operators for Gas (ENTSOG)<sup>(3)</sup> and of the Agency for the Cooperation of Energy Regulators (ACER)<sup>(4)</sup> enhanced the internal market by creating Organisations able to control for and facilitate transparency at multiple levels. ENTSOG is the association of Europe’s transmission system operators, and it comprises 45 TSOs and 2 Associated Partners from 26 countries and 6 observing TSOs from EU affiliated countries. Finally, the subsequent adoption of EU-wide network codes and guidelines addressed transparency and data exchange from a technical point, allowing for the entering into force of EU common tools and practices. For example, Regulation (EU) 2015/703 of 30 April 2015 establishing a network code on interoperability and data exchange rules<sup>(5)</sup> provides rules and procedures, so that an appropriate level of harmonisation towards efficient gas trading and transport across gas transmission systems in the EU can be achieved, thereby increasing data publication requirements. More recently, Regulation (EU) No 1227/2011<sup>(6)</sup> on wholesale energy market integrity and transparency and its Commission Implementing Regulation (EU) No. 1348/2014<sup>(7)</sup> on data reporting implementing Article 8(2) and Article 8(6) of Regulation 1227 introduced additional publication and reporting obligations to the market participants, aimed at supporting market monitoring and fostering open and fair competition in wholesale energy markets.

ENTSOG and the associated TSOs have been very active in the field of transparency of the sector. The first common platform for public data sharing was set up by EU TSOs in 2008 on a voluntary basis. Regulation (EU) No 715/2009 stipulates that “*all data shall be made available as of 1 October 2013 on one Union-wide central platform, established by ENTSOG on a cost-efficient basis*” (letter h, point 1 of section 3.1.1 of Annex I). This obligation resulted in an improved platform for data sharing at the end of 2013. In October 2014 a new and revised platform<sup>(8)</sup> was officially launched by ENTSOG, providing free of charge and vast information related to gas transmission in an organised and structured way. The platform provides technical and commercial data on gas transmission systems. It includes data on interconnection points and connections with storages, LNG facilities, distribution networks, final consumers and production facilities, with a time coverage starting in many cases from 2015. A similar platform is maintained, on a voluntary basis, by members of the Gas Infrastructure Europe (GIE) association for underground gas storages and for LNG facilities. This initiative helps to provide the information the market needs to operate efficiently and effectively whilst protecting commercially sensitive information. The Aggregated Gas Storage Inventory plus (AGSI+)<sup>(9)</sup> publishes storage inventory as per member state, storage operator and storage site. The Aggregated LNG Storage Inventory (ALSI)<sup>(10)</sup> is a public platform making available aggregated operational data of EU LNG terminals, covering all the LNG regasification capacity in operation in the EU.

<sup>(1)</sup> OJ L 211, 14.8.2009, p. 94–136.

<sup>(2)</sup> OJ L 211/36, 14.8.2009, p. 36–55.

<sup>(3)</sup> Article 4 and 5 of Reg. (EC) No 715/2009.

<sup>(4)</sup> OJ L 211, 14.8.2009, p. 1–14.

<sup>(5)</sup> OJ L 113, 15.2015, p. 13–26.

<sup>(6)</sup> OJ L 326, 8.12.2011, p. 1–16.

<sup>(7)</sup> OJ L 363, 18.12.2014, p. 121–142.

<sup>(8)</sup> <https://transparency.entsoe.eu>

<sup>(9)</sup> <https://agsi.gie.eu>

<sup>(10)</sup> <https://alsi.gie.eu>

In 2019 the European Commission published the Green Deal Communication (COM(2019) 640 final). This Communication sets a number of ambitious objectives in different areas, and particularly in the energy sector. Achieving climate neutrality by 2050 is the main target in this sector, accompanied by an intermediate objective by 2030 of reducing Greenhouse Gas (GHG) emissions by 55% with respect to 1990 levels. These ambitious goals can be reached by means of a large electrification of the energy sector, phasing out coal and decarbonising gas, together with other general measures like increasing efficiency in different areas. Decarbonisation of gas is based on massive production of green hydrogen obtained from the expected excess of renewable electricity, and on the increasing production of biogas and biomethane. The Green Deal Communication has triggered a number of actions, and in particular the ‘Fit for 55’ package, which includes a number of legislative initiatives, under development during 2021, among which the revision of the Third Energy Package for gas (Gas Directive 2009/73/EU and Regulation 715/2009/EU) to regulate competitive decarbonised gas markets (new market for hydrogen and updated market for natural gas with increasing fractions of biomethane and hydrogen). Such revision will further leverage transparency and data exchange due to the higher variability of energy content in the gas mixture that will be transported and the stricter quality requirements of the energy received on the consumers side.

The “European Natural Gas Demand” (ENaGaD) database is an effort maintained by the Joint Research Centre of the European Commission to facilitate transparency in the natural gas market by providing to the general public and academic audience an open source archive on consumption data. ENaGaD covers 25 European Member States and the United Kingdom from 2015 to 2020. Consumption data are organised — whenever possible — in three categories of users: industrial users, power generation users and residential/commercial users. To facilitate the analysis and the comparison of consumption levels, data are provided in standardised energy unit of measurement. Data are mainly collected from the transparency platform of National Transmission System Operators, or from the transparency platform of ENTSOG. In some cases, the support of the national Competent Authority for security of gas supply <sup>(11)</sup> is acknowledged as only available source of data. The report is organised as follows: in section 2 we review the provisions concerning obligations for gas network operators in terms of transparency, in section 3 we provide a detailed description of the structure of the “European Natural Gas Demand” (ENaGaD) database collecting demand data; in section 4 we illustrate the data by each Member State and Country using a country profile; finally in section 5 we present some general conclusions.

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<sup>(11)</sup> The Competent Authority is identified for each Member State based on Regulation (EU) No 2017/1938 concerning measures to safeguard the security of gas supply (OJ L 280, 28.10.2017, p. 1–56).

## 2 Legal obligations on transparency concerning natural gas data

Regulation (EC) No 715/2009 sets transparency requirements concerning transmission system operators, storage facilities and LNG facilities that are beyond those foreseen in the previous legislation. This includes more precise information covering supply and demand, network capacity, flows and maintenance, balancing and availability and usage of storage and LNG. Article 18 stipulates basic transparency requirements for transmission system operators referring to the gas demand: “*[...] The transmission system operator shall make public ex-ante and ex-post supply and demand information, based on nominations, forecasts and realised flows in and out of the system. The national regulatory authority shall ensure that all such information is made public. The level of detail of the information that is made public shall reflect the information available to the transmission system operator*”.

According to the Regulation, this information should be disclosed in a meaningful, quantifiable, clear and easily accessible manner and on a non-discriminatory basis and the market participants concerned must provide the TSO with the data considered in Article 18. Similarly, article 19 sets basic transparency requirements concerning storage facilities and LNG facilities. LNG and storage system operators shall make public detailed information regarding the services it offers and the relevant conditions applied, together with the technical information necessary for the users to access the facility. Operators shall make public information on contracted and available storage and LNG facility capacities on a numerical basis, on a regular and rolling basis and in a user-friendly standardised manner. LNG and storage system operators shall make public the amount of gas in each storage or LNG facility, or group of storage facilities if that corresponds to the way in which the access is offered to system users, inflows and outflows, and the available storage and LNG facility capacities, including for those facilities exempted from third-party access. Finally, operators or relevant regulatory authorities shall make public sufficiently detailed information on tariff derivation, the methodologies and the structure of tariffs for infrastructure under regulated third-party access.

Section 3.1.1 of Annex I stipulates that the “[...] *Transmission system operators shall provide all information referred to under paragraph 3.1.2 and paragraph 3.3(1) to 3.3(5) in the following manner:*

- (a) *on a website accessible to the public, free of charge and without any need to register or otherwise sign on with the transmission system operator;*
- (b) *on a regular/rolling basis; the frequency shall be according to the changes that take place and the duration of the service;*
- (c) *in a user-friendly manner;*
- (d) *in a clear, quantifiable, easily accessible way and on a non-discriminatory basis;*
- (e) *in a downloadable format that has been agreed between transmission system operators and the national regulatory authorities — on the basis of an opinion on a harmonised format that shall be provided by the Agency — and that allows for quantitative analyses;*
- (f) *in consistent units, in particular kWh (with a combustion reference temperature of 298.15 K<sup>(12)</sup>) shall be the unit for energy content and m<sup>3</sup> (at 273.15 K<sup>(13)</sup> and 1.01325 bar) shall be the unit for volume. The constant conversion factor to energy content shall be provided. In addition to the format above, publication in other units is also possible;*
- (g) *in the official language(s) of the Member State and in English”.*

Section 3.3 of Annex I describes the technical information necessary for network users to gain effective access to the system. It provides an exhaustive list of the information to be published for each “relevant point” of the gas system, along with the time schedule. It stipulates that the TSOs shall make available: “[...]

- (a) *the technical capacity for flows in both directions;*
- (b) *the total contracted firm and interruptible capacity in both directions;*
- (c) *the nominations and re-nominations in both directions;*
- (d) *the available firm and interruptible capacity in both directions;*
- (e) *actual physical flows;*
- (f) *planned and actual interruption of interruptible capacity;*

<sup>(12)</sup> In Celsius degree is equivalent to 15 °C.

<sup>(13)</sup> In Celsius degree is equivalent to 0 °C.

- (g) planned and unplanned interruptions to firm services as well as the information on restoration of the firm services (in particular, maintenance of the system and the likely duration of any interruption due to maintenance). Planned interruptions shall be published at least 42 days in advance;
- (h) occurrence of unsuccessful, legally valid requests for firm capacity products with a duration of one month or longer including the number and volume of the unsuccessful requests; and
- (i) in the case of auctions, where and when firm capacity products with a duration of one month or longer have cleared at prices higher than the reserve price;
- (j) where and when no firm capacity product with a duration of one month or longer has been offered in the regular allocation process;
- (k) total capacity made available through the application of the congestion-management procedures laid down in points 2.2.2, 2.2.3, 2.2.4 and 2.2.5 per applied congestion-management procedure.

Furthermore, section 3.2 provides indications on how to identify “relevant points” in the gas network for transparency requirements. It states that: “[...]

- (1) *Relevant points shall include at least:*
  - (a) all entry and exit points to and from a transmission network operated by a transmission system operator, with the exception of exit points connected to a single final customer, and with the exception of entry points linked directly to a production facility of a single producer that is located within the EU;
  - (b) all entry and exit points connecting balancing zones of transmission system operators;
  - (c) all points connecting the network of a transmission system operator with an LNG terminal, physical gas hubs, storage and production facilities, unless these production facilities are exempted under (a);
  - (d) all points connecting the network of a given transmission system operator to infrastructure necessary for providing ancillary services as defined by Article 2(14) of Directive 2009/73/EC.
- (2) *Information for single final customers and for production facilities, that is excluded from the definition of relevant points as described under 3.2(1)(a), shall be published in aggregate format, at least per balancing zone. The aggregation of single final customers and of production facilities, excluded from the definition of relevant points as described under 3.2(1)(a), shall for the application of this Annex be considered as one relevant point.*
- (3) *Where points between two or more transmission operators are managed solely by the transmission operators concerned, with no contractual or operational involvement of system users whatsoever, or where points connect a transmission system to a distribution system and there is no contractual congestion at these points, transmission system operators shall be exempted for these points from the obligation to publish the requirements under paragraph 3.3 of this Annex. The national regulatory authority may require the transmission system operators to publish the requirements under paragraph 3.3 of this Annex for groups or all of the exempted points. In such case, the information, if available to the TSO, shall be published in an aggregated form at a meaningful level, at least per balancing zone. This aggregation of these points shall for the application of this annex be considered as one relevant point.*

As a result of Regulation (EU) No 715/2009, it is today generally possible for the public to access demand and price data in the gas market with different level of details depending on the specific TSO. Table 1 provides an overview of the national transmission system operators by Member State, and the associated transparency platform. Data are generally at the daily granularity level and expressed in energy unit at normal conditions. Article 20 of the Regulation determines that TSOs, SSOs and LNG operators shall keep at the disposal of the national authorities, including the national regulatory authority, the national competition authority and the Commission, all information referred to in Articles 18 and 19, and in Part 3 of Annex I for a period of five years. This provides a baseline for retrieving time series of observations for studies and models.

**Table 1:** Data sources by Member State for daily figures concerning domestic demand. Entries are classified based on the type of unit of measurement used as cubic meters ( $m^3$ ) or kilowatt-hours (kWh), reference conditions at which the measure is provided, and time granularity (i.e., daily, hourly). For the temperature reference conditions 25/0 °C means that the combustion temperature is at 25 °C and the temperature at which the volume is calculated is 0 °C.

Member State	Data provider	Web page	Unit of measurement	Time granularity
AT	Austrian Gas Grid Management AG	<a href="https://platform.aggm.at/vis/visualisation/map">https://platform.aggm.at/vis/visualisation/map</a>	kWh (25/0 °C)	daily, hourly
BE	Fluxys	<a href="https://gasdata.fluxys.com/">https://gasdata.fluxys.com/</a>	$m^3$ (0 °C), kWh (25/0 °C)	daily, hourly
BG	Bulgartransgaz EAD	<a href="https://www.bulgartransgaz.bg/en/pages/operational-data-185.html">https://www.bulgartransgaz.bg/en/pages/operational-data-185.html</a>	kWh (25/0 °C)	daily
CZ	NET4Gas	<a href="http://extranet.net4gas.cz/gas_flow.aspx">http://extranet.net4gas.cz/gas_flow.aspx</a>	$m^3$ (15 °C), kWh (15/15 °C)	daily, hourly
DE	Fluxys Belgium SA/NV	<a href="https://gasdata.tnp.gsmartsuite.com/">https://gasdata.tnp.gsmartsuite.com/</a>	kWh (25/0 °C)	daily
	Fluxys Deutschland GmbH	<a href="https://gasdata.tnp.gsmartsuite.com/">https://gasdata.tnp.gsmartsuite.com/</a>	kWh (25/0 °C)	daily
	Gascade	<a href="https://tron.gascade.biz/#">https://tron.gascade.biz/#</a>	kWh (25/0 °C)	hourly
	Bayernets	<a href="https://www.bayernets.de/en/transparency/network-data/data-platform">https://www.bayernets.de/en/transparency/network-data/data-platform</a>	kWh (25/0 °C)	daily
	GTG Nord	<a href="https://b2b-prod.gtg-nord.de/publication/?language=en#">https://b2b-prod.gtg-nord.de/publication/?language=en#</a>	kWh (25/0 °C)	daily
	Gasunie Deutschland Transport Services GmbH	<a href="https://www.gasunie.de/en/transparency/transparenz-verpflichtungen/transparency-database">https://www.gasunie.de/en/transparency/transparenz-verpflichtungen/transparency-database</a>	kWh (25/0 °C)	hourly
	GRTgaz Deutschland	<a href="https://www.grtgaz-deutschland.de/en/networkaccess/networkdata">https://www.grtgaz-deutschland.de/en/networkaccess/networkdata</a>	kWh (25/0 °C)	hourly
	NEL Gastransport GmbH	<a href="https://tron.nel-gastransport.biz/?language=en#">https://tron.nel-gastransport.biz/?language=en#</a>	kWh (25/0 °C)	hourly
	Nowega GmbH	<a href="https://transparenz.nowega.de/#">https://transparenz.nowega.de/#</a>	kWh (25/0 °C)	hourly
	Ontras	<a href="https://www.ontras.com/en/transparency-tool">https://www.ontras.com/en/transparency-tool</a>	kWh (25/0 °C)	hourly, daily
	Open Grid Europe GmbH	<a href="https://oge.net/en/for-customers/gas-transmission/market-information/operational-network-data/network-data">https://oge.net/en/for-customers/gas-transmission/market-information/operational-network-data/network-data</a>	kWh (25/0 °C)	hourly, daily
	terraneets bw GmbH	<a href="https://www.terraneets-bw.de/en/gas-transmission/gas-grid-information/#datafacts">https://www.terraneets-bw.de/en/gas-transmission/gas-grid-information/#datafacts</a> <a href="https://transparency.entsog.eu (*">https://transparency.entsog.eu (*)</a>	kWh (25/0 °C)	hourly, daily
	Thyssengas GmbH	<a href="https://thyssengas.com/en/network-enquiries/transparency-information/overview.html">https://thyssengas.com/en/network-enquiries/transparency-information/overview.html</a> <a href="https://transparency.entsog.eu (*">https://transparency.entsog.eu (*)</a>	kWh (25/0 °C)	hourly, daily
	bayernets	<a href="https://www.bayernets.de/en/transparency/publication-requirements">https://www.bayernets.de/en/transparency/publication-requirements</a> <a href="https://transparency.entsog.eu (*">https://transparency.entsog.eu (*)</a>	kWh (25/0 °C)	hourly, daily
DK	ENERGINET.DK	<a href="http://online.energinet.dk/Pages/default.aspx">http://online.energinet.dk/Pages/default.aspx</a>	kWh (25/0 °C)	daily, hourly
EE	Eltering	<a href="https://dashboard.eltering.ee">https://dashboard.eltering.ee</a>	kWh (25/0 °C)	hourly
EL	DESFA	<a href="https://www.desfa.gr/en/regulated-services/transmission/annex-i-of-regulation-715-2009">https://www.desfa.gr/en/regulated-services/transmission/annex-i-of-regulation-715-2009</a>	kWh (25/0 °C)	hourly, daily
ES	ENAGAS	<a href="http://www.enagas.es/enagas/es/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda">http://www.enagas.es/enagas/es/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda</a> <a href="https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda">https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda</a>	GWh (25/0 °C)	daily
FI	Gasgrid Finland Oy	<a href="https://transparency.entsog.eu (*">https://transparency.entsog.eu (*)</a>	kWh (25/0 °C)	hourly, daily
FR	GRTgaz	<a href="http://www.smart.grtgaz.com/en">http://www.smart.grtgaz.com/en</a>	kWh (25/0 °C)	daily
FR	Teréga	<a href="https://portail.terega.fr/star-app/accueil">https://portail.terega.fr/star-app/accueil</a>	kWh (25/0 °C)	daily
HR	Plinacro d.o.o.	<a href="http://www.sukap.plinacro.hr/wps/portal">http://www.sukap.plinacro.hr/wps/portal</a>	$m^3$ (0, 15 °C), kWh (15/15 °C, 25/0 °C)	daily
HU	FGSZ Ltd	<a href="https://ipnew.rbp.eu/Fgsz.Tso.Data.Web/?locale=en#main">https://ipnew.rbp.eu/Fgsz.Tso.Data.Web/?locale=en#main</a>	$m^3$ (0, 15 °C), kWh (25/0 °C)	daily

<b>Member State</b>	<b>Data provider</b>	<b>Web page</b>	<b>Unit of measurement</b>	<b>Time granularity</b>
IE	Gas Network Ireland	<a href="https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/">https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/</a>	kWh (25/0 °C)	hourly, daily
IT	Snam S.p.a.	<a href="http://www.snam.it/it/trasporto/dati-operativi-business/2,_Andamento_dal_2005/">http://www.snam.it/it/trasporto/dati-operativi-business/2,_Andamento_dal_2005/</a>	$m^3$ (15 °C), kWh (15/15 °C)	daily
LT	AmbeGrid	<a href="https://www.ambergrid.lt/en/services/capacity-information/capacity-and-gas-flow-data">https://www.ambergrid.lt/en/services/capacity-information/capacity-and-gas-flow-data</a>	kWh (25/20 °C)	daily
LV	Conexus	<a href="https://capacity.conexus.lv/?id=158&amp;lang=eng">https://capacity.conexus.lv/?id=158&amp;lang=eng</a>	kWh (25/0 °C)	daily
LU	CREOS Luxembourg S.A.	<a href="https://gasdata.creos.lu">https://gasdata.creos.lu</a>	kWh (25/0 °C)	hourly, daily
NL	Gasunie	<a href="https://www.gasunietransportservices.nl/en/transparency/dataport">https://www.gasunietransportservices.nl/en/transparency/dataport</a>	kWh (25/0 °C)	daily
PL	GAZ-SYSTEM	<a href="http://en.gaz-system.pl/customer-zone/transmission/">http://en.gaz-system.pl/customer-zone/transmission/</a>	kWh (25/0 °C)	daily
PT	REN	<a href="http://www.mercado.ren.pt/EN/Gas/MarketInfo/Load/Actual/Pages/Daily.aspx">http://www.mercado.ren.pt/EN/Gas/MarketInfo/Load/Actual/Pages/Daily.aspx</a>	kWh (25/0 °C)	hourly, daily
RO	TRANSGAZ S.A.	<a href="http://www.transgaz.ro/en/clients/operational-data/physical-flows">http://www.transgaz.ro/en/clients/operational-data/physical-flows</a>	$m^3$ (0, 15 °C), kWh (15/15 °C, 25/0 °C)	daily
SE	Swedegas	<a href="https://www.swedegas.com/Our_services/services/statistics">https://www.swedegas.com/Our_services/services/statistics</a>	kWh (25/0 °C)	hourly
SI	Plinovodi	<a href="http://www.plinovodi.si/en/operation/operation-of-transmission-system/relevant-points-data/">http://www.plinovodi.si/en/operation/operation-of-transmission-system/relevant-points-data/</a>	$m^3$ (0, 15 °C), kWh (25/0 °C)	daily
SK	EUSTREAM	<a href="https://tis.eustream.sk/TisWeb/#/?nav=rd.nom">https://tis.eustream.sk/TisWeb/#/?nav=rd.nom</a>	$m^3$ (20 °C), kWh (25/20 °C)	daily
<b>Others</b>	<b>Data provider</b>	<b>Web-page</b>	<b>Unit of measurement</b>	<b>Time granularity</b>
UK	National Grid	<a href="http://mip-prod-web.azurewebsites.net/DataItemExplorer/Index">http://mip-prod-web.azurewebsites.net/DataItemExplorer/Index</a>	kWh (15/15 °C)	hourly, daily
MK	Joint Stock Company GA-MA a.d.	<a href="http://www.gama.com.mk/Default.aspx">http://www.gama.com.mk/Default.aspx</a> <a href="https://transparency.entsog.eu">https://transparency.entsog.eu (*)</a>	kWh (25/0 °C)	hourly, daily
	ENTSOG	<a href="https://transparency.entsog.eu">https://transparency.entsog.eu</a>	kWh (25/0 °C)	hourly, daily
	GASPOOL	<a href="https://www.gaspool.de">https://www.gaspool.de</a>	MWh (25/0 °C)	daily
	NCG	<a href="https://www.net-connect-germany.de">https://www.net-connect-germany.de</a>	kWh (25/0 °C)	daily

(\*) Data are from the ENTSOG transparency platform.

Source: JRC, 2021.

### 3 Structure of ENaGaD

The “European Natural Gas Demand” (ENaGaD) database aims at being a flexible and easy to use tool for the general public to access and elaborate data on domestic consumption of natural gas in European Countries. Such data may be already available from the Transmission System Operators, National Authorities or the National Statistical Institutes<sup>(14)</sup>, but a single, centralised and homogeneous archive is missing. ENaGaD addresses all these issues giving the general public and academic researchers a one-stop shop where retrieve data sets for addressing their modelling needs. Furthermore, each time series is enriched by information concerning its origin, units of measurement, granularity and processing.

Data are provided for each of the Member State with a high pressure transmission system and other European Countries in tabular form using a flat comma separated values format (CSV). CSV format has been selected because is human readable, easy to edit (even manually), and simple to implement, parse and process by almost all existing applications. Though it is not a compressed type of file, CSV is generally of small size and compact (especially compared to XML). CSV format is built around a straightforward schema, and results very effective when dealing with simple data structure. When properly complemented by metadata in the header section, it is possible to cope easily with some of its disadvantages like: distinction between text and numeric values, way of representing binary data, way of indicating null values or dates.

Each comma separated file in the ENaGaD database is named by using the ISO 3166 alpha-2 code (ISO, 2020)<sup>(15)</sup> followed by the version and sub-version number. For example, the Italian data set is indicated by “IT.v1.0.csv”, where ‘IT’ is the ISO code, and ‘v1.0’ is the version/sub-version number.

Each data file starts with a header composed of twenty-two lines. The structure of the header is presented in the following example:

```
# `European Natural Gas Demand' (ENaGaD) database
# Joint Research Centre, European Commission
# Version: X.X  Last updated on: YYYY-MM-DD
# Country: NAME OF COUNTRY
# Unit of Measurement: GWh/d (temperature combustion 25 °C, volume at
#                      0 °C and pressure at 101.325 kPa)
# NULL values: indicated by NA
# Precision of values: rounded to the third decimal digit (xx.yyy)
# Columns: GASDAY gas day of the observation (format YYYY-MM-DD);
#          DD day of the observation;
#          MONTH month of the observation;
#          YEAR year of the observation;
#          JULIANDAY Julian day of observation;
#          TOT total domestic consumption;
#          IND consumption of industrial users;
#          GPP power generation users;
#          DIS consumption of residential and commercial users;
#          PROC flag to indicated if the values are original data 0 or estimated figures E.
#
# SOURCE: data provider and website
# LICENSE: CC BY 4.0 https://creativecommons.org/licenses/by/4.0/
# REFERENCE: quote Zaccarelli, N., Giaccaria, S., Feofilous, M., Bolado-Lavin, R.,
#            The European Natural Gas Demand database (ENaGaD) -- A archive of daily time series
#            from 2015 to 2020, Publications Office of the European Union, Luxembourg, 2021,
#            ISBN 978-92-76-40208-4, doi:10.2760/497677, JRC125730}
```

The header reports on:

- the version number of the data set with a major release progressive number followed by a minor revision version progressive number. In its first release all data sets have version 1.0;
- date of last update or revision of the data set with time format YYYY-MM-DD (i.e., four digit for the year, two digit month and two digit day of the month);
- official name of the Member State or of the Country;

<sup>(14)</sup> See list available at <https://ec.europa.eu/eurostat/web/links>.

<sup>(15)</sup> For details consult the online browsing platform of the International Organization for Standardization at [https://en.wikipedia.org/wiki/ISO\\_3166-1\\_alpha-2](https://en.wikipedia.org/wiki/ISO_3166-1_alpha-2). Select “Country Codes” and “Alpha 2” for a list of codes.

- description of the unit of measurement used in the current version of the data set;
- how null values are indicated (e.g., by using the string ‘NA’);
- precision of the measurement, which is set by rounding up to the third decimal digit. Please, note that the format of decimal numbers is adopting the British convention of indicating the decimal part by the integer part of the number by using a dot;
- the list of variable used in the data set followed by a short description of their meaning;
- the actual data provider and the address of the web page on the World Wide Web;
- the license under which the data set is released (i.e., Creative Commons Attribution 4.0 International);
- how to quote the data set.

The header provides, also, a short description of the variables making up the time series. The first field of the table of the data set is ‘GASDAY’ indicating the gas day of delivery of the reported amount of energy. For convenience the gas day time stamp is then reported as day of the month ‘DD’, month of the year ‘MONTH’ and year ‘YEAR’. These fields could be easily derived from the time stamp of the gas day, but are provided to facilitate the processing of the data. Another derived field is the ‘JULIANDAY’ representing the Julian day number or ‘ordinal date’. Such date consists in indicating the day of the year ranging between 1 and 366, starting on January 1.

For each Country in the ENaGaD database, the total domestic consumption of natural gas is reported for the period January 1 2015 to December 31 2020 using the variable ‘TOT’. When possible, the total consumption is disaggregated into consumption of industrial users ‘IND’, consumption of power generation users ‘GPP’ and consumption of residential and commercial users ‘DIS’. Industrial consumers are — generally — big industrial facility directly connected to the transmission grid. Power generation users are either gas-fired power plants or combined heat and power facilities using natural gas as primary fuel. Commercial and residential users are customers downstream a city gate. When it is not possible to breakdown the total figure in these three categories, the group “Other” (‘label ‘OTHER’) is used.

Finally, a label ‘PROC’ indicates if the data is the original one — after conversion of the unit of measurement — or if it has been estimated by averaging or other techniques.

ENaGaD expresses consumption in energy unit of gigawatt hour per day at reference normal conditions. Normal conditions are here assumed to be the temperature of 25 °C for combustion and for volume the temperature of 0 °C and the pressure of 101.325 kPa. Conversion from other reference conditions is performed following the ISO 13443:1996 (ISO, 1996)<sup>(16)</sup>.

It is important to note that the figures reported in the ENaGaD database may differ from other official statistics. There are many reasons for such possible differences. For example, consumption linked to domestic production of natural gas or to the functioning of the transmission and distribution systems is not considered. Another example is that industrial users or power generation users downstream a city gate may not be properly accounted for. The use of a different unit of measurement or of alternative reference conditions may complicate the comparison. The main source of data is from the national transmission system operators and they may not account all possible use of natural gas. For official figures, the reader is encouraged to check with the National Authorities or National Statistical Institutes .

Annex 1 shows examples of the code used for processing the data (excluding conversion) and producing the tables and charts of Section 4.

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<sup>(16)</sup> <https://www.iso.org/standard/20461.html>.

## 4 Data by Country

This section provides a summary by Country of the data collected. The time series of national consumption by user category — if available — is shown along with a table with the minimum, the maximum and the average value by year. For each Country a homogeneous set of metadata is described by covering:

- “data source”: the original data provider is described along with the address of the website from where the data can be downloaded;
- “type of flow”: which type of flow can be collected from the data provider. The flow is here classified into: domestic production, cross-border interconnection point, underground storage facility, LNG facility and domestic consumption data. Data for each type of these category of flow can be collected.
- “Classification of consumption”: when in the “type of flow” the category “domestic consumption” is selected, such consumption is further classified considering two possible dimensions. On one side it is checked if the daily figures are aggregated for a virtual exit point at national level (i.e., class “one national value”) or if it is possible to obtain figures for each off-take point in the transmission system (i.e., category “node level”). After this first dimension of the data is defined, a second dimension is considered which tries to classify the daily values by indicating if data are available by user category. The user category is distinguished in: residential and commercial users, industrial users, power generation users and “other” users (when at least two users groups are merged together).
- “data on gas quality”: the presence of data concerning the higher gross calorific value and the Wobbe index is reported.
- “unit of Measurement”: the type and reference conditions of the unit of measurements used in the original data for daily consumption are indicated.
- “time granularity”: the granularity of the data for national consumption and gas quality is indicated as “daily” and/or “hourly”.
- “transparency information”: if the data provider has a web page describing the transparency requirements based on Regulation (EU) No 2009/715. When possible, the web page is reported.
- “data processing”: type of data processing carried out on the original data to produce the latest available version of the ENaGaD data sets.

Table 2 provides an overview of the information for each Member State and Country. It should be noted that despite Regulation (EU) No 2009/715 defines a clear minimum set of information to be published, the way such requirements are interpreted by the national transmission system operators may be different among Member States. In particular, the lack of data concerning domestic consumption or natural gas delivered to final consumers and distribution system operators is of concern.

**Table 2:** Summary table of the type of data provided by the national Transmission System Operators. See the beginning of section 4 for the meaning of the columns.

Country	TSO	Type of flow					Consumption details			GasQuality		Unit of measurement					Time granularity	Link to data and transparency page			
		Production	Cross-border flow	Storage Facility	LNG Facility	Consumption	One national value	Node level	User category	Residential & Commercial	Industrial	Power Generation	Other groups	GCV	Wobbe	energy (kWh)	volume (m <sup>3</sup> )	0 °C	15 °C	20 °C	25 °C
Austria	Gas Connect Austria GmbH	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	daily	<a href="https://platform.aggm.at/vis/visualisation/general">https://platform.aggm.at/vis/visualisation/general</a> <a href="https://www.gasconnect.at/en/network-access/transparency-information">https://www.gasconnect.at/en/network-access/transparency-information</a>
		x	x	x	x	x														hourly	
Belgium	Fluxys	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	<a href="https://gasdata.fluxys.com/">https://gasdata.fluxys.com/</a> <a href="https://www.fluxys.com/en/products-services/supplying-europe/uk/transparency-requirements">https://www.fluxys.com/en/products-services/supplying-europe/uk/transparency-requirements</a>
Bulgaria	Bulgartransgaz EAD	x	x		x	x				x	x	x	x	x	x	x	x	x	x	x	<a href="https://www.bulgartransgaz.bg/en/pages/istoricheski-danni-45.html">https://www.bulgartransgaz.bg/en/pages/istoricheski-danni-45.html</a> <a href="https://www.bulgartransgaz.bg/en/pages/tra-template-transmission-18.html">https://www.bulgartransgaz.bg/en/pages/tra-template-transmission-18.html</a> <a href="https://transparency.entsog.eu">https://transparency.entsog.eu</a>
Croatia	Plinacro d.o.o.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	<a href="https://www.sukap.plinacro.hr/pub/app/app?lang=en">https://www.sukap.plinacro.hr/pub/app/app?lang=en</a> <a href="https://www.plinacro.hr/default.aspx?id=592">https://www.plinacro.hr/default.aspx?id=592</a>
Czechia	net4gas	x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	<a href="http://extranet.net4gas.cz/gas_flow.aspx">http://extranet.net4gas.cz/gas_flow.aspx</a> <a href="https://www.net4gas.cz/files/legislativa/20190102_published-information-overview_en.pdf">https://www.net4gas.cz/files/legislativa/20190102_published-information-overview_en.pdf</a>
Denmark	Energinet	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	<a href="https://www.energidataservice.dk/tso-gas">https://www.energidataservice.dk/tso-gas</a> No transparency web page
Estonia	Elering AS	x	x		x	x				x	x	x	x	x	x	x	x	x	x	x	<a href="https://dashboard.elering.ee/">https://dashboard.elering.ee/</a> No transparency web page
Finland	Gasgrid Finland Oy	x								x		x	x	x	x	x	x	x	x	x	<a href="https://transparency.entsog.eu">https://transparency.entsog.eu</a> No transparency web page
France	Teréga	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	<a href="https://transparency.entsog.eu/">https://transparency.entsog.eu/</a> <a href="https://portail.terega.fr/star-app/accueil">https://portail.terega.fr/star-app/accueil</a> <a href="https://portail.terega.fr/star-app/edito/tarifs-utilisation-des-reseaux-de-transport-de-gaz-le-modele-entsog">https://portail.terega.fr/star-app/edito/tarifs-utilisation-des-reseaux-de-transport-de-gaz-le-modele-entsog</a>
		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	<a href="http://www.smart.grtgaz.com/en">http://www.smart.grtgaz.com/en</a> No transparency web page

Country	TSO	Type of flow				Consumption details			GasQuality		Unit of measurement					Time granularity	Link to data and transparency page				
		Production	Cross-border flow	Storage Facility	LNG Facility	Consumption	One national value	Node level	Residential & Commercial	Industrial	Power Generation	Other groups	GCV	Wobbe	energy (kWh)	volume (m³)	0 °C	15 °C	20 °C	25 °C	
Germany	Fluxys TENP GmbH	x											x	x	x	x	x	x	x	daily	<a href="https://gasdata.tnp.gsmartsuite.com/">https://gasdata.tnp.gsmartsuite.com/</a> No transparency web page
	Fluxys Deutschland GmbH		x										x	x	x	x	x	x	x	hourly	
	Gascade		x										x	x	x	x	x	x	x	daily	<a href="https://gasdata.tnp.gsmartsuite.com/">https://gasdata.tnp.gsmartsuite.com/</a> No transparency web page
	bayernets		x	x									x	x	x	x	x	x	x	hourly	<a href="https://tron.gascade.biz/?language=en#">https://tron.gascade.biz/?language=en#</a> No transparency web page
	Gastransport Nord GmbH (GTG Nord)		x	x	x	x		x		x		x	x	x	x	x	x	x	x	hourly	<a href="https://www.bayernets.de/en/transparency/network-data/data-platform">https://www.bayernets.de/en/transparency/network-data/data-platform</a> <a href="https://www.bayernets.de/en/transparency/publication-requirements">https://www.bayernets.de/en/transparency/publication-requirements</a>
	Gasunie Deutschland Transport Services GmbH		x	x	x	x		x		x		x	x	x	x	x	x	x	x	hourly	<a href="https://b2b-prod.gtg-nord.de/publication/?language=en#">https://b2b-prod.gtg-nord.de/publication/?language=en#</a> No transparency web page
	GRTgaz Deutschland		x	x	x	x		x		x		x	x	x	x	x	x	x	x	hourly	<a href="https://www.grtgaz-deutschland.de/customers/">https://www.grtgaz-deutschland.de/customers/</a> <a href="https://www.grtgaz-deutschland.de/transparency/">https://www.grtgaz-deutschland.de/transparency/</a>
	Lubmin-Brandov Gastransport GmbH			x								x	x	x	x	x	x	x	x	hourly	No data web page <a href="https://www.lbtg.de/en/node/40">https://www.lbtg.de/en/node/40</a>

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Country	TSO	Type of flow				Consumption details				GasQuality		Unit of measurement				Time granularity	Link to data and transparency page					
		Production	Cross-border flow	Storage Facility	LNG Facility	Consumption	One national value	Node level	Residential & Commercial	Industrial	Power Generation	Other groups	GCV	Wobbe	energy (kWh)	volume (m³)	0 °C	15 °C	20 °C	25 °C		
DE	NEL Gastransport GmbH	x											x	x							daily	<a href="https://tron.nel-gastransport.biz/?language=en#">https://tron.nel-gastransport.biz/?language=en#</a> No transparency web page
	Nowega GmbH		x				x						x	x							hourly	
	Ontras	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	daily	<a href="https://transparenz.nowega.de/#">https://transparenz.nowega.de/#</a> <a href="https://www.nowega.de/en/gas-transport/network-transparency/publication-obligations/">https://www.nowega.de/en/gas-transport/network-transparency/publication-obligations/</a>
	OPAL Gastransport GmbH & Co. KG	x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	
	Open Grid Europe GmbH	x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	<a href="https://oge.net/en/for-customers/gas-transmission/market-information/operational-network-data/network-data">https://oge.net/en/for-customers/gas-transmission/market-information/operational-network-data/network-data</a> <a href="https://oge.net/en/for-customers/gas-transmission/market-information/legal-publication/network-transparency">https://oge.net/en/for-customers/gas-transmission/market-information/legal-publication/network-transparency</a>
	terranets bw GmbH	x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	<a href="https://www.terranets-bw.de/en/gas-transmission/gas-grid-information/#datafacts">https://www.terranets-bw.de/en/gas-transmission/gas-grid-information/#datafacts</a> <a href="https://transparency.entsog.eu">https://transparency.entsog.eu</a> <a href="https://www.terranets-bw.de/en/gas-transmission/gas-grid-information/">https://www.terranets-bw.de/en/gas-transmission/gas-grid-information/</a>
	Thyssengas GmbH	x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	<a href="https://thyssengas.com/en/network-enquiries/transparency-information/overview.html">https://thyssengas.com/en/network-enquiries/transparency-information/overview.html</a> <a href="https://transparency.entsog.eu">https://transparency.entsog.eu</a> <a href="https://thyssengas.com/en/network-enquiries/transparency-information/overview.html">https://thyssengas.com/en/network-enquiries/transparency-information/overview.html</a>
		x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	
		x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	
		x	x	x	x	x							x	x	x	x	x	x	x	x	hourly	

Country	TSO	Type of flow				Consumption details			GasQuality		Unit of measurement					Time granularity	Link to data and transparency page	
		Production	Cross-border flow	Storage Facility	LNG Facility	One national value	Node level	User category		GCV	Wobbe	energy (kWh)	volume (m³)	0 °C	15 °C	20 °C	25 °C	
					Consumption			Residential & Commercial	Industrial	Power Generation	Other groups							
Greece	The Hellenic Gas Transmission System Operator (DESFA) S.A.	x	x	x		x				x		x	x	x	x	x	daily	<a href="https://www.desfa.gr/en/regulated-services/transmission/pliroforisimetaforas-page/historical-data/deliveries-offtakes">https://www.desfa.gr/en/regulated-services/transmission/pliroforisimetaforas-page/historical-data/deliveries-offtakes</a> <a href="https://www.desfa.gr/en/regulated-services/transmission/annex-i-of-regulation-715-2009">https://www.desfa.gr/en/regulated-services/transmission/annex-i-of-regulation-715-2009</a>
Hungary	FGSZ Ltd	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	hourly	<a href="http://tsodata.fgsz.hu/en/pub_data">http://tsodata.fgsz.hu/en/pub_data</a> <a href="https://fgsz.hu/en/transparency-information/eu-regulations">https://fgsz.hu/en/transparency-information/eu-regulations</a> <a href="https://ipnew.rbp.eu/Fgsz.Tso.Data.Web/#main">https://ipnew.rbp.eu/Fgsz.Tso.Data.Web/#main</a>
Ireland	Gas Networks Ireland	x	x	-	-	x	x	x	x	x	x	x	x	x	x	x	daily	<a href="https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/">https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/</a> <a href="https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/exit-flows/commercial-exit-point-energy-allocations/">https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/exit-flows/commercial-exit-point-energy-allocations/</a> <a href="https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/ec-715-transparency-land/">https://www.gasnetworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/ec-715-transparency-land/</a>
Italy	Snam S.p.a.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	daily hourly	<a href="https://www.snam.it/en/transportation/operational-data-business/2-Trends-since-2005/">https://www.snam.it/en/transportation/operational-data-business/2-Trends-since-2005/</a> <a href="https://www.snam.it/en/transportation/UE-fulfillments-reporting/transparency_template_reg_715-2009/">https://www.snam.it/en/transportation/UE-fulfillments-reporting/transparency_template_reg_715-2009/</a>
Latvia	AS "Conexus Baltic Grid"	x	x		x	x				x	x	x	x	x	x	x	daily	<a href="https://capacity.conexus.lv">https://capacity.conexus.lv</a> No transparency web page
Lithuania	AB Amber Grid	x		x	x	x	x	x	x	x		x	x	x	x	x	daily	<a href="https://www.ambergrid.lt/en/services/capacity-information/capacity-and-gas-flow-data">https://www.ambergrid.lt/en/services/capacity-information/capacity-and-gas-flow-data</a> No transparency web page
Luxembourg	CREOS Luxembourg S.A.	x		x	x	x	x	x	x	x	x	x	x	x	x	x	daily	<a href="https://gasdata.creos.lu/">https://gasdata.creos.lu/</a> <a href="https://transparency.entsog.eu">https://transparency.entsog.eu</a> No transparency web page

Country	TSO	Type of flow				Consumption details			GasQuality		Unit of measurement					Time granularity	Link to data and transparency page				
		Production	Cross-border flow	Storage Facility	LNG Facility	Consumption	One national value	Node level	Residential & Commercial	Industrial	Power Generation	Other groups	GCV	Wobbe	energy (kWh)	volume (m³)	0 °C	15 °C	20 °C	25 °C	
Netherland	GTS	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily hourly	<a href="https://www.gasunietransportservices.nl/en/transparency/dataport">https://www.gasunietransportservices.nl/en/transparency/dataport</a> <a href="https://www.gasunietransportservices.nl/en/transparency/transparency-requirements/transparency-requirements">https://www.gasunietransportservices.nl/en/transparency/transparency-requirements/transparency-requirements</a>
Poland	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily hourly	<a href="http://en.gaz-system.pl/customer-zone/transmission/">http://en.gaz-system.pl/customer-zone/transmission/</a> <a href="http://en.gaz-system.pl/customer-zone/transmission/tsotransparencytemplate/">http://en.gaz-system.pl/customer-zone/transmission/tsotransparencytemplate/</a>
Portugal	Redes Energéticas Nacionais	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily hourly	<a href="http://www.mercado.ren.pt/EN/Gas/MarketInfo/Load/Actual/Pages/Daily.aspx">http://www.mercado.ren.pt/EN/Gas/MarketInfo/Load/Actual/Pages/Daily.aspx</a> <a href="http://www.mercado.ren.pt/EN/Gas/MarketInfo/Transparency/Pages/default.aspx">http://www.mercado.ren.pt/EN/Gas/MarketInfo/Transparency/Pages/default.aspx</a>
Romania	Societatea Națională de Transport Gaze Naturale „Transgaz” SA Mediaș	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily	<a href="https://transparency.entsog.eu/#/map">https://transparency.entsog.eu/#/map</a> <a href="http://www.transgaz.ro/en/clients/operational-data/physical-flows">http://www.transgaz.ro/en/clients/operational-data/physical-flows</a> <a href="http://www.transgaz.ro/en/clients/transparency-information">http://www.transgaz.ro/en/clients/transparency-information</a>
Slovenia	Plinovodi d.o.o.	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily	<a href="http://www.plinovodi.si/en/operation/operation-of-transmission-system/relevant-points-data/">http://www.plinovodi.si/en/operation/operation-of-transmission-system/relevant-points-data/</a> <a href="http://www.plinovodi.si/en/other/transparency-information/">http://www.plinovodi.si/en/other/transparency-information/</a>
Slovakia	Eustream s.a.	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily hourly	<a href="https://www.eustream.sk/en_transmission-system/en_other-information/en_7152009-requirements">https://www.eustream.sk/en_transmission-system/en_other-information/en_7152009-requirements</a> No transparency web page
Spain	Enagás	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	daily hourly	<a href="https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/Operacion_del_Sistema_Gasista/SeguimientoDiarioDelSistema#">https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/Operacion_del_Sistema_Gasista/SeguimientoDiarioDelSistema#</a> <a href="https://www.enagas.es/enagas/en/Transporte_de_gas/Red_de_transporte/PlantillaTransparenciaTransporte">https://www.enagas.es/enagas/en/Transporte_de_gas/Red_de_transporte/PlantillaTransparenciaTransporte</a> <a href="https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda">https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda</a>

Country	TSO	Type of flow				Consumption details		GasQuality	Unit of measurement				Time granularity	Link to data and transparency page	
		Production	Cross-border flow	Storage Facility	LNG Facility	One national value	Node level		User category	Residential & Commercial	Industrial	Power Generation	Other groups		
Sweden	Swedegas	x		x		x	x	x	x	x	x	x	x	x	<a href="https://www.swedegas.com/Our_services/services/statistics">https://www.swedegas.com/Our_services/services/statistics</a> No transparency web page
United Kingdom	National Grid	x	x	x	x	x	x	x	x	x	x	x	x	x	<a href="https://www.nationalgrid.com/uk/gas-transmission/data-and-operations/transmission-operational-data">https://www.nationalgrid.com/uk/gas-transmission/data-and-operations/transmission-operational-data</a> <a href="https://www.nationalgrid.com/uk/gas-transmission/about-us/gas-transparency-requirements">https://www.nationalgrid.com/uk/gas-transmission/about-us/gas-transparency-requirements</a>

Source: JRC, 2021.

## 4.1 Austria

**Data source:** Data on total daily consumption were retrieved from the transparency platform of the Austrian Gas Grid Management AG (AGGM)<sup>(17)</sup> by aggregating the figures for the consumption items “Determined Consumption East (kWh/d)”, “Determined Consumption Tyrol (kWh/d)” and “Determined Consumption Vorarlberg (kWh/d)”.

**Type of flow:** AGGM provides data covering domestic production, cross-border interconnection points, underground storage by facilities and off-take by market area.

**Classification of consumption:** National consumption is provided by market area, but not by category of customer.

**Data on gas quality:** GCV is provided on a daily and hourly base.

**Unit of Measurement:** Austria uses only energy unit of measurement in kWh at combustion temperature of 25 °C, volume temperature of 0 °C and pressure of 101.325 kPa.

**Time granularity:** AGGM provides data at a daily and hourly granularity. The gas day is defined as the period hour 06:00 of day one and hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Transparency data are available from Gas Connect Austria GmbH<sup>(18)</sup>.

**Data processing:** Conversion from kWh/d to GWh/d.

**Table 3:** Summary statistics by year of the total national consumption in Austria.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	91.97	233.12	426.85	85089.58
<b>2016</b>	91.55	241.19	540.17	88276.43
<b>2017</b>	99.34	262.42	604.14	95783.02
<b>2018</b>	90.09	248.89	611.22	90845.66
<b>2019</b>	100.03	253.38	508.78	92484.51
<b>2020</b>	92.30	247.56	485.56	90606.96

Source: JRC, 2021.

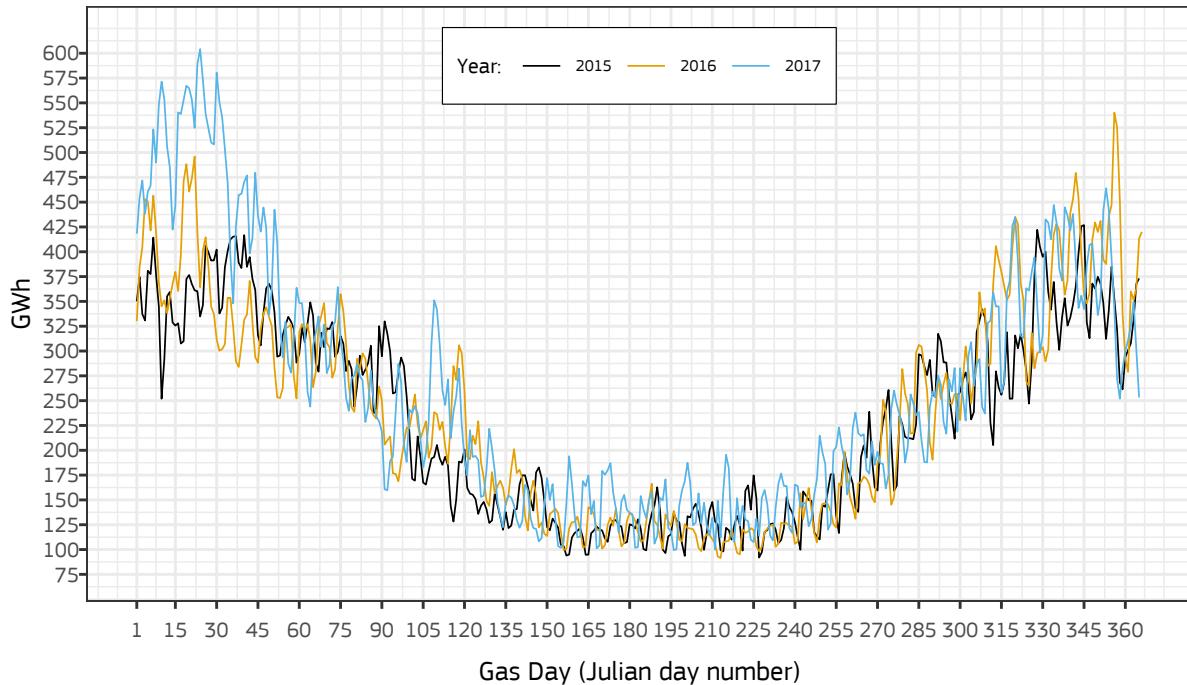
<sup>(17)</sup> <https://platform.aggm.at/vis/visualisation/general>.

<sup>(18)</sup> <https://www.gasconnect.at/en/network-access/transparency-information/>

**Figure 1:** Time series of the daily total consumption of natural gas in Austria between 2015 and 2020.

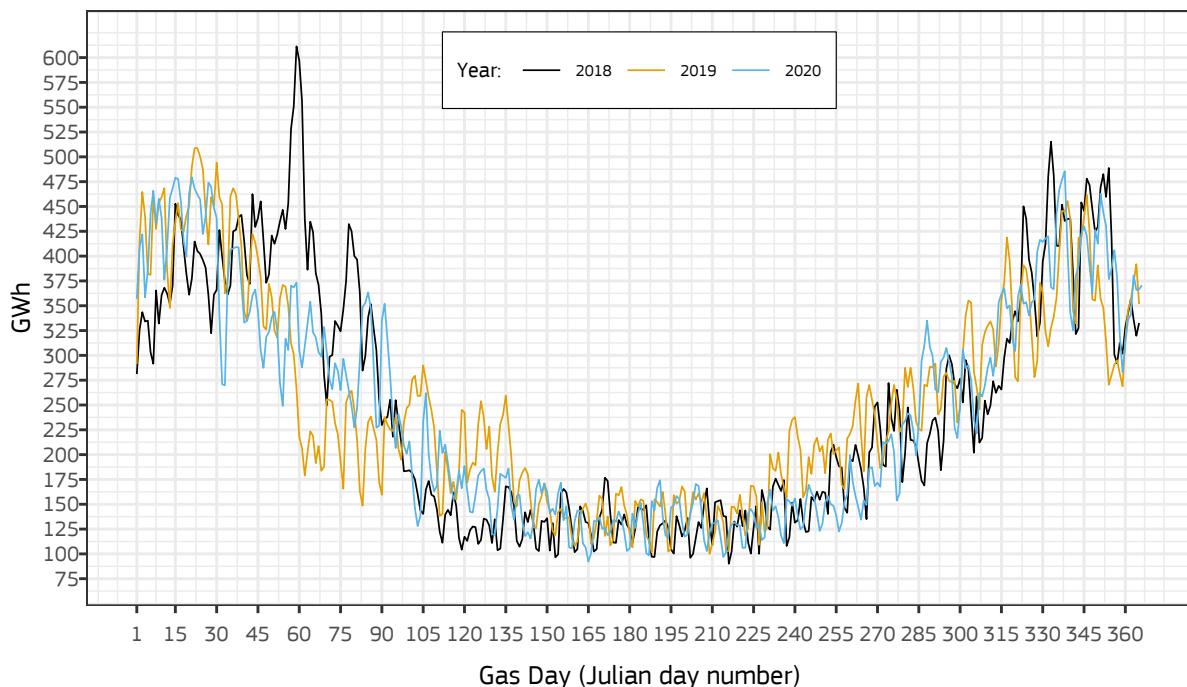
### Austria

Historical national daily Consumption



### Austria

Historical national daily Consumption



Source: JRC, 2021.

## 4.2 Belgium

**Data source:** The Belgian Transmission System Operator Fluxys publishes data on its transparency platform<sup>(19)</sup>.

**Type of flow:** Fluxys provides data covering cross-border interconnection points, the national underground storage and LNG facility, and national consumption aggregated by type of natural gas, balancing zone or type of user.

**Classification of consumption:** Fluxys provides data on “Distribution Domestic Point”, “End User Domestic Point” and “End User Domestic Point”, by two type of natural gas (i.e., H-zone and L-zone).

**Data on gas quality:** GCV is provided on a daily and hourly base.

**Unit of Measurement:** Fluxys provides data in volume or energy unit of measurement with reference conditions set to combustion temperature of 25 °C, volume temperature of 0 °C and pressure of 101.325 kPa.

**Time granularity:** Fluxys publishes data at a daily and hourly granularity. The gas day is defined as the period hour 06:00 of day one and hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO does not have a transparency page.

**Data processing:** Original values have been converted from kWh/d to Gwh/d and figures, in energy unit, from the H-zone and L-zone aggregated.

**Table 4:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in Belgium.

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	226.26	481.59	932.86	175780.5	95.10	118.19	138.66	43140.86
<b>2016</b>	225.65	490.23	956.80	179425.8	88.68	114.02	139.13	41730.47
<b>2017</b>	240.17	498.64	988.21	182002.0	94.82	120.18	140.84	43864.56
<b>2018</b>	236.08	512.62	1030.32	187104.9	99.56	126.22	153.05	46070.19
<b>2019</b>	238.47	528.17	1052.81	192782.9	102.32	135.27	165.61	49373.38
<b>2020</b>	263.47	520.91	949.15	190652.2	99.15	133.81	161.40	48975.75

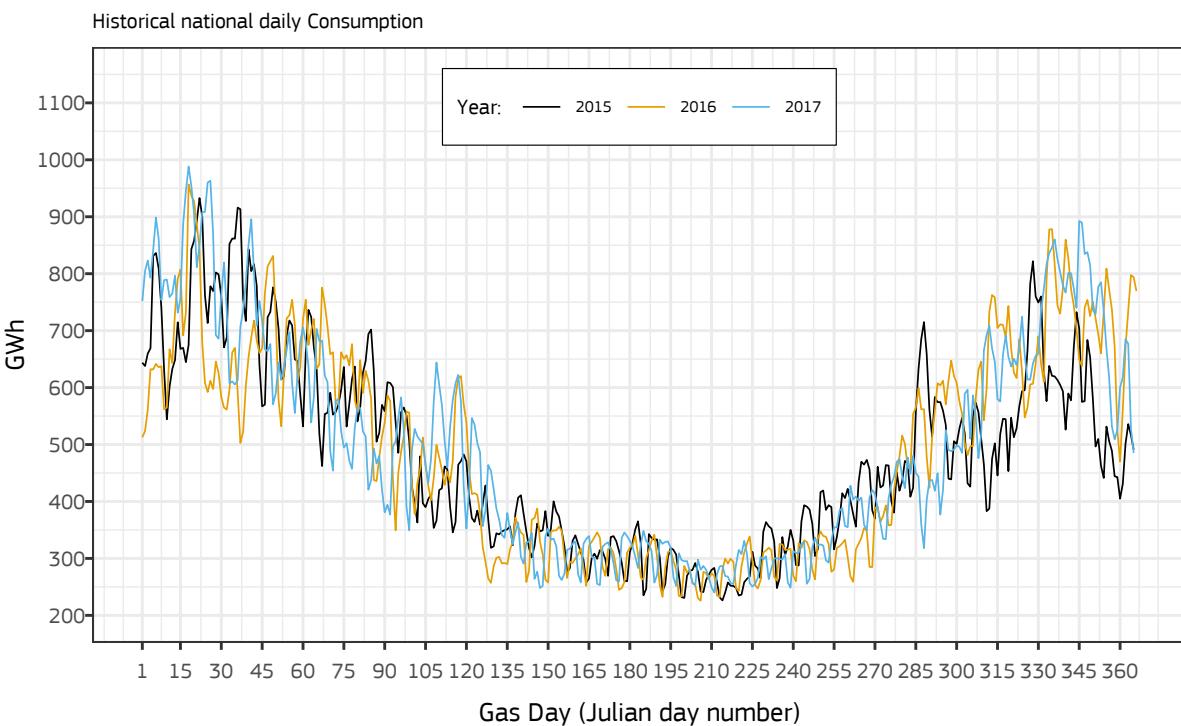
Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Ave	Max	Sum
<b>2015</b>	64.01	122.18	224.21	44596.88	61.08	241.21	596.19	88042.71
<b>2016</b>	61.76	122.18	218.43	44719.66	59.27	254.03	620.04	92975.67
<b>2017</b>	60.64	126.74	210.16	46259.35	61.47	251.72	651.15	91878.11
<b>2018</b>	62.16	132.06	259.28	48202.41	56.08	254.34	723.87	92832.34
<b>2019</b>	59.54	137.49	256.82	50183.82	63.11	255.41	649.16	93225.72
<b>2020</b>	59.83	143.39	258.54	52480.46	58.59	243.70	543.27	89195.93

Source: JRC, 2021.

