



COMMISSION
DE RÉGULATION
DE L'ÉNERGIE

SURVEILLANCE

REPORT 2020

The functioning of the
wholesale electricity
and natural gas
markets

CONTENTS

MESSAGE FROM THE PRESIDENT OF CRE.....	5
SUMMARY	6
SECTION 1 CRE WHOLESALE MARKET SURVEILLANCE	12
1. CRE WHOLESALE MARKET SURVEILLANCE UNDER THE REMIT REGULATION FRAMEWORK IN 2020.....	13
1.1.STATISTICS BY SOURCE OF DETECTION OF POTENTIALLY SUSPICIOUS BEHAVIOURS	13
1.2.SPECIFIC SURVEILLANCE CONTEXT DURING THE COVID PERIOD IMPACTED BY THE HEALTH CRISIS.....	15
1.3.SURVEILLANCE OF PRACTICES RELATED TO MANAGING INSIDE INFORMATION.....	15
1.4.SUPPORT FOR ENTITIES ORGANIZING TRANSACTIONS (EXCHANGES, BROKERS, ETC.) IN THEIR SURVEILLANCE MISSION.....	17
1.5.REGISTRATION OF MARKET PARTICIPANTS.....	18
1.6.CRE'S OPENNESS TO THE OPEN DATA AND OPEN SOURCE COMMUNITIES	19
2. INVESTIGATIONS AND SANCTIONS FOR REMIT REGULATION BREACHES	20
2.1.INVESTIGATIONS CONDUCTED BY CRE.....	20
2.2.SUMMARY OF THE KEY DECISIONS SANCTIONING BREACHES OF THE REMIT REGULATION PRONOUNCED BY REGULATORS IN THE EUROPEAN UNION	21
2.3.CRE ACTIVELY PARTICIPATES IN THE INTER-IAA COOPERATION	23
3. WHOLESALE MARKET SURVEILLANCE AT EUROPEAN LEVEL	23
3.1.CHANGES IN ACER NON-BINDING GUIDANCE	24
3.2.FEES OWED TO ACER UNDER THE REMIT REGULATION.....	25
3.3.DATA QUALITY: A KEY ISSUE FOR MARKET SURVEILLANCE	25
3.4.REMIT AND THE UNITED KINGDOM'S EXIT FROM THE EUROPEAN UNION.....	25
SECTION 2 THE ENERGY MARKET CONTEXT.....	27
1. THE IMPACT OF THE HEALTH CRISIS ON THE GLOBAL ECONOMY.....	28
2. COMMODITY PRICES: SHARP FALL DURING THE HEALTH CRISIS AND STRONG RECOVERY AT THE END OF THE YEAR	28
3. THE PRICE OF CO₂ EMISSION ALLOWANCES ENDED ON A SHARP RISE	29
4. 2020, THE HOTTEST YEAR IN FRANCE SINCE THE BEGINNING OF THE 20TH CENTURY	30
SECTION 3 WHOLESALE ELECTRICITY MARKETS.....	32
1. CHANGES TO SUPPLY AND DEMAND IN FRANCE, IN 2020	33
1.1.THE IMPACT OF THE HEALTH CRISIS ON CONSUMPTION.....	34
1.2.THE AVAILABILITY OF NUCLEAR POWER FACILITIES SERIOUSLY DISRUPTED BY THE HEALTH CRISIS	35
1.3.CHANGE IN INSTALLED CAPACITIES: WIND AND SOLAR ENERGY CONTINUE TO GROW	39
1.4.HYDRAULIC PRODUCTION IN 2020 BENEFITED FROM HIGH STOCKS AT THE END OF 2019 AND NORMAL RAINFALL.....	42
1.5.THE PRODUCTION OF THE GAS SECTOR DECREASED GIVEN THE DROP IN CONSUMPTION AND THE UNFAVOURABLE ECONOMIC ENVIRONMENT.....	42
1.6.THE CONTRIBUTION OF COAL-FIRED POWER FACILITIES TO THE FRENCH ENERGY MIX IS DECREASING, IN LINE WITH THE GRADUAL WITHDRAWAL OF THIS SECTOR FROM THE NATIONAL MIX.....	44
1.7.MARGINALITY OF THE VARIOUS PRODUCTION SECTORS IN 2020	44
2. WHOLESALE ELECTRICITY PRICES.....	47
2.1.THE SPOT PRICE COLLAPSED DURING THE HEALTH CRISIS AND FELL BY 18% ON AVERAGE IN 2020	47
2.2.DIFFERENCE BETWEEN SPOT PRICES AND EDF MARGINAL COSTS IN 2020.....	49