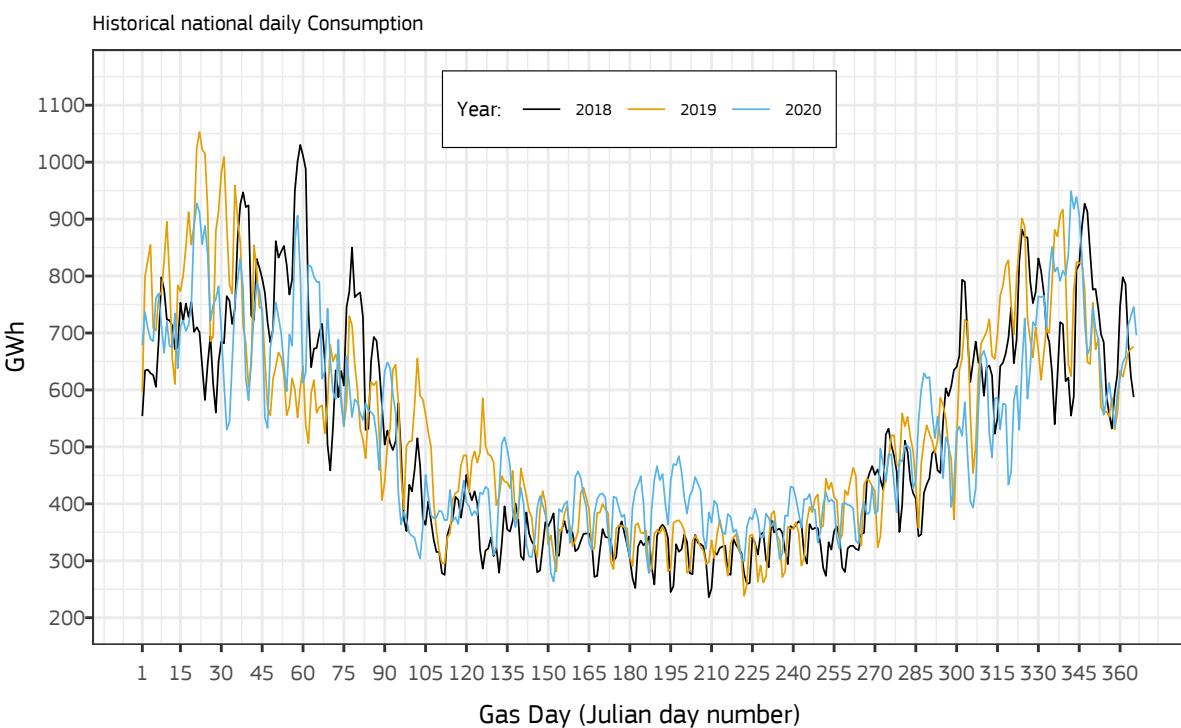
<sup>(19)</sup> <https://gasdata.fluxys.com>.

**Figure 2:** Time series of the daily total consumption of natural gas in Belgium between 2015 and 2020.

### Belgium

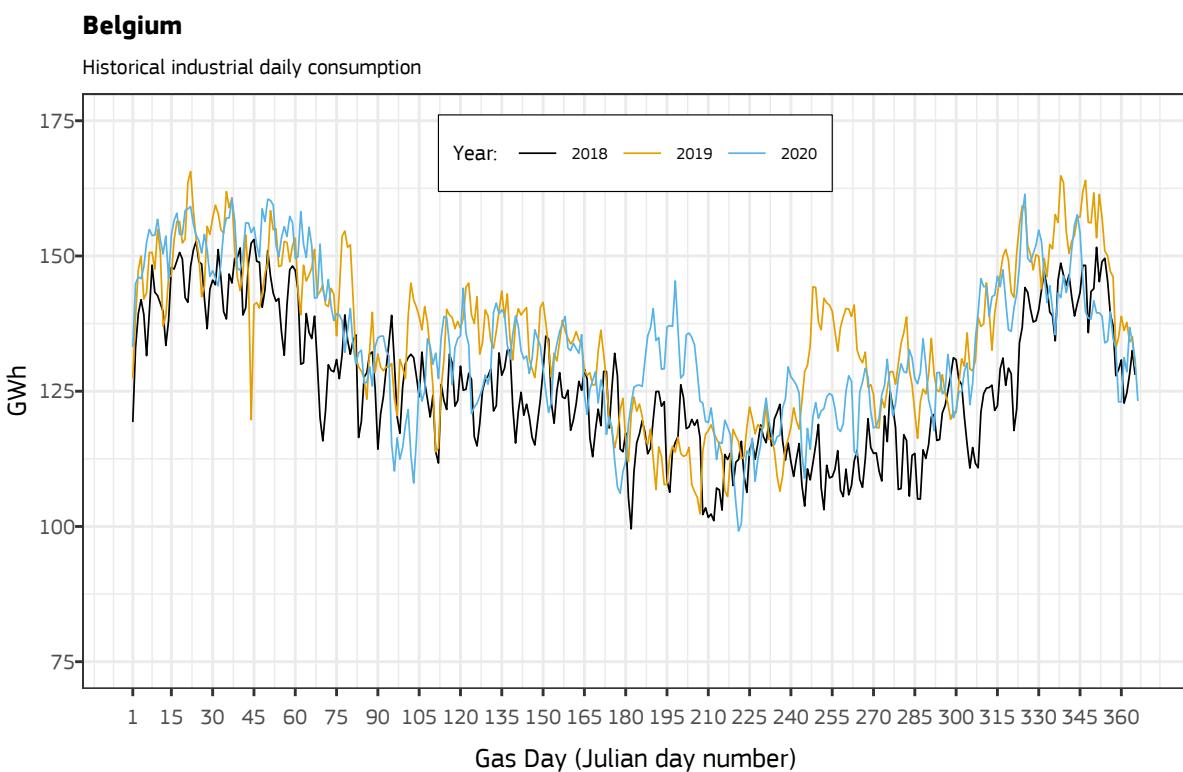
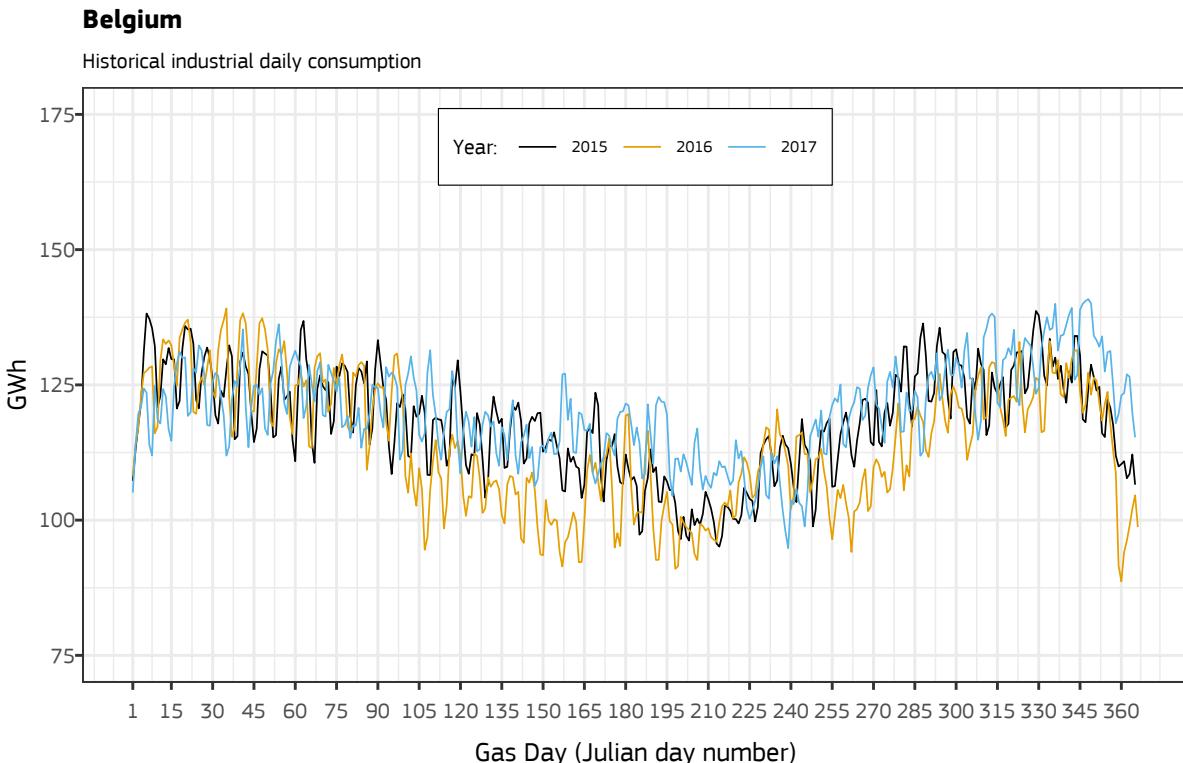


### Belgium



Source: JRC, 2021.

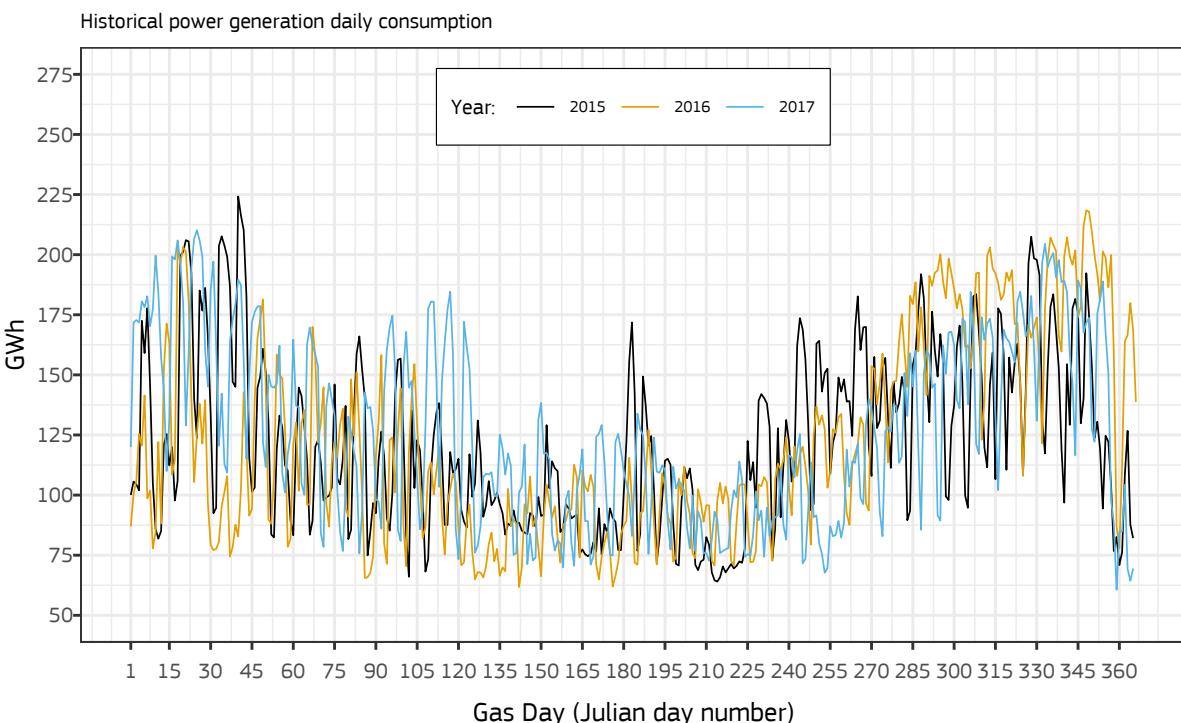
**Figure 3:** Time series of the daily consumption of natural gas by industrial users in Belgium between 2015 and 2020.



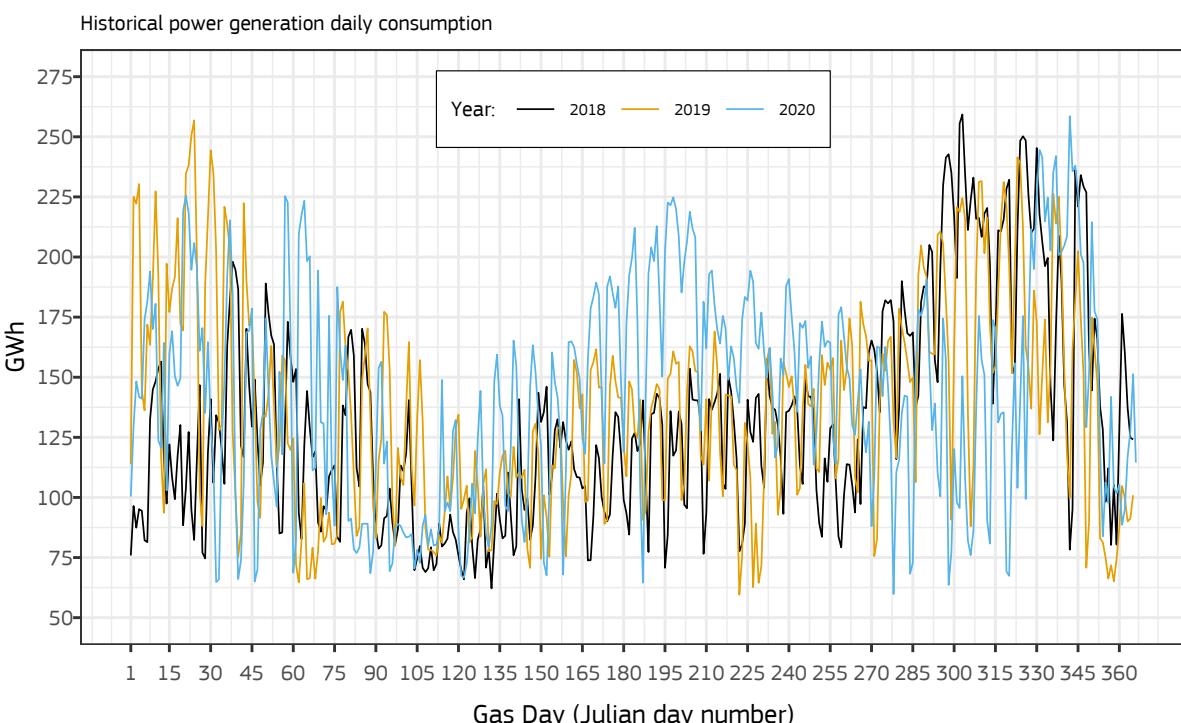
Source: JRC, 2021.

**Figure 4:** Time series of the daily consumption of natural gas by power generation users in Belgium between 2015 and 2020.

### Belgium

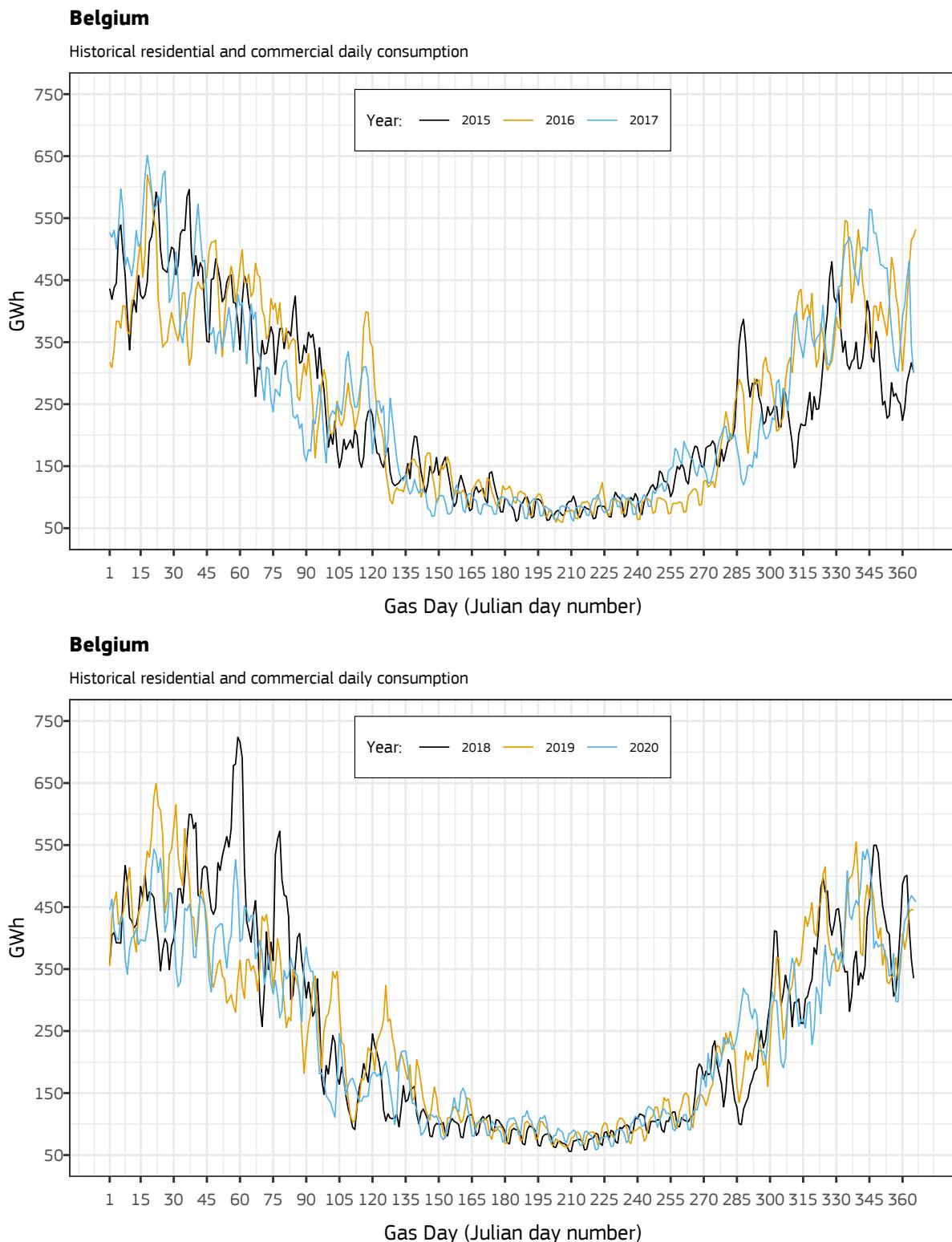


### Belgium



Source: JRC, 2021.

**Figure 5:** Time series of the daily consumption of natural gas by residential and commercial users in Belgium between 2015 and 2020.



Source: JRC, 2021.

## 4.3 Bulgaria

**Data source:** Data could be retrieved either from the ENTSOG transparency platform or from the national transmission system operator Bulgartransgaz EAD (<sup>20</sup>).

**Type of flow:** Data covers cross-border interconnection points, the underground gas storage, national aggregated consumption and — more recently — domestic production in the Galata field.

**Classification of consumption:** National consumption is provided as an aggregated daily value.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system and the aggregated consumption.

**Unit of Measurement:** Bulgaria uses energy unit of measurement for the ENTSOG platform in kWh at combustion temperature of 25 °C, volume temperature of 0 °C and pressure of 101.325 kPa. On Bulgartransgaz EAD transparency platform figures are provided in volume unit of measurement with reference conditions of temperature 20 °C and pressure of 101.325 kPa. Quality indices are available only from ENTSOG.

**Time granularity:** Only daily figures are provided. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET)

**Transparency information:** The company transparency platform is presented on a dedicated web-page(<sup>21</sup>).

**Data processing:** No data processing for values downloaded from the ENTSOG web-page.

**Table 5:** Summary statistics by year of the total national consumption in Bulgaria.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	50.25	85.99	145.56	31385.97
<b>2016</b>	46.48	88.79	154.49	32498.41
<b>2017</b>	44.91	91.64	177.13	33449.18
<b>2018</b>	46.90	86.75	165.82	31663.80
<b>2019</b>	47.08	83.44	165.37	30457.26
<b>2020</b>	45.94	85.60	143.53	31330.38

Source: JRC, 2021.

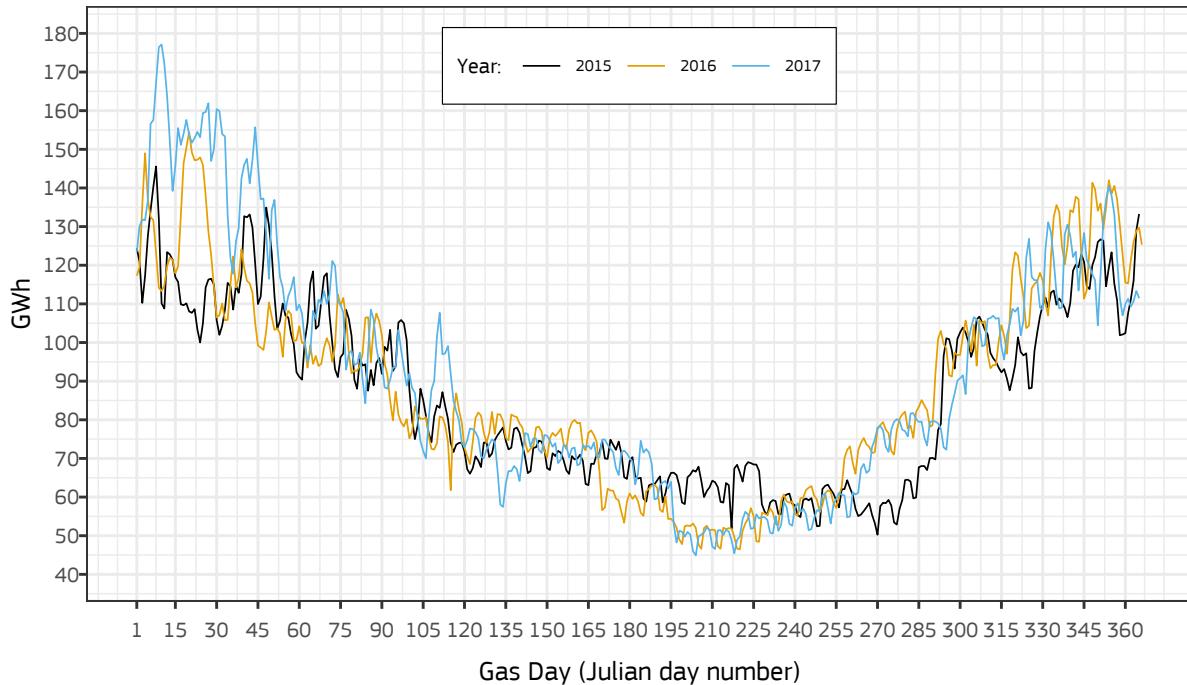
<sup>(20)</sup> <https://www.bulgartransgaz.bg/en/pages/operational-data-185.html>.

<sup>(21)</sup> <https://www.bulgartransgaz.bg/en/pages/tra-template-transmission-18.html>.

**Figure 6:** Time series of the daily total consumption of natural gas in Bulgaria between 2015 and 2020.

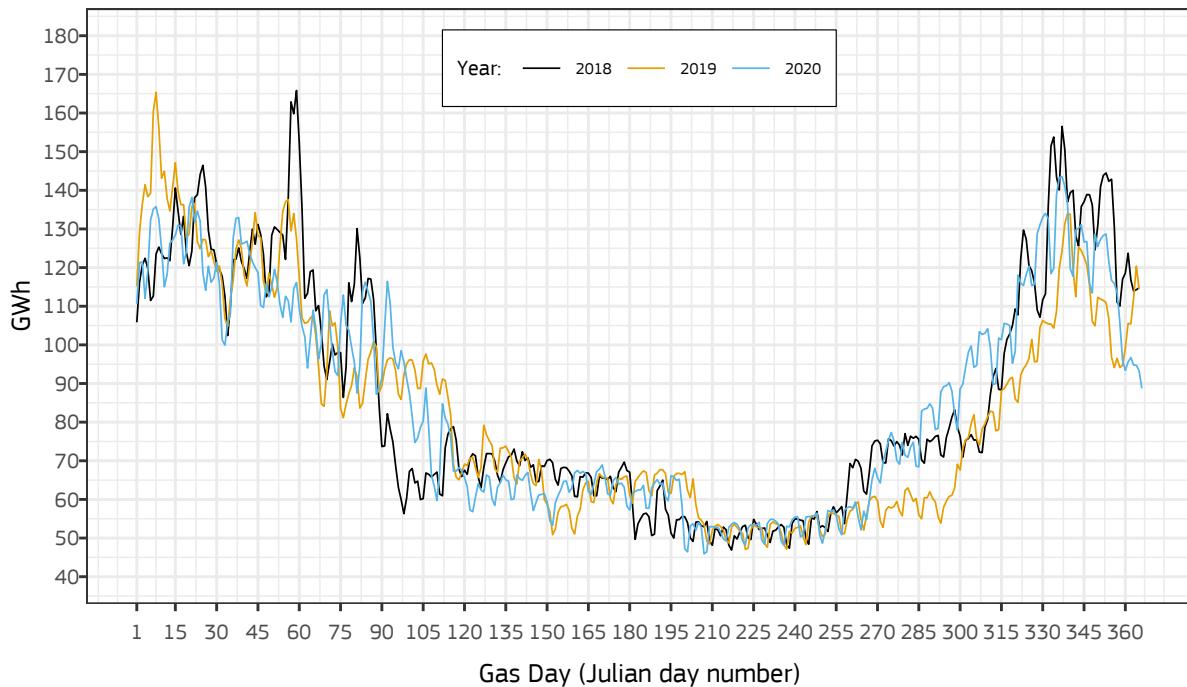
### Bulgaria

Historical national daily Consumption



### Bulgaria

Historical national daily Consumption



Source: JRC, 2021.

## 4.4 Croatia

**Data source:** Data are taken from the transparency platform of the national transmission system operator Plinacro d.o.o. (22).

**Type of flow:** Plinacro d.o.o. covers aggregated domestic production, cross-border interconnection points, underground storage and LNG facilities, and national consumption.

**Classification of consumption:** Daily consumption is divided into residential and commercial users, where individual city gates are available, or all other directly connected users ("Krajnji kupci") (i.e., either industrial or power generation users).

**Data on gas quality:** Higher and lower GCV are published. No information on the Wobbe index.

**Unit of Measurement:** Plinacro d.o.o. allows the user to select the unit of measurement, either cubic meters or energy unit, and the reference conditions like at combustion temperature of 25 °C, and volume at temperature of 20 °C and 101.35 kPa, or at combustion temperature of 15 °C, and volume at temperature of 15 °C and 101.35 kPa.

**Time granularity:** Daily figures are published. The gas day is defined as the period hour 06:00 of day one and hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a transparency web-page (23).

**Data processing:** For the period February 15 2019 - December 15 and December 26 - December 31 2020 data are provided only at the node level, and have been aggregated.

**Table 6:** Summary statistics by year of the total national consumption, residential and commercial users and other users in Croatia.

Year	Total (GWh/d)				Other users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	36.26	69.75	124.39	25457.54	17.78	38.35	60.02	13997.53
<b>2016</b>	22.14	73.76	140.26	26994.55	12.68	40.94	60.92	14985.15
<b>2017</b>	28.38	85.22	174.83	31104.05	18.80	51.29	74.68	18721.44
<b>2018</b>	22.71	77.46	173.80	28272.21	13.39	43.85	69.30	16004.18
<b>2019</b>	41.24	80.20	147.29	29273.45	30.16	47.06	65.40	17177.49
<b>2020</b>	43.72	85.92	151.99	31447.74	30.87	51.70	69.64	18922.52

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	7.38	31.40	84.98	11460.02
<b>2016</b>	7.92	32.81	88.13	12009.36
<b>2017</b>	7.87	33.92	103.08	12382.60
<b>2018</b>	8.44	33.61	108.30	12268.03
<b>2019</b>	8.23	33.14	83.94	12095.96
<b>2020</b>	8.53	34.22	82.34	12525.21

Source: JRC, 2021.

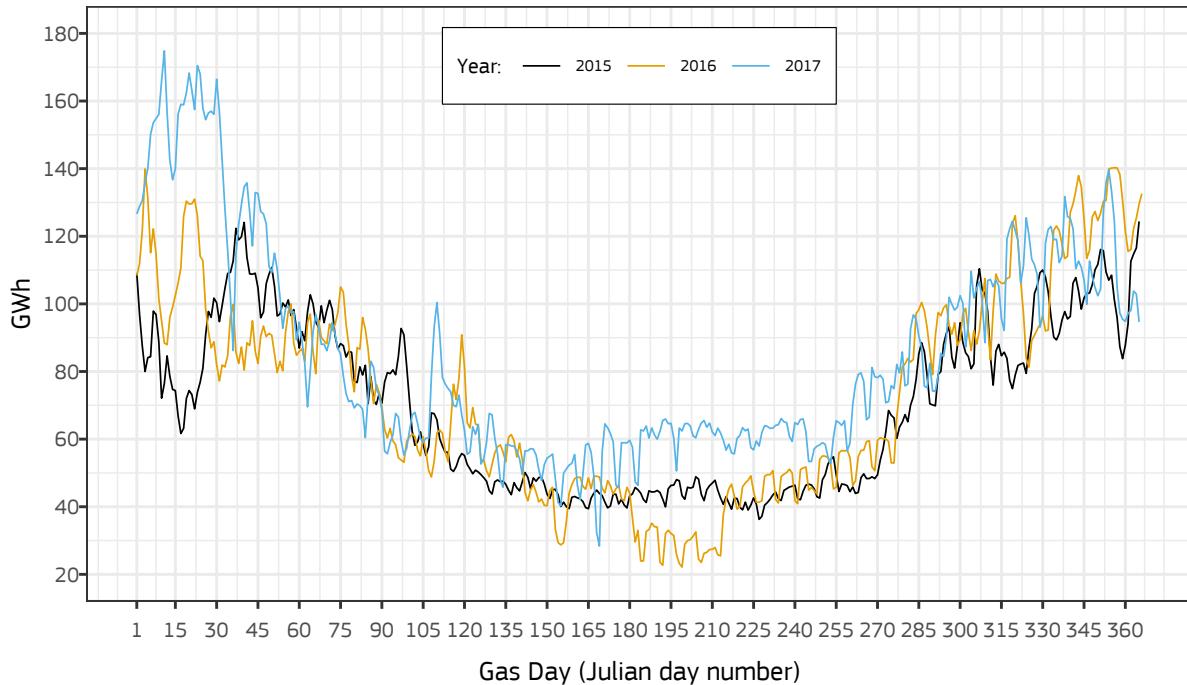
(22) <https://www.plinacro.hr>.

(23) <https://www.plinacro.hr/default.aspx?id=592>.

**Figure 7:** Time series of the daily total consumption of natural gas in Croatia between 2015 and 2020.

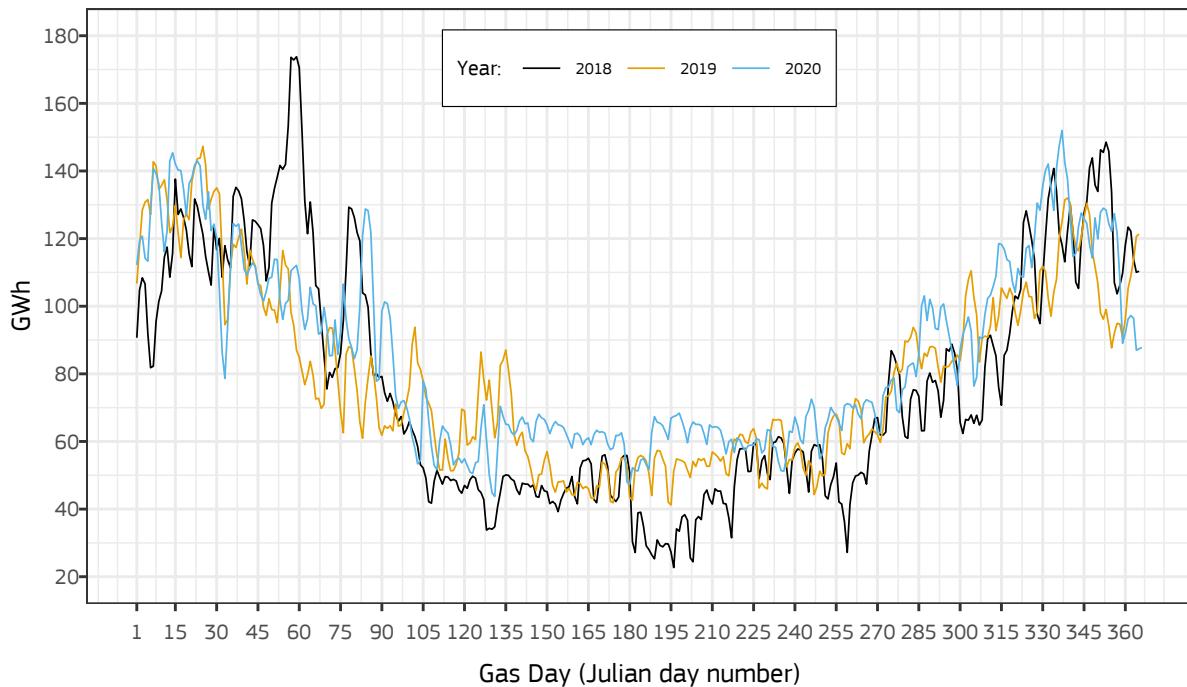
### Croatia

Historical national daily Consumption



### Croatia

Historical national daily Consumption

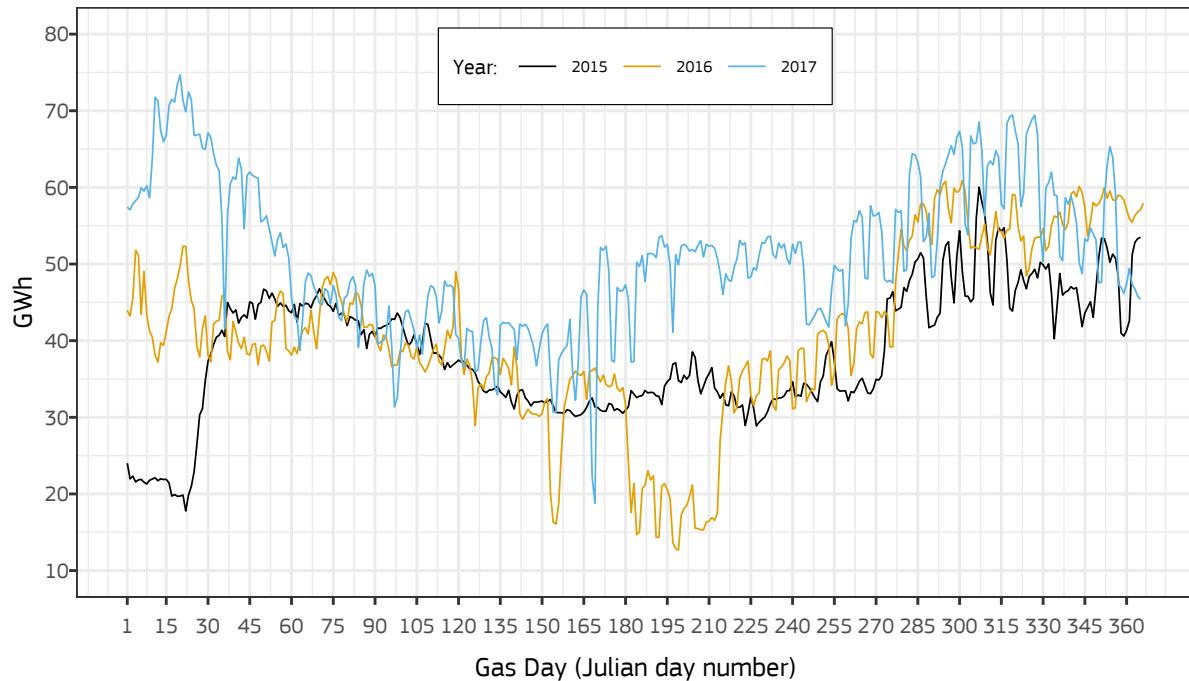


Source: JRC, 2021.

**Figure 8:** Time series of the daily consumption of natural gas by other users in Croatia between 2015 and 2020.

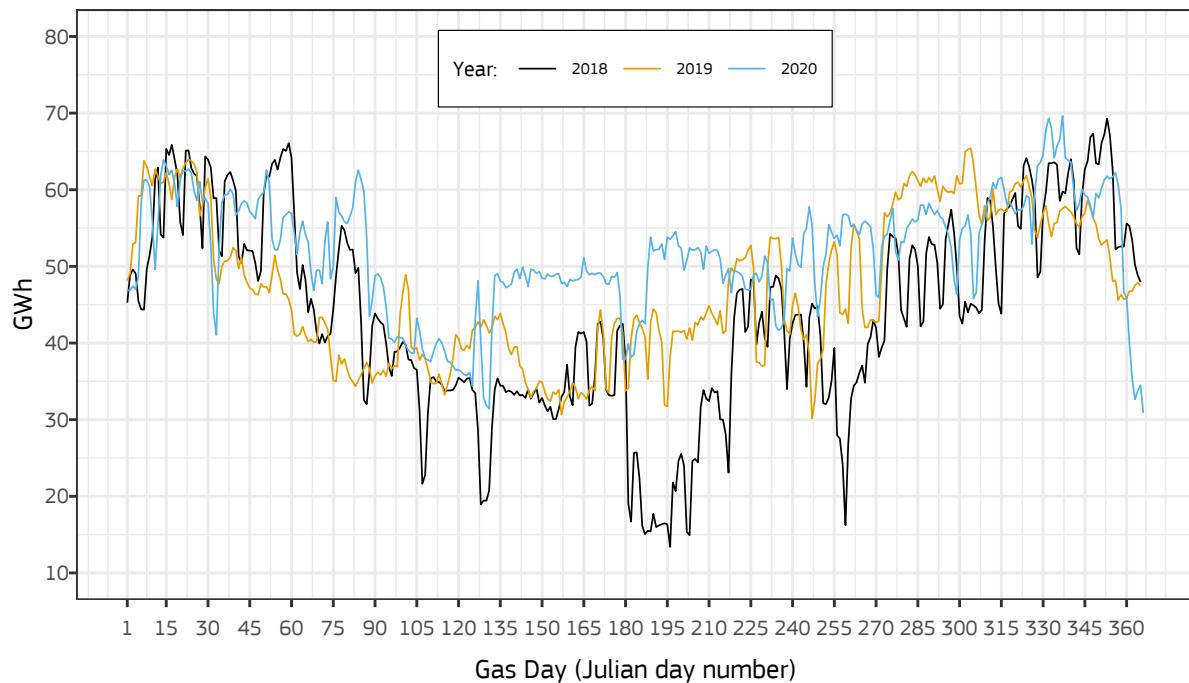
### Croatia

Historical daily consumption of group *Other*



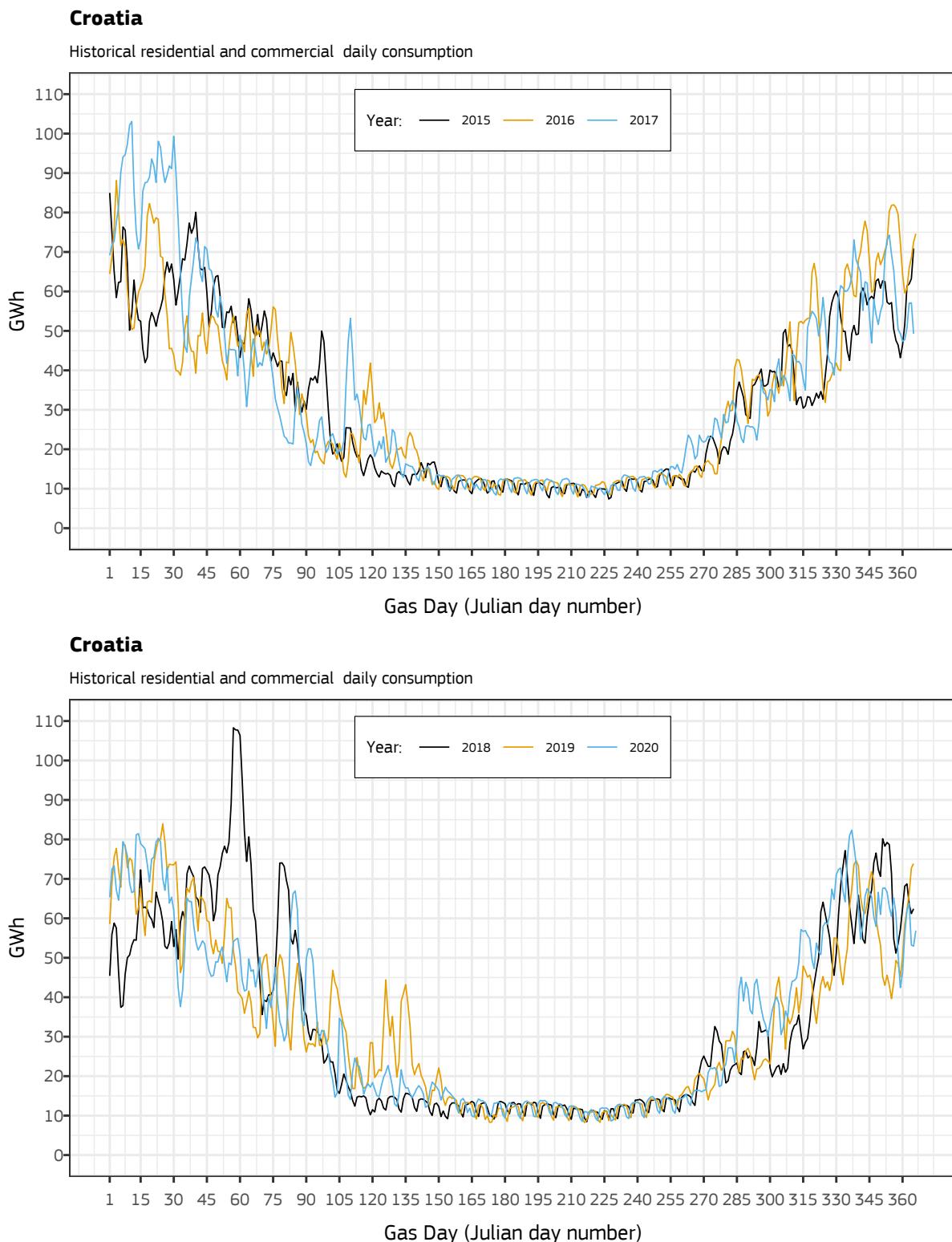
### Croatia

Historical daily consumption of group *Other*



Source: JRC, 2021.

**Figure 9:** Time series of the daily consumption of natural gas by residential and commercial users in Croatia between 2015 and 2020.



Source: JRC, 2021.

## 4.5 Czechia

**Data source:** Data are taken from the transparency platform <sup>(24)</sup> of the national TSO NET4GAS s.r.o. <sup>(25)</sup> selecting the item DSO.

**Type of flow:** NET4GAS s.r.o. covers cross-border interconnection points, underground storage facilities, and national consumption.

**Classification of consumption:** Daily consumption is estimated using the exit to distribution system operators aggregated to a national figure.

**Data on gas quality:** GCV and Wobbe index for main entry and exit point is provided.

**Unit of Measurement:** NET4GAS describes the conditions of the flow or energy content transported for each entry/exit point. Figures could be either cubic meters or energy unit, and the reference conditions like at combustion temperature of 25 °C, and volume at temperature of 20 °C and 101.35 kPa, or at combustion temperature of 15 °C, and volume at temperature of 15 °C and 101.35 kPa, or at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period hour 06:00 of day one and hour 06:00 of the following day Central European Time (CET).

**Transparency information:** NET4GAs does not have a web page for its transparency information, but publishes a document summarising <sup>(26)</sup> its compliance with Reg. (EU) 715/2009.

**Data processing:** Conversion form kWh/d to GWh/d.

**Table 7:** Summary statistics by year of the total national consumption in Czechia.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	68.93	213.47	433.20	77917.87
<b>2016</b>	73.25	226.57	500.15	82925.80
<b>2017</b>	71.33	234.56	544.86	85613.89
<b>2018</b>	72.28	224.49	574.13	81939.18
<b>2019</b>	73.65	225.56	502.49	82329.09
<b>2020</b>	79.43	228.93	460.05	83787.11

Source: JRC, 2021.

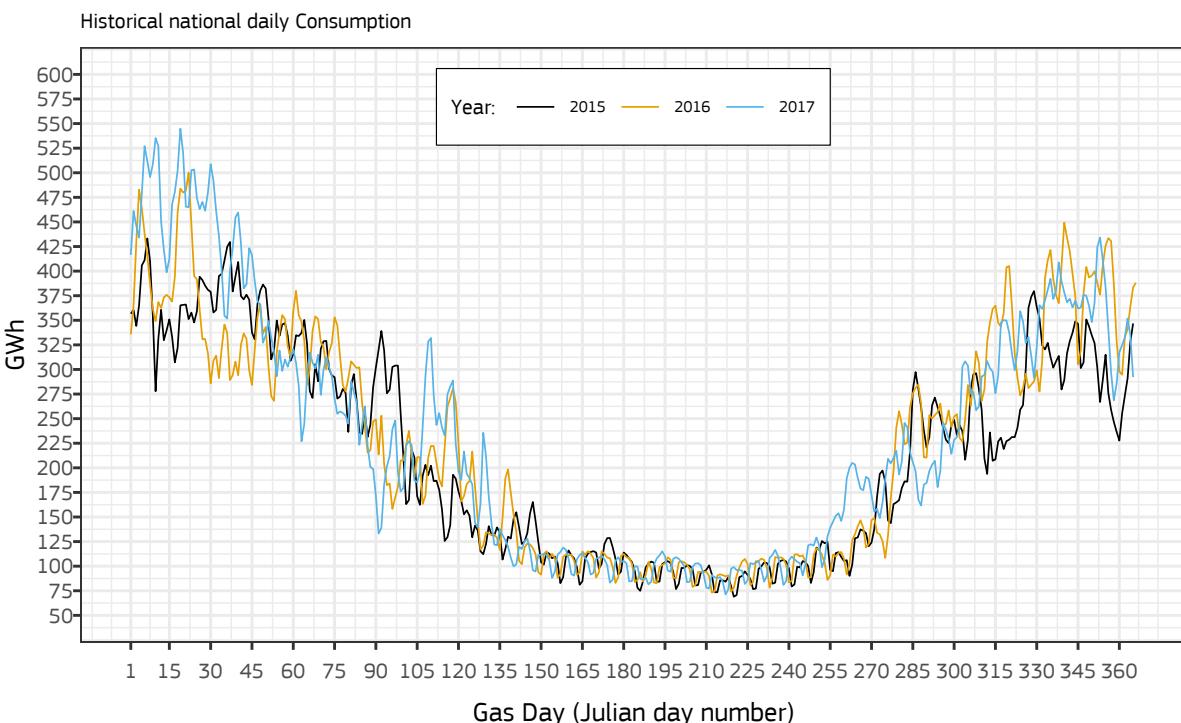
<sup>(24)</sup> [http://extranet.net4gas.cz/gas\\_flow.aspx](http://extranet.net4gas.cz/gas_flow.aspx).

<sup>(25)</sup> <https://www.net4gas.cz>.

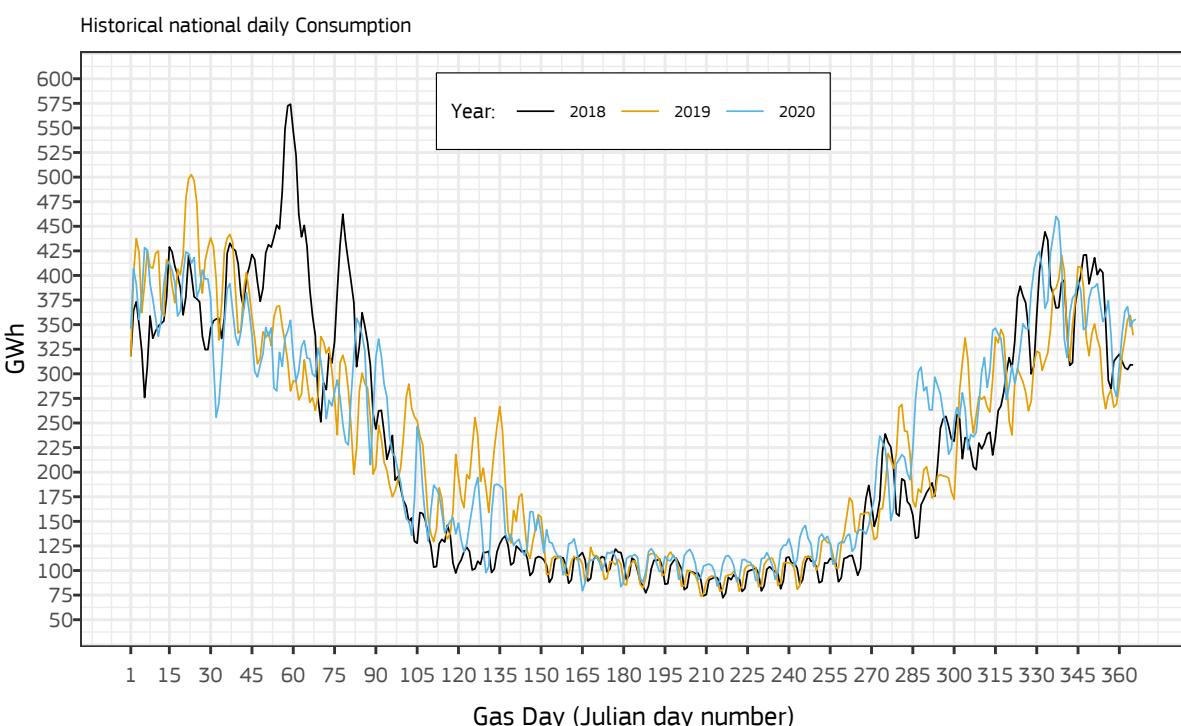
<sup>(26)</sup> [https://www.net4gas.cz/files/legislativa/20190102\\_published-information-overview\\_en.pdf](https://www.net4gas.cz/files/legislativa/20190102_published-information-overview_en.pdf).

**Figure 10:** Time series of the daily total consumption of natural gas in Czechia between 2015 and 2020.

### Czechia



### Czechia



Source: JRC, 2021.

## 4.6 Denmark

**Data source:** Data are taken from the transparency platform (<sup>27</sup>) of the national TSO Energinet (<sup>28</sup>).

**Type of flow:** Energinet covers domestic production, cross-border interconnection points, underground storage facilities, and national consumption.

**Classification of consumption:** Data are provided at metering level or aggregated at national level.

**Data on gas quality:** GCV, Wobbe index and gas composition are provided on a hourly base for the entry/exit and central points.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Energinet does not have a dedicated transparency web page.

**Data processing:** Conversion form kWh/d to GWh/d.

**Table 8:** Summary statistics by year of the total national consumption in Denmark.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	21.82	81.39	190.23	29708.79
<b>2016</b>	20.76	85.67	212.51	31354.02
<b>2017</b>	25.58	82.49	205.61	30108.89
<b>2018</b>	21.93	82.92	207.04	30266.18
<b>2019</b>	24.48	79.26	175.80	28931.10
<b>2020</b>	25.21	71.63	142.93	26215.94

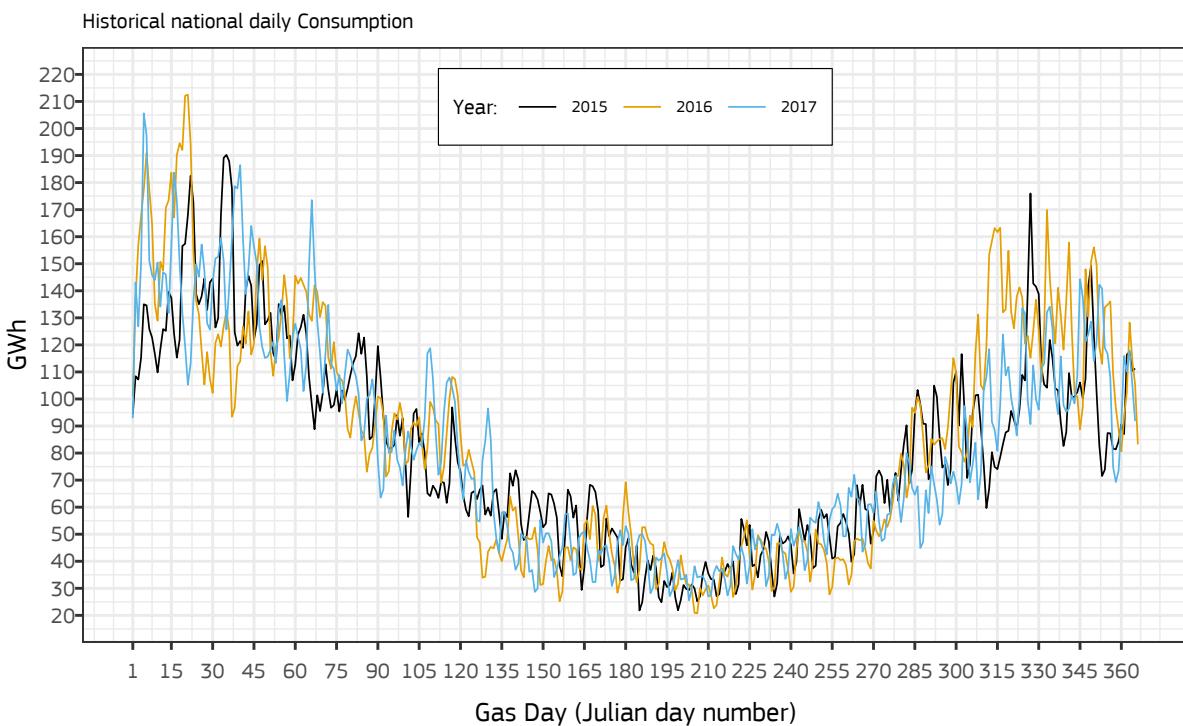
Source: JRC, 2021.

(<sup>27</sup>) <https://www.energidataservice.dk/tso-gas/gasflow>.

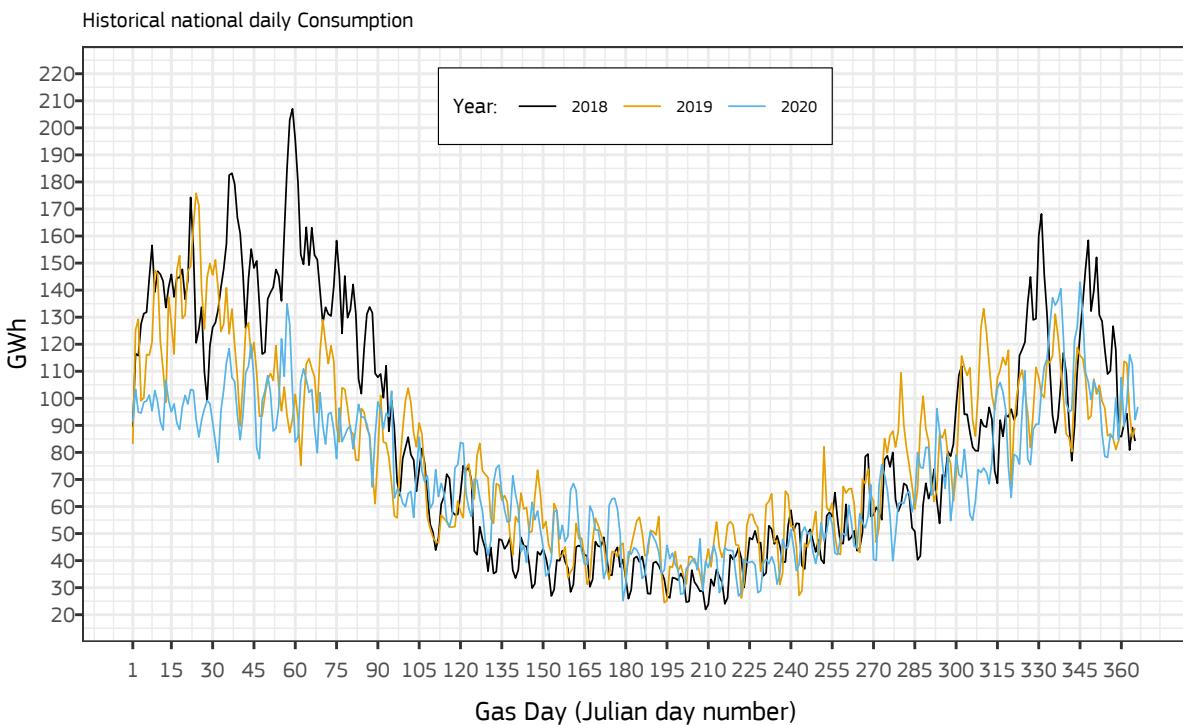
(<sup>28</sup>) <https://en.energinet.dk>.

**Figure 11:** Time series of the daily total consumption of natural gas in Denmark between 2015 and 2020.

### Denmark



### Denmark



Source: JRC, 2021.

## 4.7 Estonia

**Data source:** Data are taken from the transparency platform of ENTSOG, but the national TSO Elering AS (<sup>29</sup>) publishes hourly figures (<sup>30</sup>), which may be affected by potential errors.

**Type of flow:** Elering AS covers cross-border interconnection points and national consumption.

**Classification of consumption:** Data are aggregated at national level.

**Data on gas quality:** GCV and Wobbe index are provided on a hourly base for the entry/exit and aggregated virtual points.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Elering AS does not have a dedicated transparency web page.

**Data processing:** Conversion from kWh/d to GWh/d.

**Table 9:** Summary statistics by year of the total national consumption in Estonia.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	4.85	13.78	33.53	5031.15
<b>2016</b>	4.28	15.04	52.74	5502.88
<b>2017</b>	4.61	14.30	40.58	5219.39
<b>2018</b>	4.30	14.29	44.92	5216.94
<b>2019</b>	4.16	13.08	34.88	4773.39
<b>2020</b>	3.52	15.69	41.54	5743.51

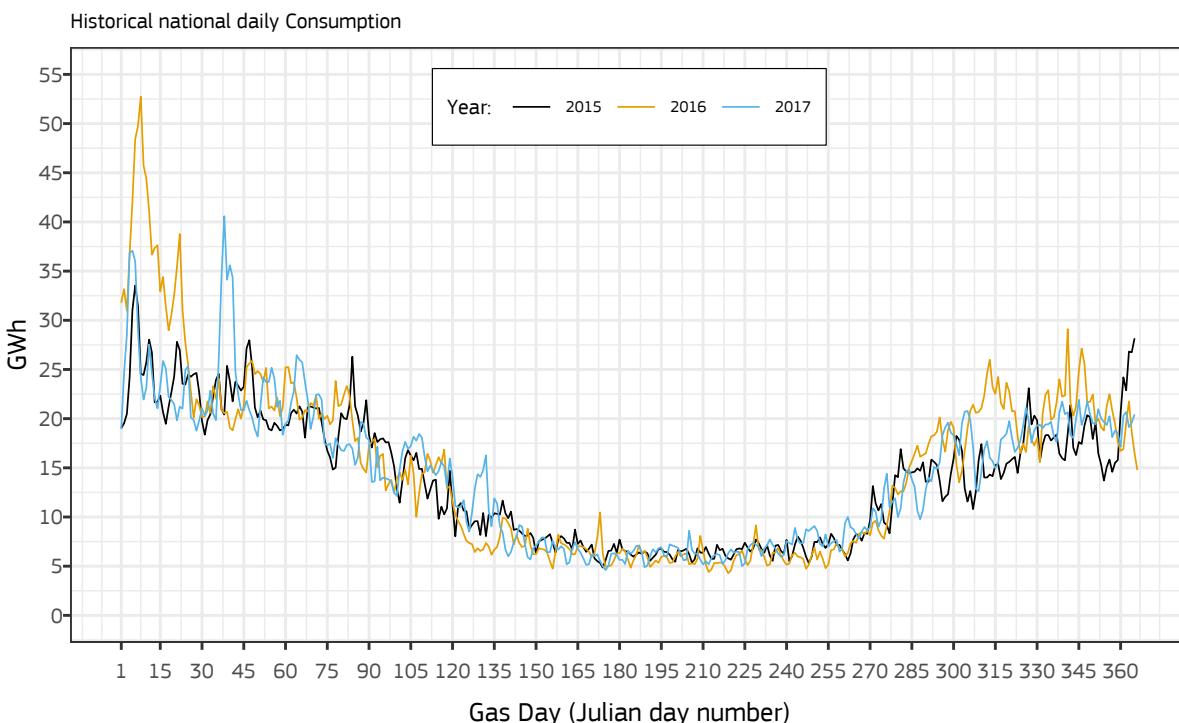
Source: JRC, 2021.