2.3.CONVERGENCE OF FRENCH SPOT PRICES WITH NEIGHBOURING COUNTRIES.....	49
2.4.FUTURES PRICES IN FRANCE AND EUROPE	51
3. CHANGES TO VOLUMES TRADED ON THE WHOLESALE MARKET	57
4. BALANCING MARKETS AND THEIR SURVEILLANCE BY THE CRE	60
4.1.RECAP OF THE GENERAL OPERATING PRINCIPLES FOR BALANCING MARKETS AND CHANGES TO COME....	60
4.2.REVIEW OF BALANCING MARKETS IN 2020.....	61
4.3.CRE'S SURVEILLANCE OF THE ADJUSTMENT MECHANISM.....	63
5. THE CAPACITY GUARANTEE MARKET AND CRE SURVEILLANCE	64
5.1.THE DECLINE IN NUCLEAR AVAILABILITY AS A RESULT OF THE HEALTH CRISIS HAS SIGNIFICANTLY ALTERED THE FUNDAMENTALS OF THE CAPACITY MARKET.....	64
5.2.STRUCTURAL CHANGES TO THE CAPACITY MECHANISM WILL BE IMPLEMENTED FOLLOWING RTE'S FEEDBACK.....	67
5.3.CAPACITY MECHANISM REVIEW.....	67
6. MAIN TAKEAWAYS ON THE FUNCTIONNING OF THE ELECTRICITY MARKET IN 2020	68
SECTION 4 WHOLESALE NATURAL GAS MARKETS.....	69
1. TRENDS IN THE WHOLESALE GAS MARKET IN 2020	70
1.1.BALANCE IN THE FRENCH SYSTEM.....	70
1.2.A DROP IN CONSUMPTION DUE TO ECONOMIC ACTIVITY WEAKENED BY THE HEALTH CRISIS	71
1.3.STORAGE LEVELS HIGHER THAN THE PREVIOUS FIVE YEARS FOR MOST OF THE YEAR.....	73
1.4.LNG IMPORTS REMAINED AT A HIGH LEVEL	73
1.5.DECLINE IN PIPELINE IMPORTS AND EXPORTS	77
1.6.A LOW LEVEL OF CONGESTION IN 2020	78
2. 2020 WAS AN EXCEPTIONAL YEAR FOR NATURAL GAS PRICES	79
2.1.COLLAPSE OF SHORT-TERM PRICES WITH THE HEALTH CRISIS AND STRONG REBOUND AT YEAR END	79
2.2.FALLING FUTURES PRICES GIVEN THE UNCERTAINTY OF ECONOMIC RECOVERY	81
2.3.CONTINUED STRONG DEMAND FOR STORAGE INJECTION	82
3. INCREASE IN VOLUMES TRADED ON WHOLESALE MARKETS IN FRANCE IN 2020 PURSUED	82
4. MAIN TAKEAWAYS ON THE FUNCTIONNING OF WHOLESALE NATURAL GAS MARKET IN FRANCE IN 2020.....	85
KEY FIGURES.....	86
1. THE ELECTRICITY MARKET	86
2. THE GAS MARKET	89

MESSAGE FROM THE PRESIDENT OF CRE

The mission of wholesale energy markets surveillance is a vital pillar of the trust in the proper functioning of these markets by the market operators and, more broadly, the stakeholders of the energy sector. This mission has been entrusted to CRE by French law since 2006 and, since 2011, it has been carried out within the framework of the European REMIT Regulation on the integrity and transparency of wholesale markets. Wholesale market surveillance has reached maturity, in particular through sanction decisions taken by CRE's Dispute Settlement and Sanctions Committee (CoRDIS) concerning breaches of the REMIT Regulation in 2018 and 2019.

In this respect, it would be an oversight not to mention an event marking a turning point in the practical implementation of the REMIT Regulation in France: in June 2021, the French Council of State confirmed the legality of the 2018 sanction decision. As such, the judge confirmed the legality of the investigation conducted by CRE staff prior to the referral to CoRDIS and ruled that CoRDIS had rightly decided that the company in question had engaged in market manipulation, justifying the financial penalty imposed. I welcome the positive outcome of this case, which confirms that the surveillance of wholesale markets and the sanction procedure are legally sound.

Above and beyond its national focus, wholesale market surveillance is also a European issue. CRE is heavily involved in the European work and projects carried out with all the energy regulators and coordinated by ACER, aimed at establishing shared principles for the operational implementation and interpretation of REMIT, as well as at harmonizing surveillance practices and making them more effective.

This 14th edition of CRE's annual surveillance report on the wholesale electricity and natural gas markets covers 2020, which was marked by extraordinary events, with the COVID-19 pandemic and the lockdown measures decided in France and in most countries. These measures had a significant impact on the energy markets, both directly, through a very sharp drop in consumption and wholesale prices, particularly during the first lockdown, and indirectly, by disrupting the management of the nuclear production facilities, with major consequences for security of supply for the winter of 2020-2021.

Despite this highly specific context, wholesale electricity and gas markets did not suffer any notable malfunction and fulfilled their function of setting energy prices by efficiently matching supply and demand. CRE maintained its surveillance during this highly specific period and, in particular, ensured the quality of the information published about the availability of electricity generation facilities.

In the first half of 2020, the decline in demand due to the health crisis led to a sharp fall in electricity and gas prices. However, concerns about the supply-demand balance for the winter of 2020-2021 came to the fore rapidly for electricity and led to higher futures prices over this period. As the year drew to a close, the prospect of the end of the pandemic and the economic recovery led to an overall increase in commodity and energy prices.

Continuing the upward trend that began at the end of 2020, the beginning of 2021 saw a spectacular rise in commodity prices, CO₂ emission allowances and, consequently, electricity. CRE's observations on these price changes are not developed on in this report, which focuses mainly on 2020. This price increase will, nonetheless, have direct and strong consequences on the prices paid by consumers; this context further underscores the importance of the surveillance of the wholesale markets undertaken by CRE, which aims to ensure that energy price movements reflect the fundamentals. This is one of the core conditions for stakeholder confidence in the efficiency of the energy system, for the benefit of consumers.

Jean-François CARENCO,
President of CRE

SUMMARY

2020 was marked by the health crisis linked to the COVID-19 pandemic, which gave rise to highly-specific conditions on many fronts. Consumption was strongly impacted by the lockdown measures, pulling prices down and disrupting nuclear generation facilities management in France in particular over the short term but also over the longer term with cascading effects on maintenance programmes. At a global level, commodity prices experienced a period of sharp decline, with a recovery beginning at the end of the year against a more optimistic backdrop relating to the end of the epidemic and a global economic recovery.

In light of this, CRE's wholesale market surveillance is thus of great importance. CRE in particular monitored the quality of publications concerning the availability of French electricity generation facilities, given the high impact of these publications on electricity prices in 2020.

Moreover and, despite this highly-specific situation, no malfunction was observed in the operation of the electricity and gas markets in France in 2020, which fulfilled their function of setting energy prices without interruption.

CRE reinforces the surveillance of the wholesale markets, in close cooperation with ACER and the other European regulators

The extent of CRE's surveillance role within the REMIT Regulation covers 5.2 million transactions made in 2020 in the wholesale energy markets, equivalent to 1,800 TWh traded, valued at more than €52bn. Some thirty cases are currently subject to in-depth analysis.

At the end of 2020, CRE departments had four investigations underway, two of which were closed, respectively through a finding of non-breach and for statute of limitations. Two other investigations, which had previously been subject of a referral to CoRDIS, were being examined by the latter.

CRE uses internal detection tools to identify possible cases of market abuse, but also notifications of suspicions received from various sources, especially from persons professionally arranging transactions (PPATs) who, as organizers of trading operations on their platforms, are a valuable source of information.

Pursuant to Article 15 of the REMIT Regulation, PPATs have the obligation to notify the national regulatory authority without delay if they have reason to suspect a breach of Articles 3 or 5 of the REMIT Regulation. CRE considers the surveillance activities which PPATs carry out as indispensable and maintains active collaboration with them, which it strengthened and expanded in 2020.

In 2020, CRE analysed the publications relating to the unavailability of electricity generation facilities thoroughly, in particular as regards the lead times in which inside information was published by market participants within the framework of normal operation and during the period impacted by the health crisis. The lead times of certain publications led to the opening of investigations at the beginning of 2021.