<sup>(29)</sup> <https://elering.ee>.

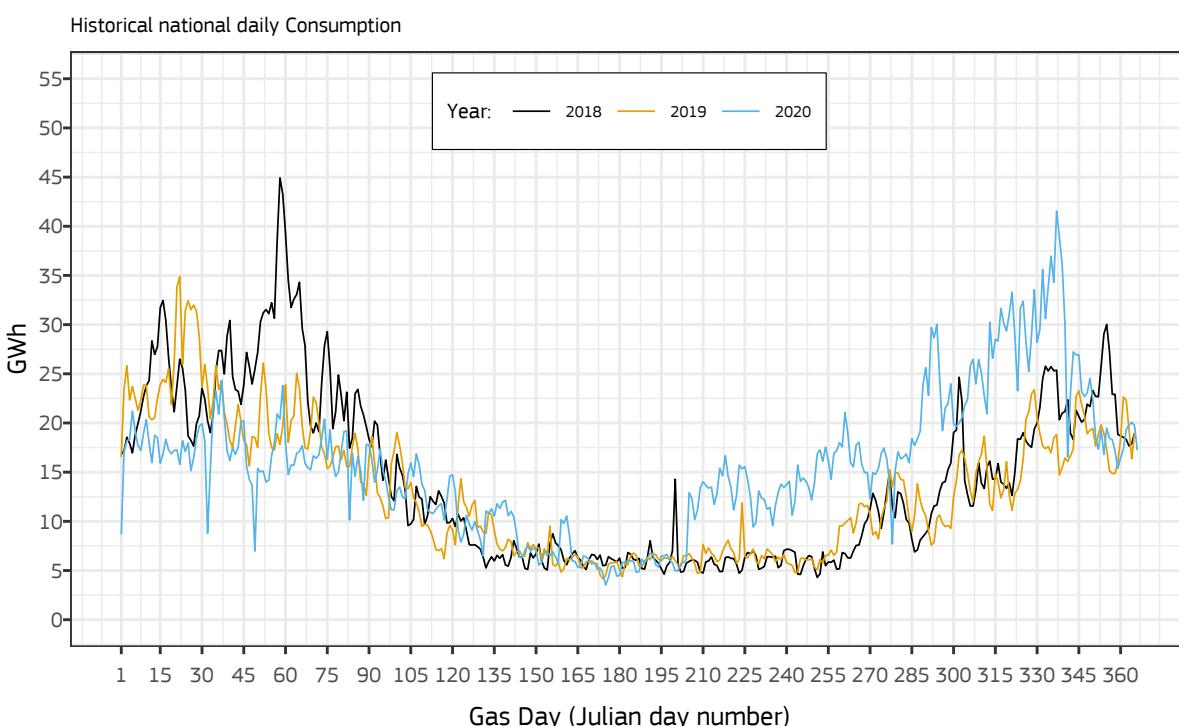
<sup>(30)</sup> <https://dashboard.elering.ee/et>.

**Figure 12:** Time series of the daily total consumption of natural gas in Estonia between 2015 and 2020.

### Estonia



### Estonia



Source: JRC, 2021.

## 4.8 Finland

**Data source:** Data are taken from the transparency platform of ENTSOG, provided by the national TSO Gasgrid Finland Oy (<sup>31</sup>).

**Type of flow:** Gasgrid Finland Oy covers cross-border interconnection points.

**Classification of consumption:** None.

**Data on gas quality:** GCV is provided on a hourly and daily base for the cross-border interconnection points.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Gasgrid Finland Oy does not have a dedicated transparency page.

**Data processing:** The values for January 1 2015 was missing and it has been estimated by replicating the one for January 2 2015. The value for December 31 2019 is estimated as average of the flow at the cross-border point of Imatra of the day before and after. From January 1 2020 the cross-border interconnection point of the Balticconnector is operational.

**Table 10:** Summary statistics by year of the total national consumption in Finland.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	44.41	79.00	154.98	28834.44
<b>2016</b>	37.43	72.55	195.54	26551.52
<b>2017</b>	34.12	67.67	158.08	24699.57
<b>2018</b>	35.08	75.11	179.50	27416.47
<b>2019</b>	32.05	70.26	156.55	25643.62
<b>2020</b>	41.70	69.21	114.16	25331.80

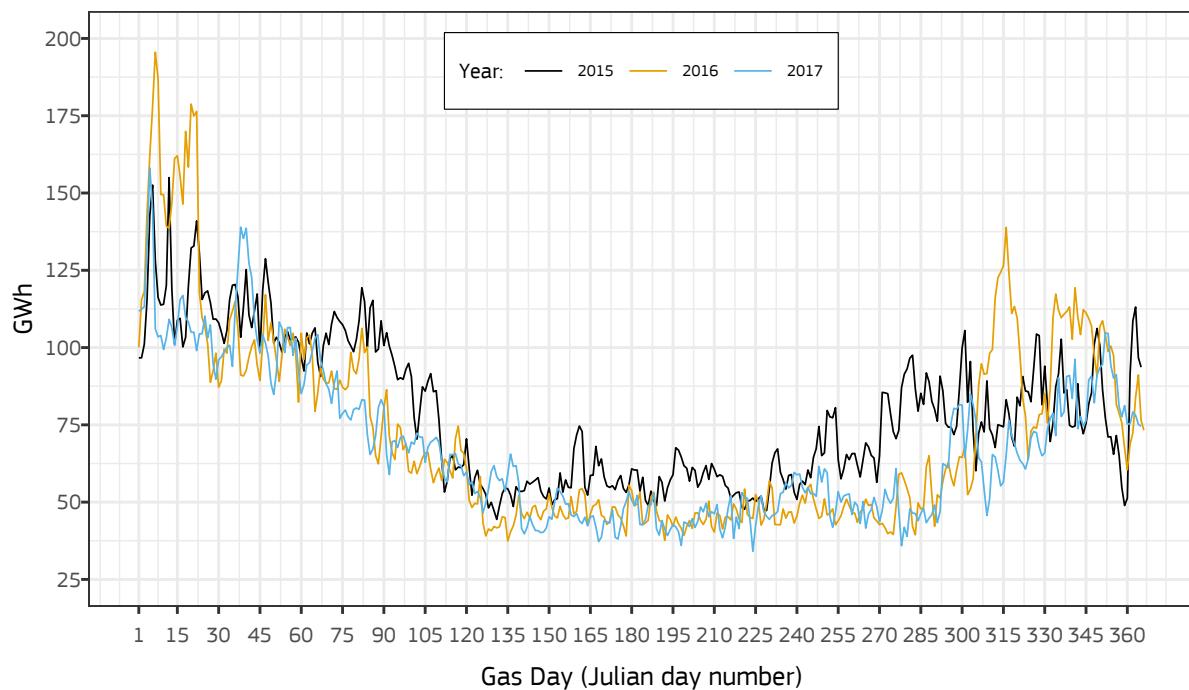
Source: JRC, 2021.

(<sup>31</sup>) <https://gasgrid.fi>.

**Figure 13:** Time series of the daily total consumption of natural gas in Finland between 2015 and 2020.

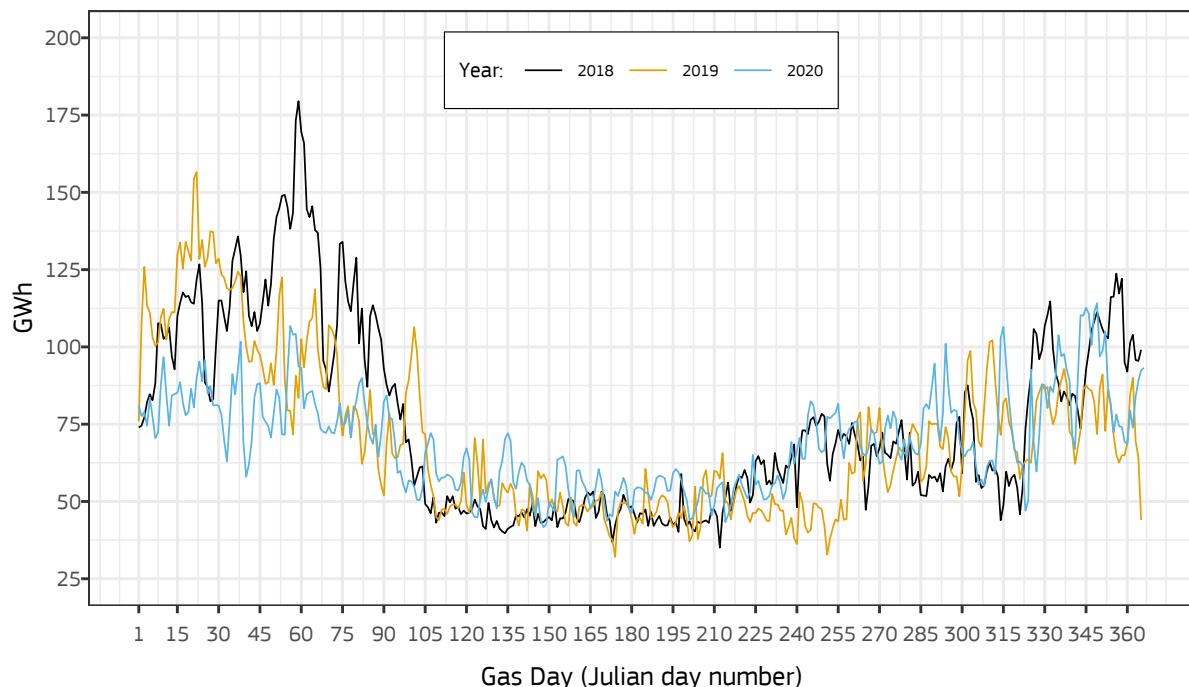
### Finland

Historical national daily Consumption



### Finland

Historical national daily Consumption



Source: JRC, 2021.

## 4.9 France

**Data source:** Data are taken from the ENTSOG transparency platform, for Teréga and “Transport et Infrastructures Gaz France” (TIGF) <sup>(32)</sup> <sup>(33)</sup>, and for GRTgaz from the national TSO transparency platform <sup>(34)</sup>.

**Type of flow:** The two TSOs cover cross-border interconnection points, underground storage and LNG facilities, domestic consumption.

**Classification of consumption:** Consumption is provided as aggregated figure for distribution and all other users.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Only Teréga has a dedicated transparency web page <sup>(35)</sup>, while GRTgaz has rich transparency platform <sup>(36)</sup>.

**Data processing:** Conversion form kWh/d to GWh/d.

**Table 11:** Summary statistics by year of the total national consumption, residential and commercial users and other users in France.

Year	Total (GWh/d)				Other users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	399.84	1234.22	2893.31	450489.3	250.78	442.98	730.99	161688.4
<b>2016</b>	416.25	1343.28	2744.52	491640.8	263.57	507.70	844.71	185817.3
<b>2017</b>	417.28	1351.93	3153.66	493453.2	259.37	535.01	828.14	195277.8
<b>2018</b>	442.65	1288.47	3253.18	470291.7	284.88	489.82	825.59	178783.3
<b>2019</b>	425.84	1313.07	2772.71	479271.8	278.70	522.39	810.97	190671.1
<b>2020</b>	492.10	1228.90	2605.54	449778.9	283.22	497.48	790.83	182078.2

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	145.01	791.24	2193.39	288801.0
<b>2016</b>	144.91	835.58	2018.42	305823.4
<b>2017</b>	153.98	816.92	2344.12	298175.4
<b>2018</b>	130.53	798.65	2427.59	291508.4
<b>2019</b>	141.19	790.69	1976.01	288600.7
<b>2020</b>	126.97	731.42	1829.71	267700.7

Source: JRC, 2021.

<sup>(32)</sup> Previous name of Teréga

<sup>(33)</sup> <https://www.terega.fr>.

<sup>(34)</sup> <https://www.grtgaz.com>.

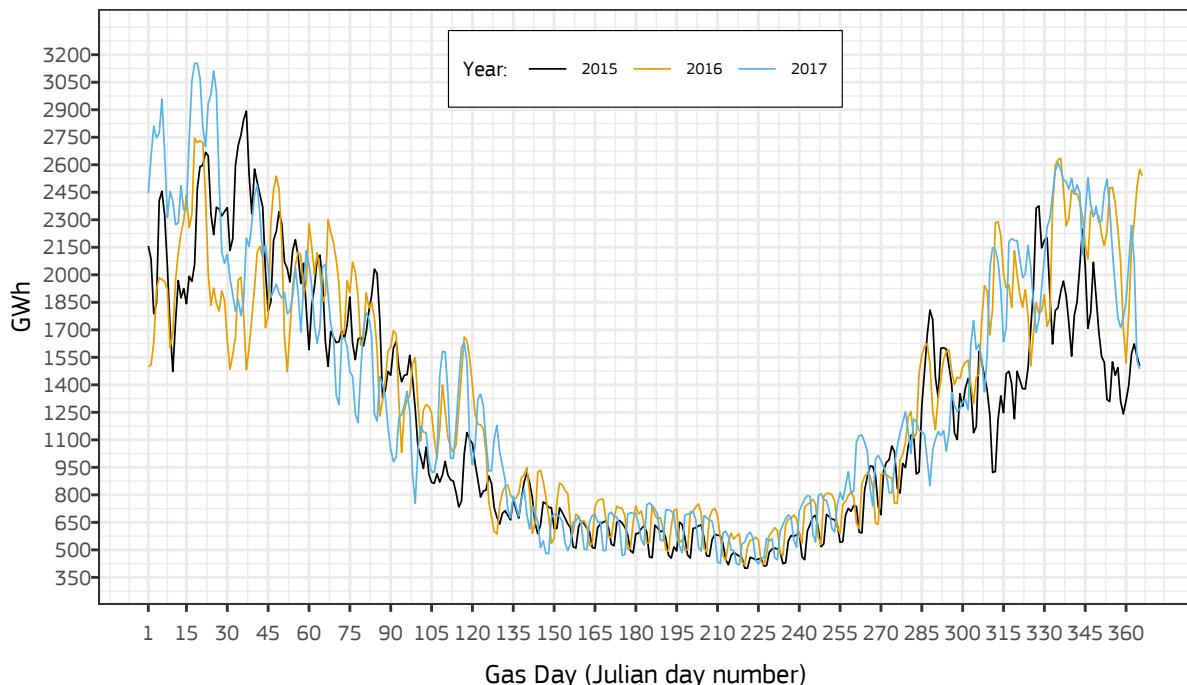
<sup>(35)</sup> <https://portail.terega.fr/star-app/edito/tarifs-dutilisation-des-reseaux-de-transport-de-gaz-le-modele-entsog>

<sup>(36)</sup> <https://www.smart.grtgaz.com>.

**Figure 14:** Time series of the daily total consumption of natural gas in France between 2015 and 2020.

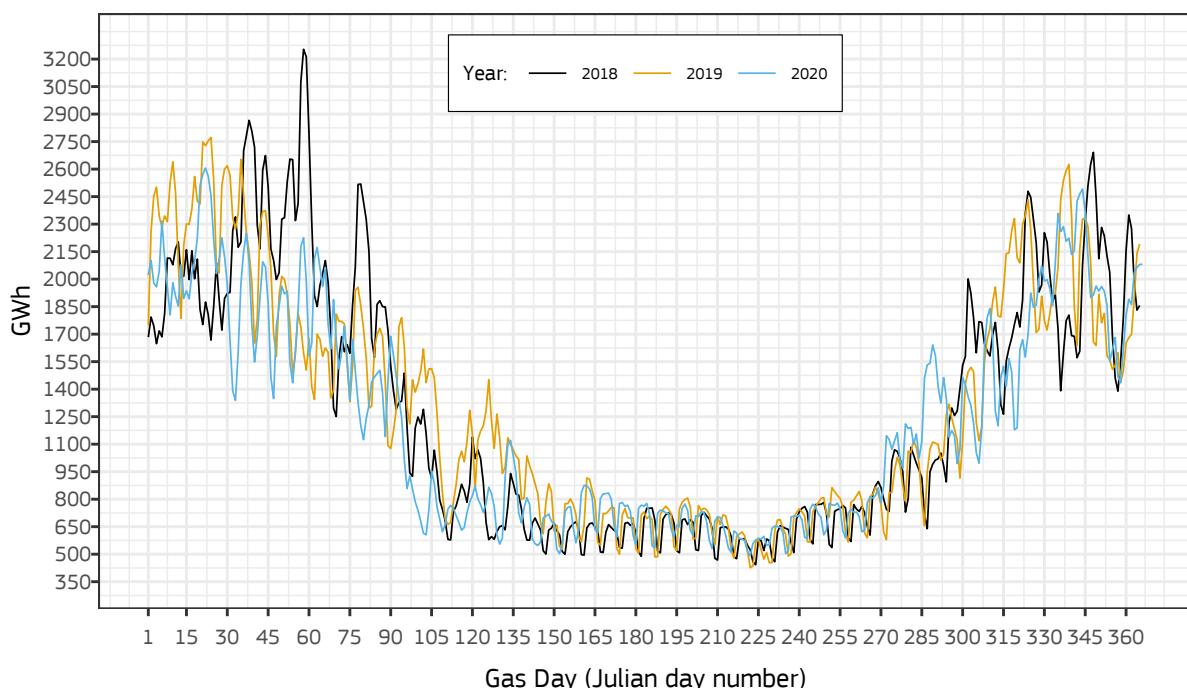
### France

Historical national daily Consumption



### France

Historical national daily Consumption

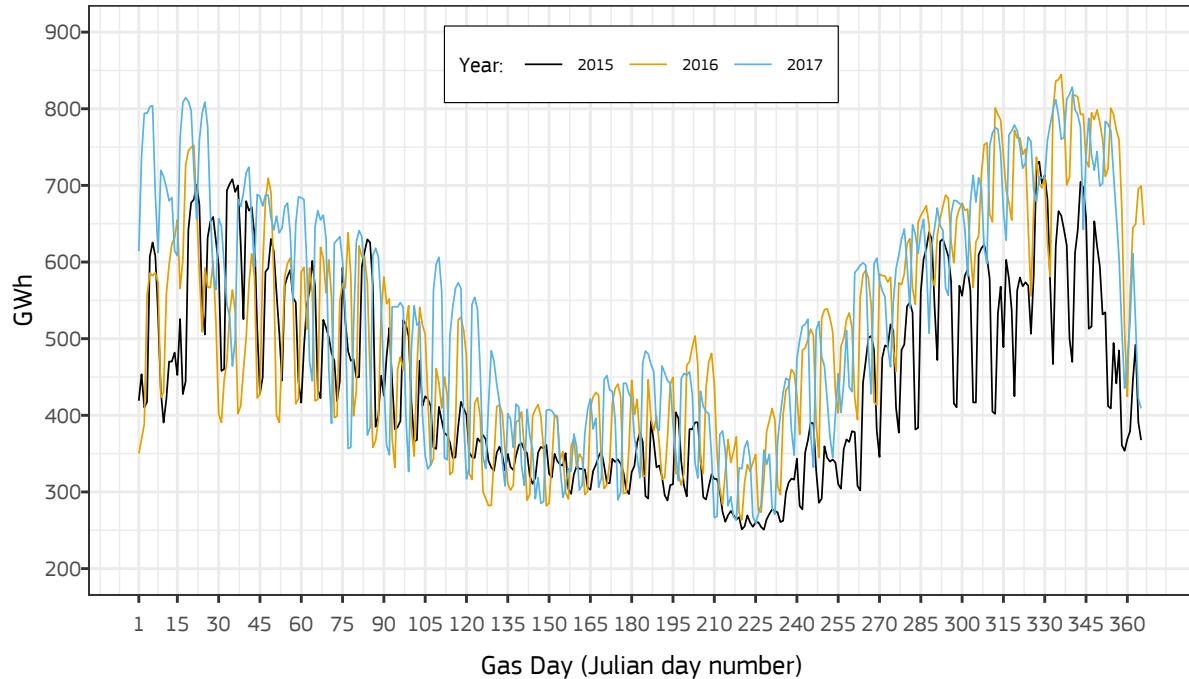


Source: JRC, 2021.

**Figure 15:** Time series of the daily consumption of natural gas by other users in France between 2015 and 2020.

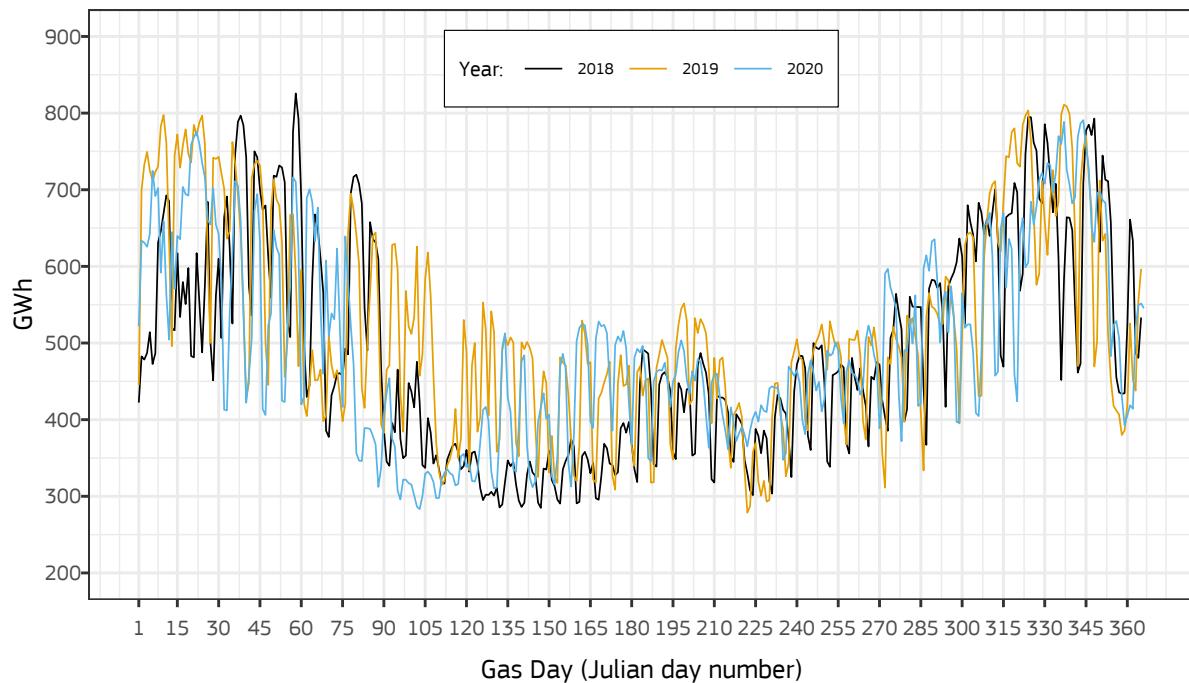
### France

Historical daily consumption of group *Other*



### France

Historical daily consumption of group *Other*

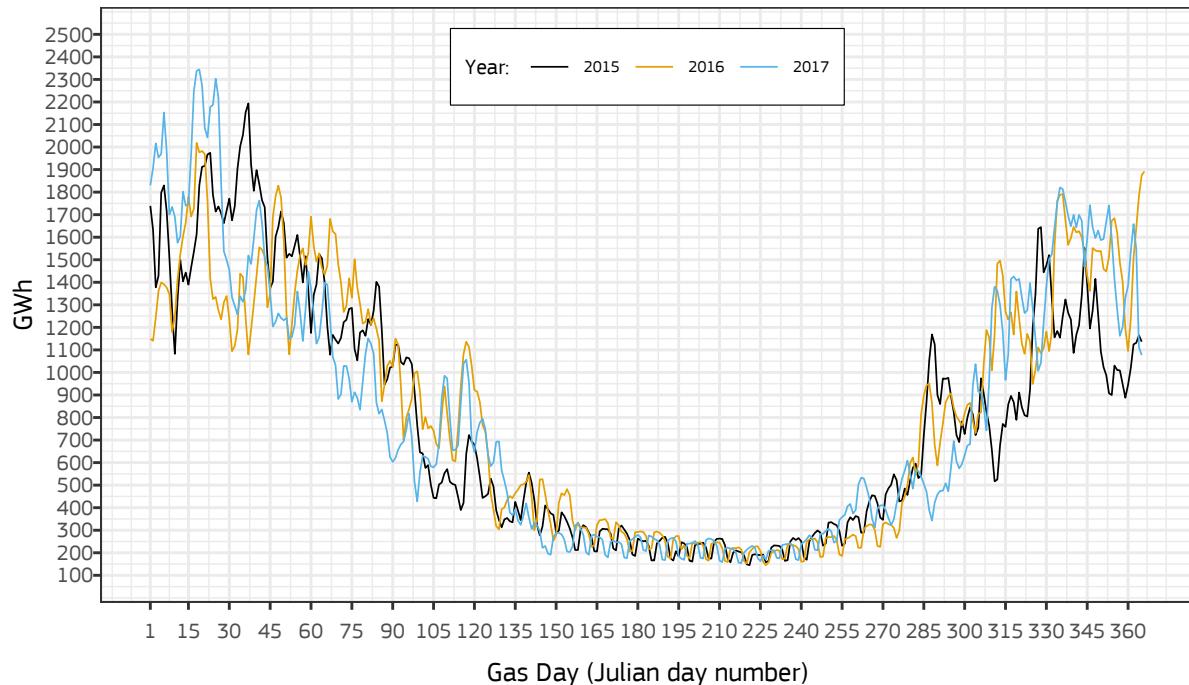


Source: JRC, 2021.

**Figure 16:** Time series of the daily consumption of natural gas by residential and commercial users in France between 2015 and 2020.

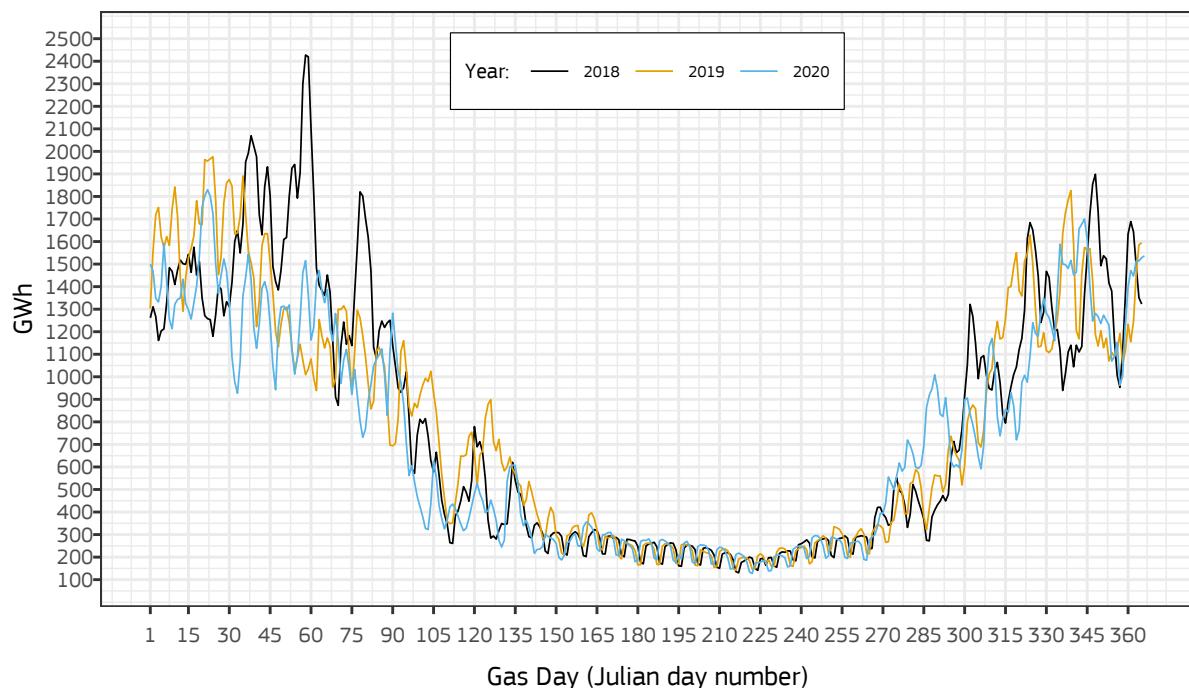
### France

Historical residential and commercial daily consumption



### France

Historical residential and commercial daily consumption



Source: JRC, 2021.

## 4.10 Germany

**Data source:** Data are taken the market areas of GASPOOL<sup>(37)</sup> and NetConnect Germany (NCG)<sup>(38)</sup><sup>(39)</sup>.

**Type of flow:** Both data platforms provide aggregated information for the respective market area divided by the type of natural gas (i.e., high calorific gas or H-gas and low calorific gas or L-gas). Furthermore, customers are divided in: (1) “standard load profile” users (SLP, ‘Standardlastprofile’) also known as “non-daily metered exit points”, which have two sub-categories, namely, the “synthetic SLP” (SLPsyn; ‘synthetisch’)(i.e., allocation of quantities is based on standard load profiles and temperature forecasts) and the “analytical SLP” (SLPana; ‘analytisch’)(i.e., residual loads are used from previous days for allocation); (2) “registering performance measurement” users (‘registrierende Leistungsmessung’, RLM), also known as “intra-day metered exit points”, with the sub-group RLMmT users, when loads are based on measured load profiles with daily bands (‘mit Tagesband’), and RLMoT users, when loads are based on measured load profiles without daily bands (‘ohne Tagesband’).

**Classification of consumption:** Consumption data are provided as aggregated figures for the market area, and can roughly be divided into “Residential and Commercial users”, when considering SLPana and SLPsyn for both L- and H-gas sub-systems. The category ‘OTHER’ is used for data of the category RLMmT and RLMoT.

**Data on gas quality:** Quality is not covered in the market area platforms.

**Unit of Measurement:** Data published on the market area platforms are provided in energy unit of measurement, either in kWh for the NCG or MWh for GASPOOL, at combustion temperature of 25 °C, volume temperature of 0 °C and pressure of 101.325 kPa.

**Time granularity:** Daily granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** German TSOs have their own transparency platforms, but, generally, data on consumption are missing. See Table 1 for details.

**Data processing:** Conversion from kWh/d or MWh/d to GWh/d.

**Table 12:** Summary statistics by year of the total national consumption, residential and commercial users and other users in Germany.

Year	Total (GWh/d)				Other users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	1013.69	2362.21	4636.43	862205.9	857.82	1354.07	2060.91	494235.6
<b>2016</b>	1125.71	2620.23	5243.13	959003.8	971.13	1537.22	2458.94	562621.9
<b>2017</b>	1179.07	2672.88	5388.42	975601.6	961.58	1598.42	2637.95	583423.2
<b>2018</b>	1154.96	2604.15	5642.54	950513.7	1002.64	1562.09	2541.45	570161.3
<b>2019</b>	1162.12	2663.53	5568.31	972189.2	961.89	1600.44	2642.49	584162.4
<b>2020</b>	1209.82	2641.14	4811.77	966655.5	959.80	1605.23	2496.13	587514.5

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	130.53	1008.14	2592.64	367970.3
<b>2016</b>	149.81	1083.01	2798.77	396381.8
<b>2017</b>	168.46	1074.46	2807.37	392178.3
<b>2018</b>	146.92	1042.06	3138.16	380352.4
<b>2019</b>	152.54	1063.09	2925.82	388026.8
<b>2020</b>	161.06	1035.90	2352.26	379140.9

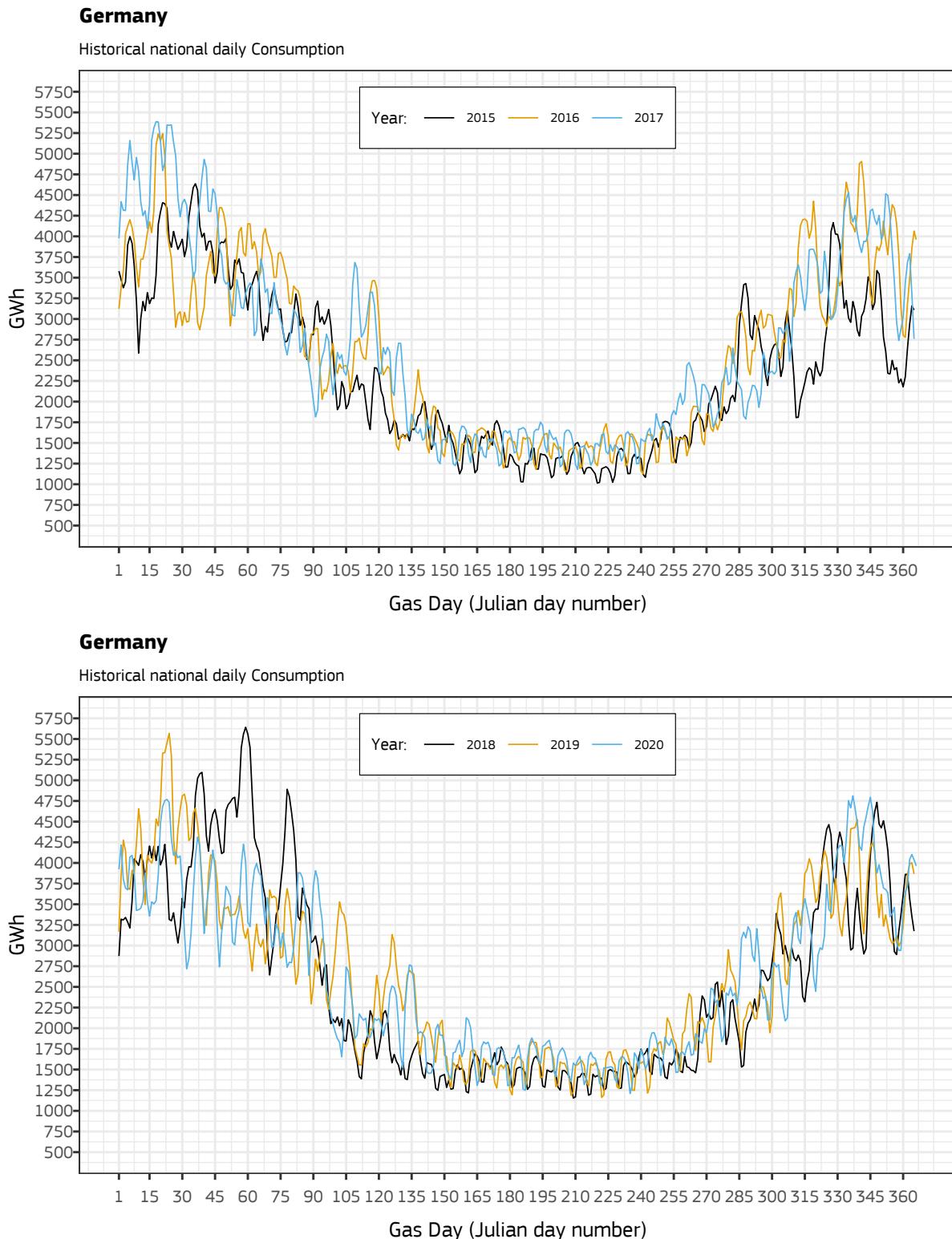
Source: JRC, 2021.

<sup>(37)</sup> <https://www.gaspool.de>

<sup>(38)</sup> <https://www.net-connect-germany.de>

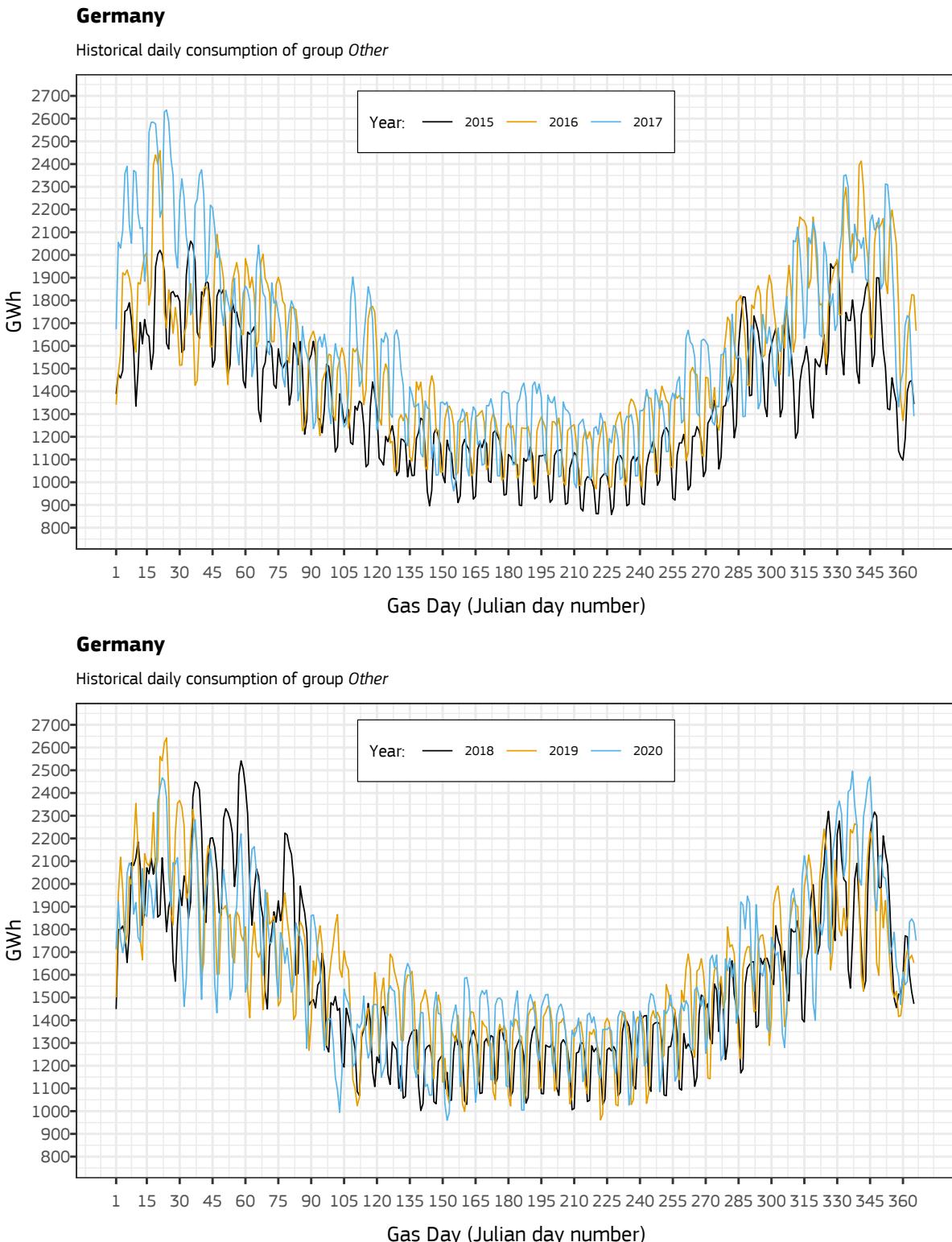
<sup>(39)</sup> At the date of publication of version 1.0 of ENaGaD the new market area manager “Trading Hub Europe GmbH” (<https://www.tradinghub.eu>) was not fully operational.

**Figure 17:** Time series of the daily total consumption of natural gas in Germany between 2015 and 2020.



Source: JRC, 2021.

**Figure 18:** Time series of the daily consumption of natural gas by other users in Germany between 2015 and 2020.

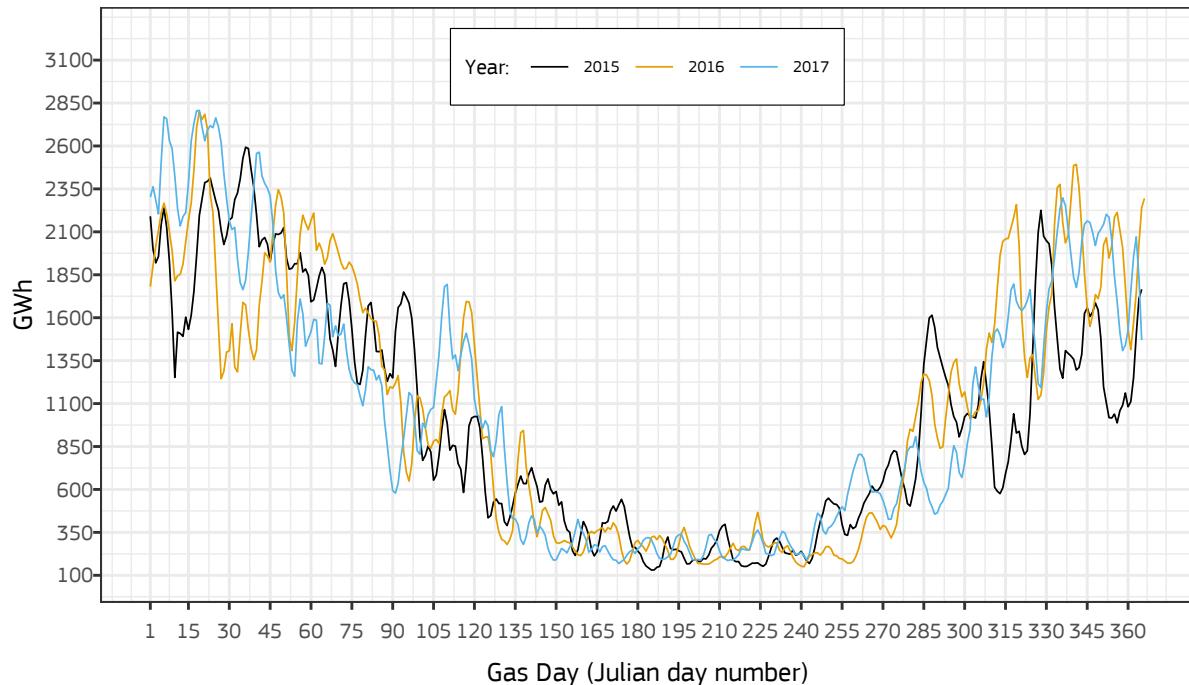


Source: JRC, 2021.

**Figure 19:** Time series of the daily consumption of natural gas by residential and commercial users in Germany between 2015 and 2020.

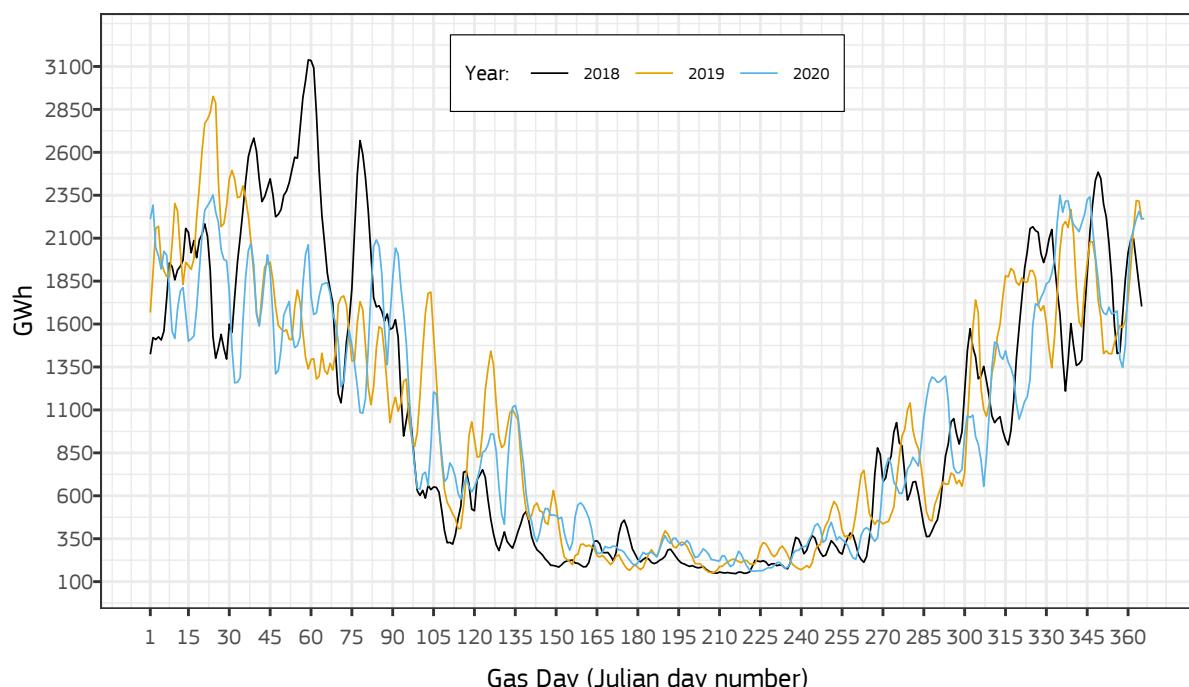
### Germany

Historical residential and commercial daily consumption



### Germany

Historical residential and commercial daily consumption



Source: JRC, 2021.

## 4.11 Greece

**Data source:** Data are taken from the transparency platform of the national transmission system operator "Hellenic Gas Transmission System Operator S.A" (DESFA) (<sup>40</sup>).

**Type of flow:** DESFA provides data for cross-border interconnection points, the LNG facility and distribution points.

**Classification of consumption:** Consumption data are provided at the off-take point level. The TSO does not aggregate points into categories of users.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa. Volume unit of measurement at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a dedicated transparency page(<sup>41</sup>).

**Data processing:** Original values were converted from kWh/d to GWh/d. The category "industrial users" is the sum of the daily figures for the off-take points of Aloyminion (Αλούμινιον), Aloyminion II (Αλούμινιον II), Aliveri PPC (Αλιβερί ΔΕΗ), Keratsini PPC (Κερατσίνι ΔΕΗ), Komotini PPC (Κομοτηνή ΔΕΗ), Lavrio PPC (Λαυρίο ΔΕΗ), Megalopolis PPC (Μεγαλοπόλη ΔΕΗ), Energiaki Thess. – Elpe (Ενεργειακή Θεσσαλονίκη – Ελπε), Heron II (Ηρών II), Heronas (Ηρωνασ), Thisvi (Θισβή) and Motor Oil II (Μοτορ Οιλ II). The category "power generation users" is the sum of the daily figures of the off-take points of Aloyminion III (Αλούμινιον III), VFL (ΒΦΛ), ELPE – EKO (ΕΛΠΕ – ΕΚΟ), ELPE VEE (ΕΛΠΕ ΒΕΕ), ELPE HAR (ΕΛΠΕ ΗΑΡ), Motor Oil (Μοτορ Οιλ), Salfa Anthoussa (Σαλφά Ανθουσσα) And Salfa Ano Liossia (Σαλφά Ανω Λιοσιών). All other off-take points are in the category "residential and commercial users".

**Table 13:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in Greece.

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	30.41	89.87	206.61	32801.15	5.83	12.86	17.04	4695.24
<b>2016</b>	36.95	119.41	222.54	43704.66	3.05	10.36	17.06	3793.43
<b>2017</b>	46.62	142.83	274.12	52133.93	11.67	16.37	22.19	5976.33
<b>2018</b>	62.00	138.15	253.55	50425.91	15.08	19.29	23.01	7042.56
<b>2019</b>	68.58	151.89	297.13	55439.72	11.80	18.78	29.11	6854.51
<b>2020</b>	68.11	172.42	272.20	63104.60	14.61	28.34	36.38	10373.69

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	10.59	50.55	139.53	18449.21	5.07	26.46	76.22	9656.72
<b>2016</b>	21.99	83.22	142.66	30456.94	6.55	25.83	71.91	9454.28
<b>2017</b>	22.04	98.05	180.84	35788.10	6.63	28.41	98.30	10369.49
<b>2018</b>	29.52	90.90	164.21	33178.10	7.22	27.96	72.20	10205.27
<b>2019</b>	35.42	102.63	180.52	37460.52	7.02	30.48	102.28	11124.69
<b>2020</b>	40.71	112.04	181.38	41005.66	7.62	32.04	87.14	11725.25

Source: JRC, 2021.

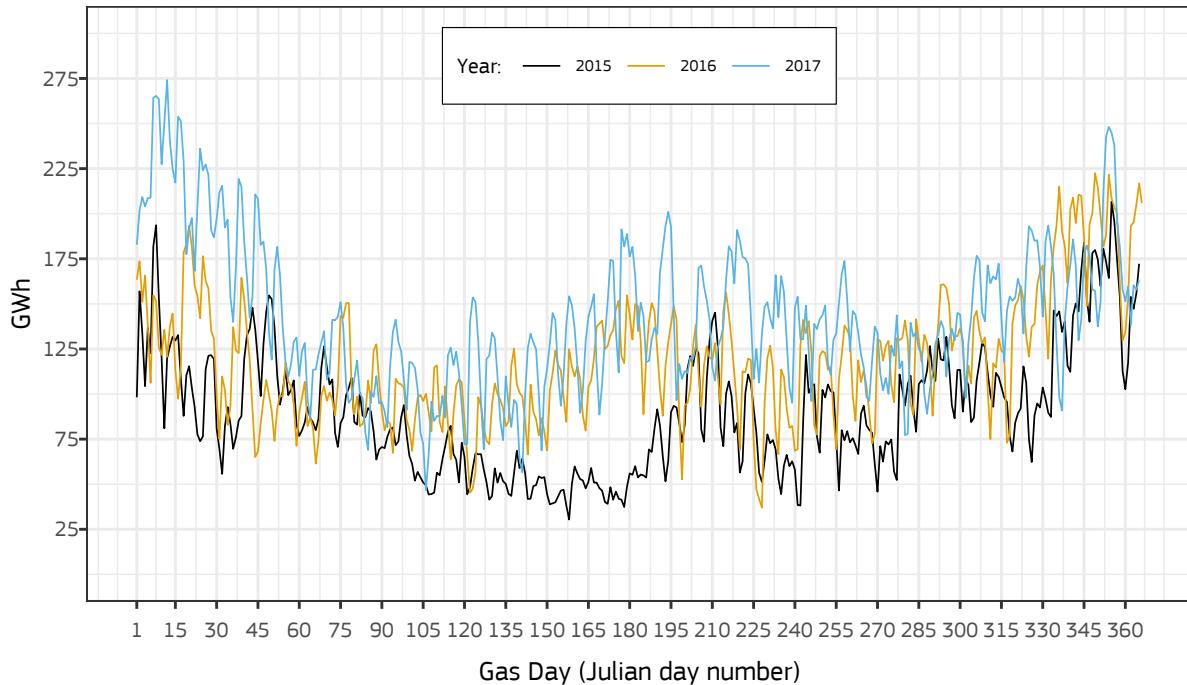
(<sup>40</sup>) <https://www.desfa.gr>.

(<sup>41</sup>) <https://www.desfa.gr/en/regulated-services/transmission/annex-i-of-regulation-715-2009>.

**Figure 20:** Time series of the daily total consumption of natural gas in Greece between 2015 and 2020.

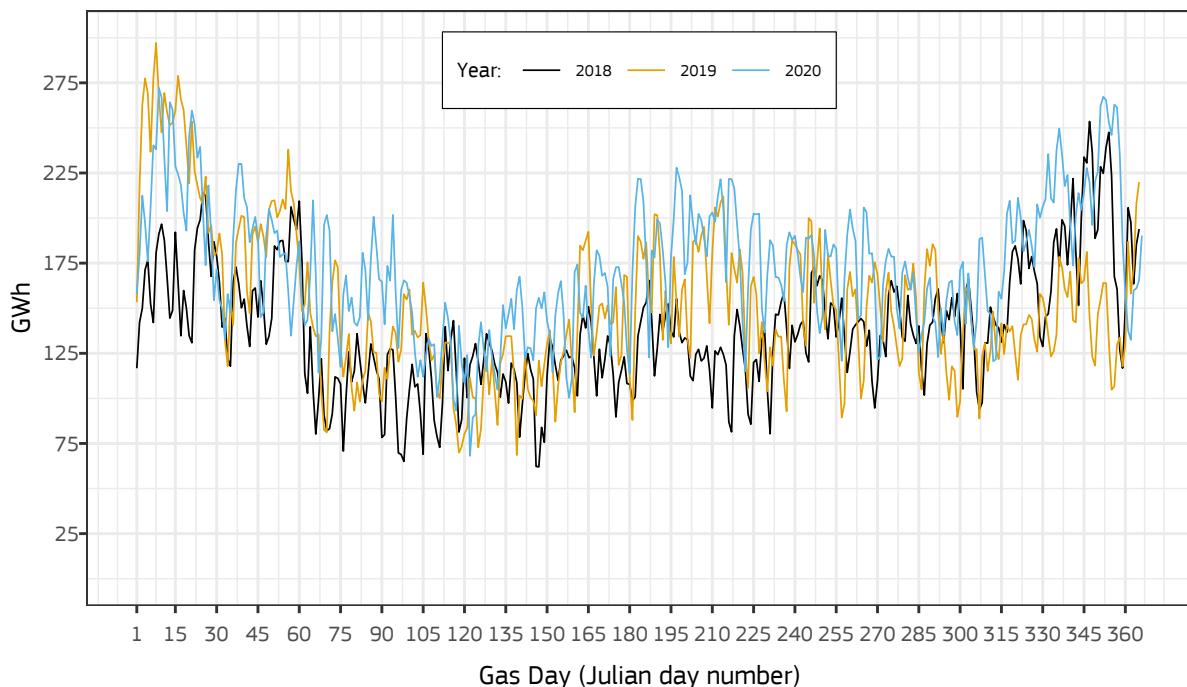
### Greece

Historical national daily Consumption



### Greece

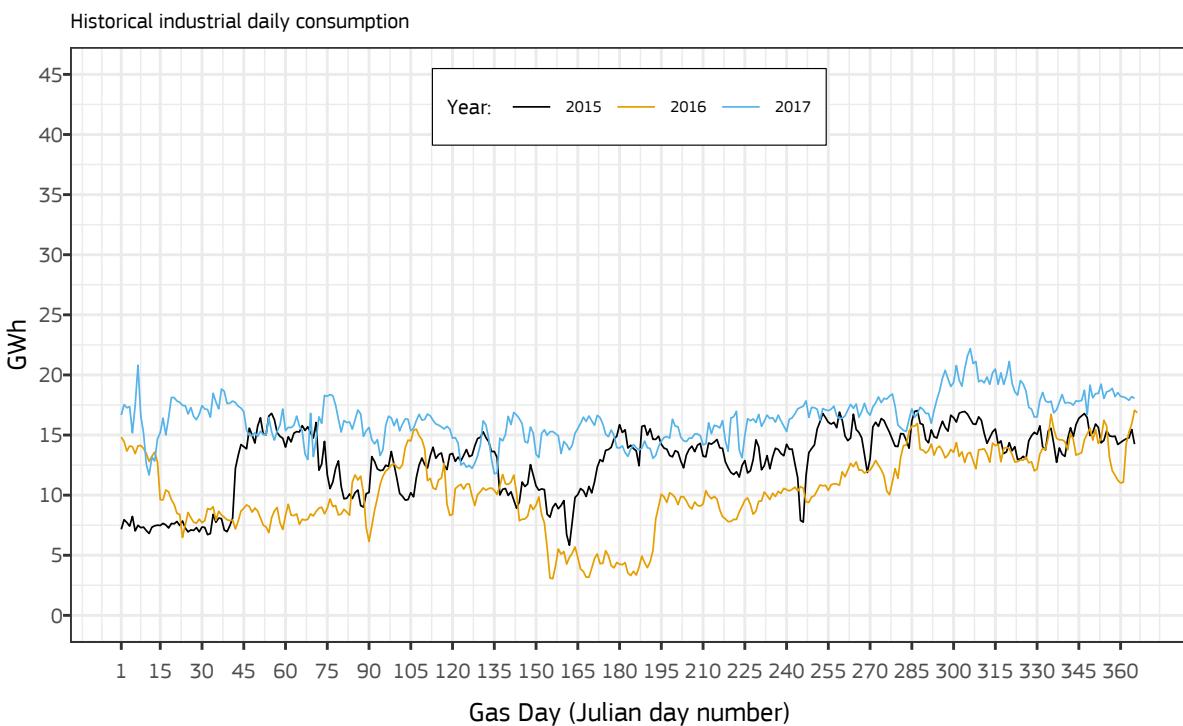
Historical national daily Consumption



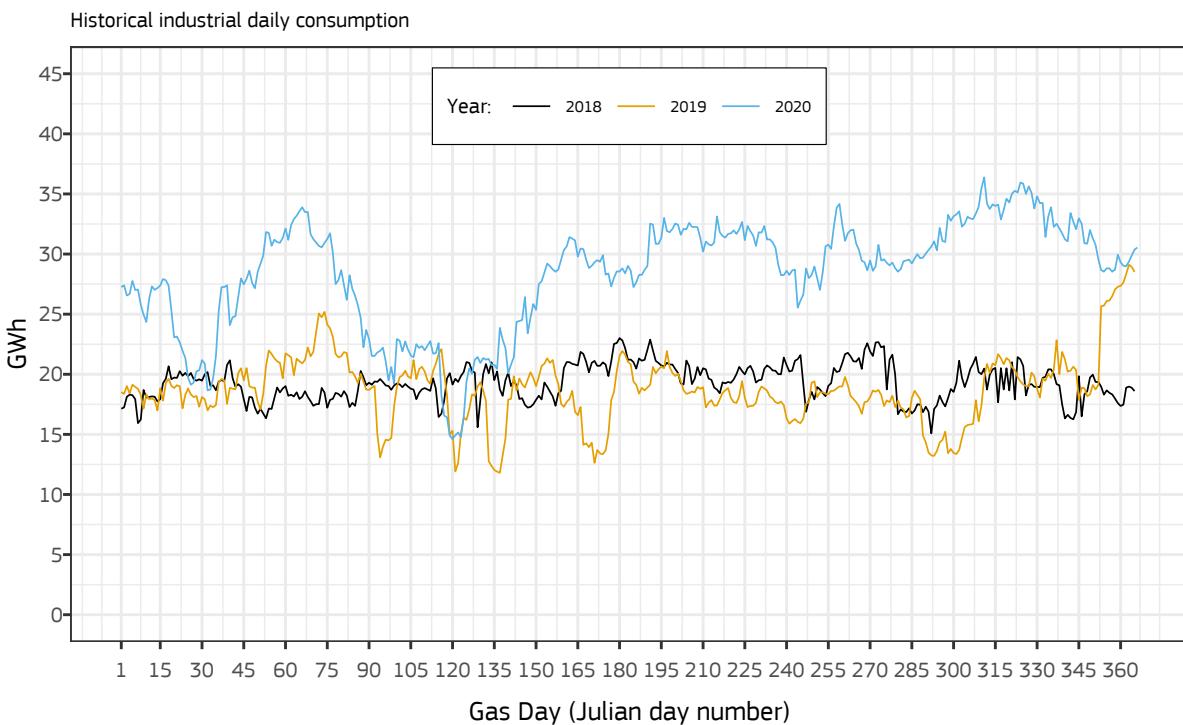
Source: JRC, 2021.

**Figure 21:** Time series of the daily consumption of natural gas by industrial users in Slovakia between 2015 and 2020.

### Greece

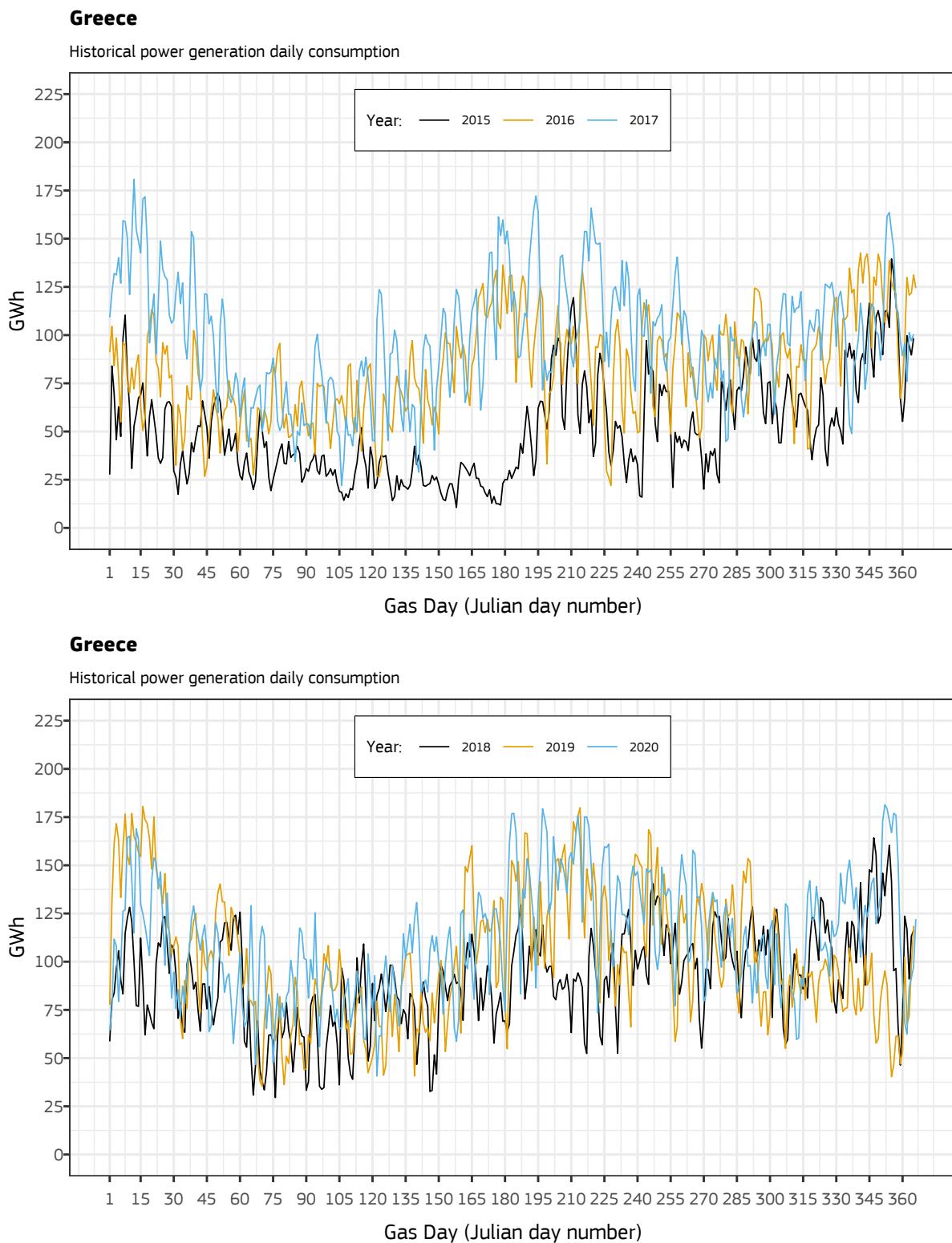


### Greece



Source: JRC, 2021.

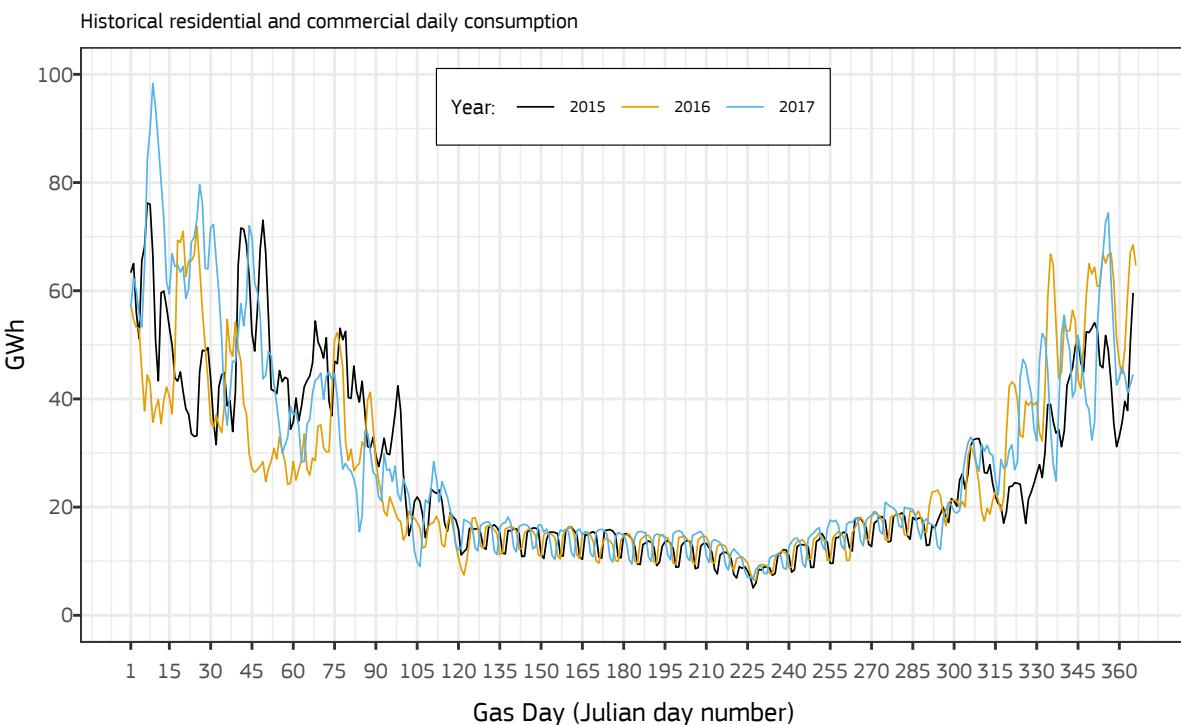
**Figure 22:** Time series of the daily consumption of natural gas by power generation users in Greece between 2015 and 2020.



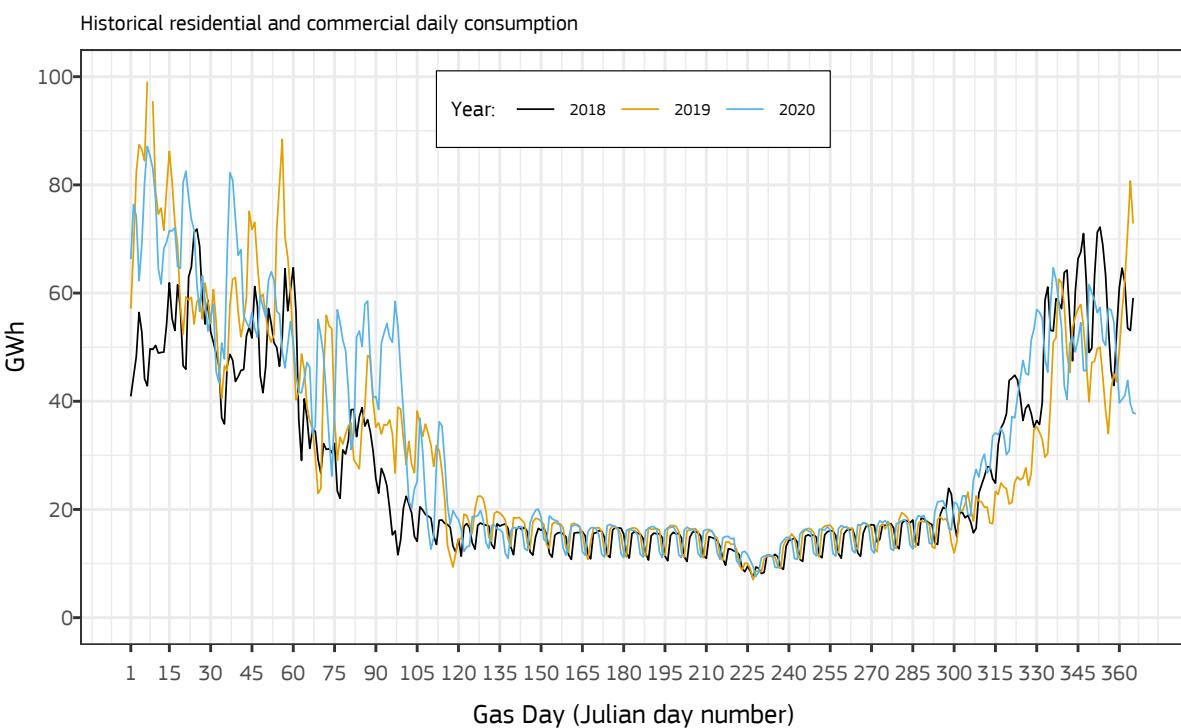
Source: JRC, 2021.

**Figure 23:** Time series of the daily consumption of natural gas by residential and commercial users in Greece between 2015 and 2020.

### Greece



### Greece



Source: JRC, 2021.

## 4.12 Hungary

**Data source:** Data are taken from the transparency platform of the transmission system operator FGSZ Ltd. (42). Data from September 30 2018 are from the new transparency platform (43). Data before September 30 2018 have been downloaded from the previous version of the transparency platform (44), which is nowadays unavailable.

**Type of flow:** FGSZ Ltd. covers cross-border interconnection points, underground storage facilities, domestic production and consumption.

**Classification of consumption:** Consumption is provided as aggregated figure for distribution and all other users, as well as for single off-take point.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system.

**Unit of Measurement:** Energy unit of measurement in kWh at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa, or in MJ at combustion temperature of 15 °C, and volume at temperature of 15 °C and 101.35 kPa. Volume unit of measurement at reference temperature of either 15 °C or 0 °C and pressure of 101.325 kPa.

**Time granularity:** Data are available at daily granularity. On the ENTSOG website a subset of data is also available at hourly time granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** FGSZ Ltd. has a dedicated web page (45) describing its transparency platform.

**Data processing:** All data were collected in kWh/d, and needed conversion to GWh/d. Only already aggregated figures have been used for data after September 30 2018. Figures from before have been estimated by aggregating all recognisable off-take points.

**Table 14:** Summary statistics by year of the total national consumption, other users, and residential and commercial users in Hungary.

Year	Total (GWh/d)					Other users (GWh/d)			
	Min	Average	Max	Sum		Min	Average	Max	Sum
<b>2015</b>	96.17	273.00	639.41	99644.43	0.00	0.00	0.00	0.00	0.00
<b>2016</b>	107.16	293.17	707.18	107302.04	36.73	64.37	82.46	5922.46	
<b>2017</b>	114.39	299.58	748.14	109348.35	44.75	69.83	103.61	25487.83	
<b>2018</b>	96.50	286.80	707.91	104681.57	36.66	65.69	106.56	23975.57	
<b>2019</b>	110.25	292.98	639.20	106936.59	39.66	73.32	103.13	26762.91	
<b>2020</b>	120.61	303.51	617.86	111085.55	46.56	73.80	103.01	27009.39	

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	0.00	0.00	0.00	0.00
<b>2016</b>	109.01	353.81	520.56	32550.24
<b>2017</b>	57.99	229.75	648.15	83860.52
<b>2018</b>	56.04	221.11	616.99	80706.00
<b>2019</b>	56.27	219.65	544.72	80173.69
<b>2020</b>	62.96	229.72	527.99	84076.16

Source: JRC, 2021.

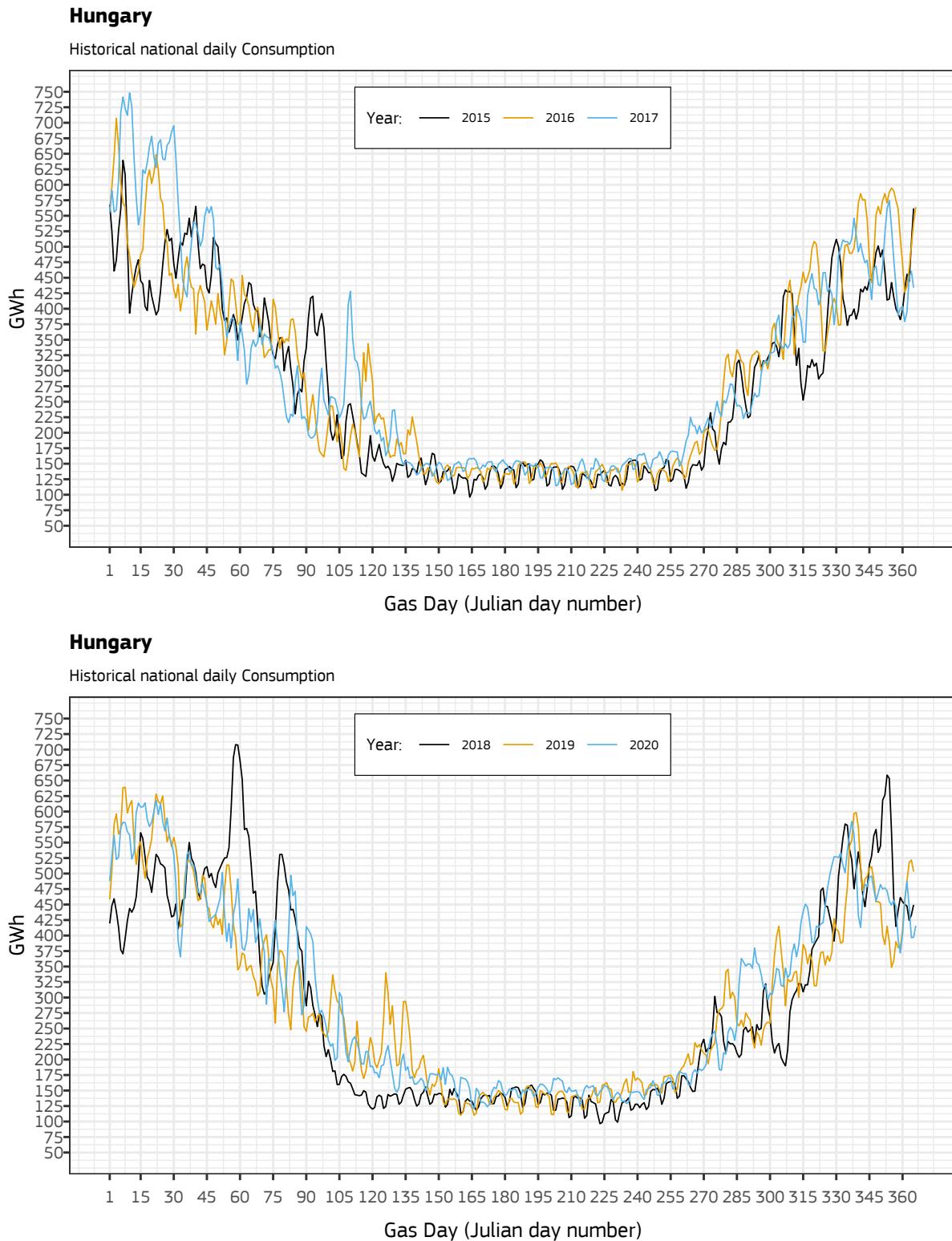
(42) <https://fgsz.hu>.

(43) <https://ipnew.rbp.eu/Fgsz.Tso.Data.Web>.

(44) [http://tsodata.fgsz.hu/en/pub\\_data](http://tsodata.fgsz.hu/en/pub_data).

(45) <https://fgsz.hu/en/transparency-information/eu-regulations>.

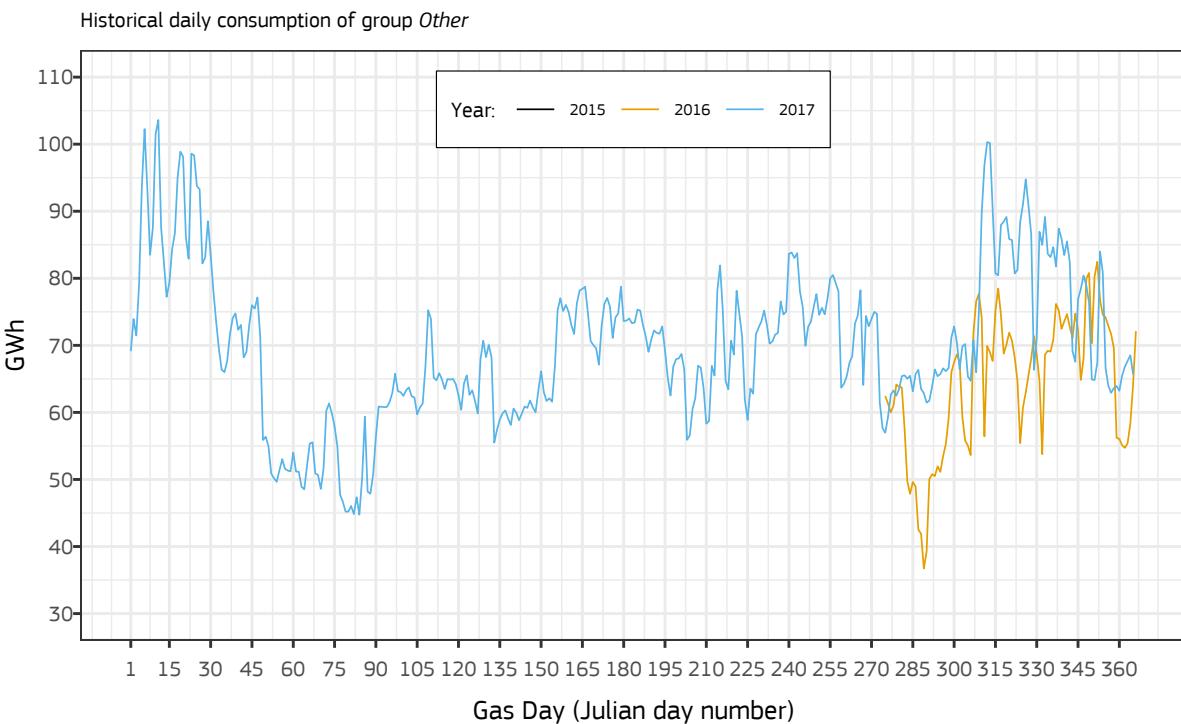
**Figure 24:** Time series of the daily total consumption of natural gas in Hungary between 2015 and 2020.



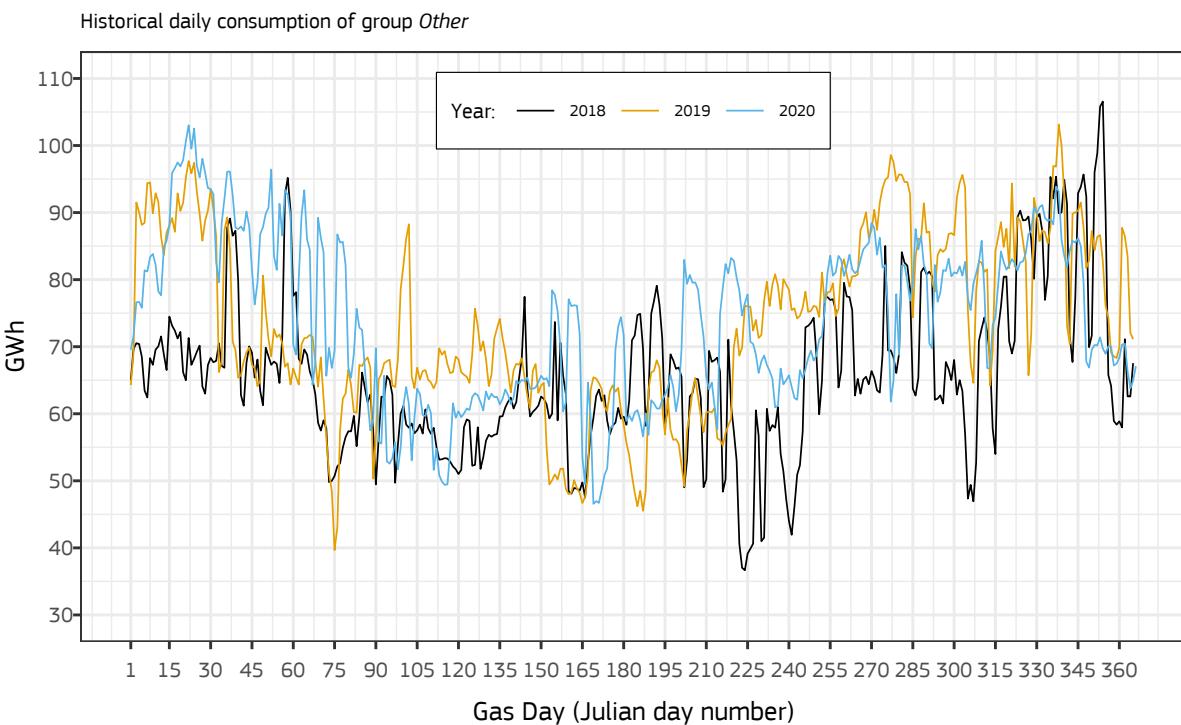
Source: JRC, 2021.

**Figure 25:** Time series of the daily consumption of natural gas by other users in Hungary between 2015 and 2020.

### Hungary

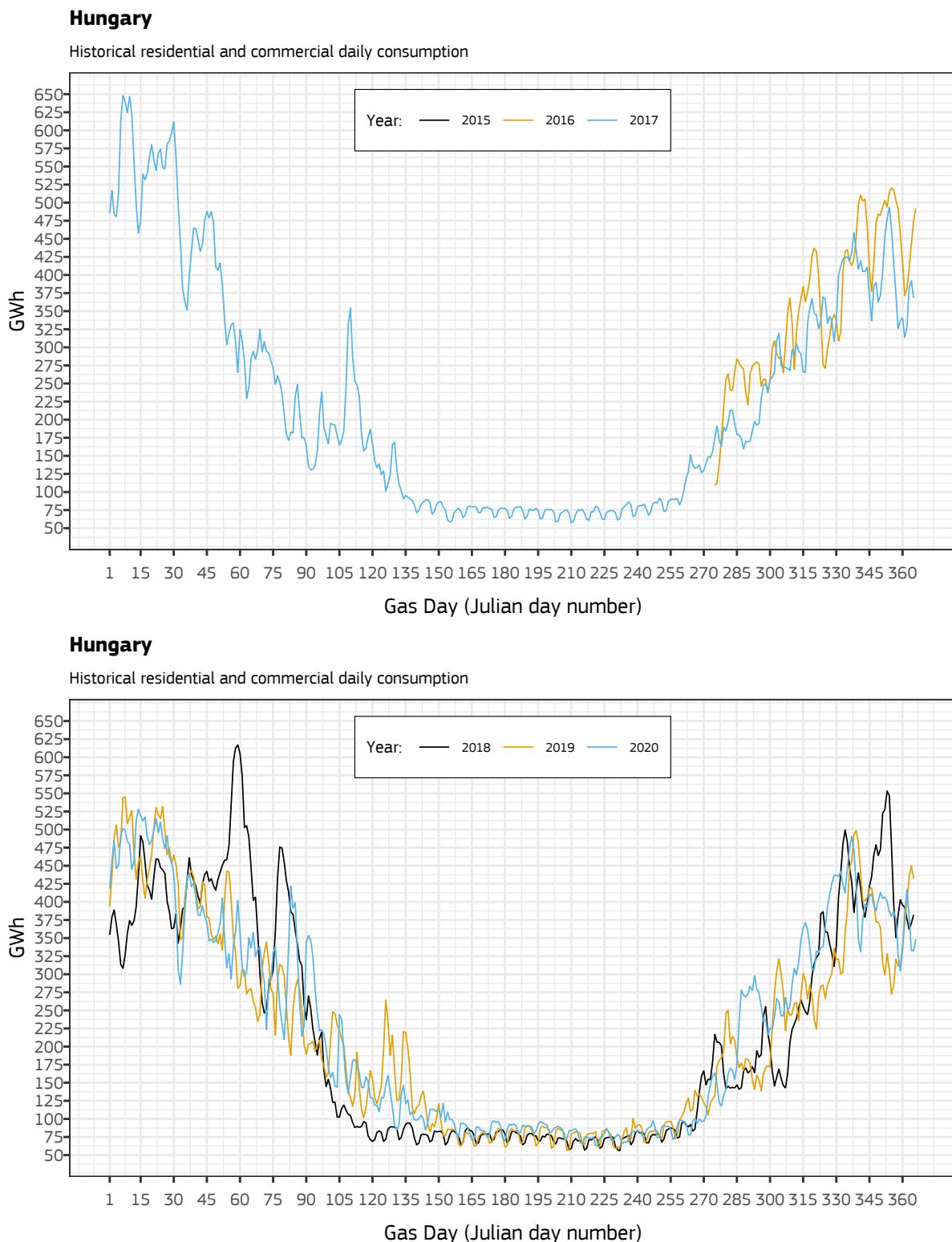


### Hungary



Source: JRC, 2021.

**Figure 26:** Time series of the daily consumption of natural gas by residential and commercial users in Hungary between 2015 and 2020.



Source: JRC, 2021.

## 4.13 Ireland

**Data source:** Data are downloaded from the transparency platform of "Gas Network Ireland" <sup>(46)</sup>, the national TSO. Figures till August 1 2017 are from the published "Transportation Monthly Reports", for all the remaining data values are from the "Dashboard Reporting".

**Type of flow:** Gas Network Ireland covers flows for domestic production points (no biogas), cross-border interconnection points and consumption — forecast and observed — aggregated by market sector.

**Classification of consumption:** Data are aggregated in market sectors distinguishing: "Non-Daily Metered" (NDM) costumers where the capacity booking on the first day of the booking period is below 5.5 GWh, "Daily Metered" (DM) costumers where the booking is between 5.5 and < 57.5 GWh, and "Large Daily Metered" (LDM) costumers where the booking is higher than 57.5 GWh. From October 2016, a fourth group "ROI Large Daily Metered" (ROI LDM) is available. It describes LDM of the Republic of Ireland and it excludes gas consumption by off-take points at Twynholm (Scotland, UK) and Glen Mooar (Isle of Man) sites. From January 2016 the group "ROI Power Generation" is introduced as well, but figures seems to be suspiciously low till May 17 2017, so they are disregarded. This group is a sub-set of the LDM sector or of the ROI LDM describing power generation consumption within the Republic of Ireland.

**Data on gas quality:** The GCV is provided by entry point and consumption zone in  $kWh/Nm^3$  at reference normal condition of combustion temperature of 25 °C, and volume at 0 °C and pressure of 101.325 kPa.

**Unit of Measurement:** flows are expressed in energy units of kWh (with a combustion reference temperature of 25 °C) and volume in cubic meters at 0 °C and 101.325 kPa.

**Time granularity:** Daily and hourly figures, with aggregated monthly figures also available. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The transparency platform of the TSO is available on its web site <sup>(47)</sup>.

**Data processing:** Due to the progressive introduction of the sector "ROI Large Daily Metered" and "ROI Power Generation", data from January 2015 to May 16 2017 are aggregated into distribution (i.e., NDM sector) and others (i.e., DM and LDM ROI). From May 17 2017 on, the classes distribution, industry (i.e., DM and difference between ROI LDM and ROI Power Generation) and gas-fired power plant (i.e., ROI Power Plant) are considered.

For the period January 2015 – September 30 2016, the sector ROI LDM is estimated by subtracting from the daily figures of the published values for sector LDM (i.e., cover also gas consumption by Twynholm (Scotland, UK) and Glen Mooar (Isle of Man) sites) the monthly estimated average difference between LDM and ROI LDM in the period October 2016 – September 2017. Monthly subtracted values are: for January 58.418 GWh/d, for February 52.180 GWh/d, for March 50.455 GWh/d, for April 53.508 GWh/d, for May 43.884 GWh/d, for June 46.046 GWh/d, for July 46.350 GWh/d, for August 48.316 GWh/d, for September 41.336 GWh/d, for October 42.718 GWh/d, for November 59.711 GWh/d, and for December 54.297 GWh/d.

<sup>(46)</sup> <https://www.gasnortworks.ie/corporate/gas-regulation/transparency-and-publicat/>.

<sup>(47)</sup> <https://www.gasnortworks.ie/corporate/gas-regulation/transparency-and-publicat/dashboard-reporting/ec-715-transparency-landi/>

**Table 15:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users, other users and residential and commercial users in Ireland.

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	53.39	125.71	224.45	45884.51	0.00	0.00	0.00	0.00
<b>2016</b>	52.07	144.85	221.90	53014.82	0.00	0.00	0.00	0.00
<b>2017</b>	81.98	150.33	210.02	54870.23	12.87	23.03	28.47	5273.39
<b>2018</b>	93.57	155.68	215.76	56824.43	12.60	24.95	32.64	9105.26
<b>2019</b>	91.52	158.91	218.92	58002.85	14.05	26.17	32.61	9552.98
<b>2020</b>	89.81	158.06	228.11	57850.53	16.16	25.77	31.64	9433.09

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	0.00	0.00	0.00	0.00	7.57	31.44	73.46	11474.26
<b>2016</b>	0.00	0.00	0.00	0.00	7.04	32.09	71.45	11746.37
<b>2017</b>	48.32	98.21	145.13	22489.11	7.20	31.91	74.68	11646.74
<b>2018</b>	49.39	96.22	149.74	35119.23	6.67	34.52	97.23	12599.93
<b>2019</b>	49.57	98.53	148.63	35962.80	8.34	34.21	76.36	12487.08
<b>2020</b>	52.80	99.17	156.09	36296.98	7.82	33.12	74.83	12120.47

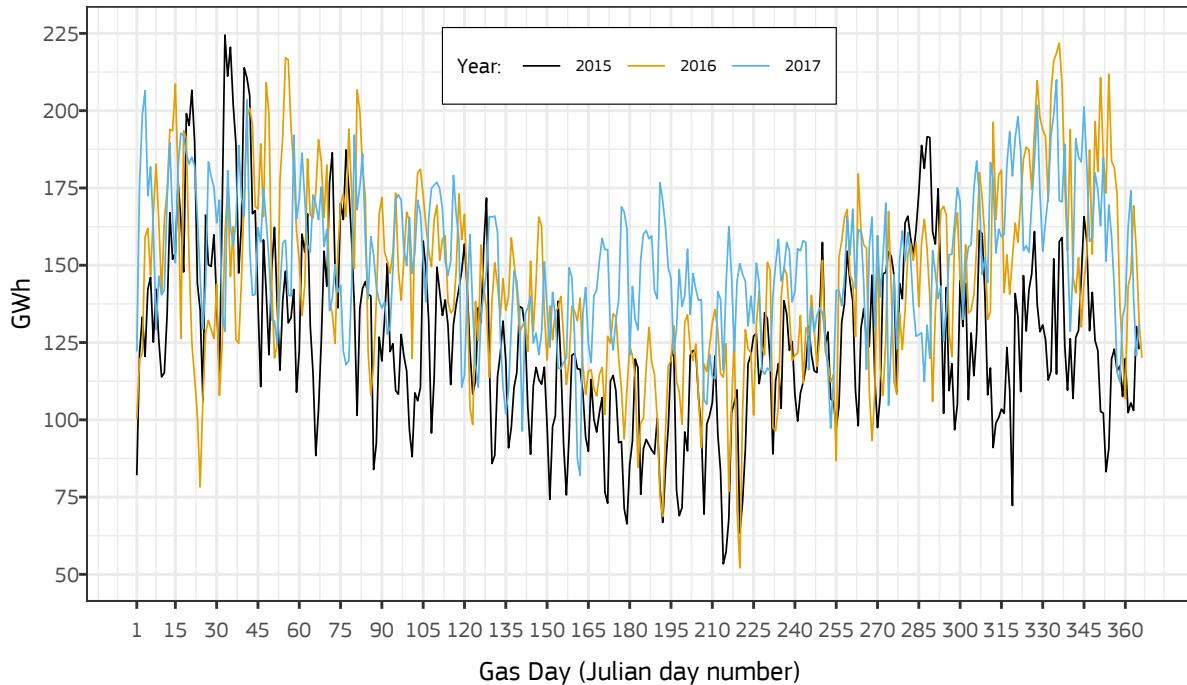
Year	Other users (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	41.88	94.27	159.24	34410.25
<b>2016</b>	43.04	112.76	163.35	41268.46
<b>2017</b>	69.25	118.42	166.64	43223.49
<b>2018</b>	72.13	121.16	172.14	44224.48
<b>2019</b>	71.11	124.70	177.84	45515.78
<b>2020</b>	70.05	124.95	180.87	45730.07

Source: JRC, 2021.

**Figure 27:** Time series of the daily total consumption of natural gas in Ireland between 2015 and 2020.

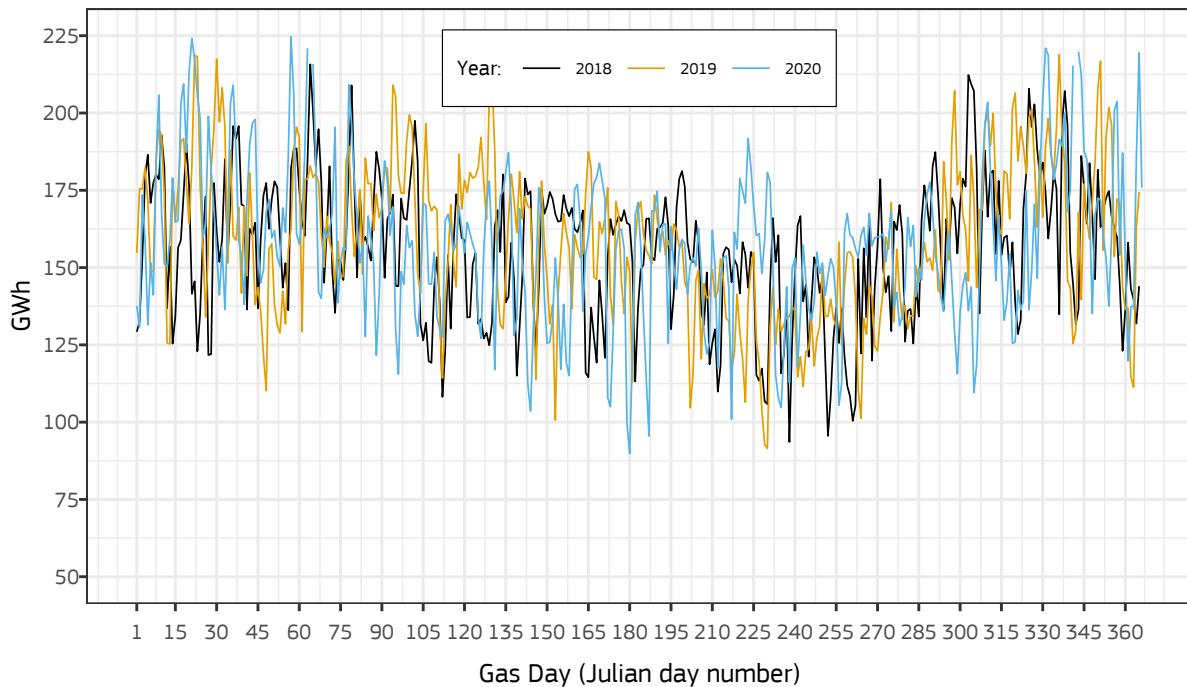
### Ireland

Historical national daily Consumption



### Ireland

Historical national daily Consumption

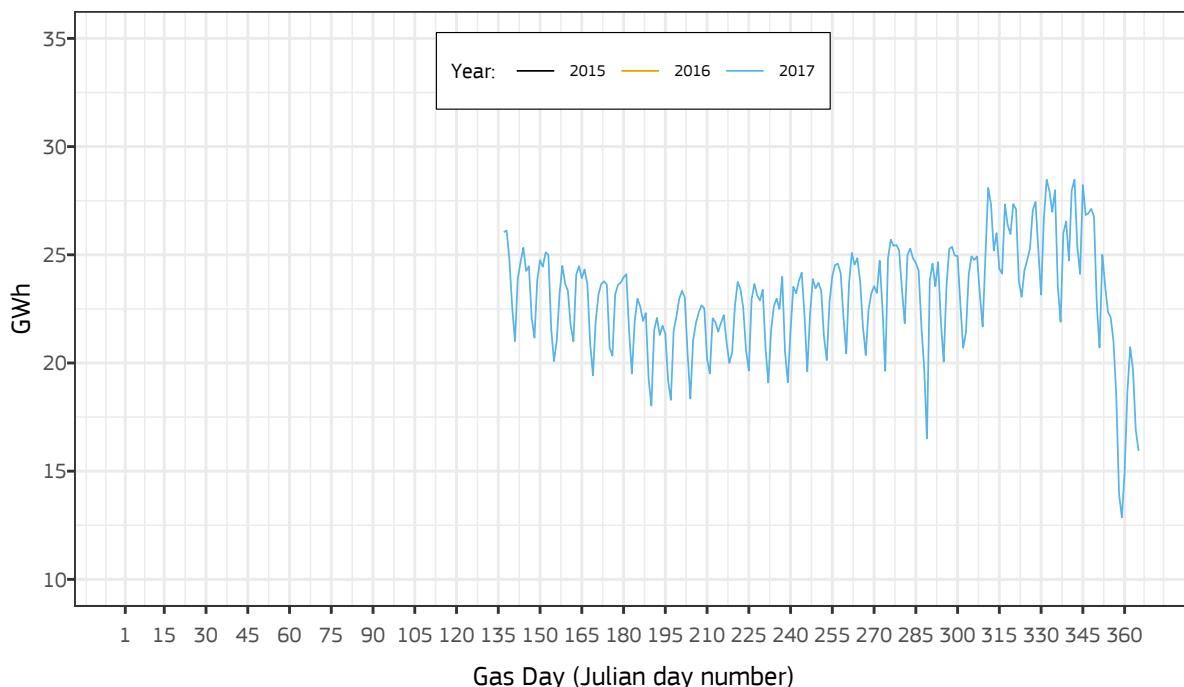


Source: JRC, 2021.

**Figure 28:** Time series of the daily consumption of natural gas by industrial users in Ireland between 2015 and 2020.

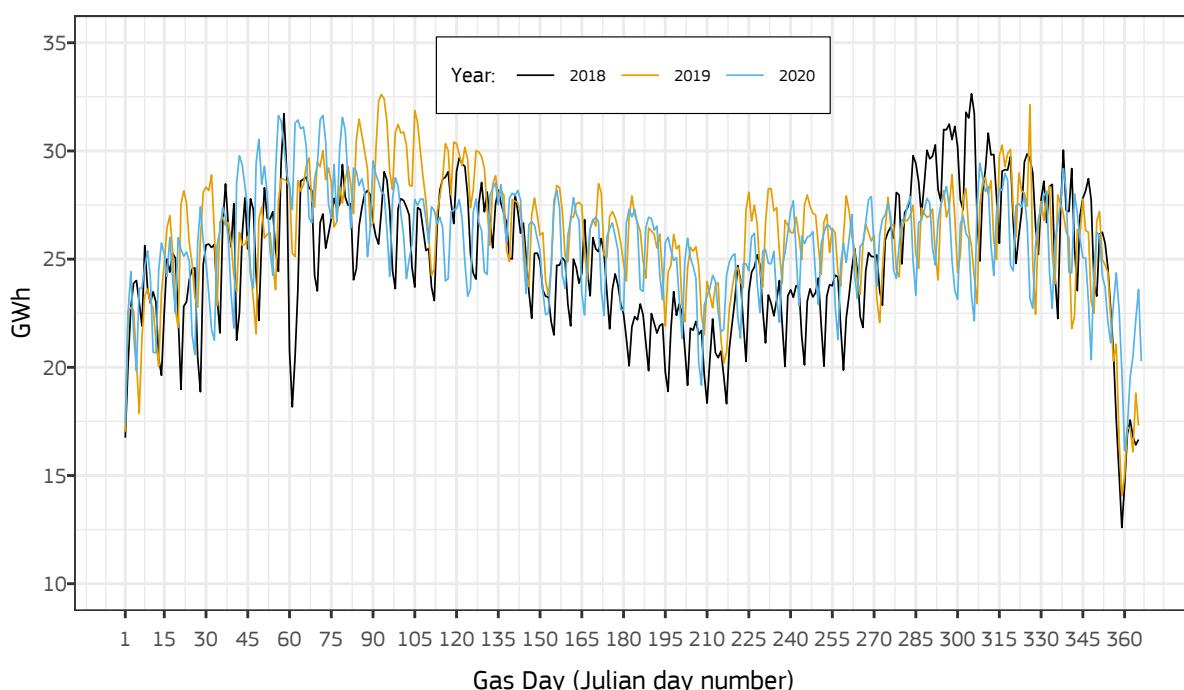
### Ireland

Historical industrial daily consumption



### Ireland

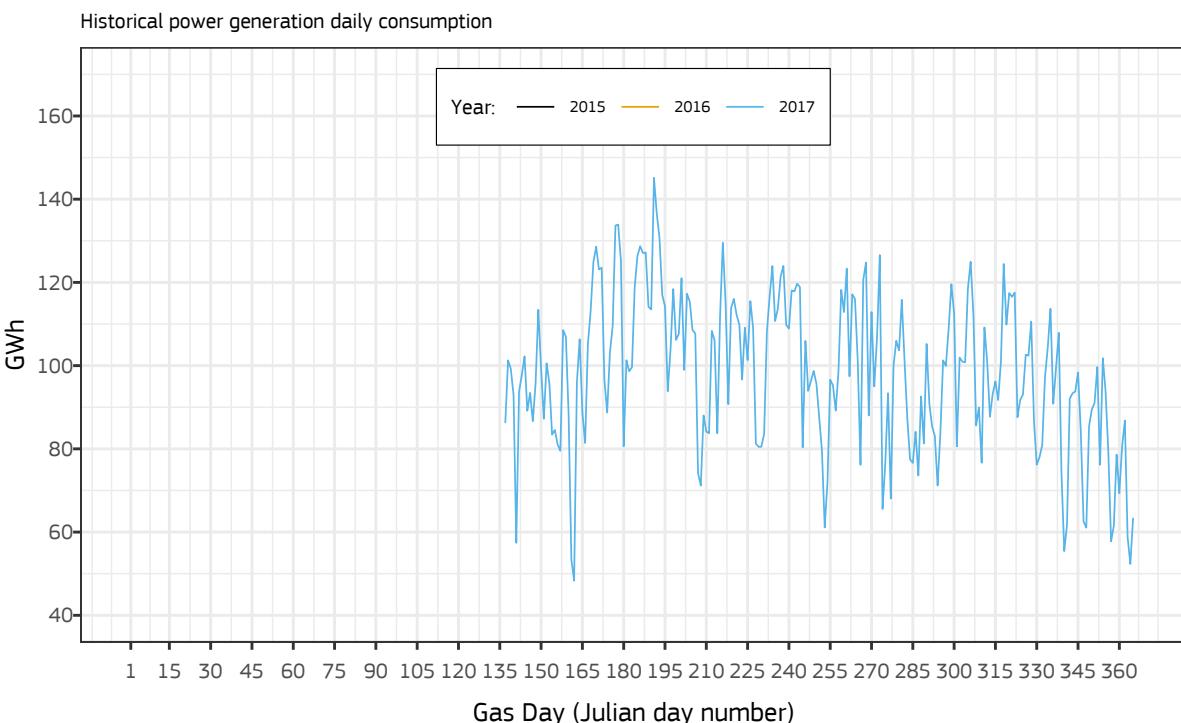
Historical industrial daily consumption



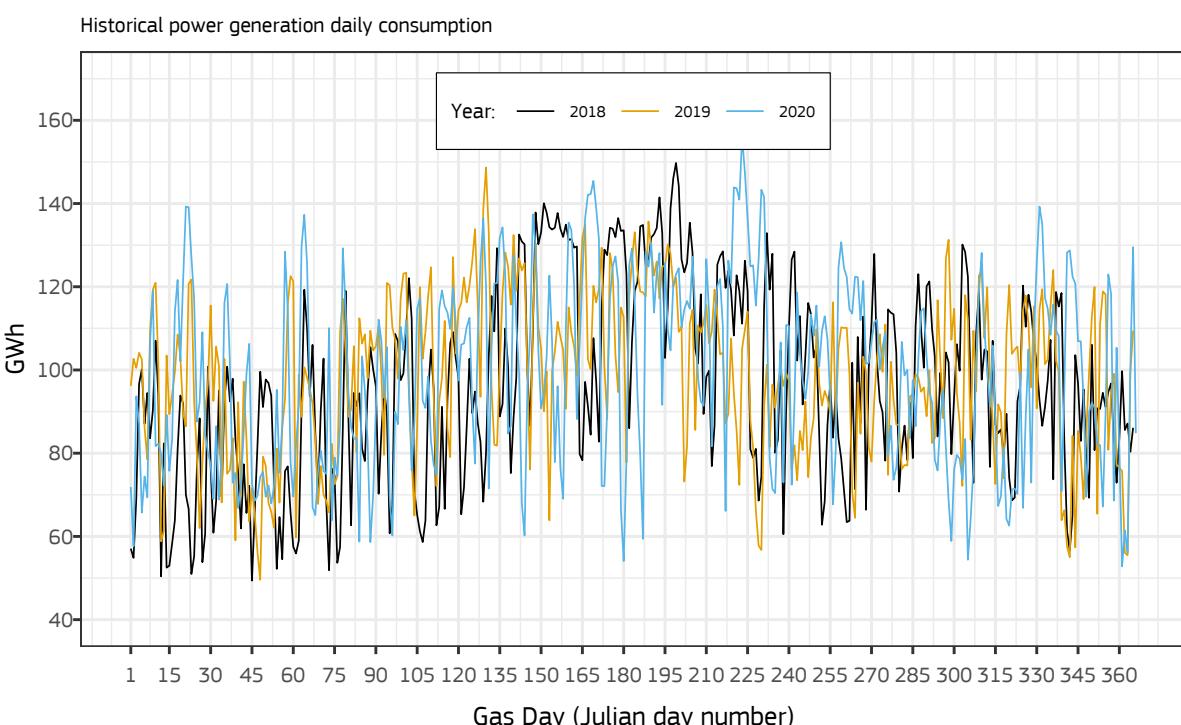
Source: JRC, 2021.

**Figure 29:** Time series of the daily consumption of natural gas by power generation users in Ireland between 2015 and 2020.

### Ireland



### Ireland

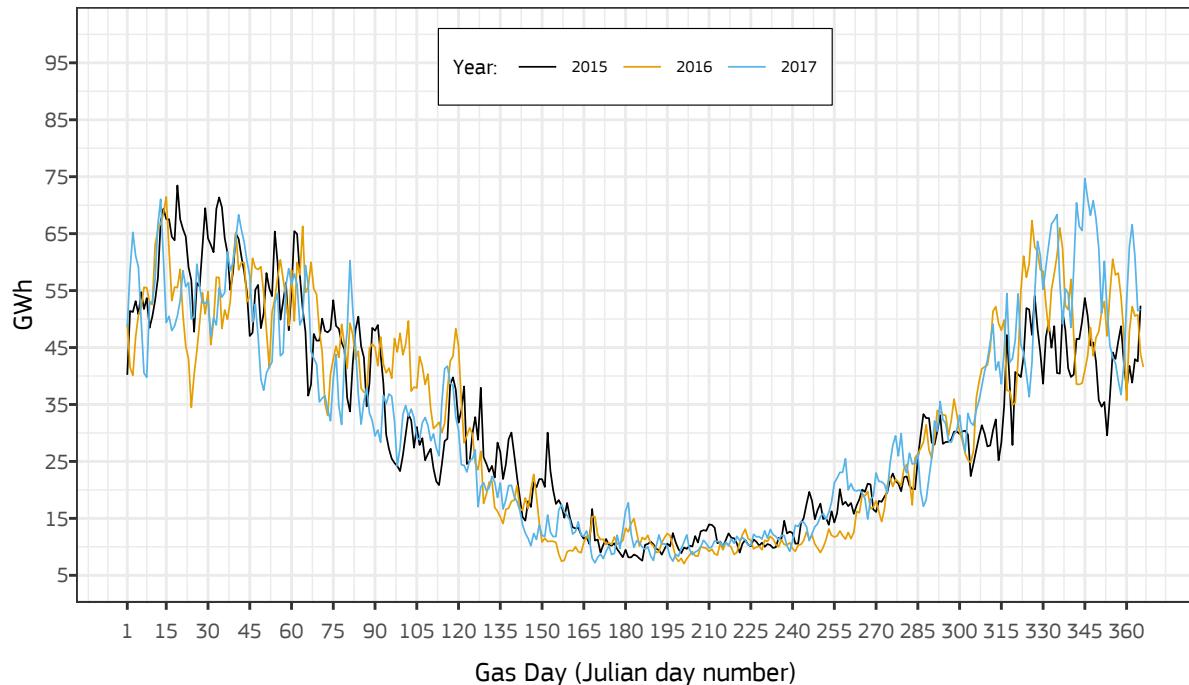


Source: JRC, 2021.

**Figure 30:** Time series of the daily consumption of natural gas by residential and commercial users in Ireland between 2015 and 2020.

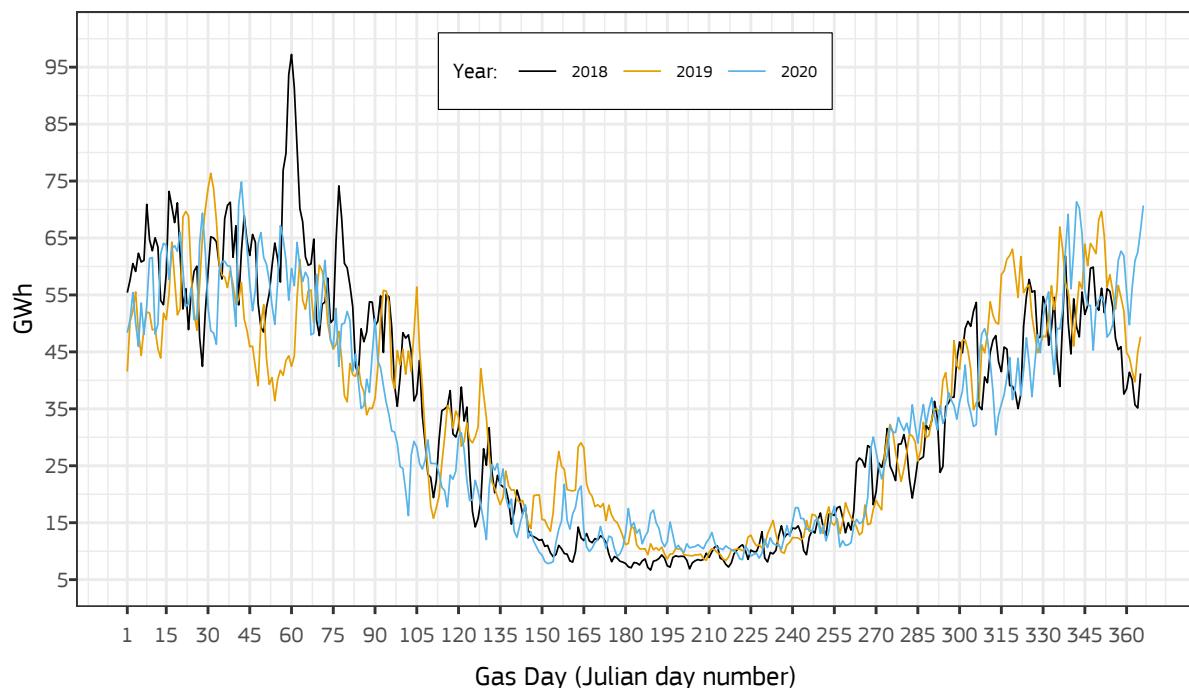
### Ireland

Historical residential and commercial daily consumption



### Ireland

Historical residential and commercial daily consumption

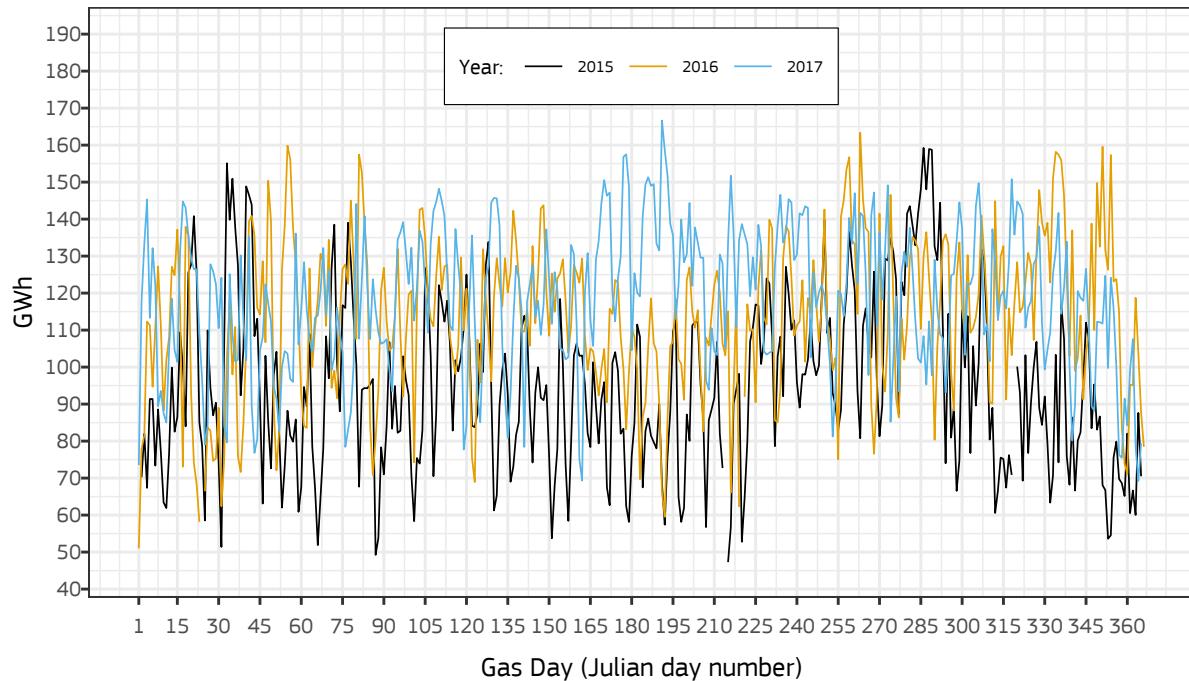


Source: JRC, 2021.

**Figure 31:** Time series of the daily consumption of natural gas by other users in Ireland between 2015 and 2020.

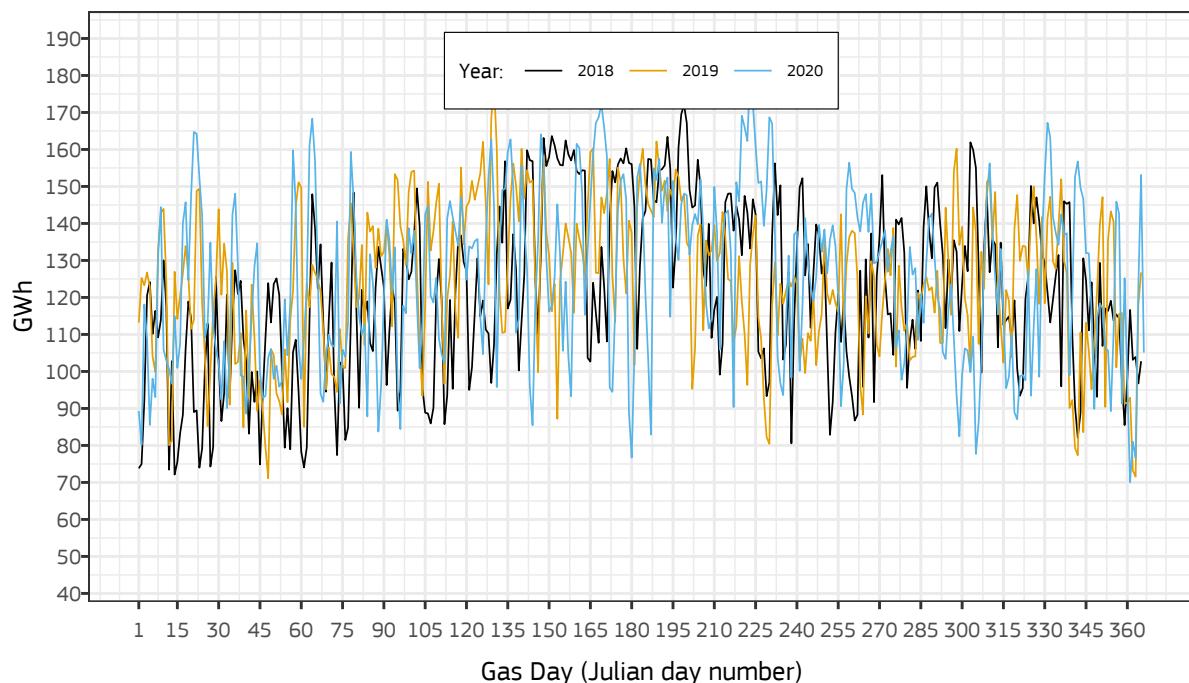
### Ireland

Historical daily consumption of group *Other*



### Ireland

Historical daily consumption of group *Other*



Source: JRC, 2021.

## 4.14 Italy

**Data source:** Data are taken from the transparency platform of the national transmission system operator "Snam S.p.a." (48).

**Type of flow:** Snam S.p.a. provides data for cross-border interconnection points, underground storage and LNG facility, and virtual aggregated distribution points.

**Classification of consumption:** Daily figures are provided for user category groups.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system (physical or virtual) on a daily or hourly basis.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa. Volume unit of measurement at temperature of 0 °C or 15 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a dedicated transparency page<sup>(49)</sup>.