Furthermore, in 2020, CRE departments conducted a study on the sensitivity of the French electricity market price as regards the publication of the unavailability of production facilities in France. This study provides quantitative information on the average sensitivity of the intraday price of electricity in France as regards the publication of inside information and will be published by CRE in the second half of 2021.

Cooperation set up in 2019 with other independent French administrative authorities continued in 2020, in particular on initiating general investigative, but also "reinforced" powers, involving on-site visits and seizures. These discussions between independent administrative authorities enable CRE to question its practices and innovate.

CRE attaches great importance to European work and projects as regards implementing common surveillance rules and practices within the European Union. To this end, CRE is actively involved in the European working groups and forums relating to REMIT in close collaboration with ACER, as well as with the energy regulators of the other Member States of the European Union and the financial and competition authorities.

This work, coordinated by ACER, resulted in several publications in 2020. In particular, the 5th edition of the ACER Guidance on the application of the REMIT Regulation provides specific guidance on qualifying and managing inside information, as well as on the practice referred to as capacity withholding.

Data quality: a key issue in market surveillance; the REMIT fees collected by ACER

The quality of transactional and fundamental data is vital to conduct wholesale market surveillance. As such, CRE is actively involved in ACER's work on data quality and, in conjunction with the other European authorities, has helped define the key components to improve harmonization of data reporting as well as quality and completeness

tests. This work led to a publication by ACER on data reporting on 30 June 2020 and a new open letter on data quality on 22 October 2020¹.

Teleworking conditions imposed by the health crisis have slowed down the work undertaken by ACER, as well as by the other regulators, on improving the centralized collection of data pursuant to Article 8 of the REMIT Regulation and its use for surveillance activities. As long as this work to improve data quality has not been completed, CRE will maintain its national data collection system from the organized marketplaces (exchanges and brokers), to avoid any discontinuity or interruption in CRE surveillance.

Moreover, from 2021, fees are due to ACER for the collection, management, processing and analysis of the information communicated pursuant to Article 8 of the REMIT Regulation. Their implementation from 1st January 2021 was specified by European Commission Decision 2020/2152 of 17 December 2020.

The fee is levied on market participants reporting information to ACER on their behalf, as well as entities reporting information on behalf of third parties (the *Registered Reporting Mechanism* or *RRM*). On 17 December 2020, ACER also published a Q&A document on these new fees².

The health crisis, combined with the geopolitical situation, impacted commodity prices during 2020, which was also the warmest year recorded in France since the beginning of the 20th century

The COVID-19 epidemic and the lockdowns decided to curb it have impacted the global economy greatly. At the beginning of the year, the drop in global demand led to a fall in commodity prices, particularly oil. This was further exacerbated by disagreements between oil-producing countries about cutting production. In April, American oil even recorded negative prices for a short period.

Commodity prices then recovered slightly, although this was marked by uncertainty about the end of the epidemic and the recovery of the global economy. At the end of the year, a sharp rise began, in particular with the prospect of the arrival of vaccines and global economic recovery.

The price of CO₂ emission allowances, also impacted in March by the health crisis, ended the year with a sharp increase, reaching €33.4/tCO₂. 2020 was marked by the end of the third phase of the European Emissions Trading Scheme (EU ETS), and the fourth phase, initiated in 2021, confirms the European ambition with an acceleration of the annual reduction of emissions caps. As such, in spite of the economic slowdown in 2020 due to the health crisis, the carbon market remains a key tool for decarbonization in the European Union.

Finally, 2020 was once again marked by record temperatures, after those of 2018 and 2019, and was the warmest year observed in France since 1900. These particularly mild temperatures lowered the electricity and gas consumption.

Electricity prices fell sharply during and after the first lockdown, but the drop in the availability of nuclear generation facilities resulted in strain in the 2nd half of the year

The first lockdown in France, from 17 March to 11 May 2020, impacted electricity consumption considerably, which recorded drops of up to 20% less than normal. The drop in consumption, but also the lockdown measures themselves, disrupted the maintenance programme of generation facilities, in particular nuclear, with consequences in the short term but also over the longer term, raising fears about security of supply for winter 2020-2021.