**Data processing:** Original values were converted from kWh/d to GWh/d.

**Table 16:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in Italy.

Year	Total (GWh/d)					Industrial users (GWh/d)				
	Min	Average	Max	Sum		Min	Average	Max	Sum	
<b>2015</b>	808.73	1883.92	3484.98	687632.4	193.36	369.05	472.43	134702.0		
<b>2016</b>	820.89	1976.86	3908.14	723529.6	186.41	386.95	497.07	141623.4		
<b>2017</b>	796.07	2098.25	4319.49	765861.7	210.40	416.09	516.82	151874.4		
<b>2018</b>	843.83	2026.22	4124.62	739568.5	207.50	413.60	519.95	150962.7		
<b>2019</b>	877.98	2071.16	4047.28	755974.6	205.82	405.95	513.64	148170.4		
<b>2020</b>	971.70	1980.04	3746.68	724693.9	199.19	381.91	503.97	139777.7		

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	317.84	601.58	1071.60	219578.4	182.90	913.29	2298.95	333352.1
<b>2016</b>	335.68	675.44	1087.06	247209.7	195.51	914.47	2441.93	334696.5
<b>2017</b>	326.86	737.11	1102.41	269045.3	192.07	945.05	2741.09	344942.0
<b>2018</b>	323.58	676.42	1079.18	246891.8	188.22	936.20	2764.97	341714.0
<b>2019</b>	363.37	747.94	1155.83	272999.6	189.47	917.27	2377.81	334804.5
<b>2020</b>	351.21	706.56	1146.16	258599.4	188.06	891.58	2247.66	326316.9

Source: JRC, 2021.

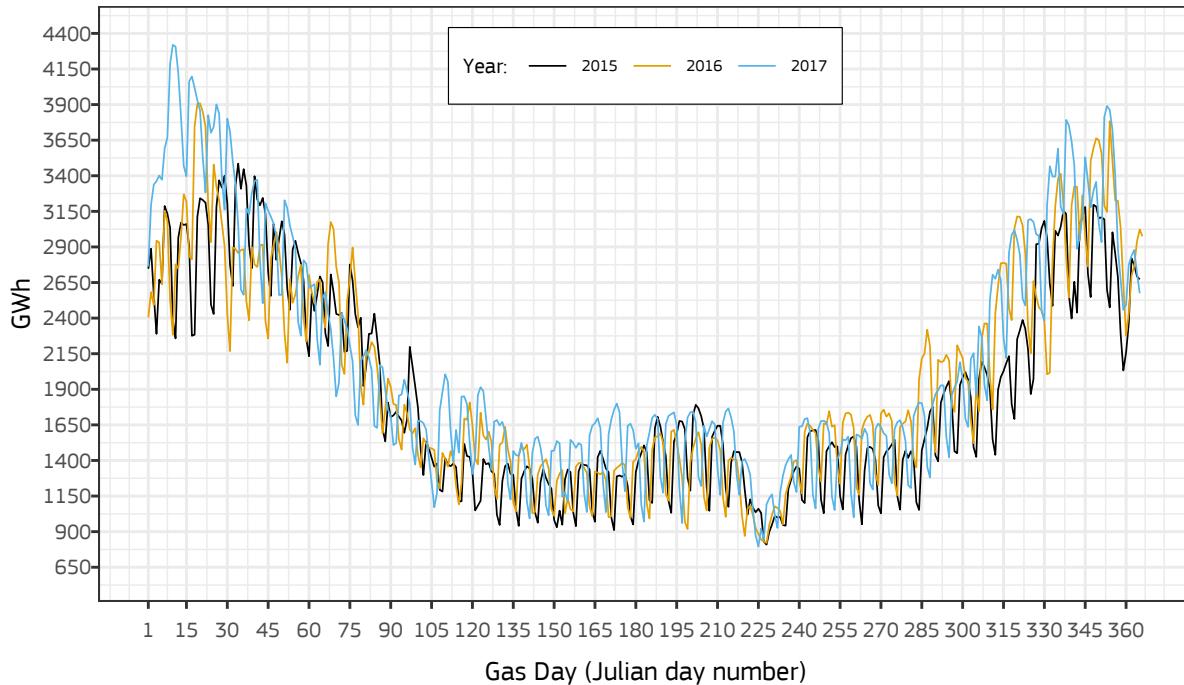
(48) <https://www.snam.it>.

(49) [https://www.snam.it/en/transportation/UE-fulfillments-reporting/transparency\\_template\\_reg\\_715-2009](https://www.snam.it/en/transportation/UE-fulfillments-reporting/transparency_template_reg_715-2009).

**Figure 32:** Time series of the daily total consumption of natural gas in Italy between 2015 and 2020.

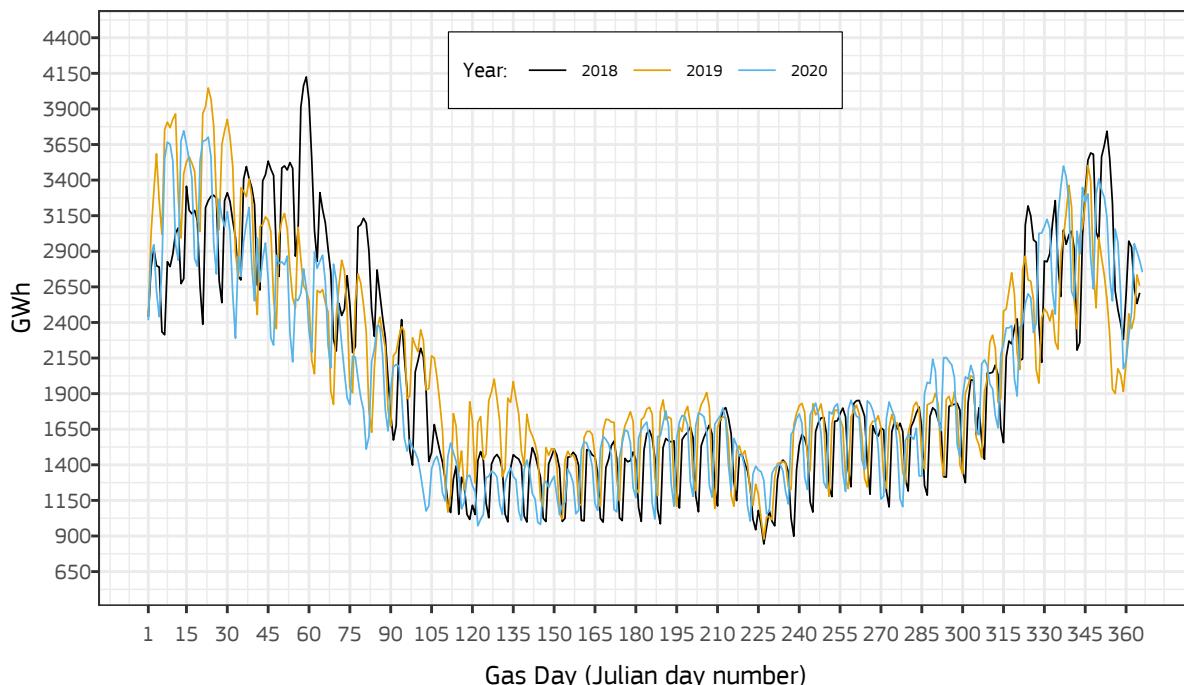
### Italy

Historical national daily Consumption



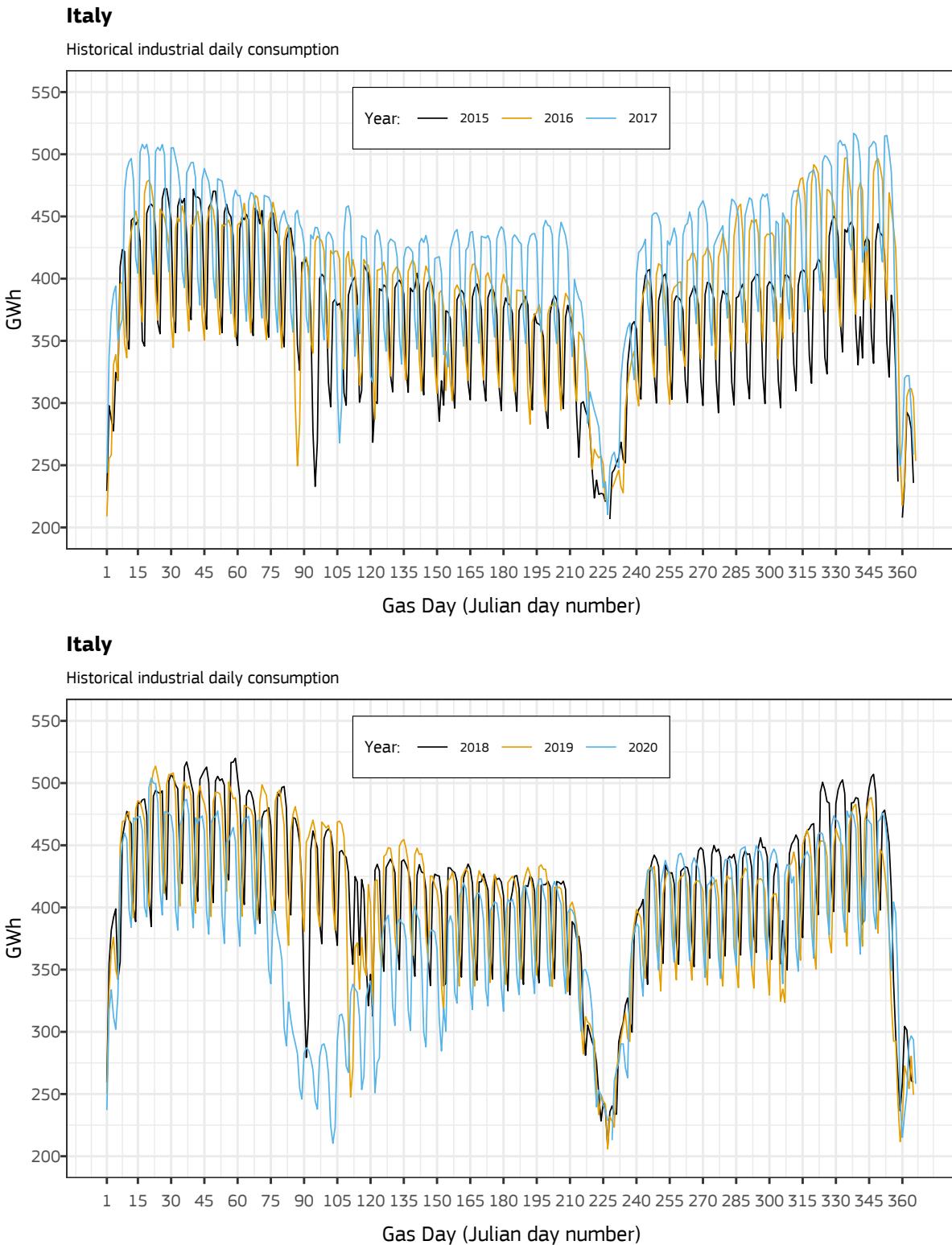
### Italy

Historical national daily Consumption



Source: JRC, 2021.

**Figure 33:** Time series of the daily consumption of natural gas by industrial users in Slovakia between 2015 and 2020.

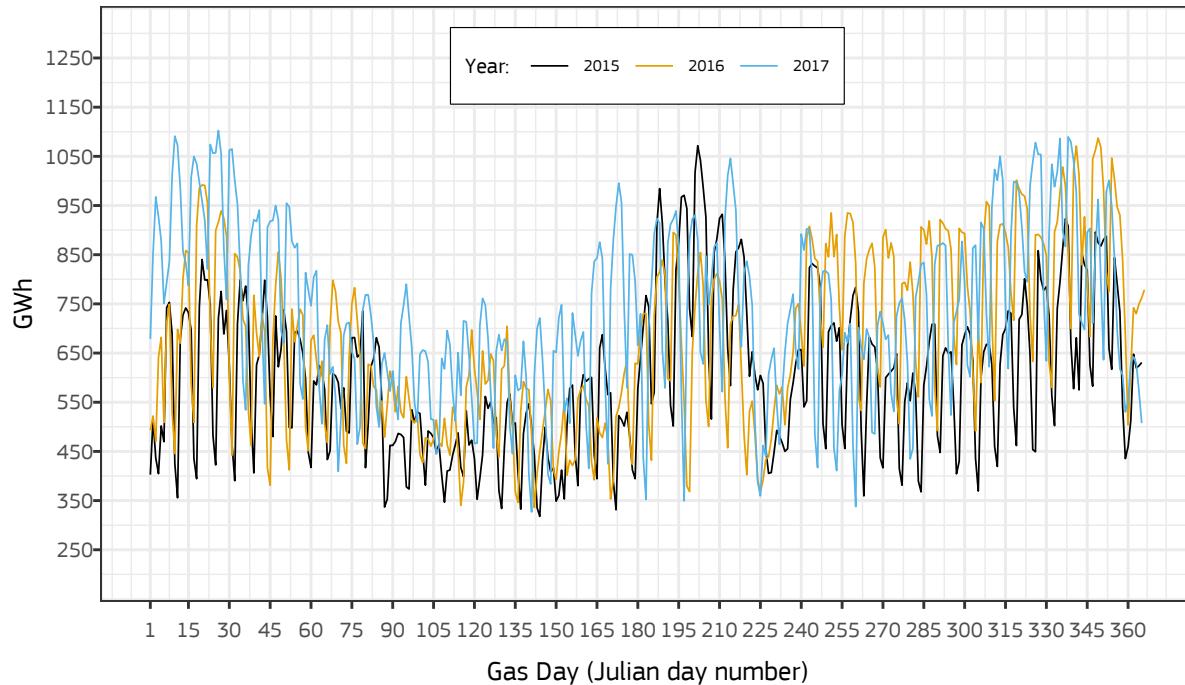


Source: JRC, 2021.

**Figure 34:** Time series of the daily consumption of natural gas by power generation users in Italy between 2015 and 2020.

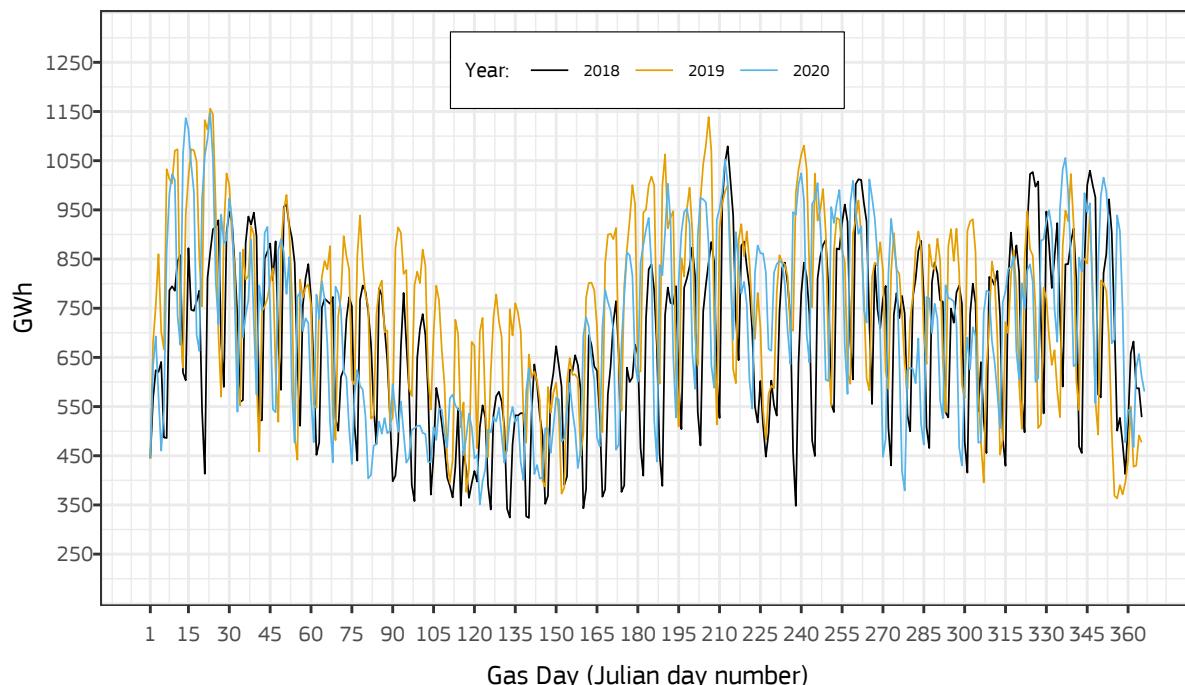
### Italy

Historical power generation daily consumption



### Italy

Historical power generation daily consumption

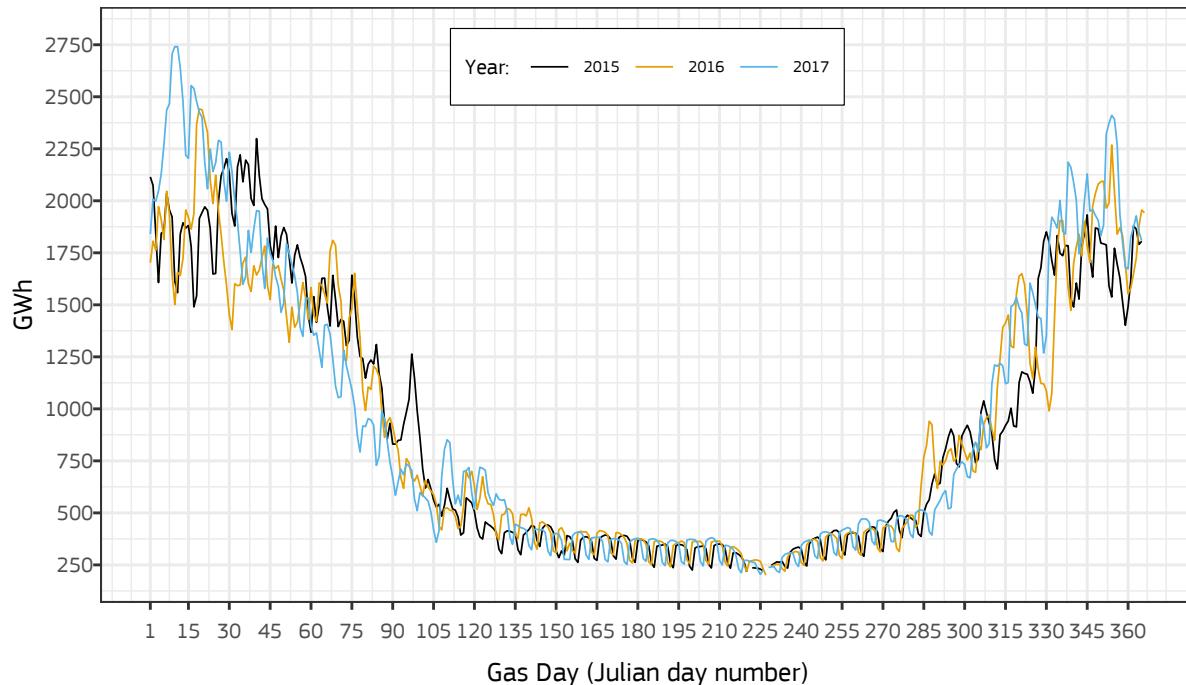


Source: JRC, 2021.

**Figure 35:** Time series of the daily consumption of natural gas by residential and commercial users in Italy between 2015 and 2020.

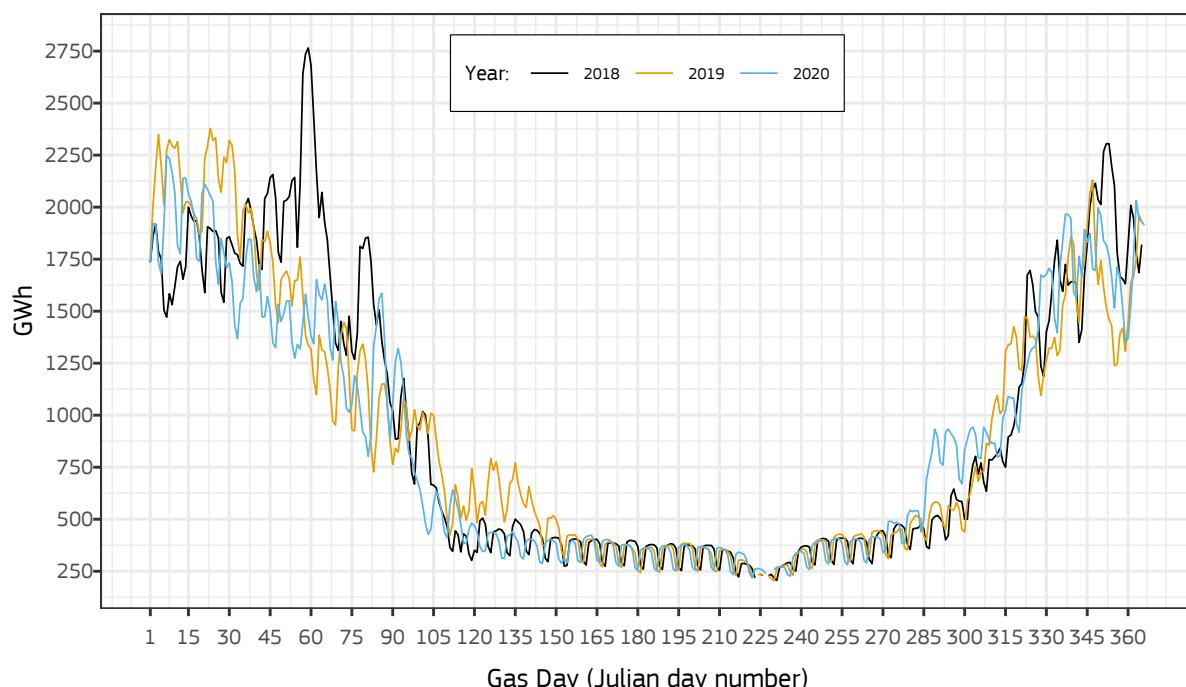
### Italy

Historical residential and commercial daily consumption



### Italy

Historical residential and commercial daily consumption



Source: JRC, 2021.

## 4.15 Latvia

**Data source:** Data are taken from the transparency platform of the national TSO AS “Conexus Baltic Grid”<sup>(50)</sup>.

**Type of flow:** AS “Conexus Baltic Grid” covers cross-border interconnection points, the underground storage facility and national consumption.

**Classification of consumption:** Data are aggregated at national level.

**Data on gas quality:** GCV and Wobbe index are provided on a daily base for all points in the transmission network.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa. For the period between January 1 2015 and April 2 2017 data are available in cubic meters per day (at 20 °C, 101.325 kPa).

**Time granularity:** Daily and monthly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO does not have a transparency page.

**Data processing:** For the period between January 1 2015 and April 2 2017 data are available in cubic meters per day (at 20 °C, 101.325 kPa). Values are converted in energy units by using a reference gross calorific value of 10.19197 kWh/m<sup>3</sup> (reference combustion temperature 25 °C, volume temperature 0 °C, pressure 101.325 kPa). The GCV is the average of the values reported in the document “Natural gas calorific value, 2017” converted from the reference conditions of combustion temperature 25 °C, volume temperature 20 °C, pressure 101.325 kPa by multiplying by 1.00738 as indicated in standard ISO 13443:1996.

**Table 17:** Summary statistics by year of the total national consumption in Latvia.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015*</b>	11.46	37.19	79.10	13572.77
<b>2016*</b>	10.72	38.74	109.41	14180.35
<b>2017*</b>	10.37	35.55	107.28	12975.84
<b>2018</b>	8.00	41.37	113.67	15098.26
<b>2019</b>	6.53	39.12	88.68	14278.72
<b>2020</b>	6.52	31.59	68.47	11563.27

\* See “Data Processing” section.

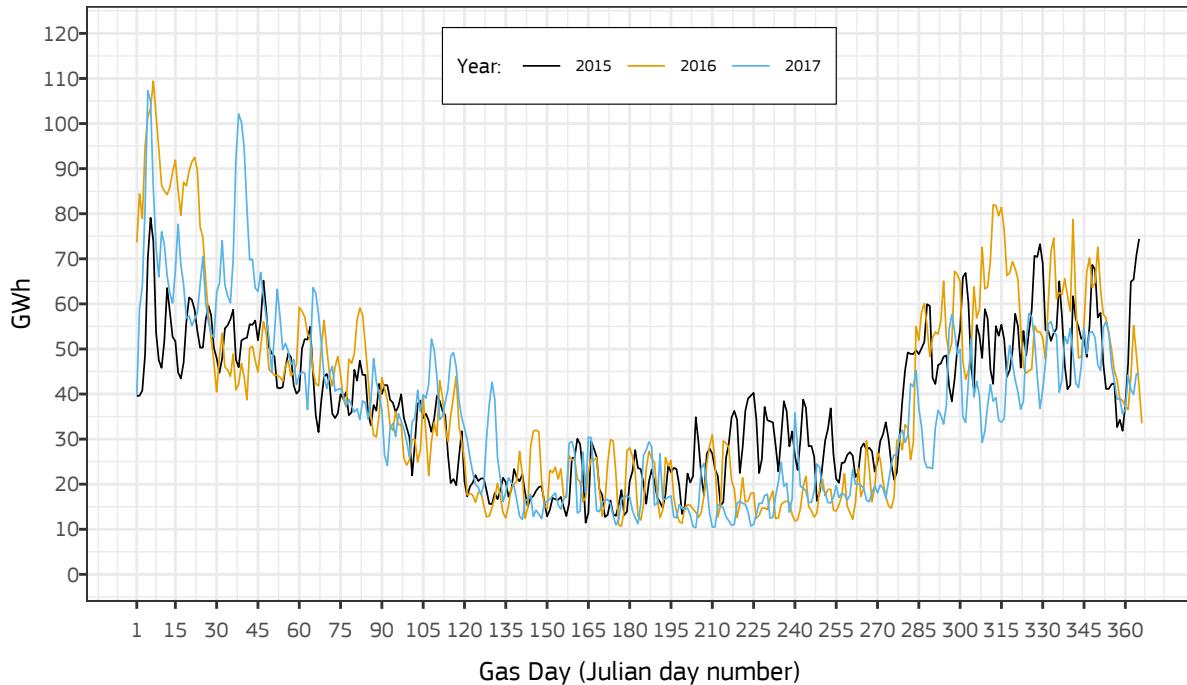
Source: JRC, 2021.

<sup>(50)</sup> <https://capacity.conexus.lv>.

**Figure 36:** Time series of the daily total consumption of natural gas in Latvia between 2015 and 2020.

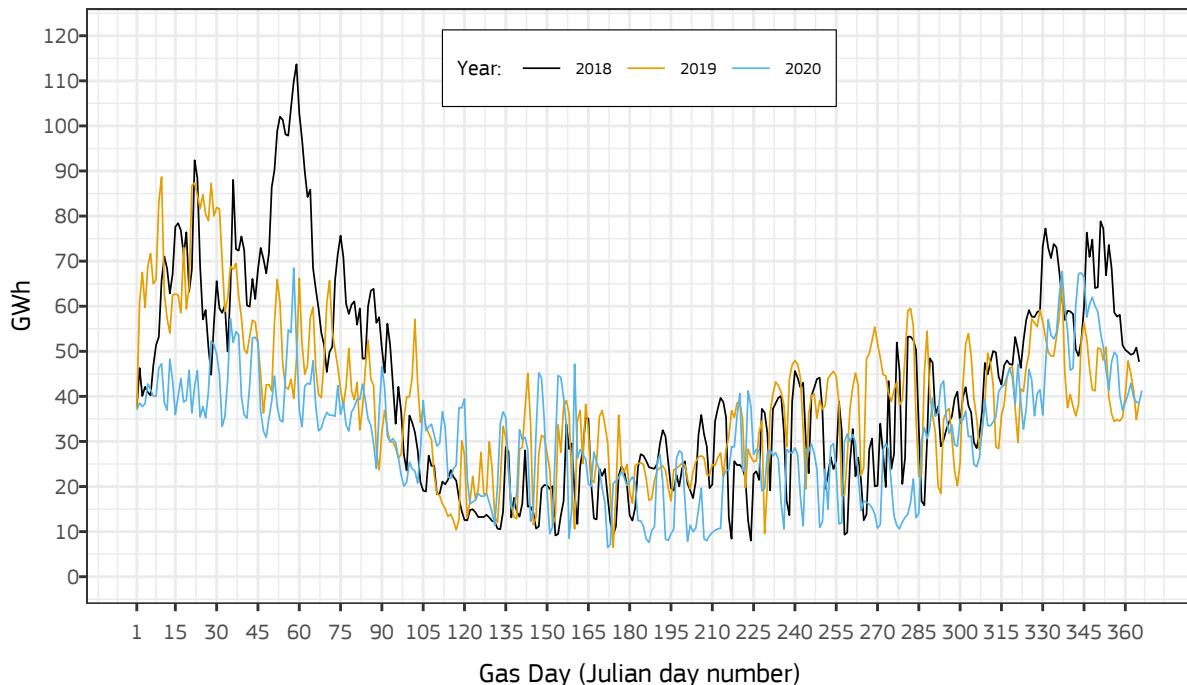
### Latvia

Historical national daily Consumption



### Latvia

Historical national daily Consumption



Source: JRC, 2021.

## 4.16 Lithuania

**Data source:** Data are taken from the transparency platform of the national transmission system operator AB Amber Grid<sup>(51)</sup> where information is provided for the main points of the system<sup>(52)</sup>.

**Type of flow:** AB Amber Grid covers cross-border interconnection points, the LNG facility and consumption of the main points of the transmission system.

**Classification of consumption:** Consumption is provided for the main points of the transmission system.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for all entry and exit points of the transmission system.

**Unit of Measurement:** Energy unit of measurement in kWh at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Data are available at daily granularity. Gas quality indices are available at hourly granularity as well. On the ENTSOG website a subset of data is also available at hourly time granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** AB Amber Grid does not have a dedicated web page on transparency, but publishes a document where the information is mapped to online web pages<sup>(53)</sup>.

**Data processing:** The total daily consumption is based on a mass balance of the cross-border interconnection points and of the LNG facility. Industrial consumption is estimated using the off-take point Jonava. Power generation consumption is estimated using the off-take point of Elektrenai. Residential and commercial consumption is estimated by difference of the total minus the previous two terms. Estimated figures are converted from kWh/d to GWh/d.

**Table 18:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in Lithuania.

Year	Total (GWh/d)					Industrial users (GWh/d)			
	Min	Average	Max	Sum		Min	Average	Max	Sum
<b>2015</b>	28.42	72.52	129.47	26468.49		0.00	38.50	44.16	14053.76
<b>2016</b>	17.69	65.41	135.36	23938.62		8.26	34.23	43.90	12529.90
<b>2017</b>	24.77	67.49	124.96	24635.35		19.50	39.86	44.37	14547.99
<b>2018</b>	21.98	61.77	125.08	22546.48		16.84	34.04	43.69	12425.71
<b>2019</b>	26.25	65.40	144.81	23872.66		21.51	38.44	43.40	14031.91
<b>2020</b>	37.17	69.36	129.26	25387.57		19.94	36.09	42.86	13209.77

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Ave	Max	Sum
<b>2015</b>	0.02	6.68	19.14	2436.80	3.61	27.34	84.49	9977.93
<b>2016</b>	0.08	2.98	18.03	1090.93	4.15	28.19	94.20	10317.79
<b>2017</b>	0.09	1.04	15.87	378.49	2.72	26.60	80.50	9708.88
<b>2018</b>	0.06	0.63	14.65	229.22	3.59	27.10	82.79	9891.55
<b>2019</b>	0.06	0.38	11.05	139.13	3.65	26.58	101.95	9701.63
<b>2020</b>	0.06	6.96	27.48	2547.93	2.18	26.31	70.25	9629.87

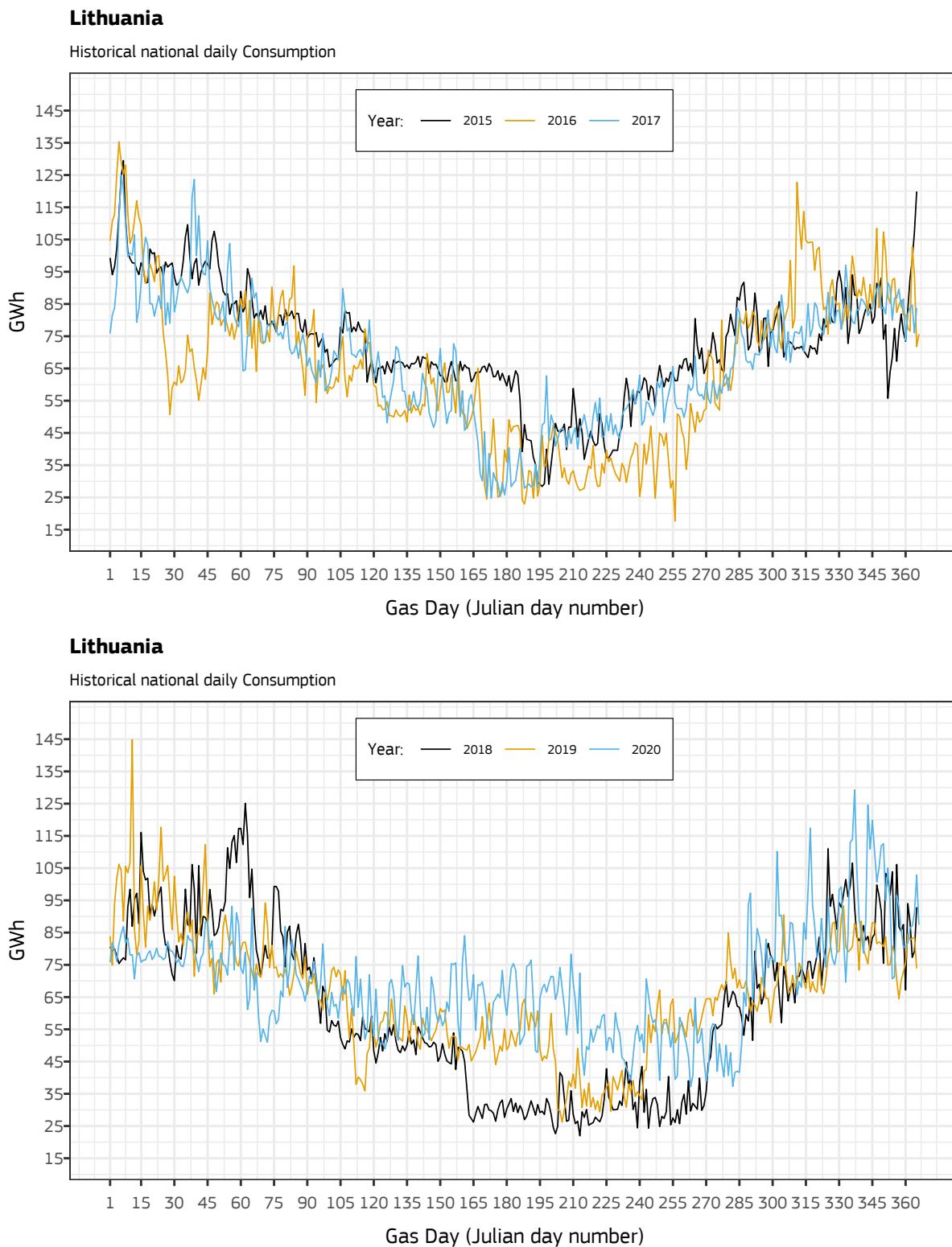
Source: JRC, 2021.

<sup>(51)</sup> <https://www.ambergrid.lt>.

<sup>(52)</sup> <https://www.ambergrid.lt/en/services/capacity-information/capacity-and-gas-flow-data>.

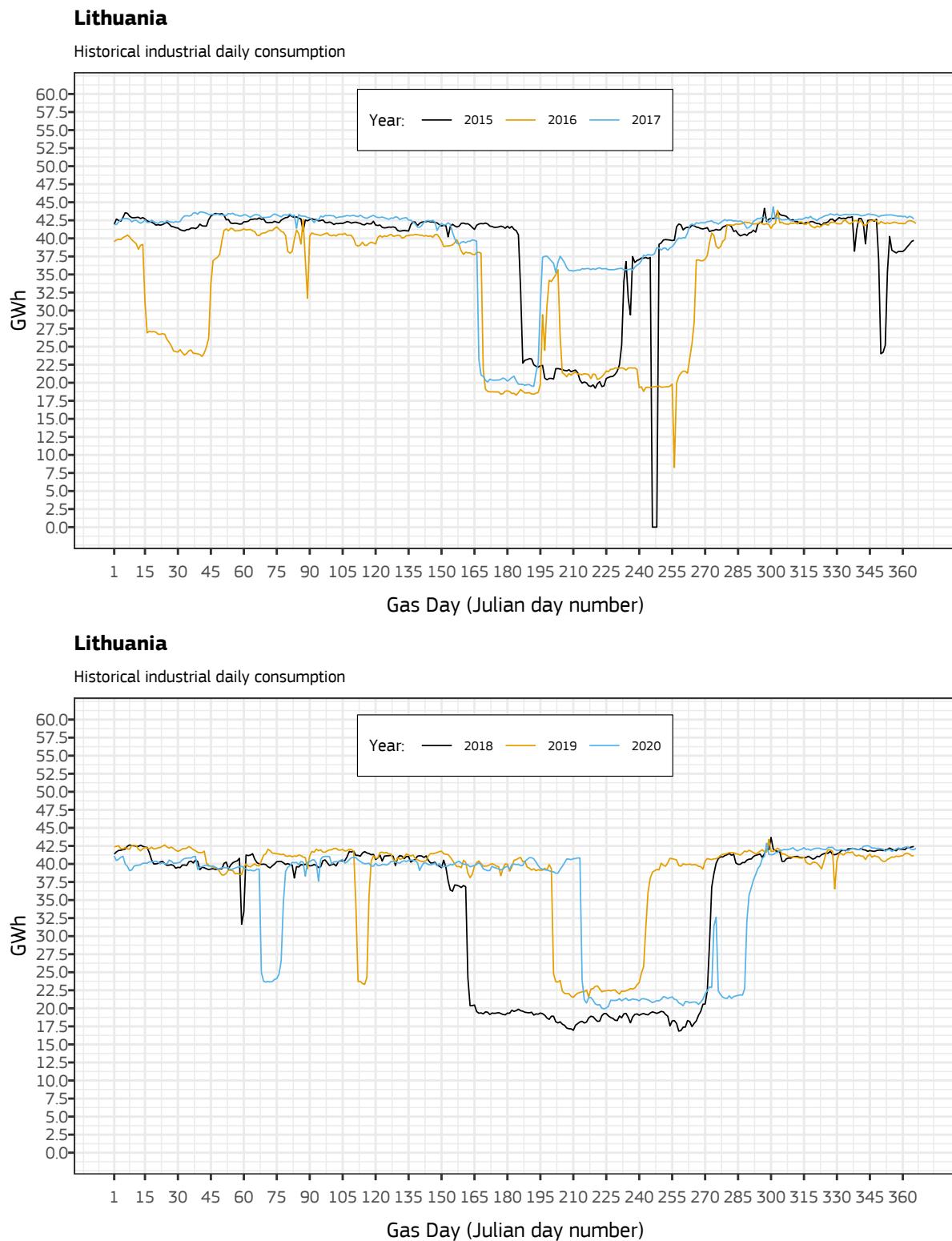
<sup>(53)</sup> [https://www.ambergrid.lt/uploads/documents/TAR\\_NC\\_2021\\_\(Article\\_29\).pdf](https://www.ambergrid.lt/uploads/documents/TAR_NC_2021_(Article_29).pdf).

**Figure 37:** Time series of the daily total consumption of natural gas in Lithuania between 2015 and 2020.



Source: JRC, 2021.

**Figure 38:** Time series of the daily consumption of natural gas by industrial users in Lithuania between 2015 and 2020.

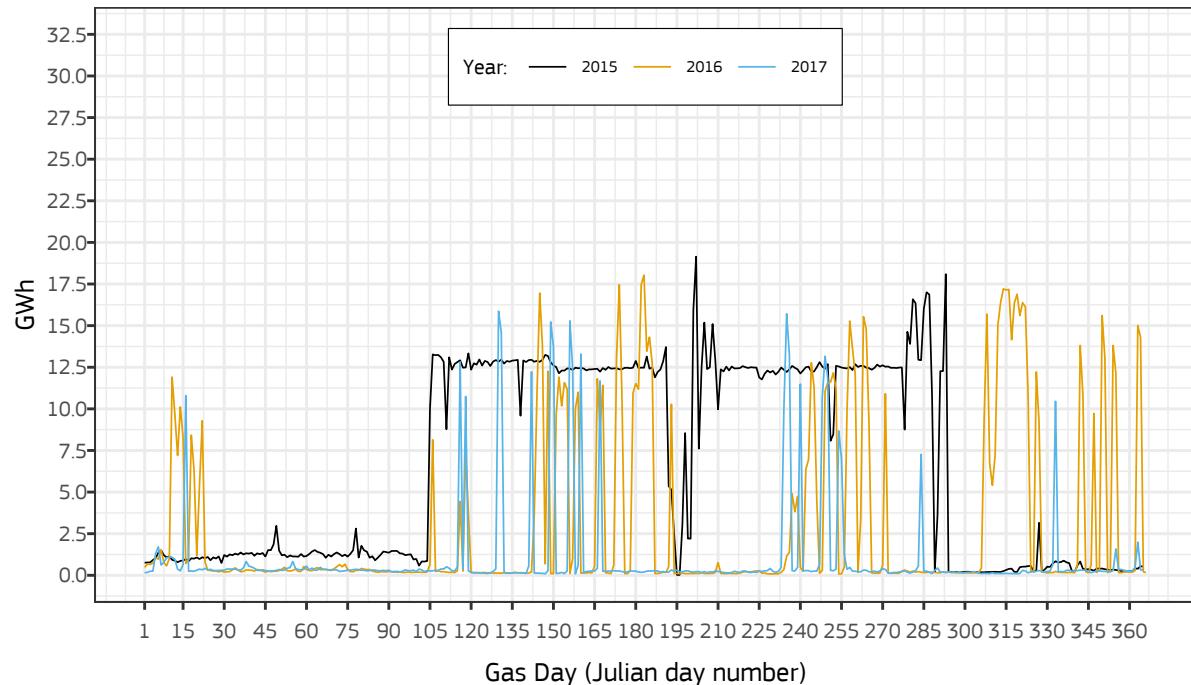


Source: JRC, 2021.

**Figure 39:** Time series of the daily consumption of natural gas by power generation users in Lithuania between 2015 and 2020.

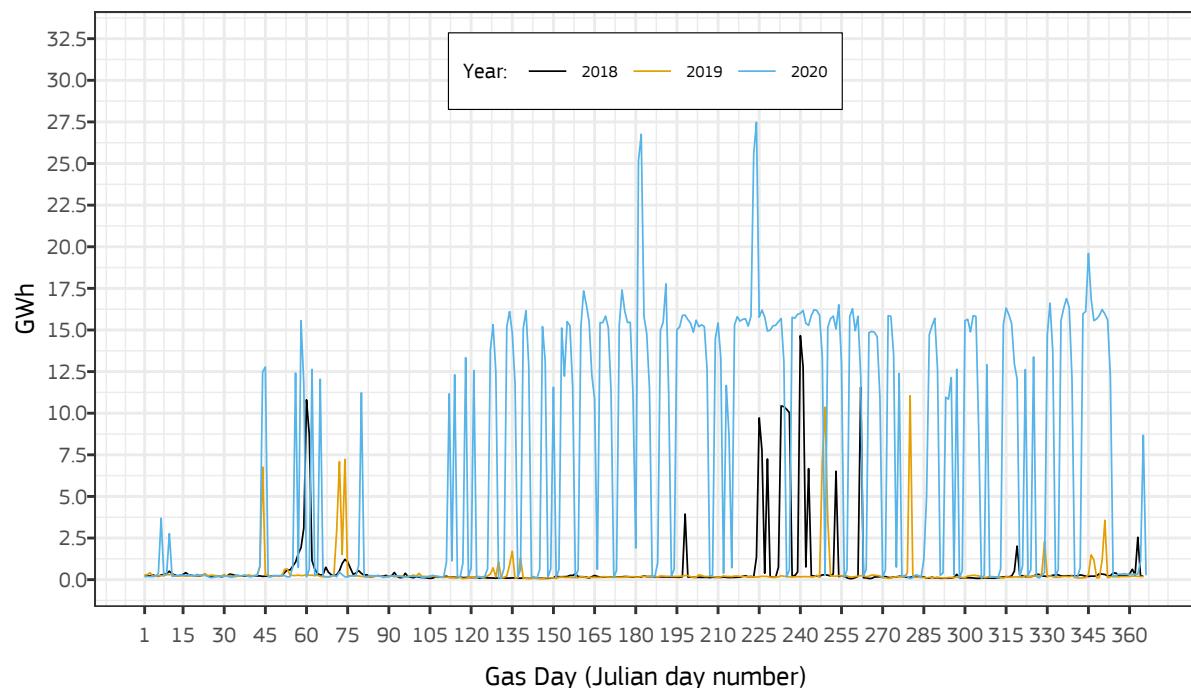
### Lithuania

Historical power generation daily consumption



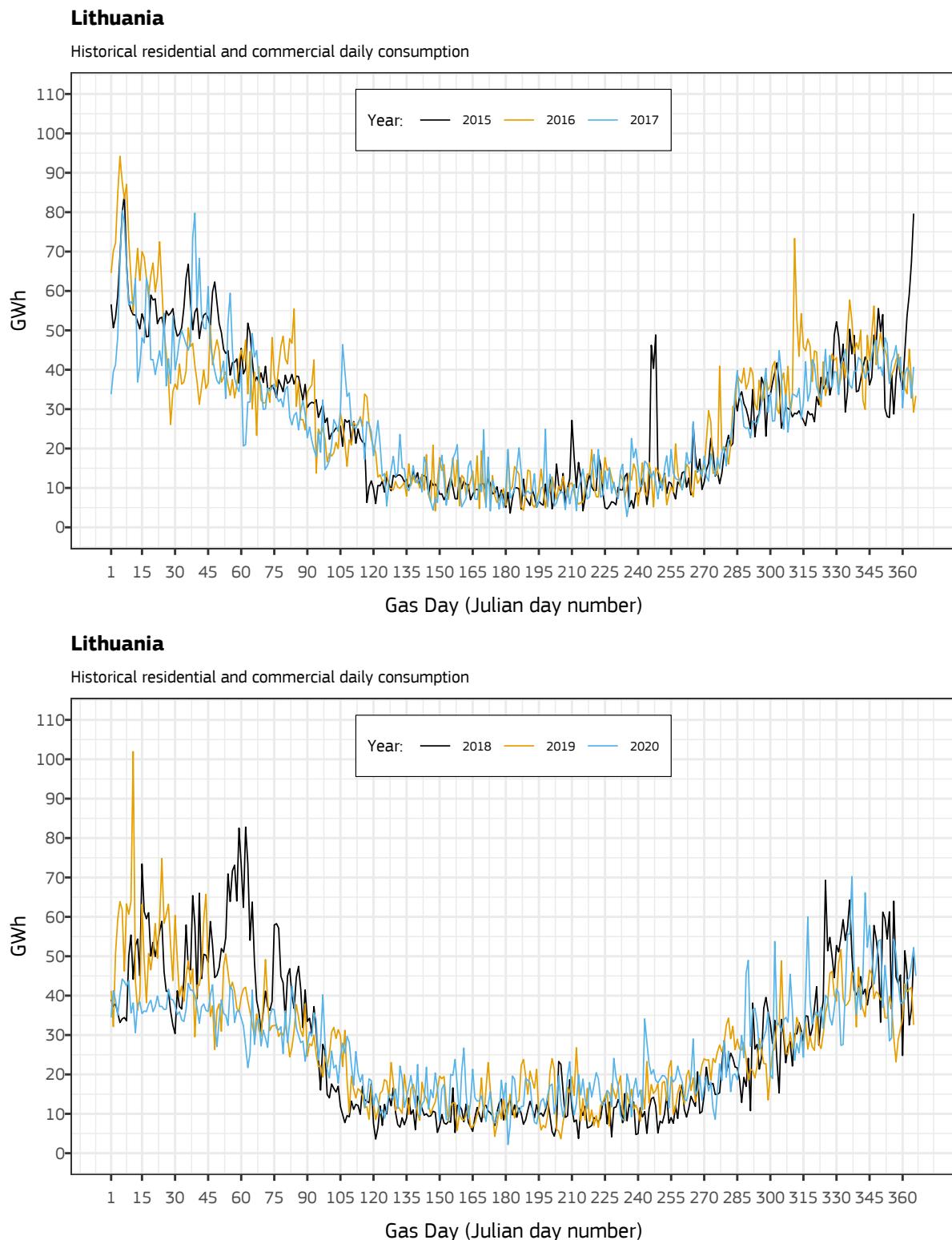
### Lithuania

Historical power generation daily consumption



Source: JRC, 2021.

**Figure 40:** Time series of the daily consumption of natural gas by residential and commercial users in Lithuania between 2015 and 2020.



Source: JRC, 2021.

## 4.17 Grand Duchy of Luxembourg

**Data source:** Data are taken from the transparency platform of ENTSOG, but the national TSO CREOS Luxembourg S.A. (54) publishes also data on its transparency platform (55).

**Type of flow:** CREOS Luxembourg S.A. provides ENTSOG with flows for the cross-border interconnection points and for consumption.

**Classification of consumption:** Data are aggregated at national level for industrial users and for residential and commercial users.

**Data on gas quality:** Only the GCV is available.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** CREOS Luxembourg S.A. does not have a dedicated transparency web page.

**Data processing:** For the period between January 1 2015 and September 30 2015, consumption data were not available. Total domestic consumption is estimated by a mass balance of the entry and transit flow to the Member State.

**Table 19:** Summary statistics by year of the total national consumption, industrial users and residential and commercial users in the Grand Duchy of Luxembourg.

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015*</b>	10.69	27.27	63.09	9955.31	5.08	10.05	12.57	924.55
<b>2016</b>	10.11	25.27	48.33	9248.31	5.74	10.48	14.55	3833.99
<b>2017</b>	11.37	24.71	48.28	9017.35	5.70	10.29	13.29	3754.13
<b>2018</b>	9.16	24.46	50.99	8928.30	6.13	10.54	13.83	3847.47
<b>2019</b>	10.27	24.45	46.37	8923.49	4.76	10.21	13.04	3726.17
<b>2020</b>	8.29	22.15	41.84	8107.72	3.48	8.80	13.30	3220.06

\* Partially estimated by mass balance.

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015*</b>	9.32	16.70	26.36	1536.78
<b>2016</b>	3.71	14.79	34.56	5414.30
<b>2017</b>	3.96	14.42	35.10	5263.21
<b>2018</b>	3.02	13.92	37.20	5080.82
<b>2019</b>	3.47	14.24	34.17	5197.32
<b>2020</b>	3.02	13.35	28.75	4887.66

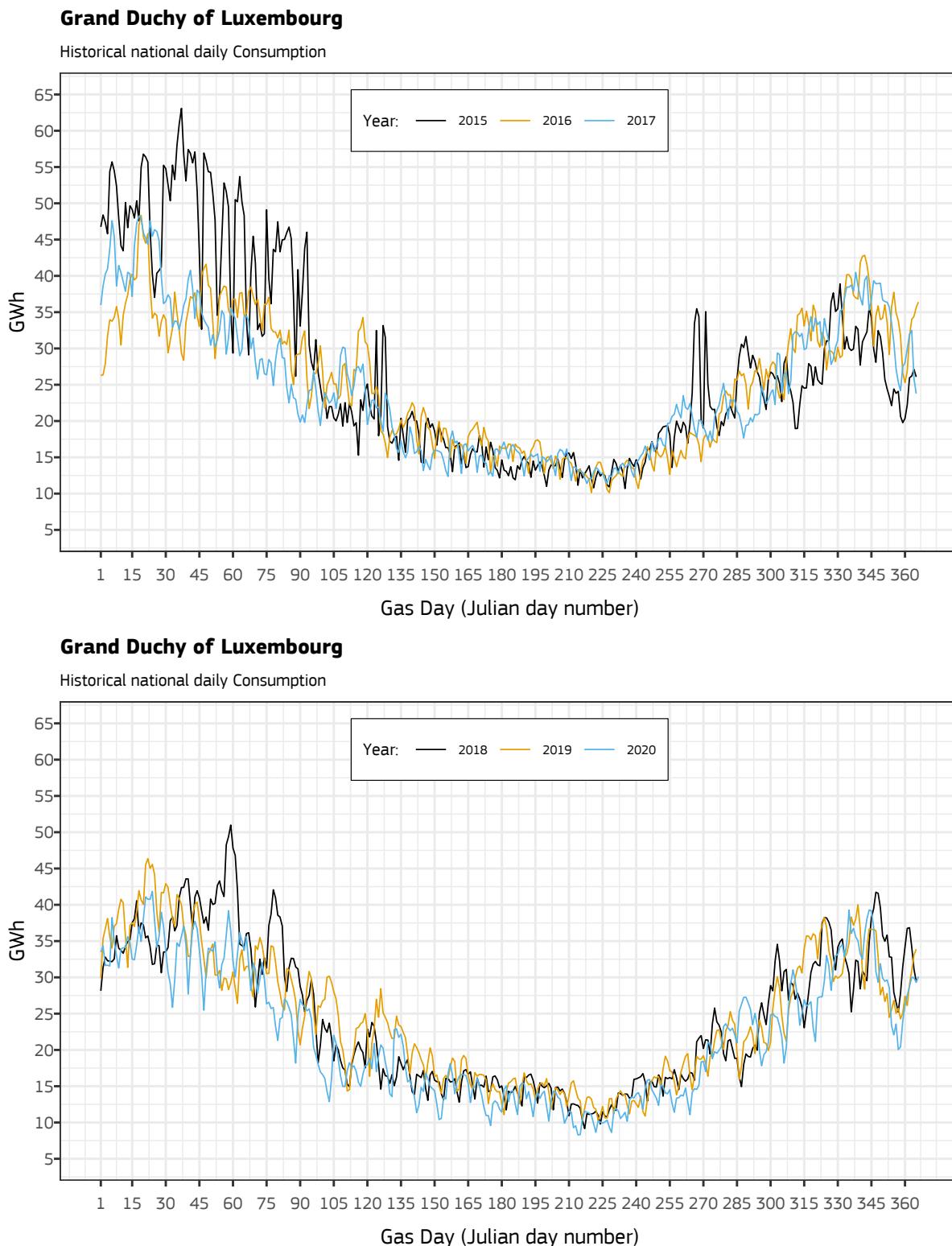
\* Partially estimated by mass balance.

Source: JRC, 2021.

(54) <https://www.creos-net.lu>.

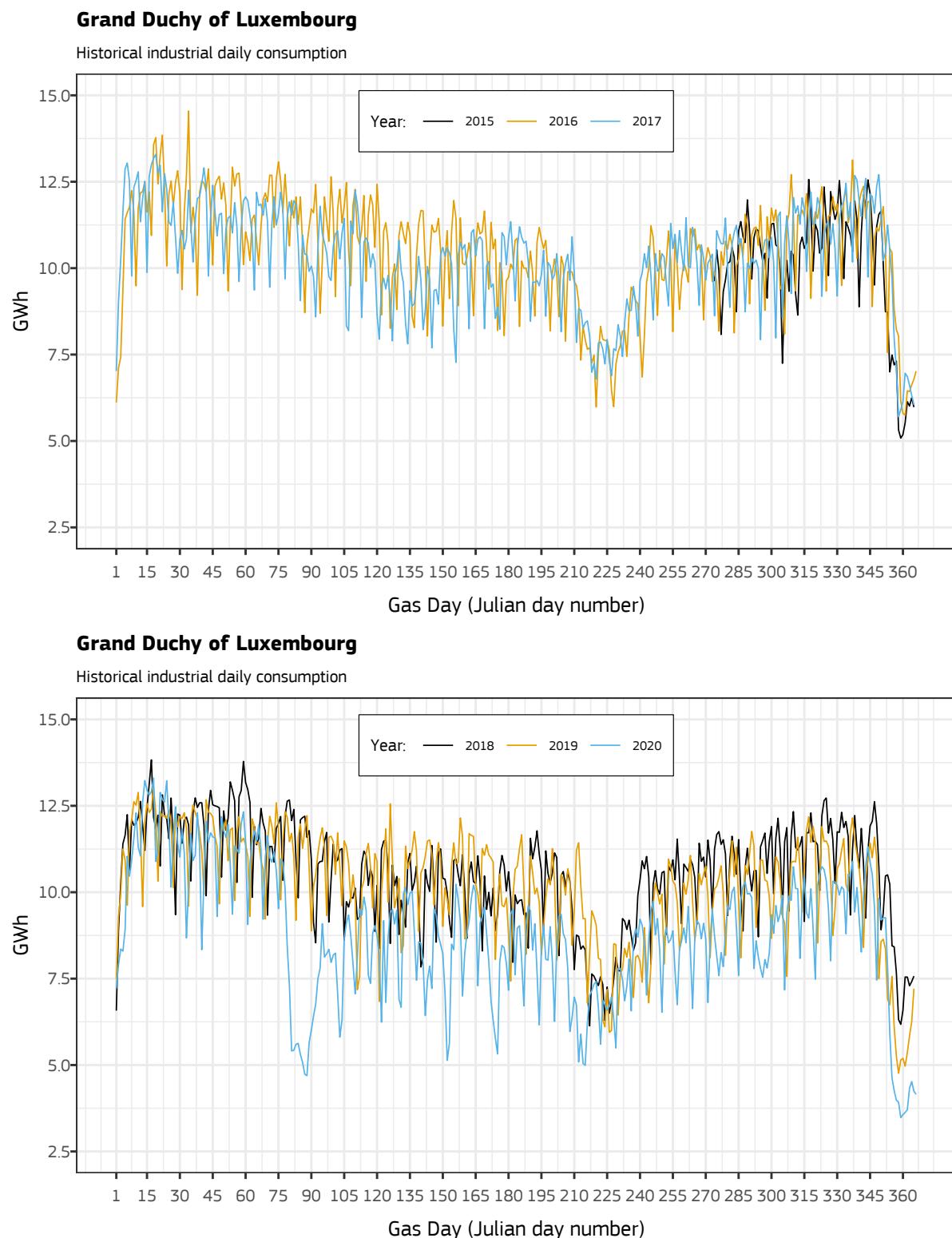
(55) <https://gasdata.creos.lu>.

**Figure 41:** Time series of the daily total consumption of natural gas in the Grand Duchy of Luxembourg between 2015 and 2020.



Source: JRC, 2021.

**Figure 42:** Time series of the daily consumption of natural gas by industrial users in the Grand Duchy of Luxembourg between 2015 and 2020.

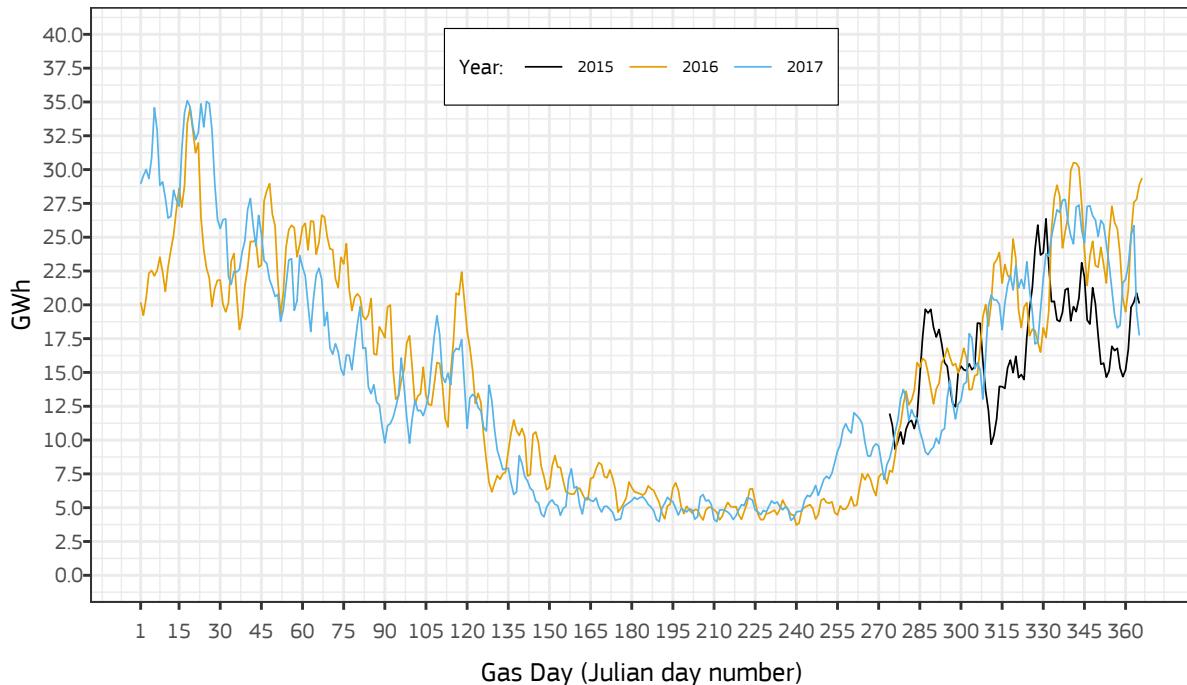


Source: JRC, 2021.

**Figure 43:** Time series of the daily consumption of natural gas by residential and commercial users in the Grand Duchy of Luxembourg between 2015 and 2020.

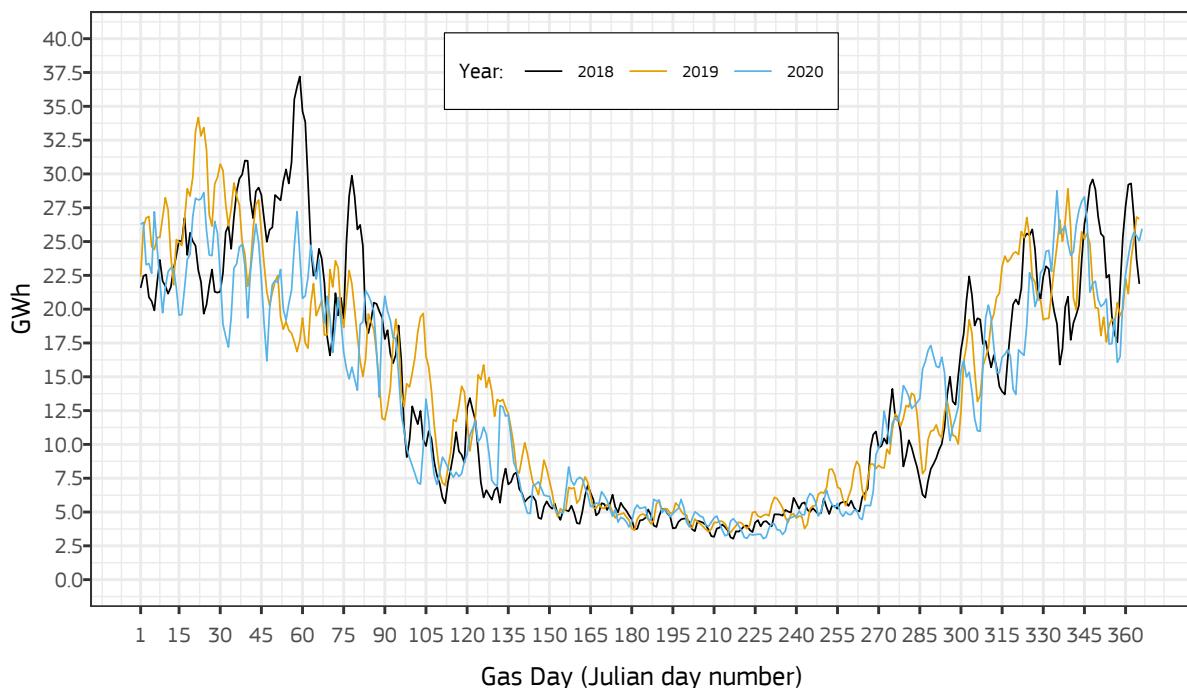
### Grand Duchy of Luxembourg

Historical residential and commercial daily consumption



### Grand Duchy of Luxembourg

Historical residential and commercial daily consumption



Source: JRC, 2021.

## 4.18 the Netherlands

**Data source:** Data are taken from the ENTSOG transparency platform. The national transmission system operator Gasunie Transport Service (GTS) (<sup>56</sup>) opted to dismiss its own transparency platform (<sup>57</sup>).

**Type of flow:** GTS cover domestic production, cross-border interconnection points, underground storage and LNG facilities, domestic consumption.

**Classification of consumption:** Consumption is provided as a daily aggregated figure for “Industrial Consumers”, “Local Distribution Companies” (LDC) and “Private Distribution Companies” (PDC).

**Data on gas quality:** Only GCV is provided for each consumption category.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** GTS has a dedicated transparency page (<sup>58</sup>).

**Data processing:** Data are downloaded from ENTSOG transparency platform as indicated on the web page of the TSO. The class “Distribution” is the sum of the publish groups “Local Distribution Companies (LDC) (NL)” and “Private Distribution Companies (PDC) (NL)”. The value for class “Industrial Consumers (NL)” is estimated as the average of the day before and after for March 13 2016 (compared to the original figure of 65435401.6 kWh/d) and for January 15 2020 (compared to the original figure of 248550902.4 kWh/d).

**Table 20:** Summary statistics by year of the total national consumption, other users and residential and commercial users in the Netherlands.

Year	Total (GWh/d)				Other users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	454.64	965.96	1948.43	352576.3	311.78	449.55	667.74	164084.4
<b>2016</b>	477.95	1010.59	2003.54	369876.3	295.61	475.90	682.49	174178.0
<b>2017</b>	478.70	1035.04	2084.06	377789.8	322.79	508.54	732.49	185615.8
<b>2018</b>	523.68	1040.67	2203.16	379845.1	357.07	518.98	706.31	189426.5
<b>2019</b>	537.11	1071.22	2005.13	390994.7	380.98	568.07	698.88	207345.1
<b>2020</b>	536.40	1050.05	1818.20	384317.2	342.25	577.43	752.56	211339.8

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	129.51	516.42	1326.22	188491.9
<b>2016</b>	134.21	534.69	1345.24	195698.3
<b>2017</b>	151.13	526.50	1385.39	192174.0
<b>2018</b>	122.48	521.69	1667.74	190418.6
<b>2019</b>	125.60	503.15	1336.84	183649.5
<b>2020</b>	115.98	472.62	1075.53	172977.3

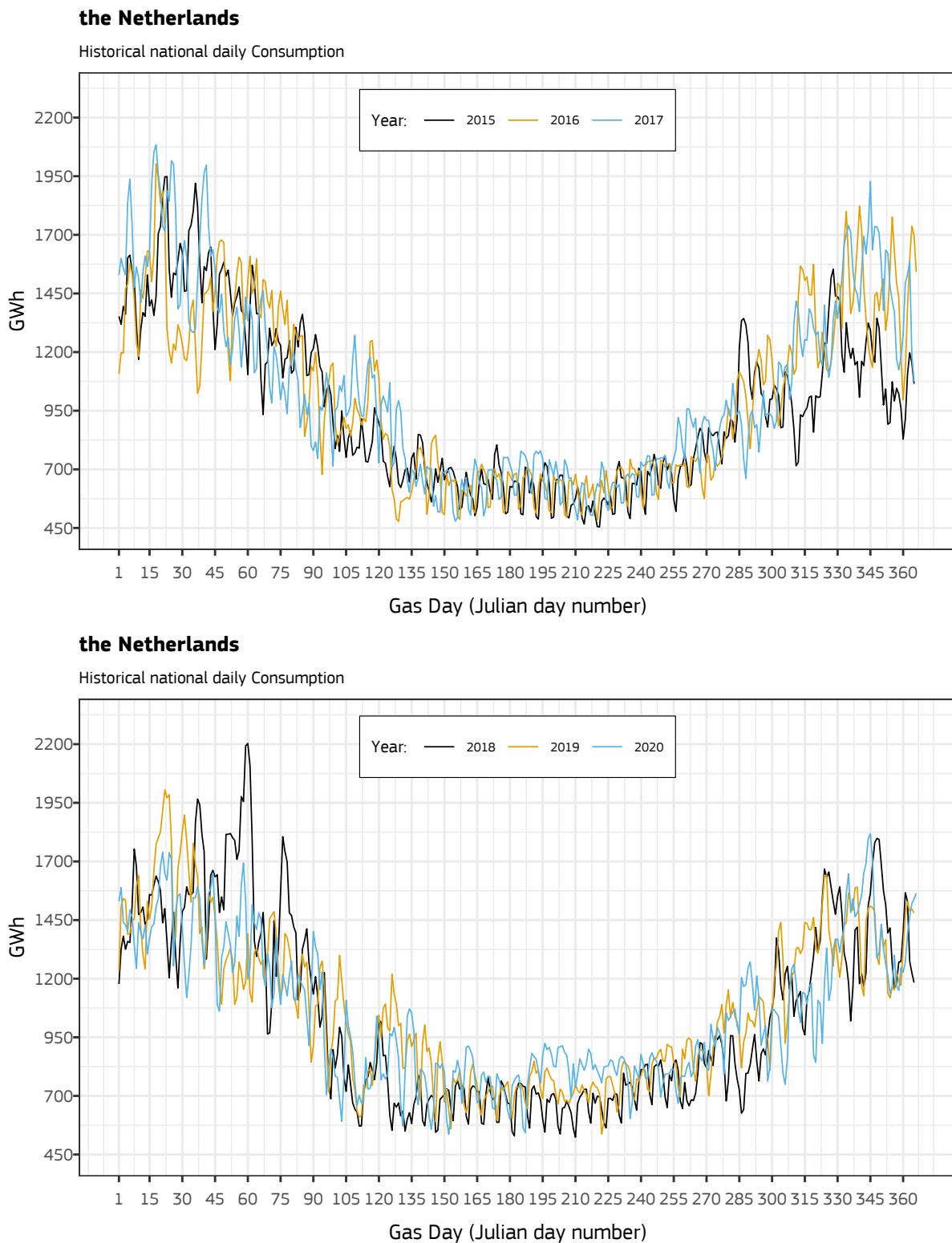
Source: JRC, 2021.

<sup>(56)</sup> <https://www.gasuniettransportservices.nl>.

<sup>(57)</sup> <https://www.gasuniettransportservices.nl/en/transparency/dataport>.

<sup>(58)</sup> <https://www.gasuniettransportservices.nl/en/transparency/transparency-requirements/transparency-requirements>.

**Figure 44:** Time series of the daily total consumption of natural gas in the Netherlands between 2015 and 2020.

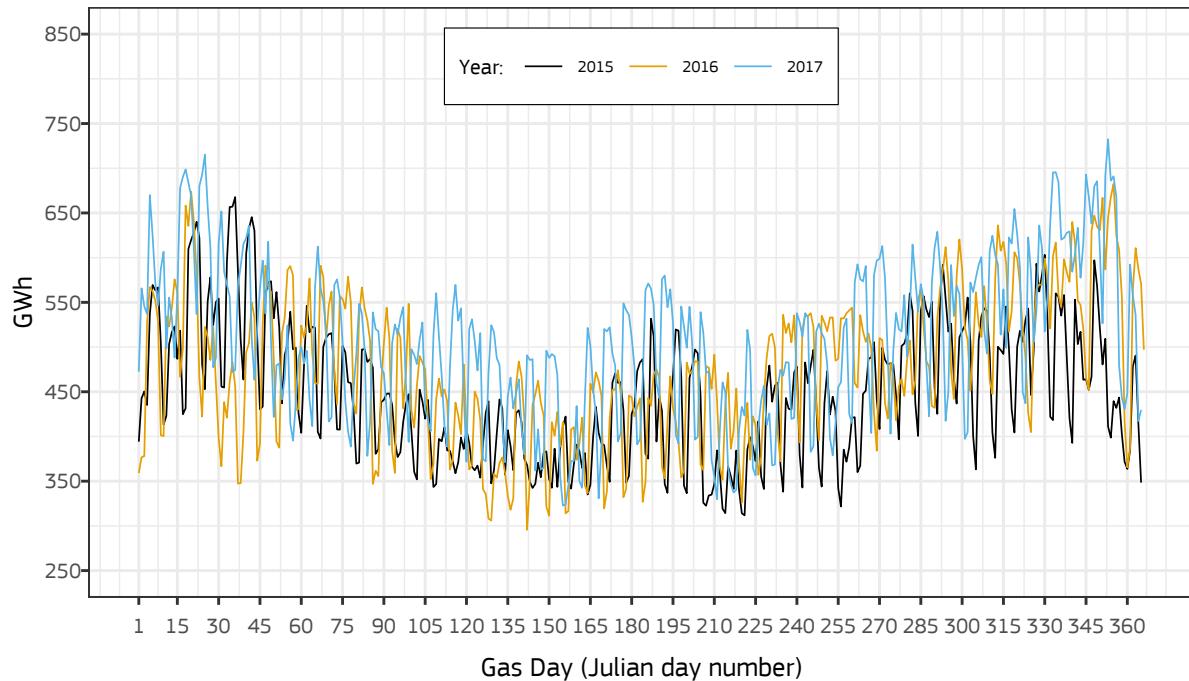


Source: JRC, 2021.

**Figure 45:** Time series of the daily consumption of natural gas by other users in the Netherlands between 2015 and 2020.

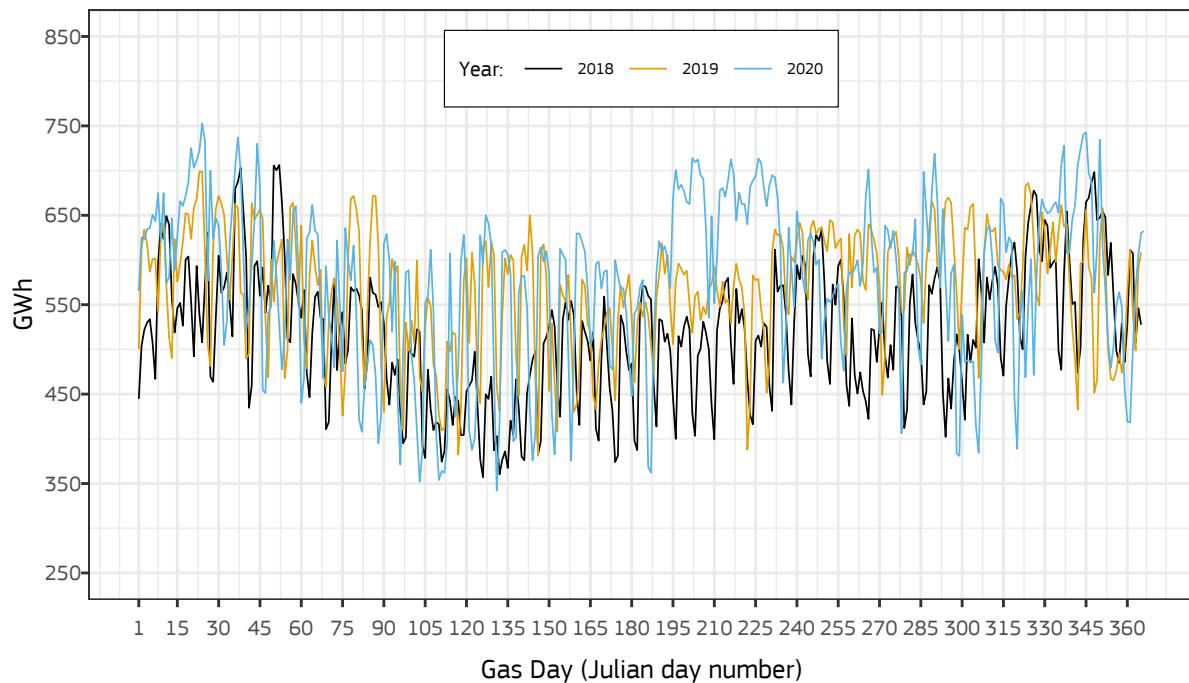
### the Netherlands

Historical daily consumption of group *Other*



### the Netherlands

Historical daily consumption of group *Other*

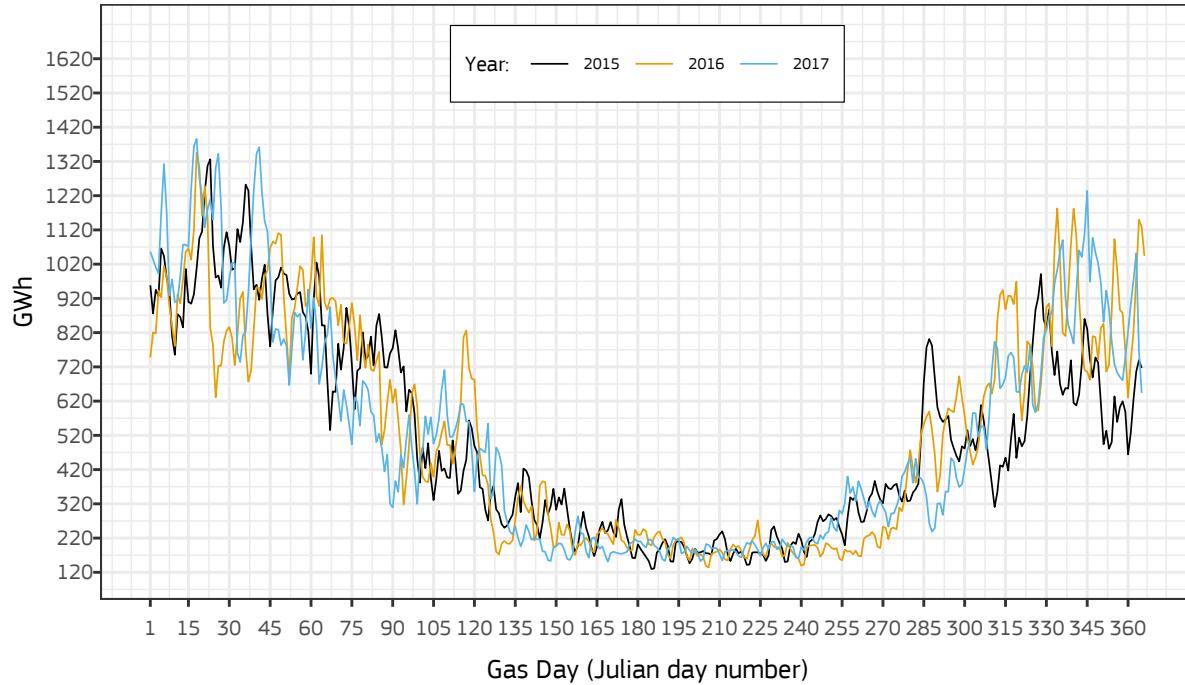


Source: JRC, 2021.

**Figure 46:** Time series of the daily consumption of natural gas by residential and commercial users in the Netherlands between 2015 and 2020.

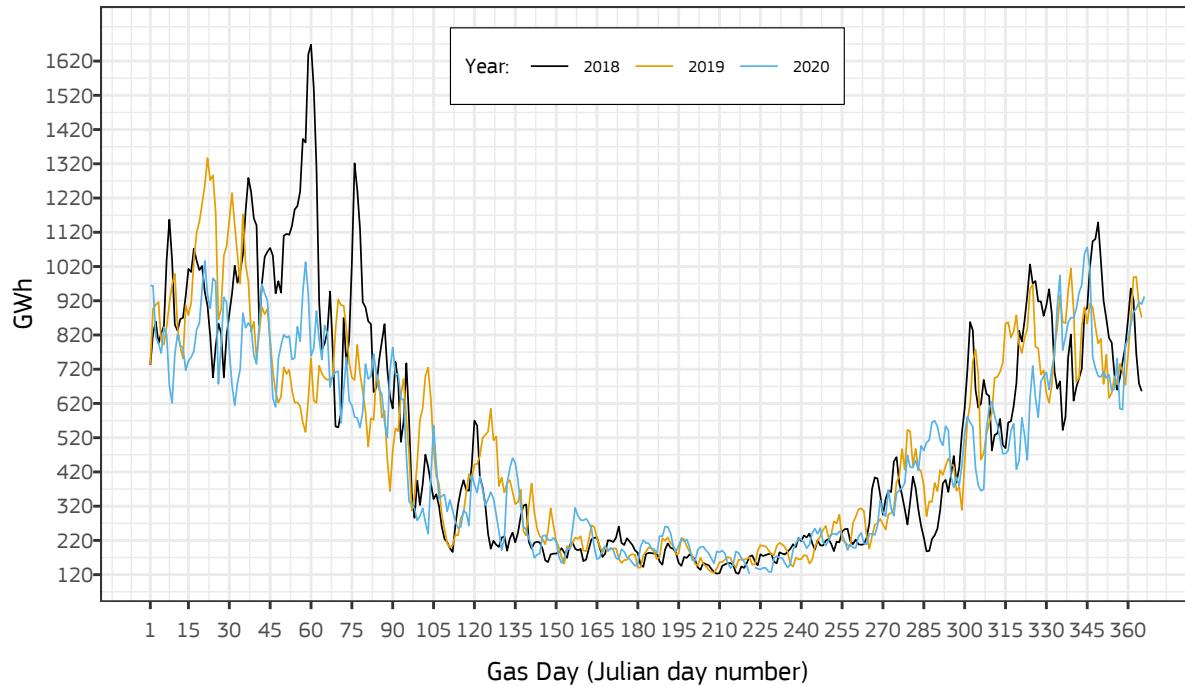
### the Netherlands

Historical distribution daily consumption



### the Netherlands

Historical distribution daily consumption



Source: JRC, 2021.

## 4.19 North Macedonia

**Data source:** Data are from the transparency platform of ENTSOG fro the cross-border interconnection point of Kyustendil (BG) / Zidilovo (MK) submitted by the Bulgarian TSO Bulgartransgaz.

**Type of flow:** Consumption is approximated by the flow at the only cross-border entry point for the period 2015–2020. Due to the small size of the transmission system and the limited flexibility of the linepack, the approximation is acceptable. Figures are valid for the total domestic consumption and no breakdown in categories is possible. The North Macedonian TSO, Joint Stock Company GA-MA a.d., does not publish data.

**Classification of consumption:** Data are collected in aggregated form and no distinction among consumers classes or locations.

**Data on gas quality:** Both hourly GCV and the Wobbe index figures are available on the ENTSOG platform as provided by Bulgartransgaz.

**Unit of Measurement:** Energy values are expressed in kWh/d or kWh/h, while quality indices are in kWh/(N)m<sup>3</sup>. Conditions are for combustion temperature of 25 °C and for volume temperature of 0 °C and pressure of 101.325 kPa.

**Time granularity:** The cross-border interconnection flow is available at hourly or daily granularity. Quality indices are only available at daily granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Not available.

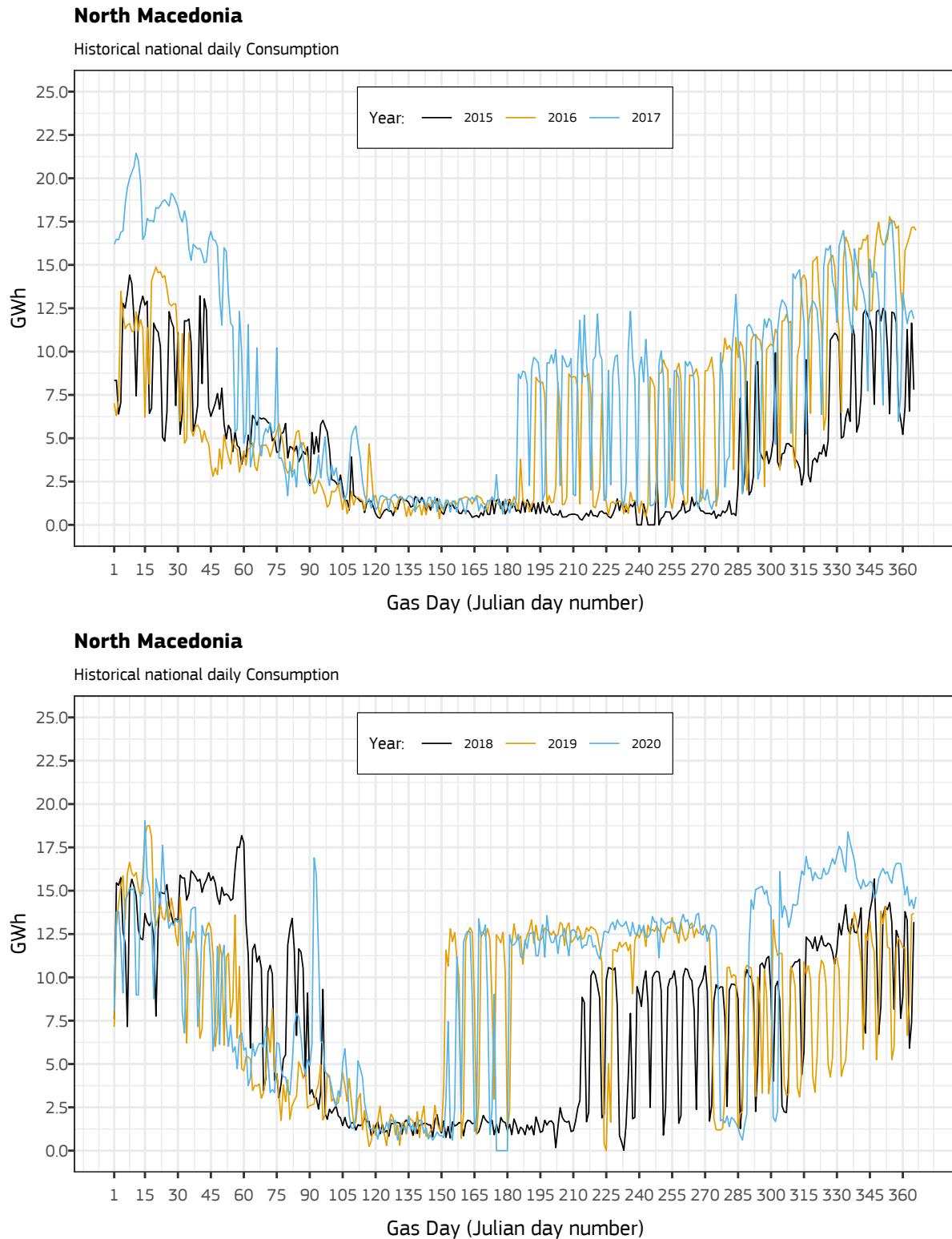
**Data processing:** No processing of data..

**Table 21:** Summary statistics by year of the total national consumption in North Macedonia.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	0.00	3.96	14.42	1444.01
<b>2016</b>	0.35	6.21	17.79	2272.90
<b>2017</b>	0.62	8.01	21.44	2923.95
<b>2018</b>	0.02	7.35	18.18	2684.27
<b>2019</b>	0.00	8.63	18.76	3148.66
<b>2020</b>	0.00	9.74	19.04	3564.55

Source: JRC, 2021.

**Figure 47:** Time series of the daily total consumption of natural gas in North Macedonia between 2015 and 2020.



Source: JRC, 2021.

## 4.20 Poland

**Data source:** Data are taken from the transparency platform of the national transmission system operator Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A. (59) (60). Data are also taken from the ENTSOG transparency platform.

**Type of flow:** GAZ-SYSTEM S.A. covers aggregated domestic production, cross-border interconnection points, underground storage and LNG facilities, and national consumption.

**Classification of consumption:** GAZ-SYSTEM S.A. publishes data on consumption by considering four groups: "Point of interconnection with DSO (H-gas)" (code 900557), "Point of interconnection with DSO (L-gas)" (code 900558), "Final Customer (H-gas)" (code 909027), and "Final Customer (L-gas)" (code 909028).

**Data on gas quality:** GAZ-SYSTEM S.A. publishes daily and hourly data for the GCV and the Wobbe Index at entry / exit point level.

**Unit of Measurement:** GAZ-SYSTEM S.A. provides data in energy unit of measurement with reference conditions set to combustion temperature of 25 °C, volume temperature of 0 °C and pressure of 101.325 kPa.

**Time granularity:** Daily figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a transparency web-page (61).

**Data processing:** No distinction is made between L-system and H-system. The respective classes are merged together. For the period before 2018 there are differences and the data from ENTSOG are preferred. Up to March 2016 the series for "Others" may be underestimated because no data is available for the final customers on the L-gas system. Finally, the values from the ENTSOG for "Aggregated Distribution (PL)" for the period July 19 2016 - September 1 2016 and September 2016 to September 14 2016 have been reduced from the original figures, by subtracting the values of the variable "Distribution (PL)". Values after 2018 are from GAZ-SYSTEM S.A. and are based on the classes: "Point of interconnection with DSO (H-gas)" (code 900557), "Point of interconnection with DSO (L-gas)" (code 900558), "Final Customer (H-gas)" (code 909027), and "Final Customer (L-gas)" (code 909028).

**Table 22:** Summary statistics by year of the total national consumption, other points and distribution off-take points.

Year	Total (GWh/d)				Other users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	220.38	423.47	685.77	154565.7	98.38	138.94	176.07	50713.66
<b>2016</b>	283.94	478.13	819.75	174994.5	82.86	124.66	160.16	45626.69
<b>2017</b>	328.63	526.39	874.83	192130.8	105.44	149.11	203.61	54424.64
<b>2018</b>	341.85	533.29	968.38	194651.7	91.24	152.13	202.88	55527.80
<b>2019</b>	293.86	515.50	856.30	188157.5	94.09	135.49	170.00	49452.96
<b>2020</b>	323.59	540.16	852.99	197697.4	115.73	151.52	193.67	55455.39

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	121.27	284.53	520.89	103852.0
<b>2016</b>	181.24	353.46	679.34	129367.8
<b>2017</b>	198.33	377.28	715.99	137706.2
<b>2018</b>	201.73	381.16	782.78	139123.9
<b>2019</b>	192.94	380.01	721.26	138704.5
<b>2020</b>	205.90	388.64	667.16	142242.0

Source: JRC, 2021.

(59) <https://www.gaz-system.pl/>.

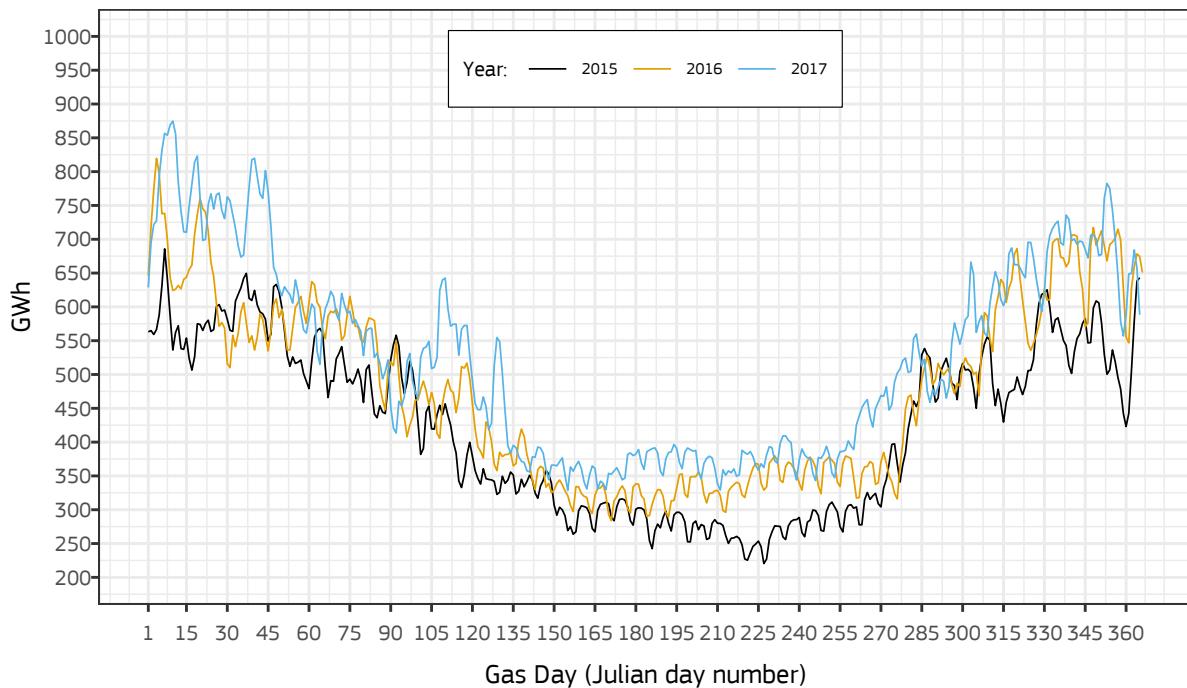
(60) <https://en.gaz-system.pl/customer-zone/transmission/>.

(61) <https://en.gaz-system.pl/strefa-klienta/system-przesylowy/tsotransparencytemplate>.

**Figure 48:** Time series of the daily total consumption of natural gas in Poland between 2015 and 2020.

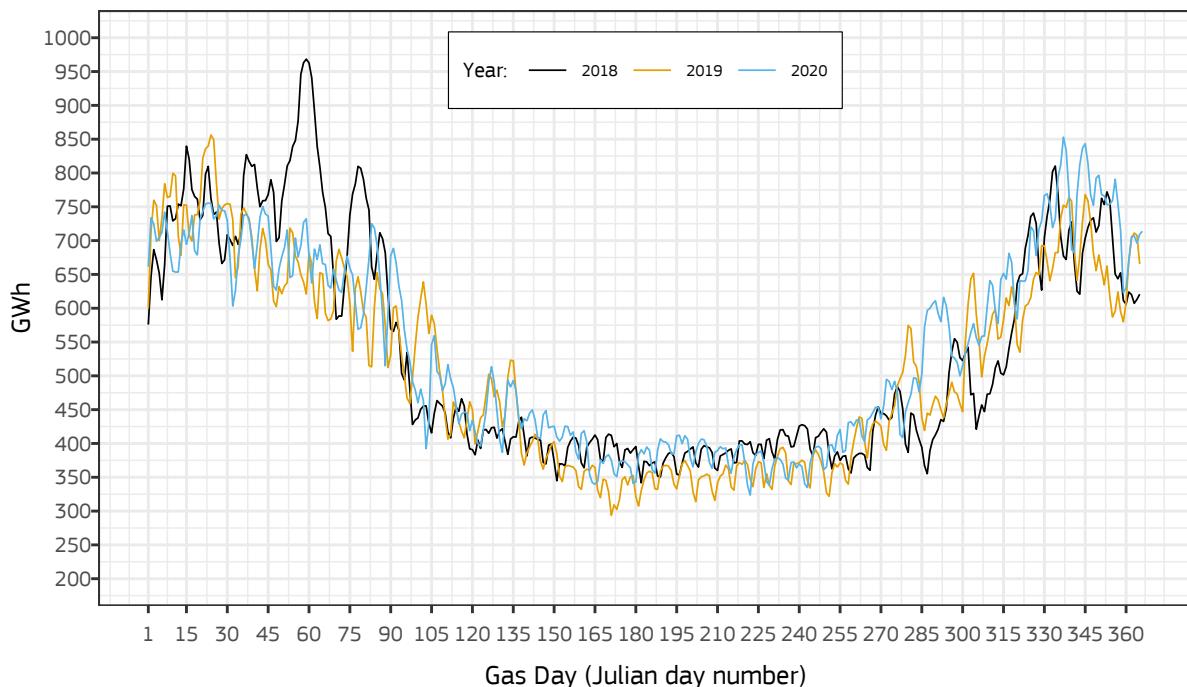
### Poland

Historical national daily Consumption



### Poland

Historical national daily Consumption

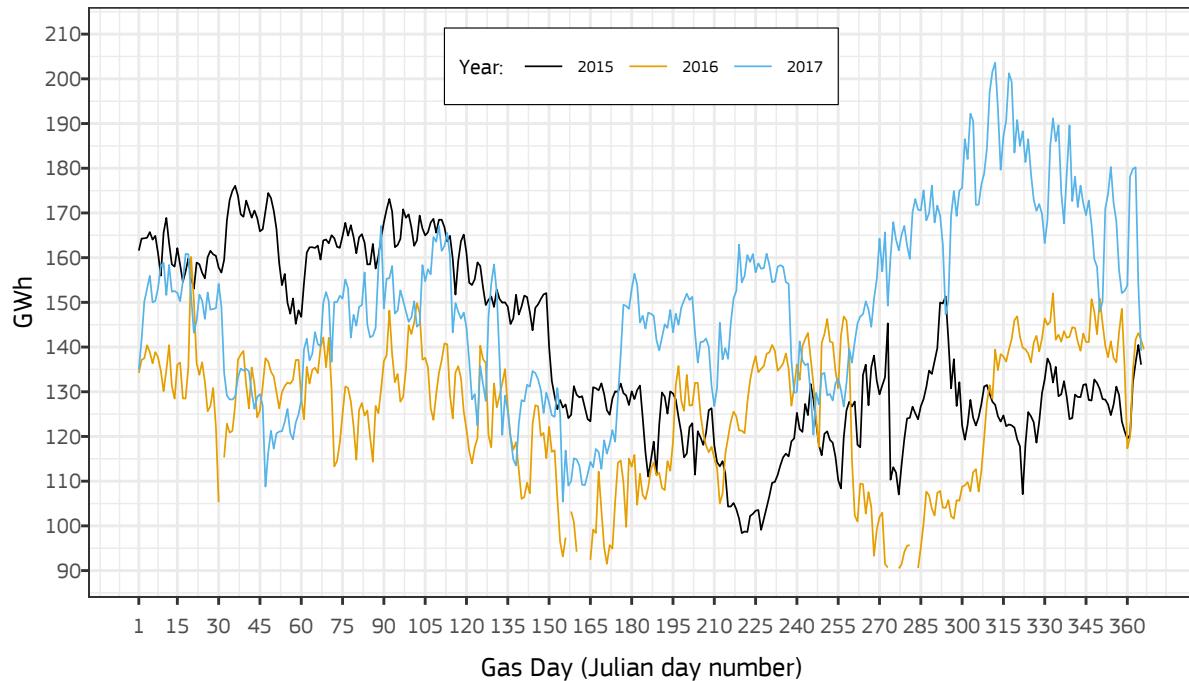


Source: JRC, 2021.

**Figure 49:** Time series of the daily consumption of natural gas by other users in Poland between 2015 and 2020.

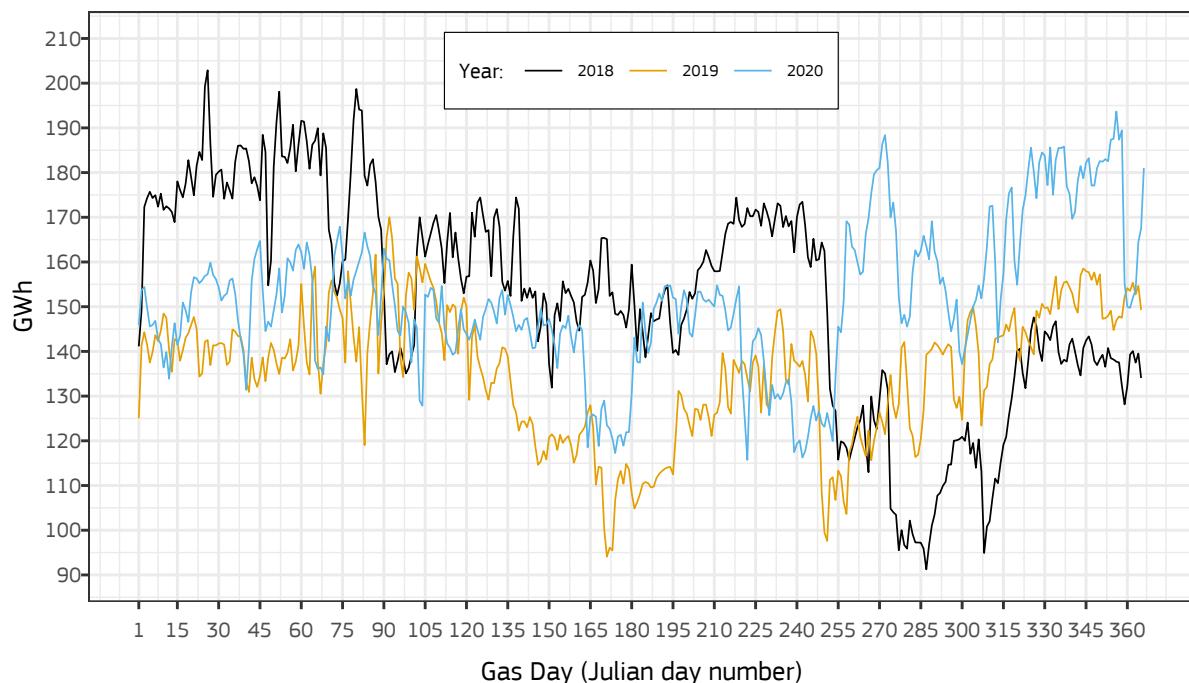
### Poland

Historical daily consumption of group *Other*



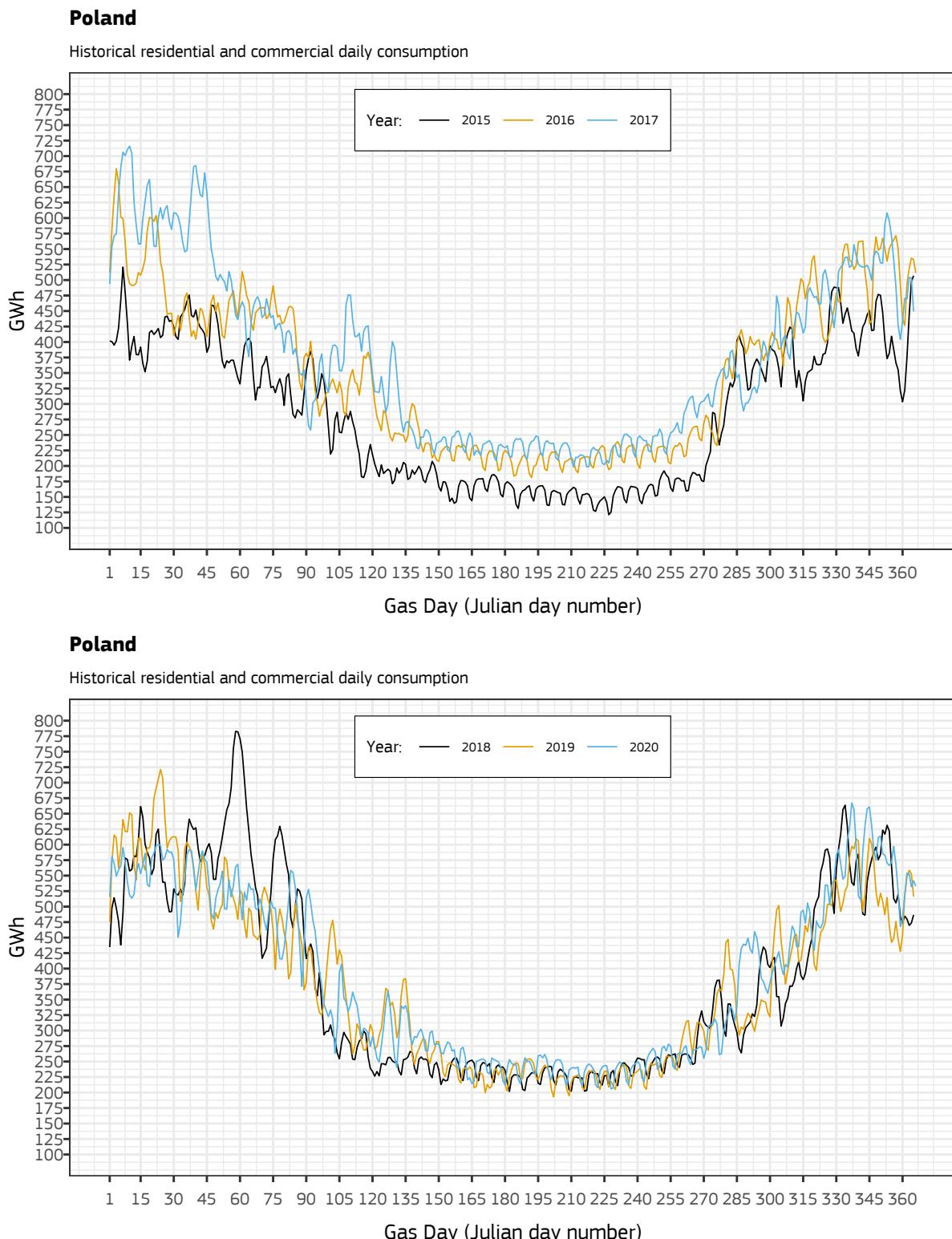
### Poland

Historical daily consumption of group *Other*



Source: JRC, 2021.

**Figure 50:** Time series of the daily consumption of natural gas by residential and commercial users in Poland between 2015 and 2020.



Source: JRC, 2021.

## 4.21 Portugal

**Data source:** Data are taken from the transparency platform of the national transmission system operator Redes Energéticas Nacionais (REN) (<sup>62</sup>) (<sup>63</sup>).

**Type of flow:** REN covers cross-border interconnection points, underground storage and LNG facilities, and national consumption by consumer category.

**Classification of consumption:** REN provides aggregated daily figures for three market segments: “Distribution”, “HP Clients” (i.e., industrial users), and “Electricity Generation”.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published for transported flows. Quality indices are available at daily granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** REN has a dedicated transparency web page (<sup>64</sup>).

**Data processing:** Conversion form kWh/d or MWh/d to GWh/d.

**Table 23:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in Portugal

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	75.22	139.46	206.69	50904.04	36.79	45.37	53.12	16559.10
<b>2016</b>	72.08	148.94	222.32	54512.47	29.92	42.43	51.15	15529.54
<b>2017</b>	82.65	186.73	262.98	68155.00	36.09	45.24	52.86	16514.05
<b>2018</b>	83.93	172.86	251.46	63094.72	34.39	47.11	61.99	17195.72
<b>2019</b>	80.37	181.02	243.30	66073.81	28.96	46.93	54.08	17129.67
<b>2020</b>	65.79	177.49	261.55	64960.60	23.44	44.37	52.94	16241.12

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Ave	Max	Sum
<b>2015</b>	0.14	30.27	89.82	11047.09	33.32	63.83	90.57	23297.78
<b>2016</b>	0.03	42.04	103.60	15388.03	32.27	64.47	88.89	23594.70
<b>2017</b>	0.21	75.49	134.46	27554.68	32.77	65.99	93.17	24085.97
<b>2018</b>	0.03	56.91	120.18	20773.28	32.18	68.84	95.81	25125.61
<b>2019</b>	0.03	65.25	124.68	23816.51	37.59	68.84	93.57	25127.50
<b>2020</b>	0.01	67.54	136.49	24719.23	35.73	65.57	94.59	24000.07

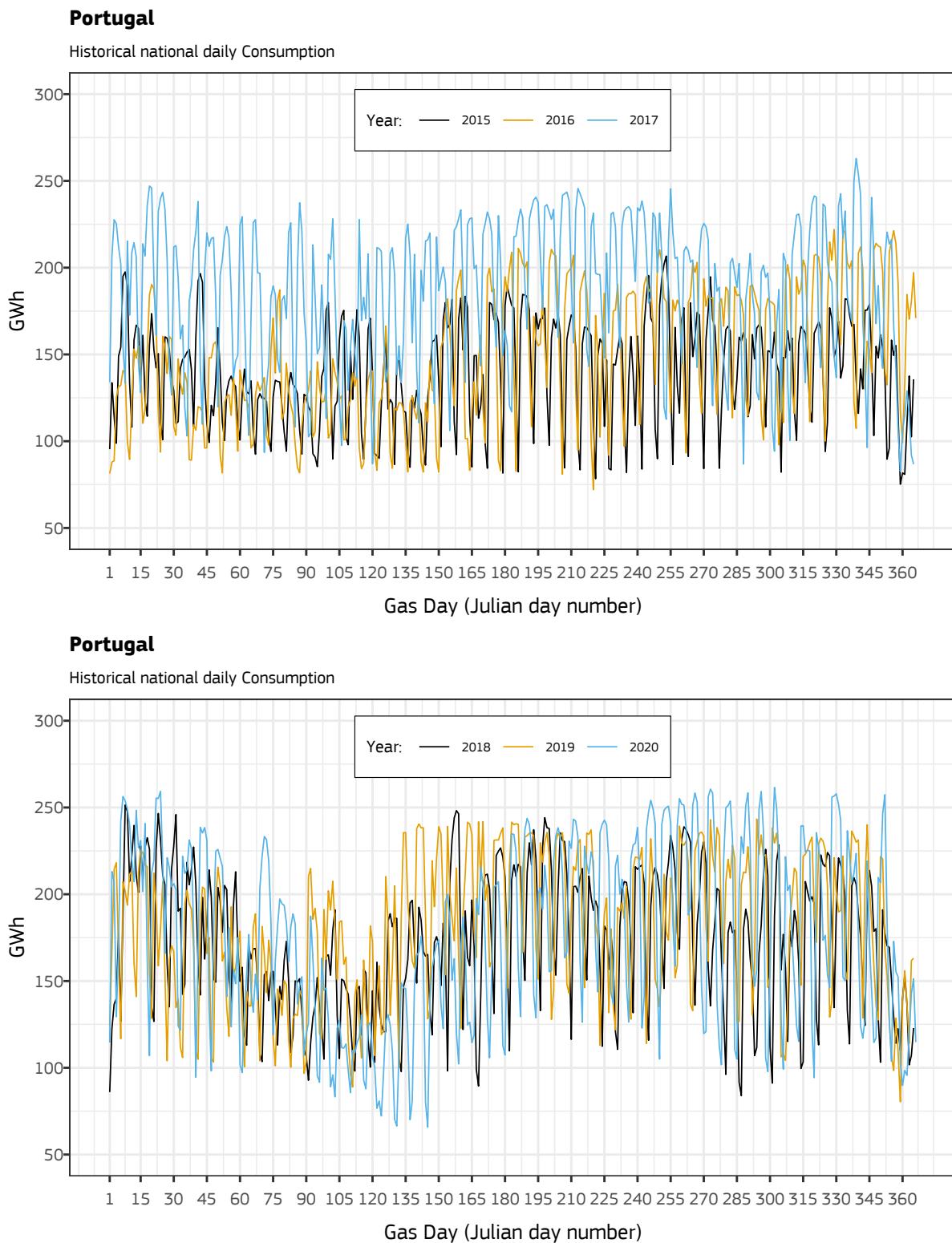
Source: JRC, 2021.

(<sup>62</sup>) <https://www.ren.pt/>.

(<sup>63</sup>) <http://www.mercado.ren.pt/EN/Gas/MarketInfo/Load/Actual/Pages/Daily.aspx>.

(<sup>64</sup>) <https://www.mercado.ren.pt/EN/Gas/MarketInfo/Transparency/Pages/default.aspx>.

**Figure 51:** Time series of the daily total consumption of natural gas in Portugal between 2015 and 2020.

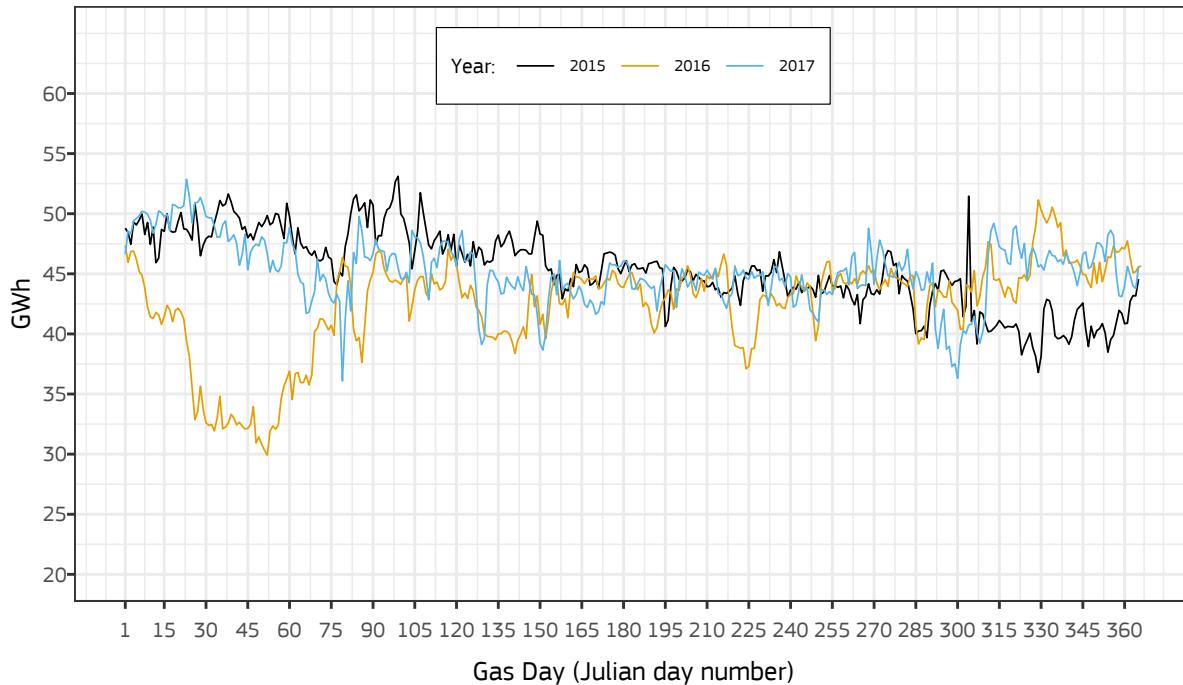


Source: JRC, 2021.

**Figure 52:** Time series of the daily consumption of natural gas by industrial users in Portugal between 2015 and 2020.

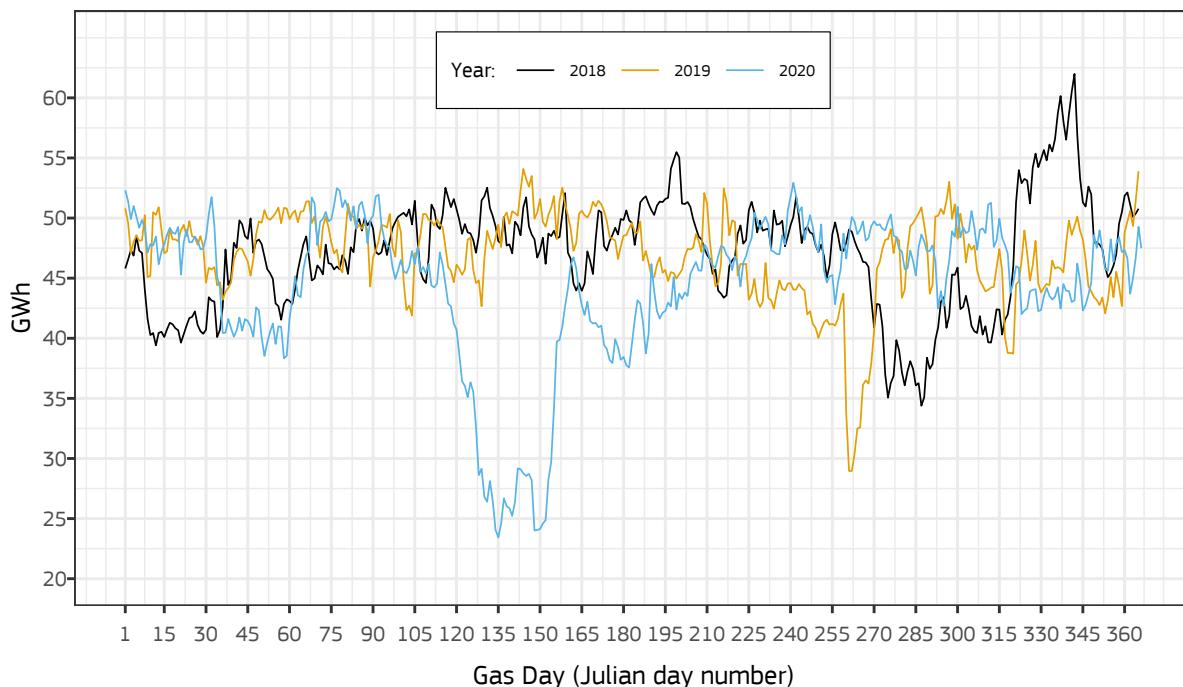
### Portugal

Historical industrial daily consumption



### Portugal

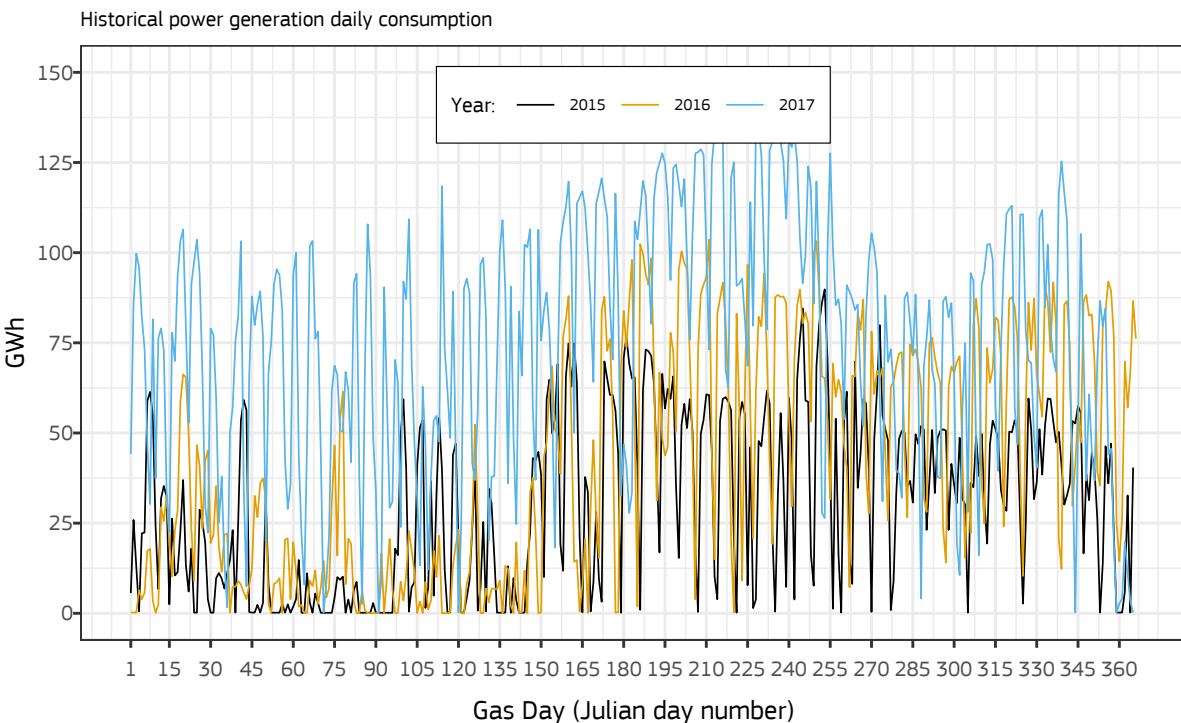
Historical industrial daily consumption



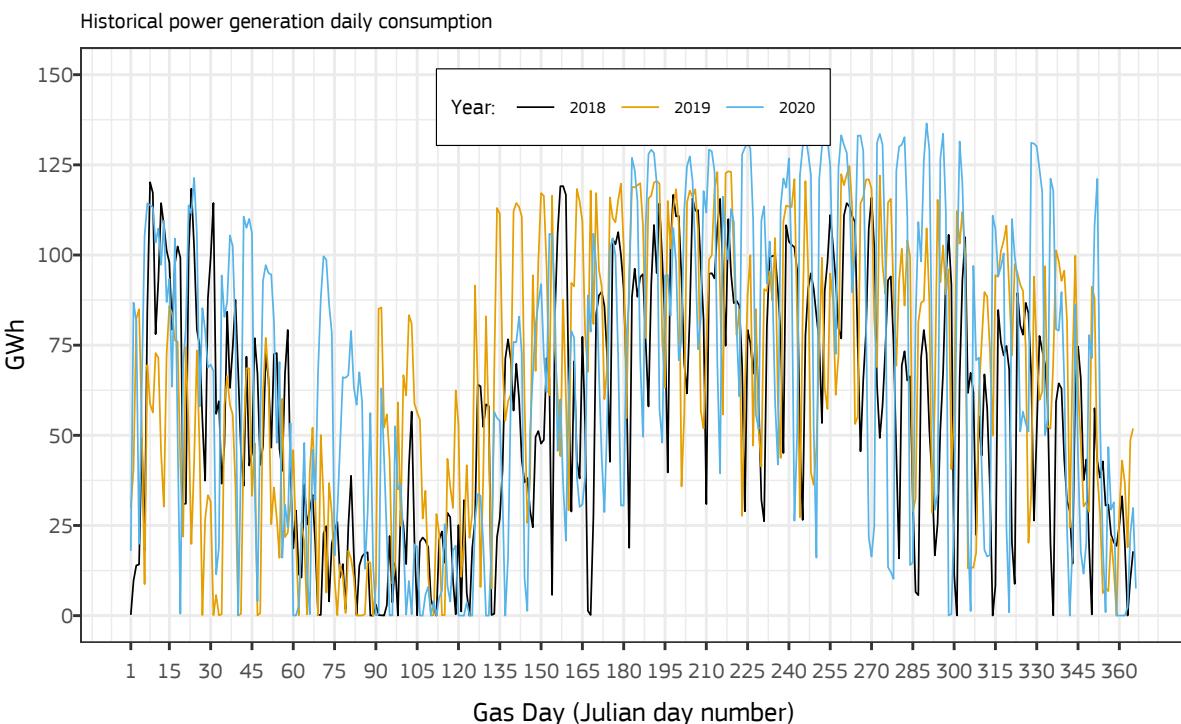
Source: JRC, 2021.

**Figure 53:** Time series of the daily consumption of natural gas by power generation users in Portugal between 2015 and 2020.

### Portugal

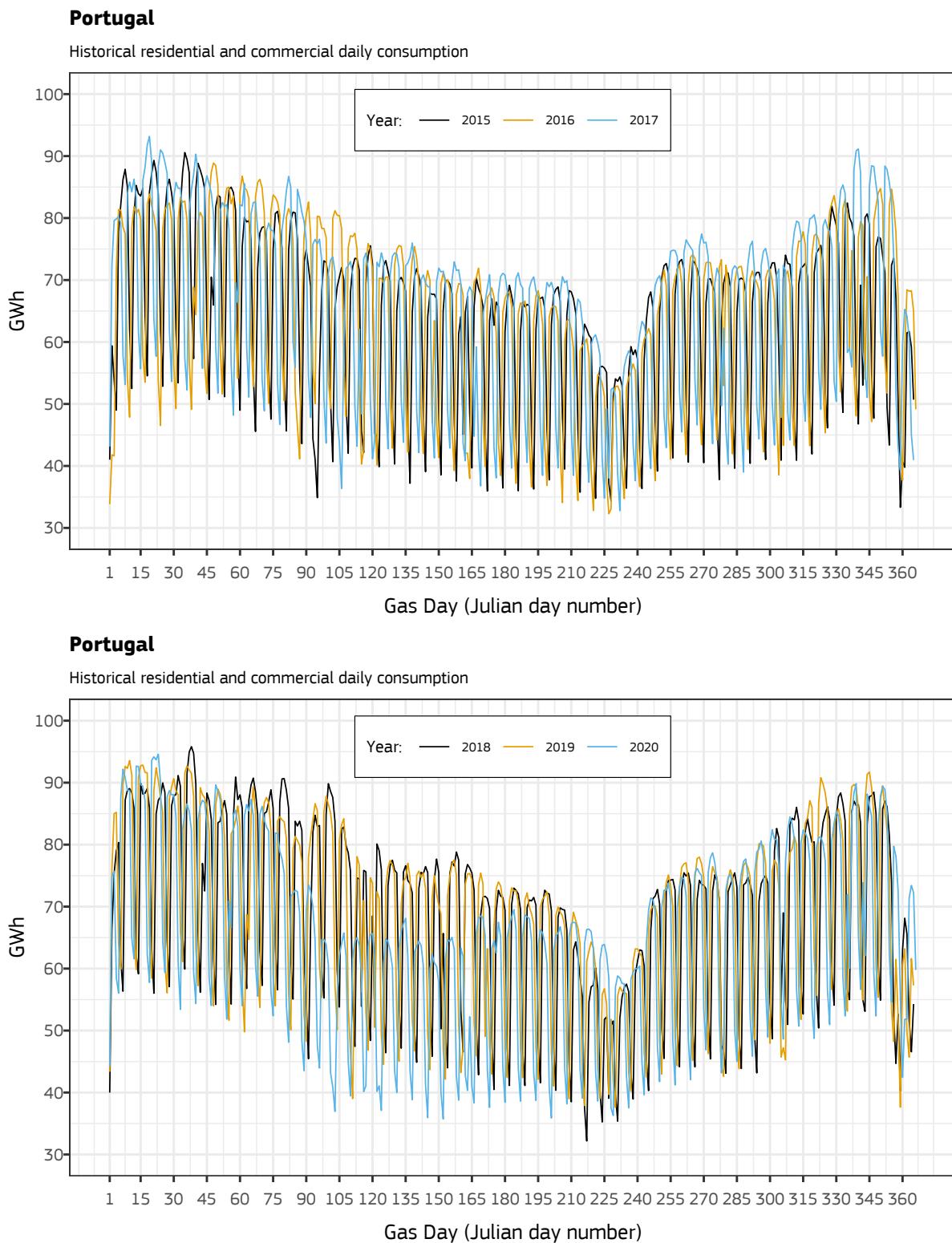


### Portugal



Source: JRC, 2021.

**Figure 54:** Time series of the daily consumption of natural gas by residential and commercial users in Portugal between 2015 and 2020.



Source: JRC, 2021.

## 4.22 Romania

**Data source:** Data were retrieved from the transparency platform of the national transmission system operator “Societatea Națională de Transport Gaze Naturale „Transgaz“ SA Mediaș”<sup>(65)</sup>.

**Type of flow:** Transgaz S.A. covers aggregated domestic production, cross-border interconnection points, underground storage facilities, and national consumption.

**Classification of consumption:** Daily consumption is divided into residential and commercial users (code SM-SD001 “SISTEME DE DISTRIBUȚIE”), and all other customers (code SM-CF001 “CLIENTI FINALI RACORDATI DIRECT LA SNT”).

**Data on gas quality:** Only the higher GCV is published for all entry and exit points. No information on the Wobbe index.

**Unit of Measurement:** Transgaz S.A. allows the user to select the unit of measurement, either cubic meters or energy unit, and the reference conditions like at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa, or at combustion temperature of 15 °C, and volume at temperature of 15 °C and 101.35 kPa.

**Time granularity:** Daily figures are published. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a transparency web-page<sup>(66)</sup>.

**Data processing:** Conversion from kWh/d to GWh/d.

**Table 24:** Summary statistics by year of the total national consumption, residential and commercial users and other users in Romania.

Year	Total (GWh/d)				Other users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	123.24	300.93	641.57	109840.5	45.84	102.12	147.93	37273.92
<b>2016</b>	110.73	307.21	666.87	112440.0	47.70	99.58	176.99	36446.04
<b>2017</b>	111.98	323.69	745.76	118145.7	49.38	108.57	184.00	39629.02
<b>2018</b>	125.24	321.76	696.76	117441.2	60.20	107.55	162.46	39256.98
<b>2019</b>	87.73	301.57	685.98	110073.4	28.65	94.18	149.72	34376.04
<b>2020</b>	130.58	320.00	650.84	117119.8	58.52	113.30	161.09	41469.14

Residential and Commercial users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	55.80	198.81	532.49	72566.62
<b>2016</b>	53.58	207.63	522.68	75993.94
<b>2017</b>	59.79	215.11	584.93	78516.66
<b>2018</b>	59.35	214.20	556.10	78184.18
<b>2019</b>	59.08	207.39	540.97	75697.32
<b>2020</b>	58.94	206.70	498.57	75650.69

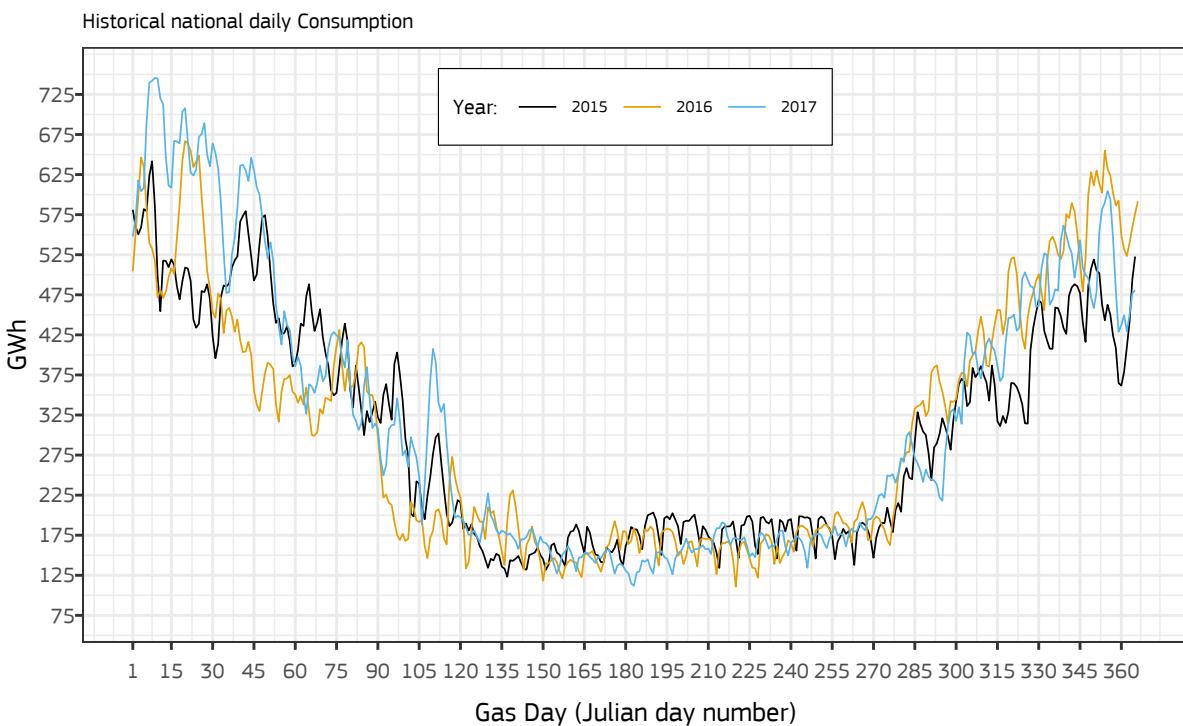
Source: JRC, 2021.

<sup>(65)</sup> <https://www.transgaz.ro/ro/clienti/informatii-operationale/fluxuri-fizice-realizate>.

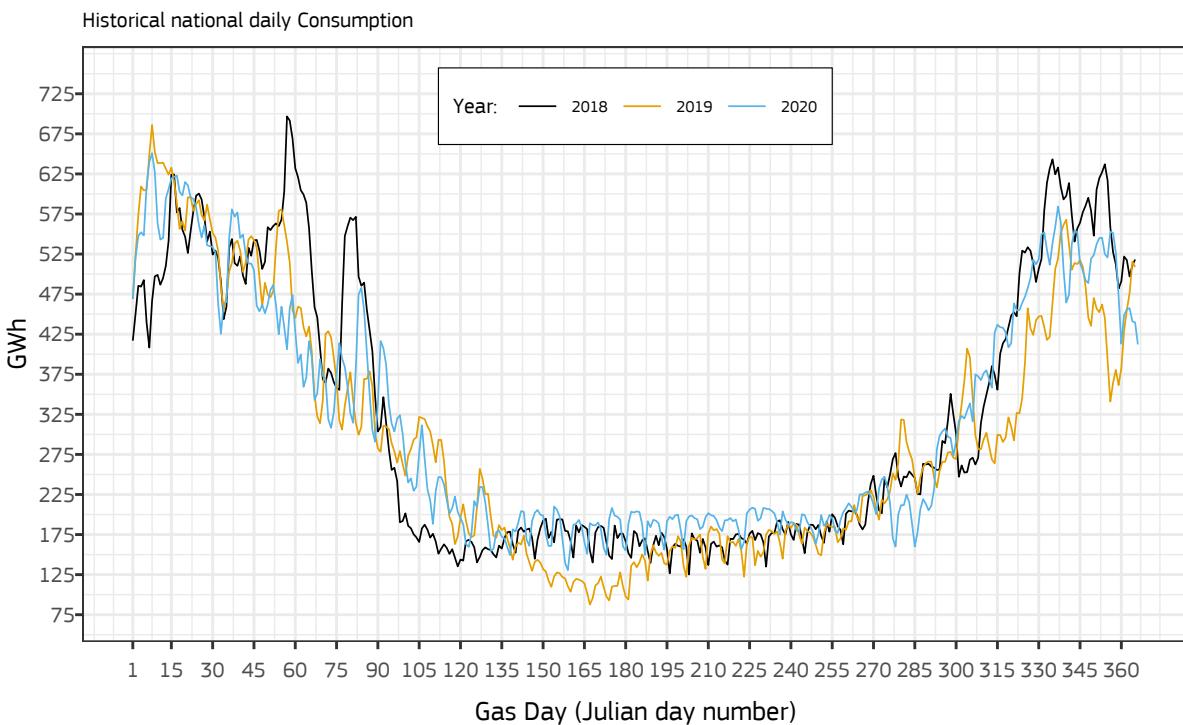
<sup>(66)</sup> <https://www.nationalgrid.com/uk/gas-transmission/about-us/gas-transparency-requirements>.

**Figure 55:** Time series of the daily total consumption of natural gas in Romania between 2015 and 2020.

### Romania

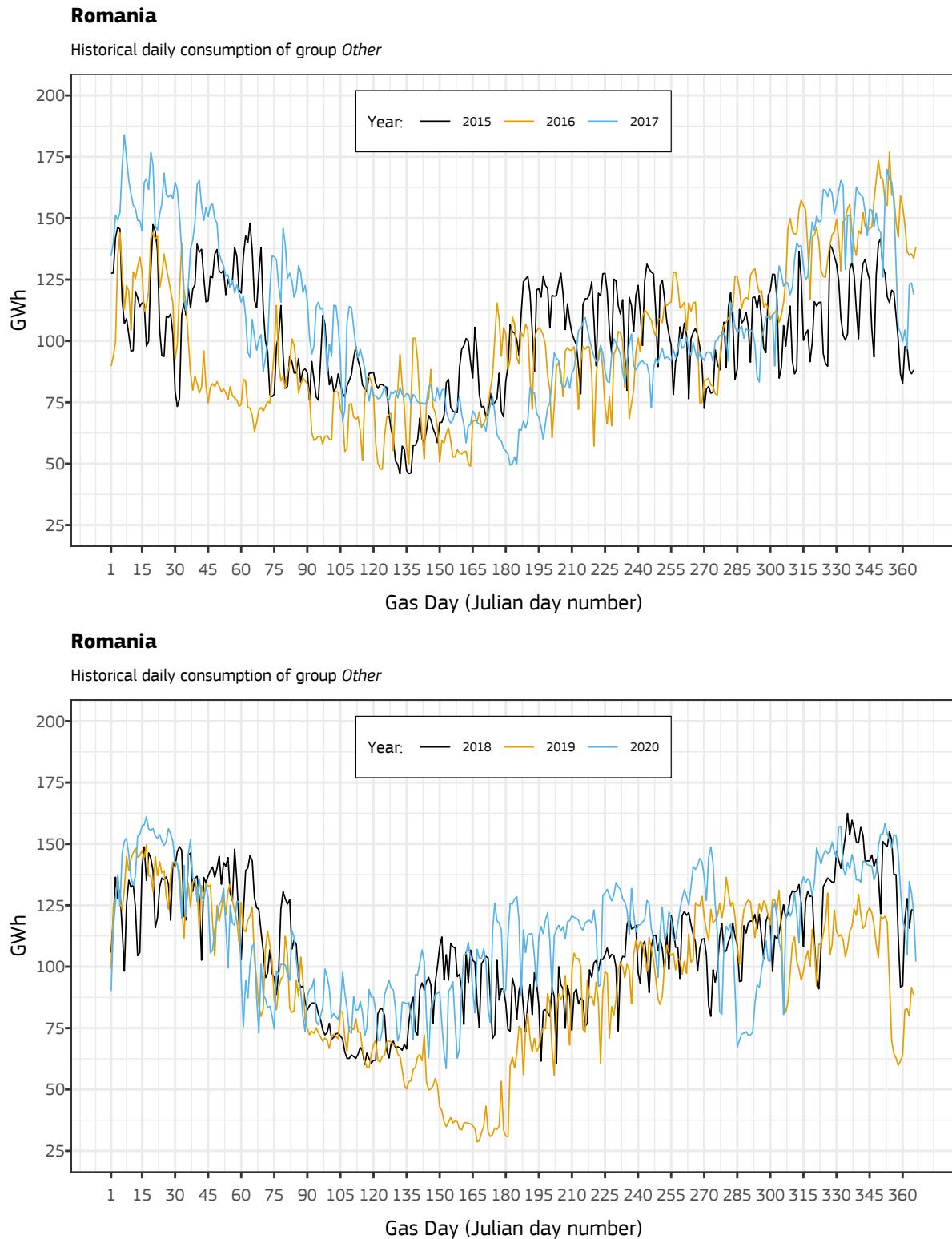


### Romania



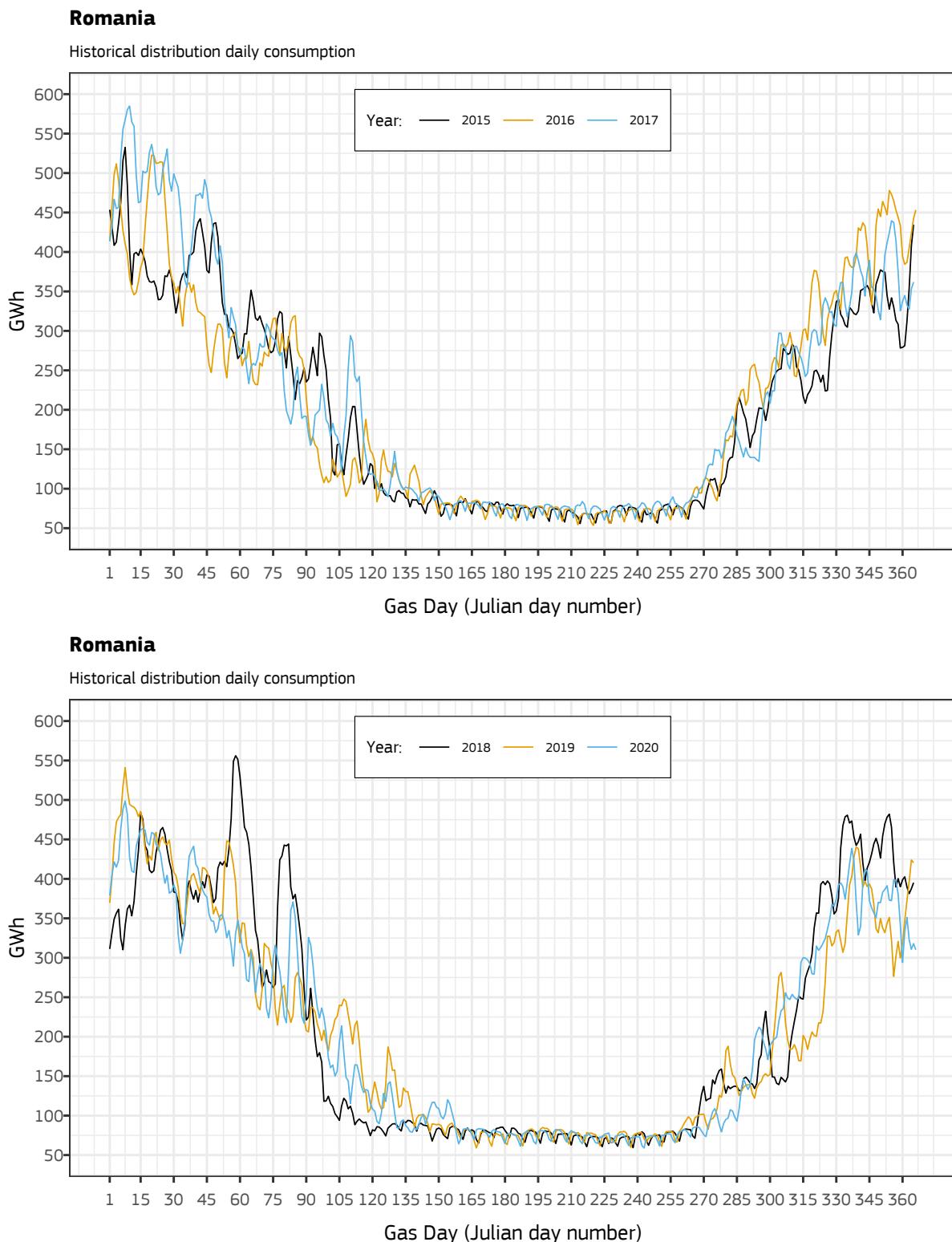
Source: JRC, 2021.

**Figure 56:** Time series of the daily consumption of natural gas by other users in Romania between 2015 and 2020.



Source: JRC, 2021.

**Figure 57:** Time series of the daily consumption of natural gas by residential and commercial users in Romania between 2015 and 2020.



Source: JRC, 2021.

## 4.23 Slovakia

**Data source:** The original data on the daily consumption were provided by the Ministry of Economy of the Slovak Republic (Ministerstvo hospodárstva Slovenskej republiky). Figures of the daily average GCV used to convert data into energy unit of measurement were acquired from the national transmission system operator Eustream a.s.

**Type of flow:** Eustream s.a. provides data by main point of the transmission system. Main points are: cross-border interconnection points of Budince, Vel'ké Kapušany, Baumgarten, Vel'ké Zlievce and Lanžhot; interconnection with the distribution system called "Domestic SPP Distribúcia"; interconnection with the underground storage of called "Domestic NAFTA" and another virtual interconnection describing traded gas. The transmission system operator covers cross-border entry/exit points, underground storage and part of the national consumption. Data concerning domestic production, linepack and consumption by final consumers or distribution system operators are missing.

**Classification of consumption:** Data are provided in aggregated form for only one exit node from the system. No distinction among consumers classes or locations.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system.

**Unit of Measurement:** Data provided by the Ministry of Economy were in cubic meters per day with reference conditions of temperature of 20 °C and of pressure of 101.35 kPa. The TSO provides similar data at the same reference conditions or values in MWh/d at combustion temperature of 25 °C, and volume at temperature of 20 °C and 101.35 kPa. Gas quality indices are expressed in kWh/m<sup>3</sup> at combustion temperature of 25 °C and either 0 or 20 °C for the volume.

**Time granularity:** Data concerning the physical flow of natural gas are provided with a daily granularity. Data concerning gas quality are provided with a daily or hourly granularity for the main points of the transmission system managed by Eustream s.a. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Eustream s.a. has a dedicated web page<sup>(67)</sup> describing its transparency platform.

**Data processing:** Data were converted to GWh/d by multiplying the daily flow by user types at 20 °C by a reference GCV measures at 25 °C/20 °C. The result was further converted from the temperature conditions of 25 °C/20 °C to 25 °C/0 °C using the coefficient provided by ISO 13443. Because daily values of the average GCV for the exit point "Domestic SPP Distribúcia" were provided only starting from June 22 2016, the period from January 1 2015 to June 21 2016 was approximated by using the daily figures of the interval January 1 2017 to June 22 2018 as 2016 was a leap year.

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<sup>(67)</sup> [https://www.eustream.sk/en\\_transmission-system/en\\_other-information/en\\_7152009-requirements](https://www.eustream.sk/en_transmission-system/en_other-information/en_7152009-requirements).

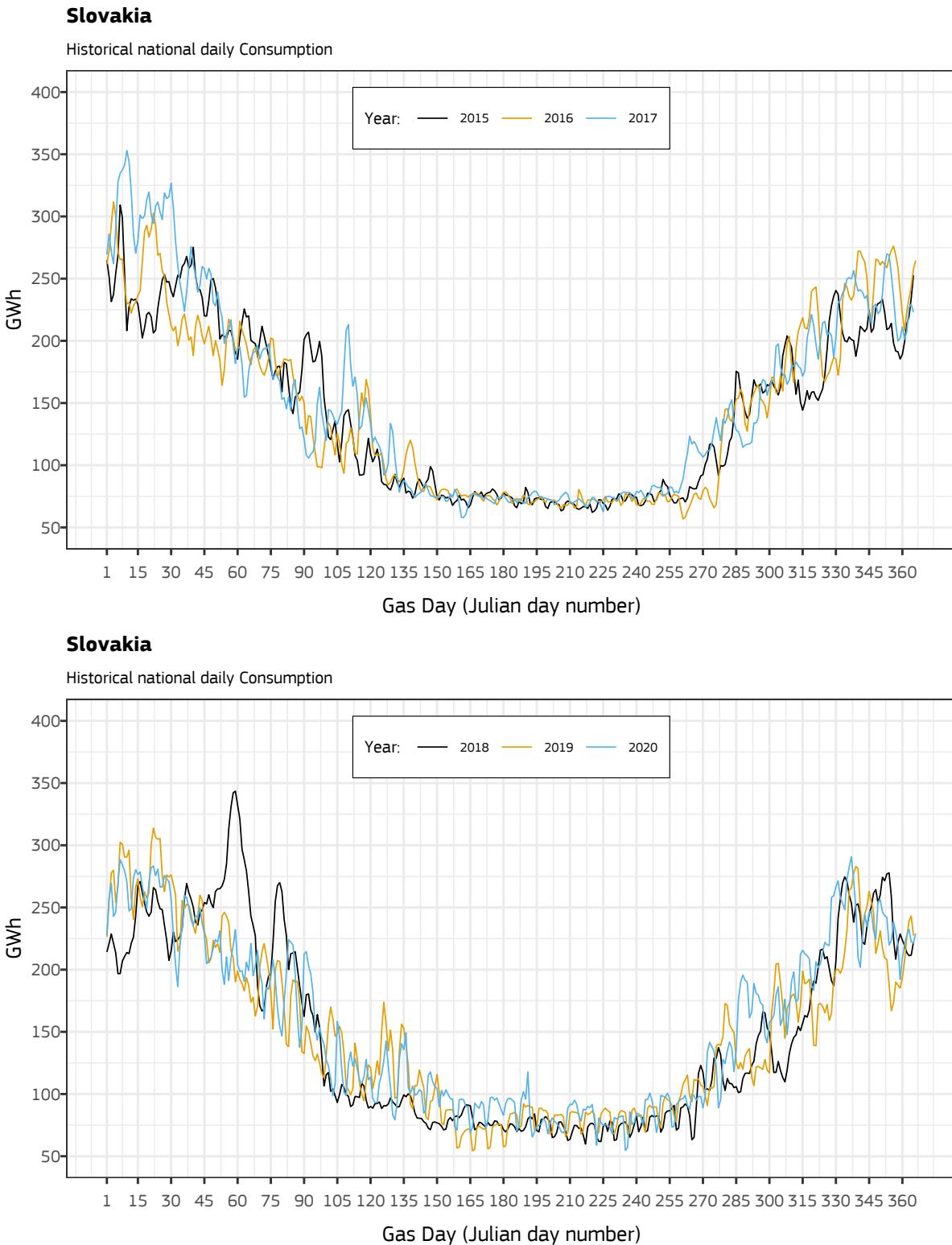
**Table 25:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in Slovakia.

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	62.10	142.58	309.15	52041.72	51.01	82.55	141.94	30130.98
<b>2016</b>	56.74	145.12	311.70	53113.21	43.14	80.77	136.45	29562.10
<b>2017</b>	57.97	152.39	352.87	55621.40	41.19	83.40	148.02	30441.13
<b>2018</b>	59.77	148.42	343.57	54173.24	42.33	83.57	154.47	30502.57
<b>2019</b>	54.43	150.46	313.84	54919.14	39.36	78.89	132.54	28793.55
<b>2020</b>	54.66	155.79	290.85	57019.48	40.52	80.49	127.55	29460.69

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Ave	Max	Sum
<b>2015</b>	1.82	4.18	7.04	1527.03	4.78	55.85	160.33	20383.71
<b>2016</b>	1.66	4.60	9.32	1684.32	6.33	59.75	168.52	21866.79
<b>2017</b>	2.21	6.82	10.82	2490.63	4.82	62.16	198.59	22689.63
<b>2018</b>	1.82	7.74	22.28	2826.78	6.52	57.11	181.44	20843.87
<b>2019</b>	3.58	14.91	23.49	5443.97	6.80	56.66	160.67	20681.60
<b>2020</b>	2.98	17.09	29.31	6253.22	6.74	58.21	143.95	21305.57

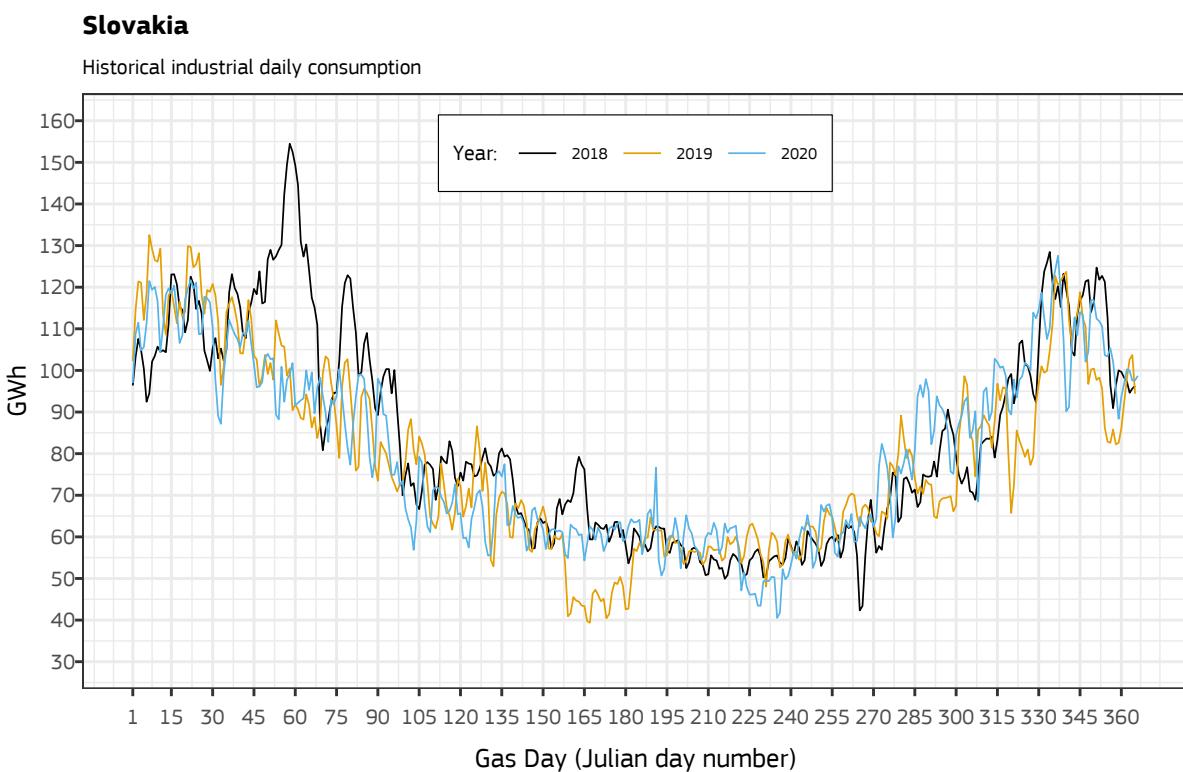
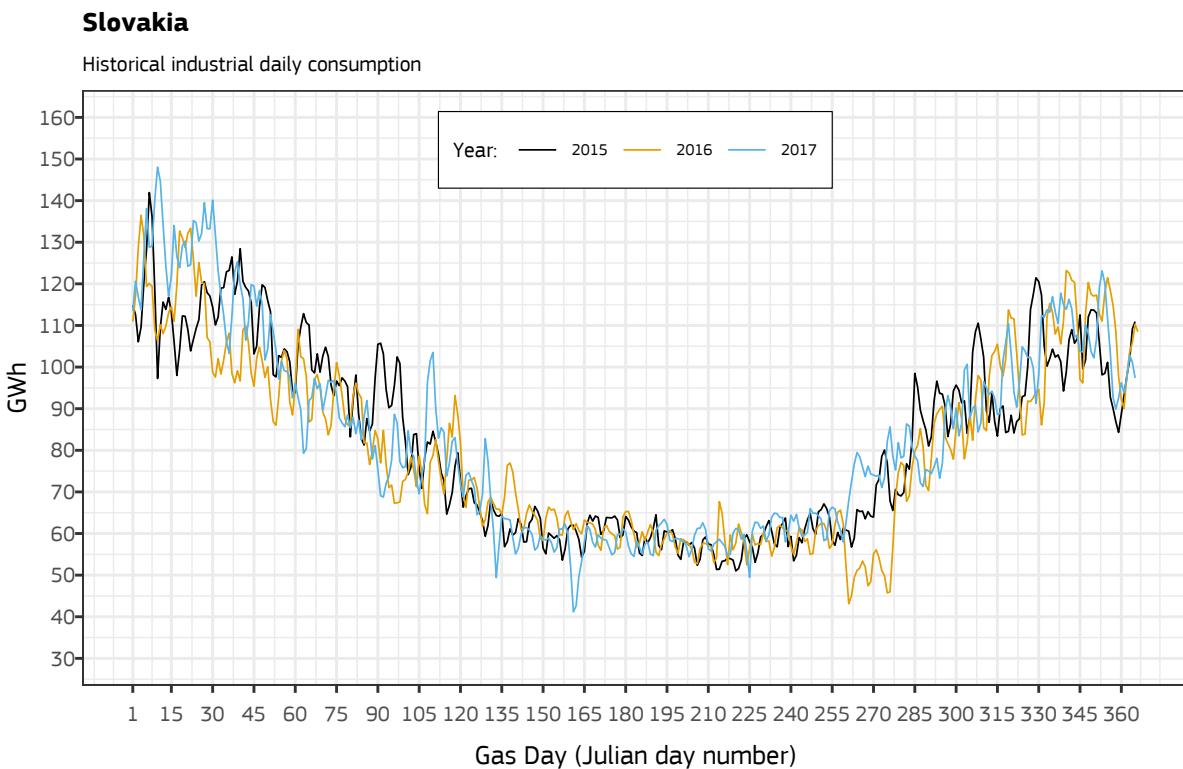
Source: JRC, 2021.

**Figure 58:** Time series of the daily total consumption of natural gas in Slovakia between 2015 and 2020.



Source: JRC, 2021.

**Figure 59:** Time series of the daily consumption of natural gas by industrial users in Slovakia between 2015 and 2020.

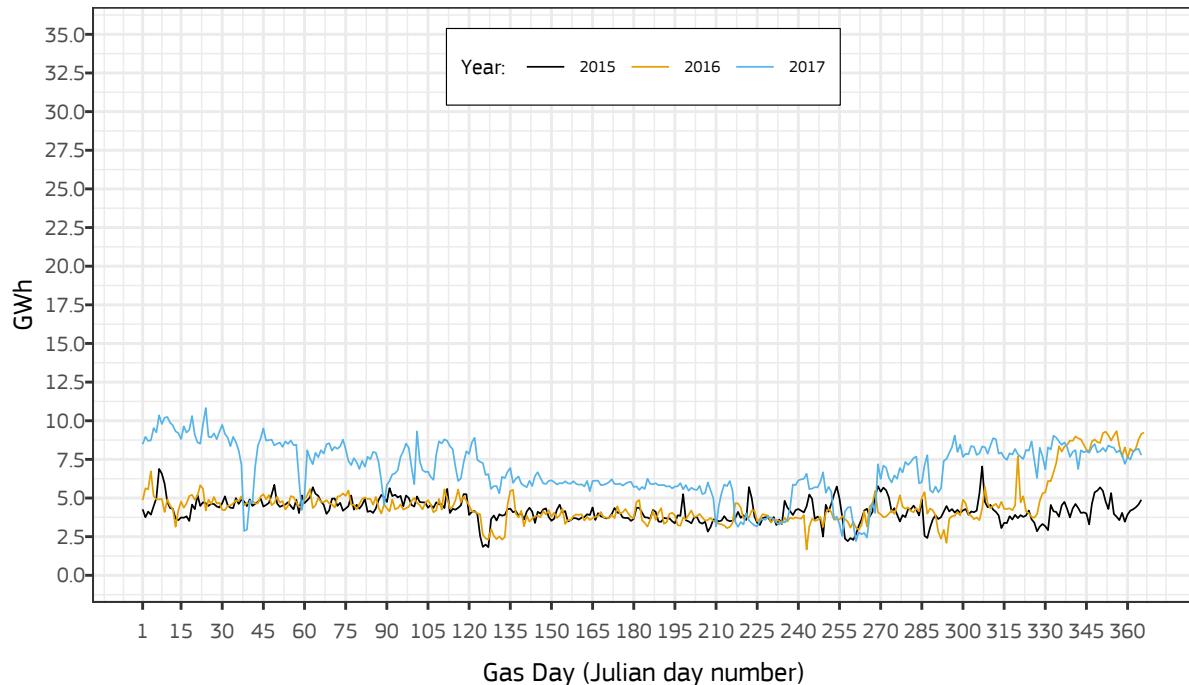


Source: JRC, 2021.

**Figure 60:** Time series of the daily consumption of natural gas by power generation users in Slovakia between 2015 and 2020.

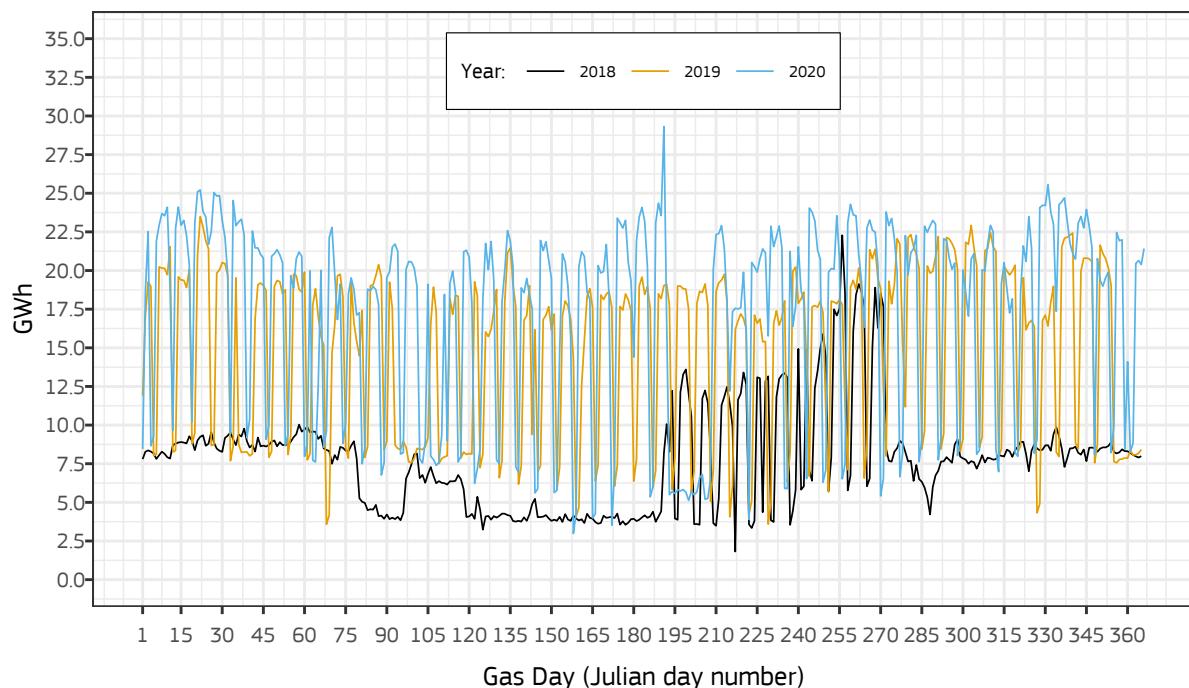
### Slovakia

Historical power generation daily consumption



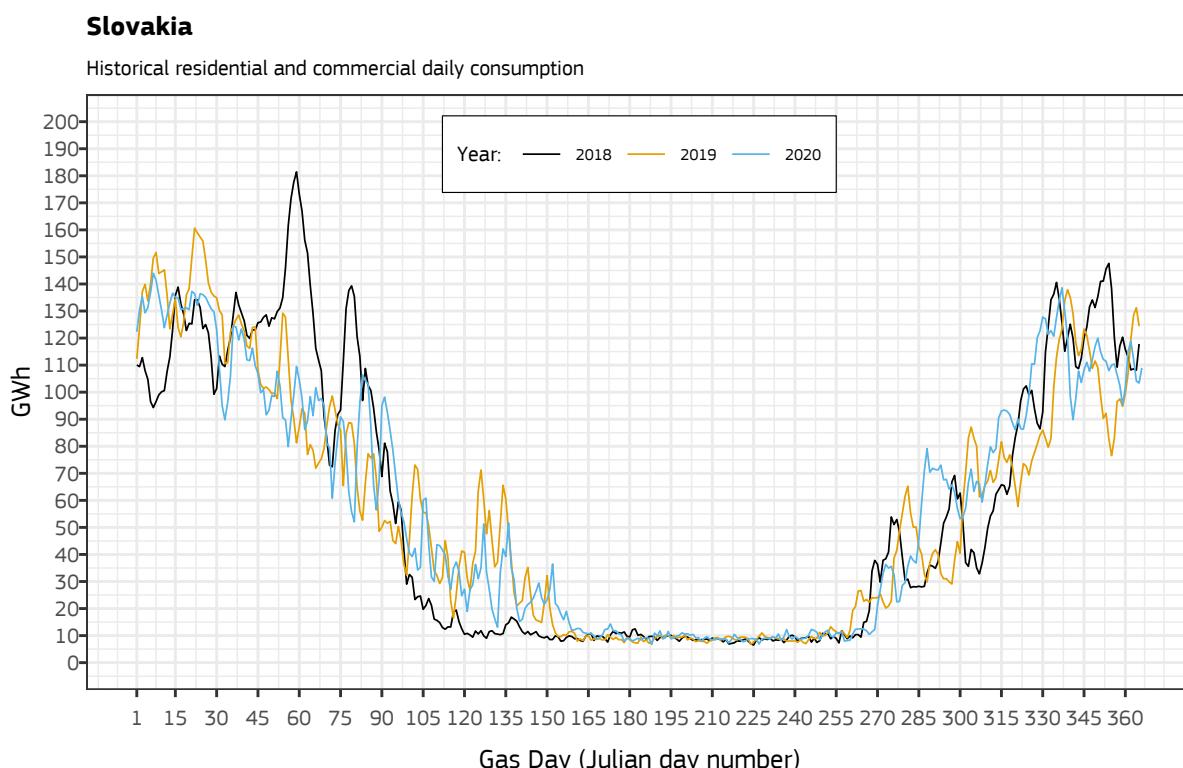
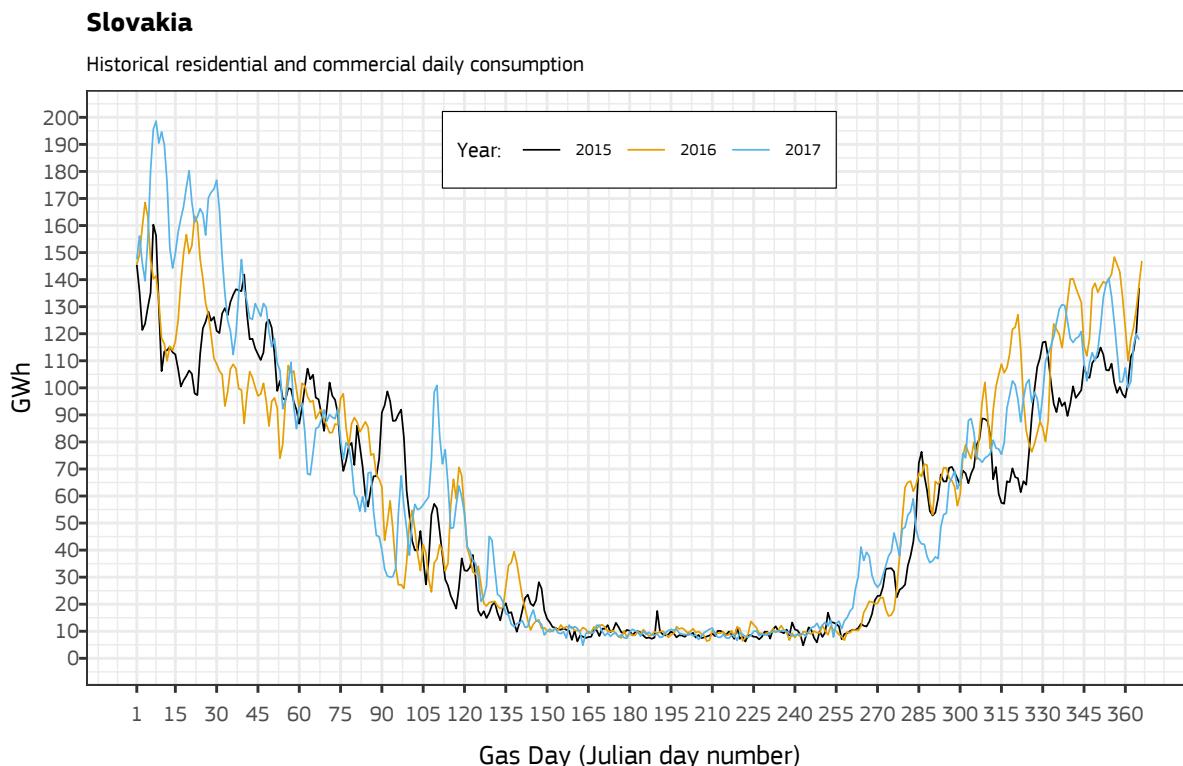
### Slovakia

Historical power generation daily consumption



Source: JRC, 2021.

**Figure 61:** Time series of the daily consumption of natural gas by residential and commercial users in Slovakia between 2015 and 2020.



Source: JRC, 2021.

## 4.24 Slovenia

**Data source:** Data are taken from the transparency platform of the national transmission system operator Plinovodi d.o.o. (68) (69).

**Type of flow:** Plinovodi d.o.o. covers cross-border interconnection points and national consumption as virtual aggregated point.

**Classification of consumption:** National consumption is provided as aggregated daily figure for a virtual off-take point.

**Data on gas quality:** Both the GCV and the Wobbe index are provided for each main point of the transmission system.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa. Volume unit of measurement is define at at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published for transported flows. Quality indices are available at daily granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Plinovodi d.o.o. has a dedicated transparency web page (70).

**Data processing:** Conversion form kWh/d to GWh/d.

**Table 26:** Summary statistics by year of the total national consumption in Slovenia

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	10.76	24.32	42.93	8876.27
<b>2016</b>	12.57	25.38	44.89	9287.49
<b>2017</b>	12.74	26.59	55.76	9705.03
<b>2018</b>	12.08	26.02	58.25	9498.67
<b>2019</b>	12.89	26.48	50.79	9665.79
<b>2020</b>	12.29	26.35	49.15	9645.75

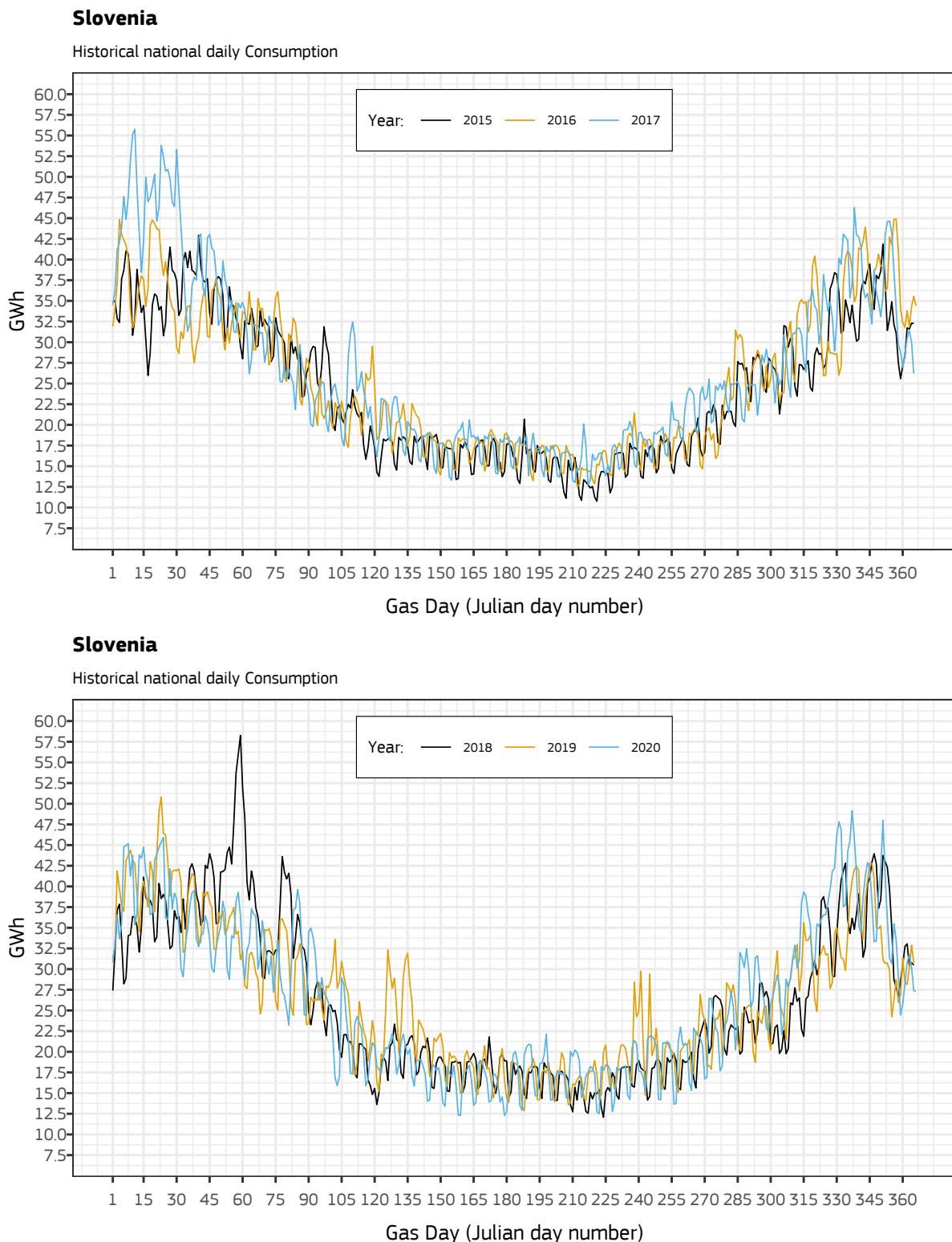
*Source:* JRC, 2021.

(68) <http://www.plinovodi.si>.

(69) <http://www.plinovodi.si/en/operation/operation-of-transmission-system/relevant-points-data/>.

(70) <http://www.plinovodi.si/en/other/transparency-information>.

**Figure 62:** Time series of the daily total consumption of natural gas in Slovenia between 2015 and 2020.



Source: JRC, 2021.

## 4.25 Spain

**Data source:** Data are taken from the transparency platform of the national transmission system operator Enagás S.A. (<sup>71</sup>) (<sup>72</sup>).

**Type of flow:** Enagás S.A. covers aggregated domestic production, cross-border interconnection points, underground storage and LNG facilities, and national consumption.

**Classification of consumption:** Daily consumption is divided into “conventional” (“Convencional” or residential, commercial and industrial users) and power station off-take points (“Sector Eléctrico” or power generation users).

**Data on gas quality:** Higher GCV is published at the level of municipality and pressure of the off-take point. No information on the Wobbe index.

**Unit of Measurement:** Enagás S.A. publishes data in energy unit of measurement with reference conditions of combustion temperature of 0 °C, and volume at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Data are provided with daily or hourly granularity. Quality data are provided with a daily granularity for the off-take points. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a transparency web-page (<sup>73</sup>).

**Data processing:** Original values are expressed in energy units using normal reference conditions for the volume (273.15 K, 101.325 kPa) and combustion temperature of 0 °C for the GCV. The conversion factor used for transforming the data to a reference combustion temperature of 25 °C is 1/1.0026. Values were further converted to GWh/d.

**Table 27:** Summary statistics by year of the total national consumption, power generation users and other users in Spain.

Year	Total (GWh/d)				Power Generation users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	552.98	862.93	1348.17	314967.9	72.20	166.97	385.71	60944.28
<b>2016</b>	565.43	876.02	1441.17	320623.8	51.14	162.45	474.59	59455.39
<b>2017</b>	619.37	958.83	1767.47	349973.6	55.66	206.69	628.08	75443.39
<b>2018</b>	587.86	954.82	1511.36	348508.8	52.19	169.11	412.08	61726.89
<b>2019</b>	712.10	1087.38	1632.51	396892.0	51.34	303.68	669.31	110843.89
<b>2020</b>	601.63	980.66	1531.68	358920.2	64.57	241.83	548.32	88508.85

Other users (GWh/d)				
Year	Min	Average	Max	Sum
<b>2015</b>	443.61	695.96	1142.71	254023.6
<b>2016</b>	448.81	713.57	1065.80	261168.4
<b>2017</b>	479.10	752.14	1226.02	274530.1
<b>2018</b>	493.92	785.70	1217.73	286781.9
<b>2019</b>	498.86	783.69	1207.99	286048.1
<b>2020</b>	471.91	738.83	1225.45	270411.4

Source: JRC, 2021.

(<sup>71</sup>) <https://www.enagas.es>.

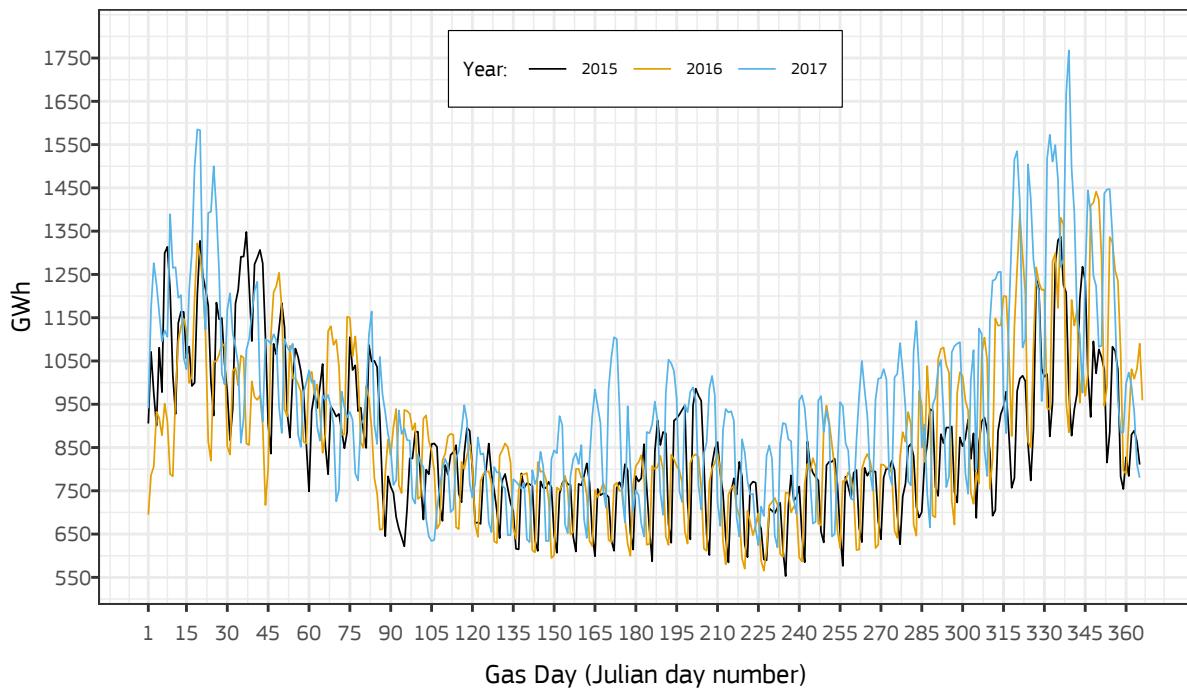
(<sup>72</sup>) [https://www.enagas.es/enagas/en/Gestion\\_Tecnica\\_Sistema/DemandaGas/SeguimientoDemanda](https://www.enagas.es/enagas/en/Gestion_Tecnica_Sistema/DemandaGas/SeguimientoDemanda).

(<sup>73</sup>) [https://www.enagas.es/enagas/en/Transporte\\_de\\_gas/Red\\_de\\_transporte/PlantillaTransparenciaTransporte](https://www.enagas.es/enagas/en/Transporte_de_gas/Red_de_transporte/PlantillaTransparenciaTransporte).

**Figure 63:** Time series of the daily total consumption of natural gas in Spain between 2015 and 2020.

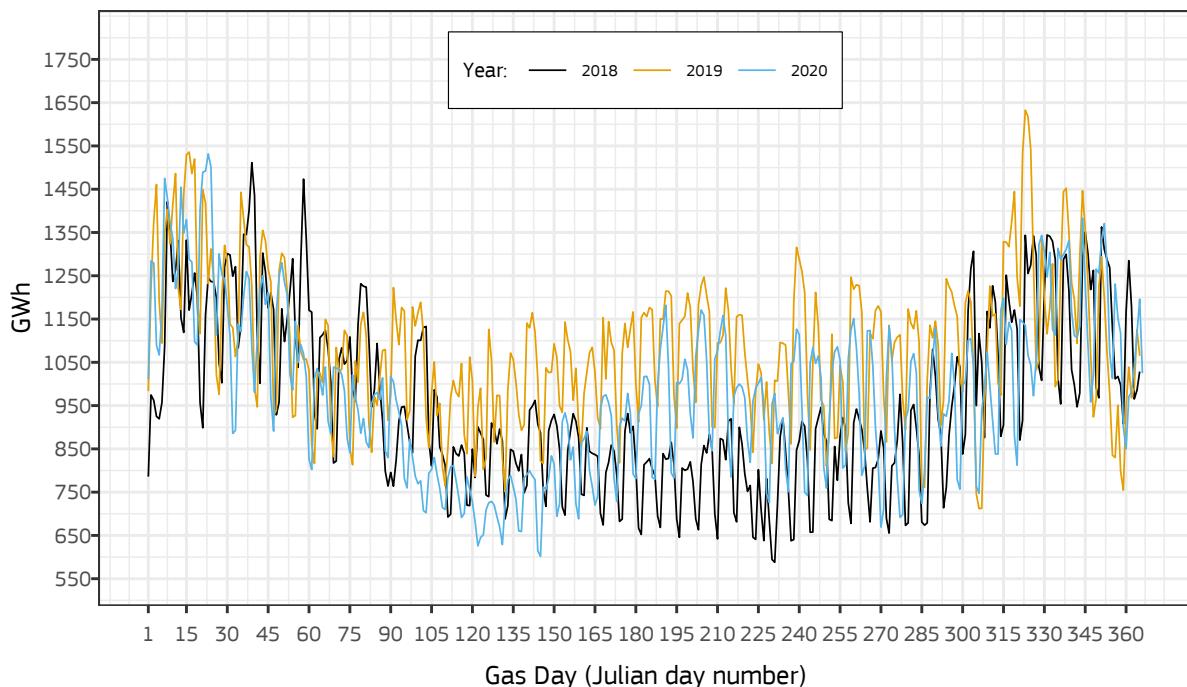
### Spain

Historical national daily Consumption



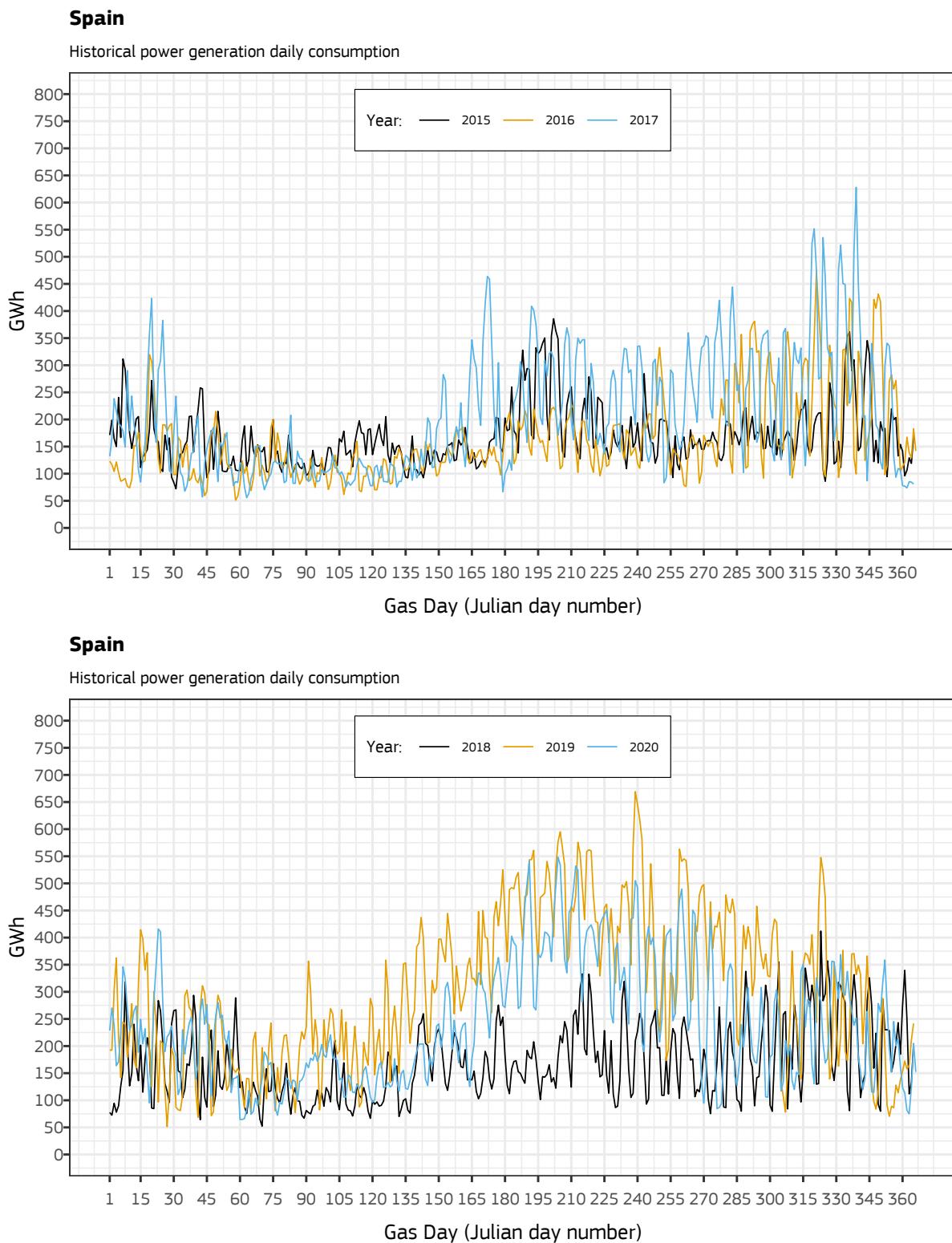
### Spain

Historical national daily Consumption



Source: JRC, 2021.

**Figure 64:** Time series of the daily consumption of natural gas by power generation users in Spain between 2015 and 2020.

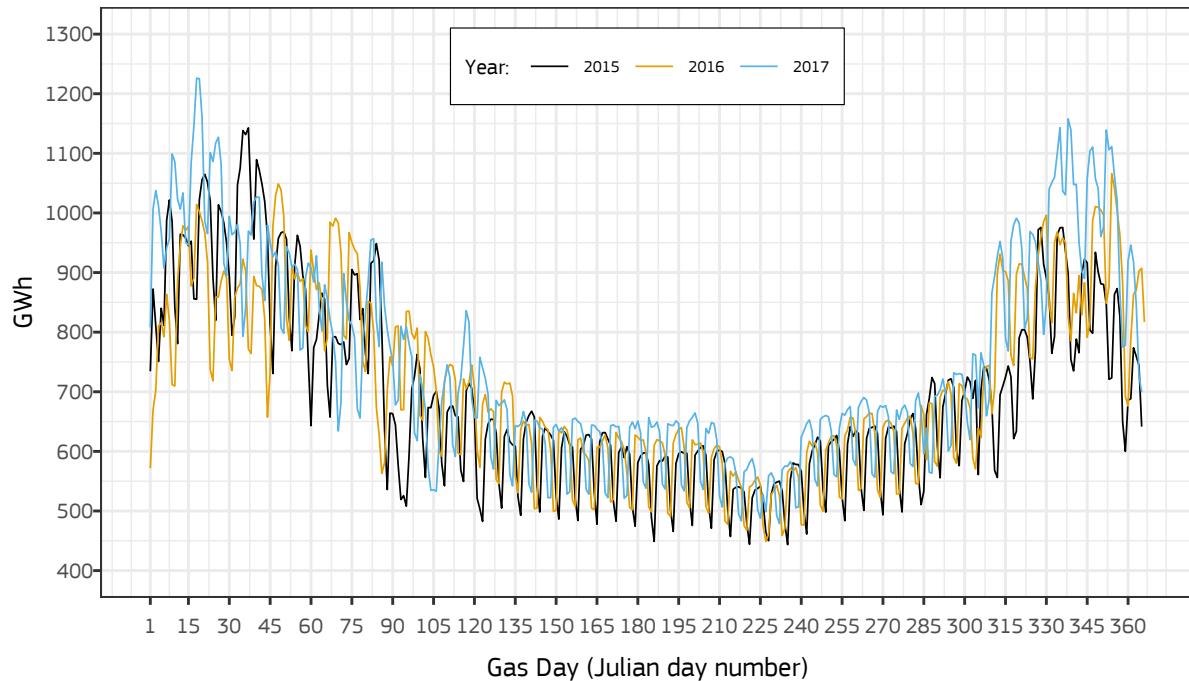


Source: JRC, 2021.

**Figure 65:** Time series of the daily consumption of natural gas by other users in Spain between 2015 and 2020.

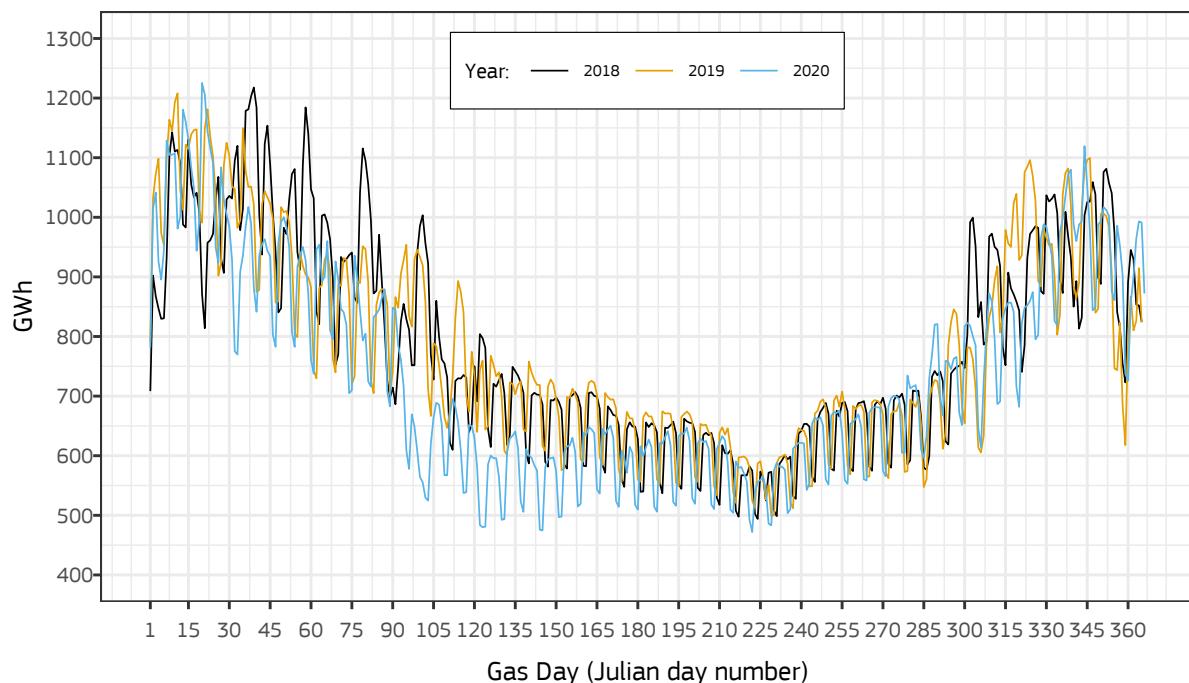
### Spain

Historical daily consumption of group *Other*



### Spain

Historical daily consumption of group *Other*



Source: JRC, 2021.

## 4.26 Sweden

**Data source:** Data are taken from the transparency platform of the national transmission system operator Swedegas<sup>(74)</sup><sup>(75)</sup>. Part of the data are from the Danish TSO transparency platform.

**Type of flow:** Swedegas d.o.o. covers cross-border interconnection points and national consumption as virtual aggregated point.

**Classification of consumption:** National consumption is provided as aggregated daily figure for a virtual off-take point. This is not used in order to have a consistent time series for the period not covered by Swedegas.

**Data on gas quality:** Only the GCV is provided.

**Unit of Measurement:** Energy unit of measurement at combustion temperature of 25 °C, and volume at temperature of 0 °C and 101.35 kPa. Volume unit of measurement is defined at at temperature of 0 °C and 101.35 kPa.

**Time granularity:** Daily and hourly figures are published for transported flows. Quality indices are available at daily granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Swedegas does not have a dedicated transparency web page.

**Data processing:** For the period April 1 2019 - December 31 2020 data are from Swedegas. For the previous period, data are from the Danish TSO. Only the flow at the cross-border point of Drag or is used to approximate the domestic demand. Conversion from kWh/d to GWh/d.

**Table 28:** Summary statistics by year of the total national consumption in Sweden.

Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	7.93	25.60	74.91	9344.61
<b>2016</b>	10.02	28.87	71.23	10565.66
<b>2017</b>	11.02	23.80	57.65	8687.94
<b>2018</b>	8.51	25.25	68.47	9217.85
<b>2019</b>	12.71	25.30	49.11	9234.13
<b>2020</b>	14.16	23.37	40.16	8552.51

Source: JRC, 2021.

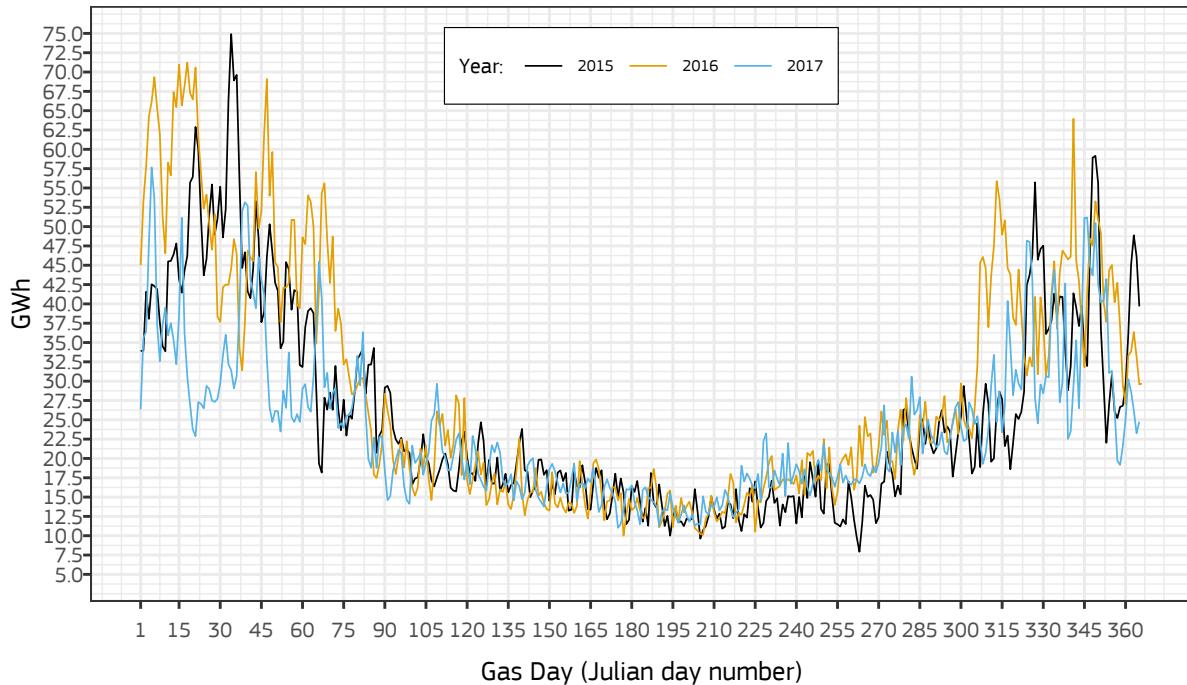
<sup>(74)</sup> <https://www.swedegas.com>.

<sup>(75)</sup> [https://www.swedegas.com/Our\\_services/services/statistics](https://www.swedegas.com/Our_services/services/statistics).

**Figure 66:** Time series of the daily total consumption of natural gas in Sweden between 2015 and 2020.

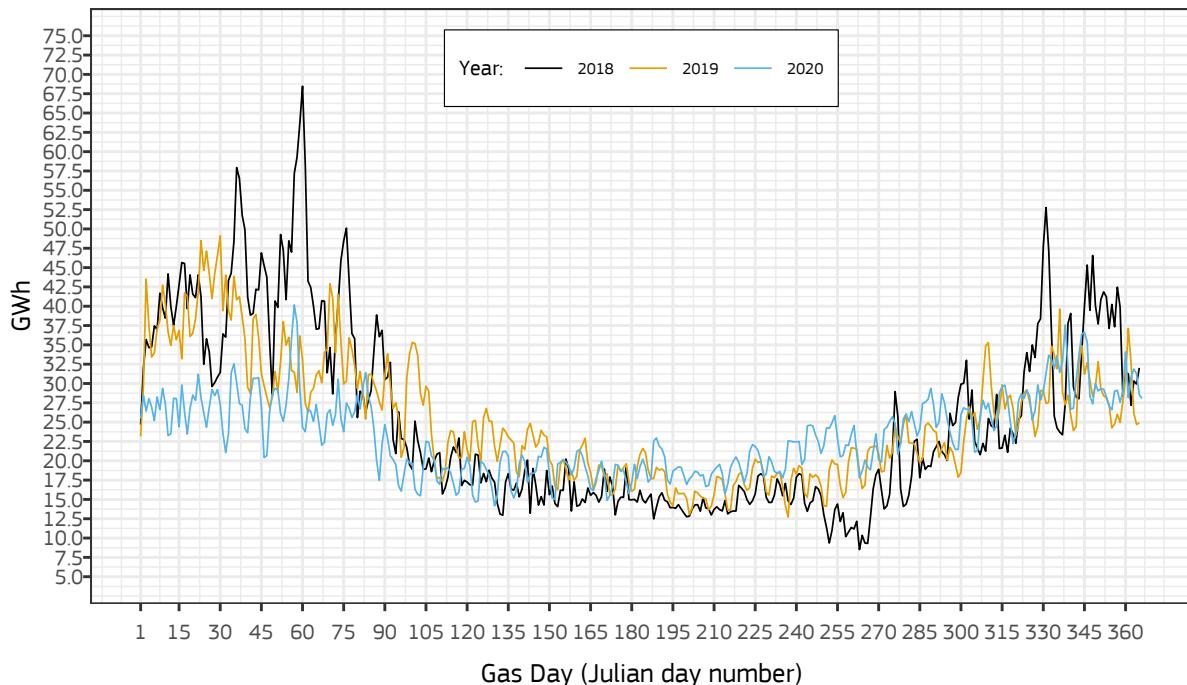
### Sweden

Historical national daily Consumption



### Sweden

Historical national daily Consumption



Source: JRC, 2021.

## 4.27 Switzerland

**Data source:** The national transmission system operator Swissgas<sup>(76)</sup> is not bound by Regulation (EC) No 715/2009, but it is a member of ENTSOG. Data could be retrieved from the ENTSOG transparency platform for the main cross-border interconnection points.

**Type of flow:** No data on domestic consumption are published.

**Classification of consumption:** None

**Data on gas quality:** GCV is provided on a daily base.

**Unit of Measurement:** Figures are in energy unit of measurement expressed in kWh at combustion temperature of 25 °C, volume temperature of 0 °C and pressure of 101.325 kPa.

**Time granularity:** Daily granularity is available, with small portions of data also available at hourly granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** Transparency data are available from ENTSOG transparency platform<sup>(77)</sup>.

**Data processing:** Mass balance based on sum of all entry flows to Switzerland. Values are taken from the entry points: Griespass (CH) / Passo Gries (IT), RC Basel, RC Thayngen-Fallentor, Bizzarrone, Wallbach, Oltingue (FR) / Rodersdorf (CH) and Jura. Figures for Griespass / Passo Gries for July 11 2015 and November 16 2016 have been changed by multiplying by 10 in the first case and taking the average of the day before and after for the second case. Conversion form kWh/d to GWh/d.

**Table 29:** Summary statistics by year of the total national consumption in Switzerland

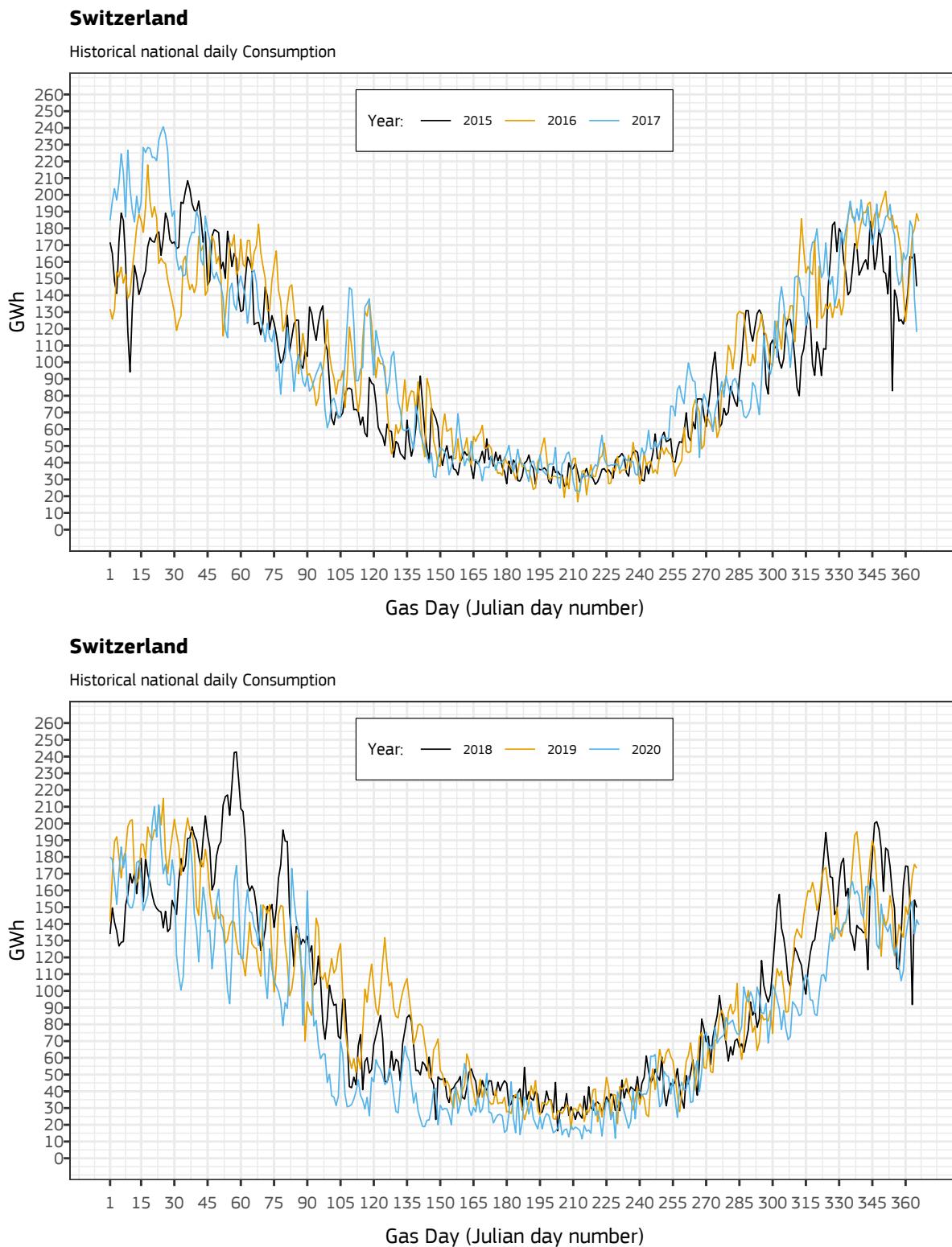
Year	Total (GWh/d)			
	Min	Average	Max	Sum
<b>2015</b>	25.85	95.81	208.48	34970.37
<b>2016</b>	16.58	101.87	217.89	37283.42
<b>2017</b>	22.85	103.74	240.67	37866.62
<b>2018</b>	16.36	98.26	242.72	35865.23
<b>2019</b>	17.24	98.69	215.03	36022.98
<b>2020</b>	11.53	82.26	211.08	30108.54

Source: JRC, 2021.

<sup>(76)</sup> <https://www.swissgas.ch>.

<sup>(77)</sup> <https://transparency.entsoe.eu>.

**Figure 67:** Time series of the daily total consumption of natural gas in Switzerland between 2015 and 2020.



Source: JRC, 2021.

## 4.28 United Kingdom

**Data source:** Data are taken from the transparency platform of the national transmission system operator National Grid (78) (79) for the period after April 13 2016. For the period before April 13 2016, data are from the transparency platform of ENTSOG.

**Type of flow:** National Grid covers aggregated domestic production, cross-border interconnection points, underground storage and LNG facilities, and national consumption.

**Classification of consumption:** Daily consumption is divided into residential and commercial users by “Local Demand Zone” (LDZ), industrial off-take points and power station off-take points. Data are aggregated at national level as well as provided for LDZs or single off-take point.

**Data on gas quality:** The higher GCV is published. No information on the Wobbe index.

**Unit of Measurement:** National Grid publishes data in UK standard units: combustion temperature of 15 °C, and volume at temperature of 15 °C and 101.35 kPa.

**Time granularity:** Data are provided with daily or hourly granularity. The gas day is defined as the period of time from hour 06:00 of day one to hour 06:00 of the following day Central European Time (CET).

**Transparency information:** The TSO has a transparency web-page (80).

**Data processing:** Data from April 14 2016 till 2020 are converted from UK standard units (combustion temperature of 15 °C, volume expressed at temperature of 15 °C and pressure of 101.325 kPa) to the reference normal conditions of combustion temperature of 25 °C and volume expressed at 0 °C and 101.325 kPa. Furthermore, the values for power generation users for the day July 29, August 1 2016 and January 1 2020 have been replaced from the figures provided by the TSO to the one available on the ENTSOG transparency platform. The value for industrial users for January 1 2020 have been replaced with the one from ENTSOG. For distribution the figures are estimated by the average of the day before and after. The total consumption is the sum of the revised values for distribution and gas-fired power plants, plus the original TSO figure for industry. The total consumption for those two days remain the same.

**Table 30:** Summary statistics by year of the total national consumption, and the consumption of industrial users, power generation users and residential and commercial users in the United Kingdom.

Year	Total (GWh/d)				Industrial users (GWh/d)			
	Min	Average	Max	Sum	Min	Average	Max	Sum
<b>2015</b>	880.18	1932.43	3728.80	705338.1	189.54	417.19	699.77	152272.6
<b>2016</b>	832.43	2199.68	3884.17	805081.4	241.97	623.89	1028.50	228345.4
<b>2017</b>	976.28	2154.39	4038.08	786350.6	196.20	593.54	980.08	216643.4
<b>2018</b>	820.68	2180.43	4415.74	795855.7	232.61	582.99	983.63	212791.6
<b>2019</b>	834.60	2155.18	4196.15	786641.2	208.03	591.20	1060.18	215788.1
<b>2020</b>	870.92	2035.11	3758.92	744848.7	202.23	489.75	973.84	179247.1

Year	Power Generation users (GWh/d)				Residential and Commercial users (GWh/d)			
	Min	Average	Max	Sum	Min	Ave	Max	Sum
<b>2015</b>	48.07	106.00	134.17	38690.15	484.29	1409.25	3027.69	514375.4
<b>2016</b>	71.26	111.41	142.77	40775.89	509.00	1464.37	2799.51	535960.1
<b>2017</b>	81.53	110.96	135.86	40499.00	536.50	1449.89	3116.34	529208.2
<b>2018</b>	70.86	108.67	135.75	39666.01	330.99	1488.76	3888.88	543398.1
<b>2019</b>	49.49	114.50	187.84	41792.14	466.68	1449.48	3155.99	529061.0
<b>2020</b>	77.72	132.76	233.79	48591.36	474.85	1412.60	2879.94	517010.2

Source: JRC, 2021.

(78) <https://www.nationalgrid.com>.

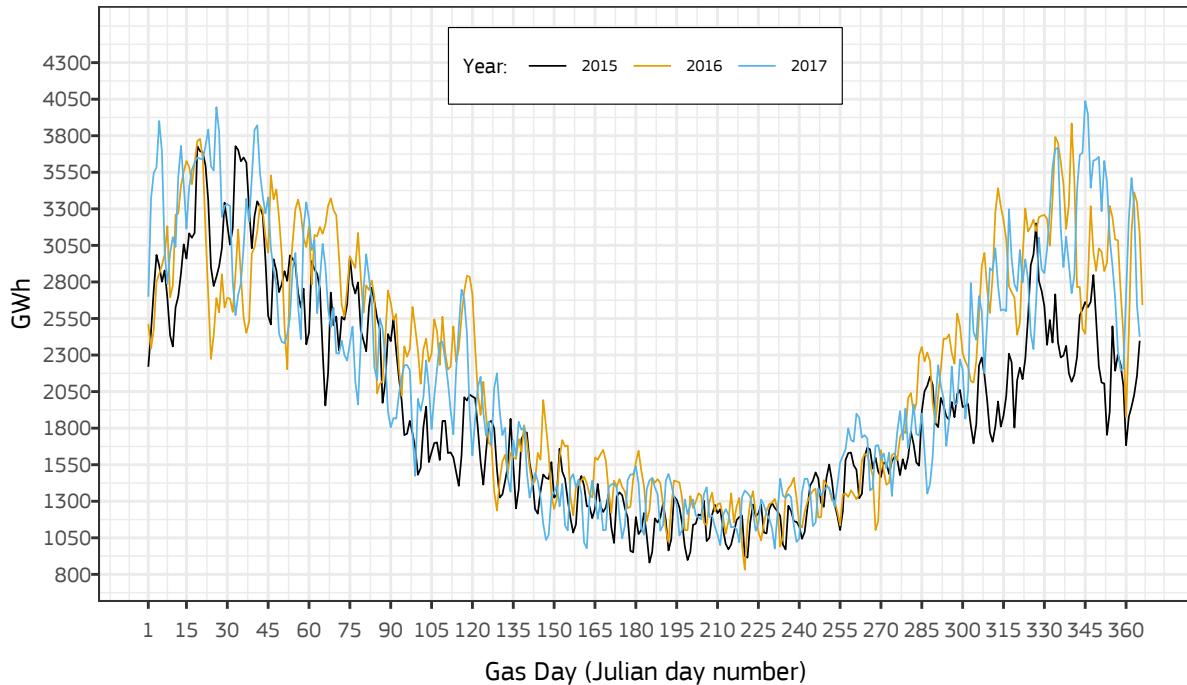
(79) <https://www.nationalgrid.com/uk/gas-transmission/data-and-operations/transmission-operational-data>.

(80) <https://www.nationalgrid.com/uk/gas-transmission/about-us/gas-transparency-requirements>.

**Figure 68:** Time series of the daily total consumption of natural gas in the United Kingdom between 2015 and 2020.

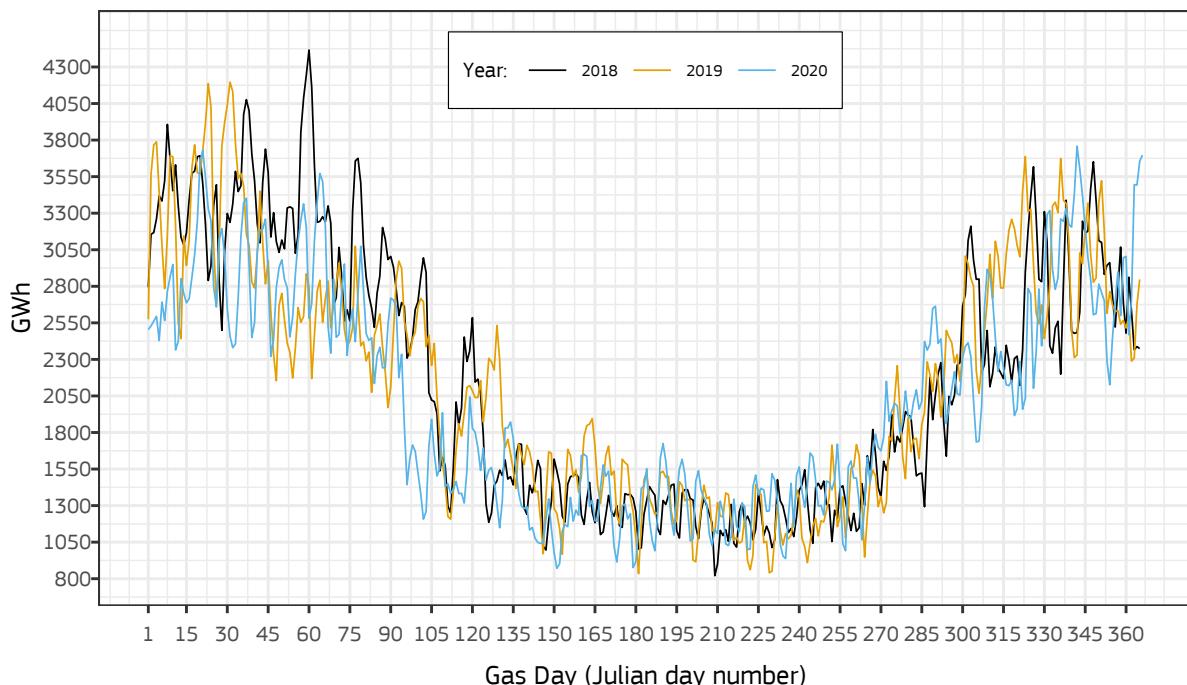
### United Kingdom

Historical national daily Consumption



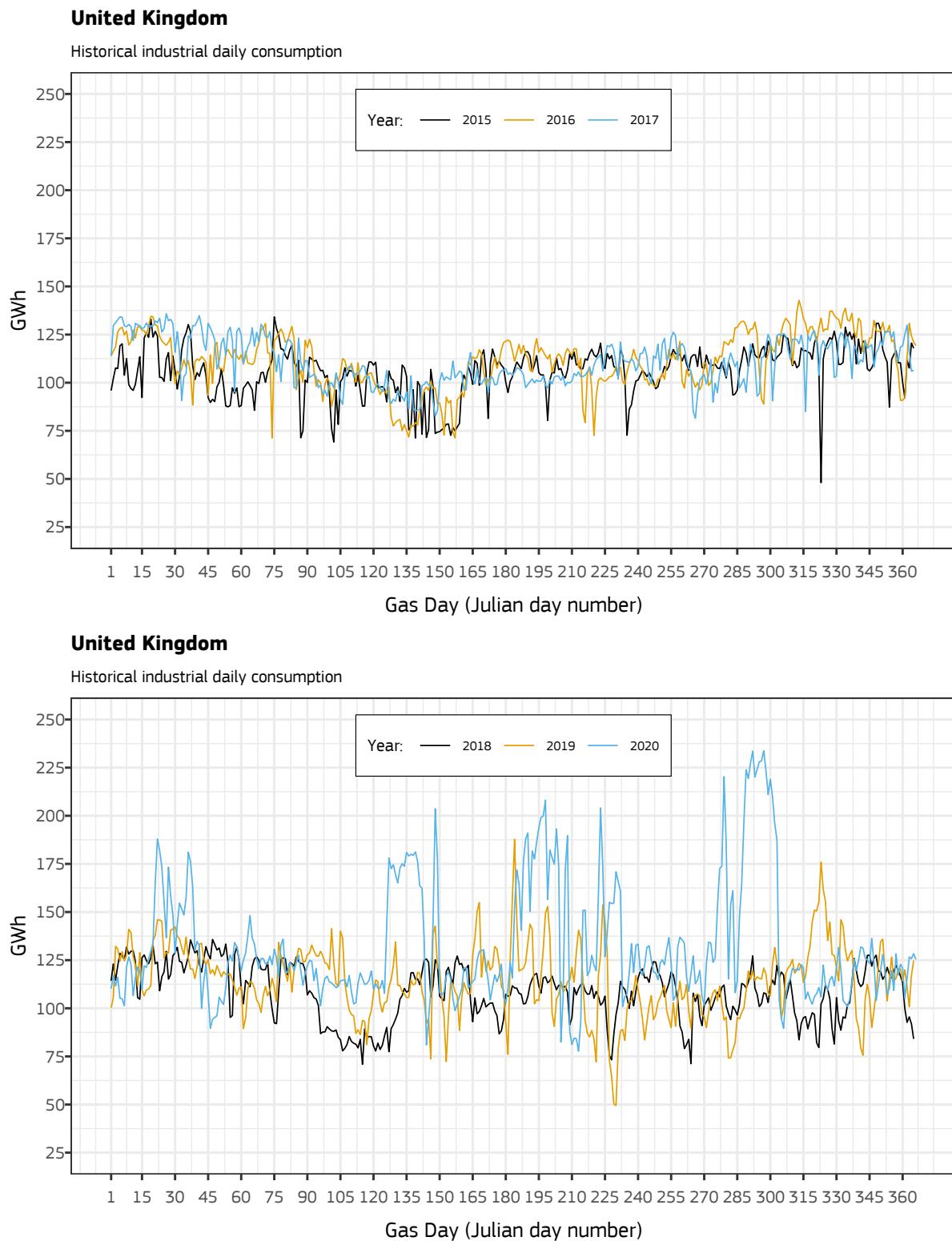
### United Kingdom

Historical national daily Consumption



Source: JRC, 2021.

**Figure 69:** Time series of the daily consumption of natural gas by industrial users in the United Kingdom between 2015 and 2020.

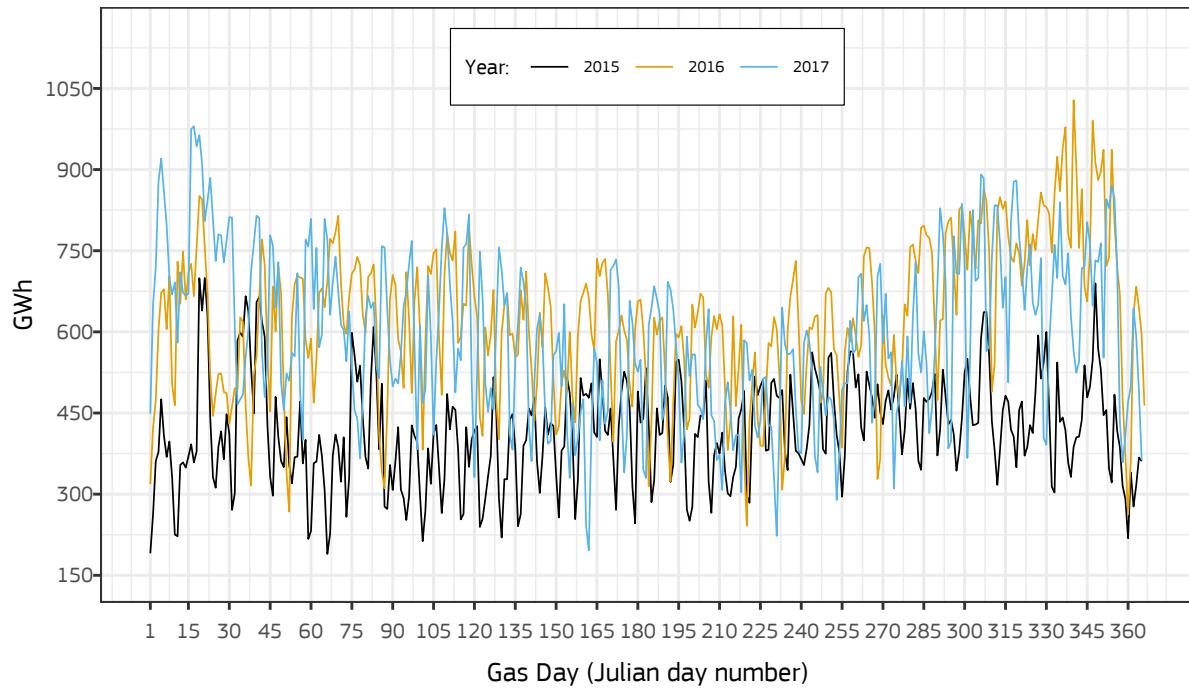


Source: JRC, 2021.

**Figure 70:** Time series of the daily consumption of natural gas by power generation users in the United Kingdom between 2015 and 2020.

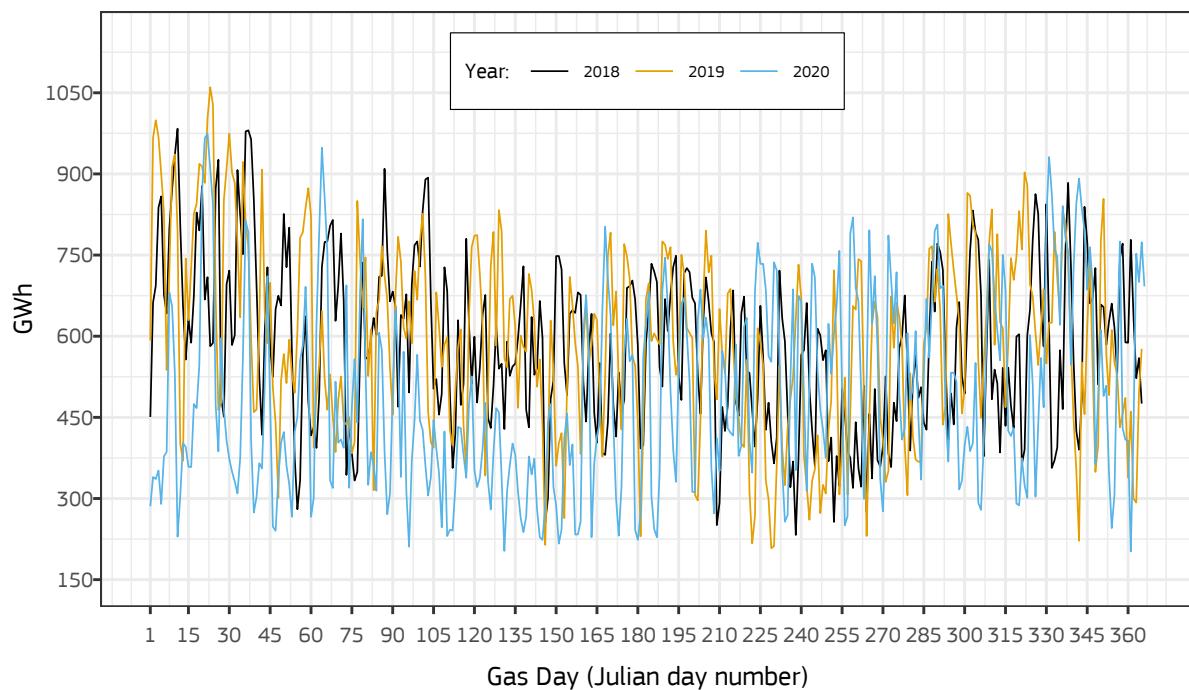
### United Kingdom

Historical power generation daily consumption



### United Kingdom

Historical power generation daily consumption

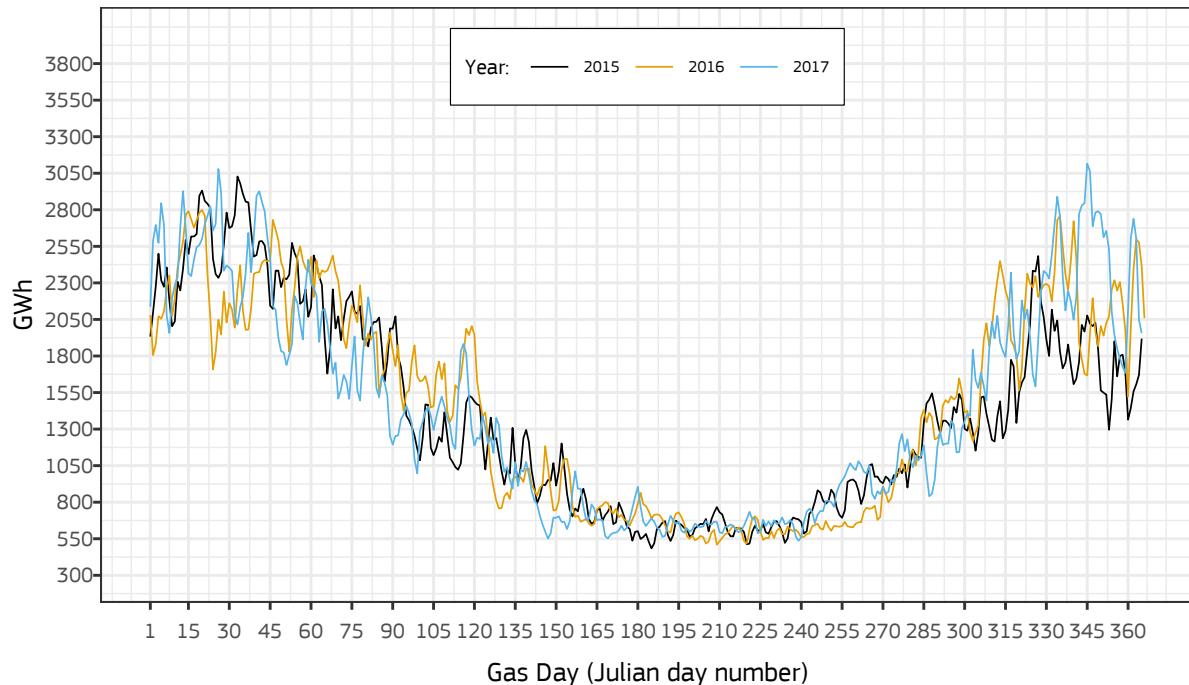


Source: JRC, 2021.

**Figure 71:** Time series of the daily consumption of natural gas by residential and commercial users in the United Kingdom between 2015 and 2020.

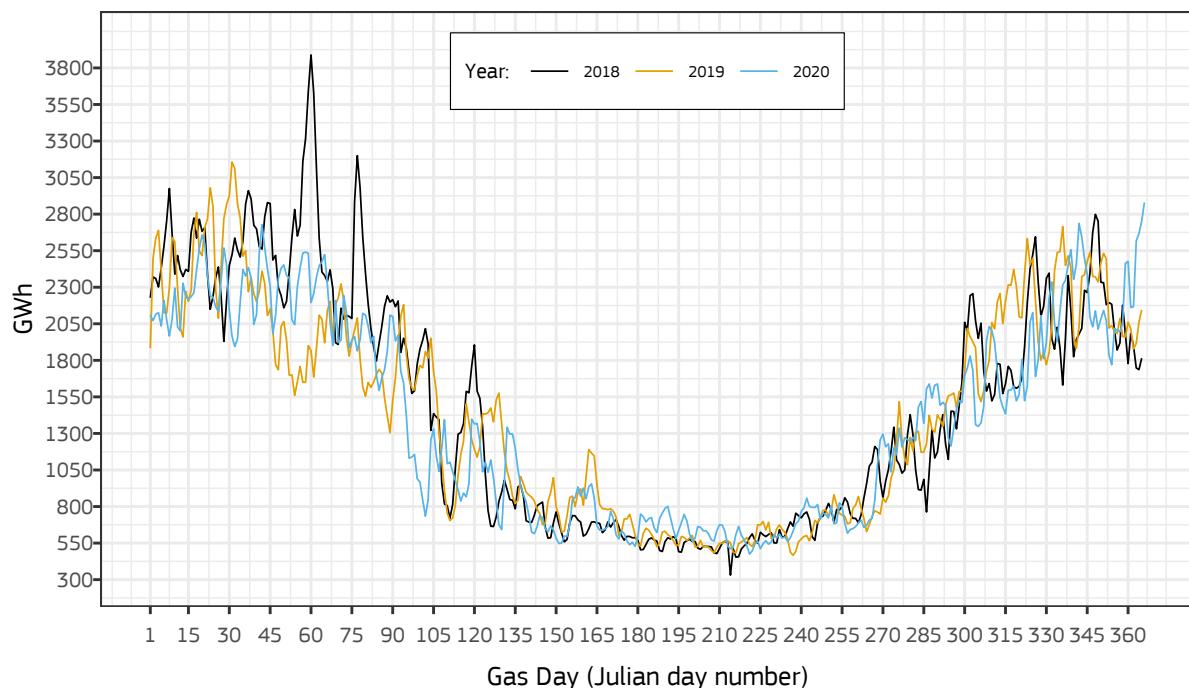
### United Kingdom

Historical residential and commercial daily consumption



### United Kingdom

Historical residential and commercial daily consumption



Source: JRC, 2021.

## 5 Conclusions

The report presents the first version of the “European Natural Gas Demand” (ENaGaD) database.

ENaGaD is designed to answer the needs of energy modellers seeking data to describe the daily national consumption of natural gas in the EU Member States and some European Countries. Fully based on publicly available data, ENaGaD facilitates energy modelling by centralising information and providing a coherent data set where basic data quality, conversion and checking have been already performed. ENaGaD is realised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>), providing the general public and researchers with a “free of charge tool” and the possibility of data reuse, provided appropriate credit is given and any changes are indicated.

A possible limitation of ENaGaD, as stressed at the end of section 4, is that it may not be able to fully capture all possible uses of natural gas in a country. For this specific purpose national statistical services, with sectoral statistics and energy balances, are better alternative data providers. But, a common limitation of the data available through such data providers is the lack of a “fine” time granularity. National statistical services may offer — generally — time series with monthly time steps. ENaGaD is structured for providing daily time series spanning from January 1 2015 to December 31 2020. This is a major defining characteristic of the database compared to the majority of official statistics.

Furthermore, ENaGaD tries to break down national daily consumption of natural gas into three main users categories: consumption of industrial users, consumption of power generation users and consumption of residential and commercial users. This option is not available for all Member States and Countries, but it stands out as another major feature of the database. In this respect, ENaGaD provides the most updated and close to a pan-European coverage data source for modelling consumption of natural gas, as well as its interactions with the national energy system for electricity and heat production. This shows the remarkable contribution of ENaGaD to integrated energy modelling at national or European level.

Future activities will improve the ENaGaD database by updating the national time series to 2021, further extending the breakdown by user categories to Member States and Countries to the cases for which such breakdown is missing, and by complementing daily consumption with ancillary information concerning the average daily temperature.

The ENaGaD database is available from the Joint Research Centre Data Catalogue at <https://data.jrc.ec.europa.eu/>. Use the name “ENaGaD” or the term “natural gas” to search the catalogue and to download the database. ENaGaD is also available from the data sharing platform Zenodo<sup>(81)</sup>. It can be found either by using the Zenodo search feature or by using the Zenodo DOI [10.5281/zenodo.5109726](https://doi.org/10.5281/zenodo.5109726).

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<sup>(81)</sup> <https://zenodo.org/>.

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## List of abbreviations and definitions

- ACER** Agency for the Cooperation of Energy Regulators
- AGSI+** Aggregated Gas Storage Inventory plus
- ALSI** Aggregated LNG Storage Inventory
- CET** Central European Time
- CSV** Comma Separated Values
- d** Day
- DOI** Digital Object Identifier
- ENaGaD** European Natural Gas Demand
- ENTSOG** European Network of Transmission System Operators for Gas
- GCV** Gross Calorific Value
- GIE** Gas Infrastructure Europe
- GTS** Gasunie Transport Service
- GWh** Giga-Watt hour
- ISO** International Organization for Standardization
- kPa** Kilo-Pascal
- kWh** Kilo-Watt hour
- LNG** Liquefied Natural Gas
- LDC** Local Distribution Companies
- LDZ** Local Demand Zone
- Max** Maximum value
- Min** Minimum value
- MJ** Mega-Joule
- NCG** NetConnect Germany
- PDC** Private Distribution Companies
- PDF** Portable Document Format
- REN** Redes Energéticas Nacionais
- RLM** “Registering Performance Measurement” users or “Registrierende LeistungsMessung”
- RLMmT** RLM users with load profiles with daily bands (‘mit Tagesband’)
- RLMoT** RLM users with load profiles without daily bands (‘ohne Tagesband’)
- SLP** Standard Load Profile or ‘Standardlastprofile’
- SLPanA** Analytical SLP or ‘analytisch Standardlastprofile’
- SLPsyn** Synthetic SLP or ‘synthetisch Standardlastprofile’
- SSO** Storage System Operator
- TIGF** Transport et Infrastructures Gaz France
- TSO** Transmission System Operator
- XML** Extensible Markup Language

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## Annexes

### Annex 1. R Code for tables and pictures

This report uses the language and environment for statistical computing R (R Core Team, 2020) to process the data. Tables were produced using the package “knitr” and “kableExtra” (Xie, 2015, Zhu, 2021). Charts were produced using the package “ggplot2” (Wickham, 2016). Tables and Charts were developed in “portable document format” (PDF) for a digital pdf version of the document. The following code can be used for generating the tables and pictures presented in the report. Depending on the specific Member State or Country, it requires some minor changes to consider the correct number of variables. The piping operator is from the package “magrittr” (Bache and Wickham, 2020).

```
DATA <- read.csv("Path to data", header=TRUE, skip= 19,
                 stringsAsFactors = FALSE, na.strings="NA")
DATA$GASDAY <- as.POSIXct(strptime(DATA$GASDAY, format="%Y-%m-%d",
                                    tz= "UTC"))
DATA$YEAR <- as.factor(DATA$YEAR)
#
TOTsum <- DATA %>% group_by(YEAR) %>% summarize(Min = min(TOT),
                                                       Ave = mean(TOT), Max = max(TOT), Sum = sum(TOT))
INDsum <- DATA %>% group_by(YEAR) %>% summarize(Min = min(IND),
                                                       Ave = mean(IND), Max = max(IND), Sum = sum(IND))
GPPsum <- DATA %>% group_by(YEAR) %>% summarize(Min = min(GPP),
                                                       Ave = mean(GPP), Max = max(GPP), Sum = sum(GPP))
DISsum <- DATA %>% group_by(YEAR) %>% summarize(Min = min(DIS),
                                                       Ave = mean(DIS), Max = max(DIS), Sum = sum(DIS))

combo1 <- bind_cols(TOTsum, INDsum[, -1])
combo2 <- bind_cols(GPPsum, DISsum[, -1])

CAPTION <- "Summary statistics by year of the total national consumption, and the
consumption of industrial users, power generation users and residential and
commercial users in COUNTRY NAME"
LABEL <- "COUNTRY CODE" # alpha two code from ISO 3166-1

kable(combo1, booktabs = TRUE, digits=2, col.names = c("Year", "Min", "Ave", "Max",
                                                       "Sum", "Min", "Ave", "Max", "Sum"), caption= CAPTION, label= LABEL) %>%
  column_spec(1, bold = T, width = "0.5cm") %>%
  column_spec(c(2:9), width = "1.4cm") %>%
  kable_classic_2(full_width = F) %>%
  add_header_above(c(" " = 1, "Total (GWh/d)" = 4, "Industrial users (GWh/d)" = 4),
                  bold=T) %>% kable_styling(latex_options = "hold_position")

kable(combo2, booktabs = TRUE, digits=2, col.names = c("Year", "Min", "Ave", "Max",
                                                       "Sum", "Min", "Ave", "Max", "Sum")) %>%
  column_spec(1, bold = T, width = "0.5cm") %>%
  column_spec(c(2:9), width = "1.4cm") %>%
  kable_classic_2(full_width = F) %>%
  add_header_above(c(" " = 1, "Power Generation users (GWh/d)" = 4, "Residential and
  Commercial users (GWh/d)" = 4), bold=T) %>%
  kable_styling(latex_options = "hold_position")

Palette3 <- c("#000000", "#E69F00", "#56B4E9") # Colour palette
MS <- "NAME OF COUNTRY"
DATAtmp <- DATA[1:1096,] # From 2015 to 2017, alternatively DATA[1097:2192,]
DATAtmp$YEAR <- as.factor(DATAtmp$YEAR)

Plot.1 <- ggplot(DATAtmp, aes(x = JULIANDAY, y = TOT, col = YEAR)) +
  geom_line(size = 0.3) +
```

```

scale_x_continuous(name = "Gas Day (Julian day number)",
                   breaks=c(1, seq(15, 360, by = 15))) +
scale_y_continuous(name= "GWh", breaks = c(seq(50, 400.0, by=50)),
                   limits= c(50, 400)) +
labs(title= MS, subtitle= "Historical national daily Consumption", color= "Year: ") +
scale_colour_manual(values=Palette3) +
theme_bw() +
theme( #text = element_text(family = "EC Square Sans Pro", size = 8),
      plot.title = element_text(                                #title
                                 family = "EC Square Sans Pro", #set font family
                                 size = 10,                  #set font size
                                 face = 'bold',              #bold typeface
                                 hjust = 0,                  #left align
                                 vjust = 2),                 #raise slightly
      plot.subtitle = element_text(                            #subtitle
                                 family = "EC Square Sans Pro", #font family
                                 size = 8),                  #font size
      plot.caption = element_text(                           #caption
                                 family = "EC Square Sans Pro", #font family
                                 size = 10,                  #font size
                                 hjust = 1),                 #right align
      axis.title = element_text(                           #axis titles
                                 family = "EC Square Sans Pro", #font family
                                 size = 10),                 #font size
      axis.text = element_text(                           #axis text
                                 family = "EC Square Sans Pro", #axis family
                                 size = 8),                  #font size
      axis.text.x = element_text(                         #margin for axis text
                                 family = "EC Square Sans Pro", #font family
                                 margin=margin(5, b = 5),
                                 size = 8),                  #font size
      axis.text.y = element_text(                         #margin for axis text
                                 family = "EC Square Sans Pro", #font family
                                 margin=margin(5, b = 5),
                                 size = 8),                  #font size
      legend.text = element_text(                         #font size
                                 family = "EC Square Sans Pro", #font family
                                 size = 6),                  #font size
      legend.title = element_text(                        #font size
                                 family = "EC Square Sans Pro", #font family
                                 size = 8),                  #font size
      legend.position = c(0.5, 0.9), legend.direction="horizontal",
      legend.background = element_rect(fill="white",
                                         size=0.2, linetype="solid",
                                         colour ="black"))

ggsave("NAME OF FILE.pdf", Plot.1 , device="pdf", path="WHERE TO SAVE",
       units="cm", width=16, height=5)

```

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