Given the declining consumption, electricity production had to adapt. Weak demand and high wind and photovoltaic generation (7.7 TWh between 17 March and 11 May instead of 6.5 TWh over the same period in 2019) led to less use of thermal resources, whose production fell by 53% compared with the same period the previous year. Nuclear production fell by 18% to its historical minimum for the same period. This new balance of supply and demand and the sharp drop in commodity prices led to a very sharp fall in electricity prices on the spot markets: the average day-ahead price in France over this period was €15.3/MWh (€37.8/MWh in 2019). Short-term electricity and gas prices remained at low levels throughout the first half of the year, at an average of €23.7/MWh (€41.1/MWh in 2019), due to lower consumption and low commodity prices.

In the second half of the year, a certain amount of strain was seen, with short-term prices being driven up by low availability of nuclear power, anti-cyclonic periods reducing wind production in Europe and the general rise in commodity prices at the end of the year against a backdrop of optimism about the end of the pandemic and the global economic recovery. As such, the spot was above €100/MWh for 6h and reached up to €200/MWh (level not reached since November 2018). The average spot price in December 2020 was €48.4/MWh, the highest monthly average

¹ https://documents.acer-remit.eu/wp-content/uploads/20201022_Fourth-Open-Letter-on-REMIT-data-quality.pdf

² https://documents.acer-remit.eu/wp-content/uploads/REMIT_24th_edition_QA_v1.pdf

price since January 2019 (at €61.2/MWh). Consumption was less impacted in the second half of the year, remaining 2-4% below normal.

Electricity futures prices initially fell, driven mainly by lower commodity prices. The 2021 calendar product price, which stood at €45.7/MWh on 2 January 2020, fell to €37.4/MWh on 18 March. Prices then became particularly sensitive to EDF's announcements concerning the availability of nuclear generation facilities. As such, the "cascading" disruptions of scheduled maintenance on nuclear facilities led to concerns about the supply-demand balance in the winter of 2020-2021, resulting in a rise in futures prices for this period. On 30 June, the 2021 calendar product reached €48.7/MWh. From the summer onwards, the improvement in availability forecast for the winter eased this strain. At the end of the year, the overall rise in commodity prices and CO₂ allowances contributed to a further increase in futures prices. As such, between 20 November and 28 December 2020, the 2021 calendar product increased by 39%, rising from €42.0/MWh to €53.2/MWh.

Electricity balancing markets are developing fast

Electricity balancing markets experienced significant changes in 2020. After the Frequency containment reserve (FCR) switched to daily tenders in 2019, product granularity was increased with the introduction of four-hour products on 1st July 2020. Moreover, since 2 December 2020, RTE has been using the RR (replacement reserve) exchange platform alongside its "balancing mechanism" to meet its balancing needs.

European balancing market integration will continue in 2021 and 2022. The secondary reserve (aFRR) will evolve towards market mechanisms, and tertiary reserve (mFRR) contracting will be closer to real time. These changes will lead to the development of new markets, which will need to be monitored accordingly.

The capacity mechanism subject to strain on the system given the health crisis context; a structural architectural change must be envisaged

As the health crisis impacted the availability of electricity generation facilities, the prices of capacity auctions in 2020 reached very high levels: almost €48K/MW for the 2021 delivery year and €54K/MWh for the 2020 delivery year. Prices subsequently fell as a result of more optimistic announcements by RTE on security of supply. The overall balance of the mechanism for 2020 is not yet known, as the final calculation of obligations takes place three years after the delivery year.

For the winter of 2020-2021, by way of exception, RTE proposed to make certain provisions of the capacity mechanism more flexible in order to encourage operators of generation and load-shedding capacities to maximize their availability during this period, and these proposals were approved by CRE decision dated 10 September 2020.

In any case, CRE is conducting an in-depth analysis of the 2020 price increase to ensure it reflects market fundamentals.

CRE is also satisfied that RTE analysed the feedback on the mechanism in 2020, with the aim of assessing the mechanism and providing input for discussions on its architecture and practical implementation.

Against this background, CRE reiterates the criticisms made in its 2018 and 2019 wholesale market surveillance reports regarding the current architecture of the capacity market.

On the gas markets, the drop in demand led to short-term prices plummeting, with a high convergence level of European prices and a further increase in volumes traded in France

The health crisis led to a real collapse in short-term gas prices from March 2020. Day-ahead and month M+1 products remained below €6/MWh for several months, with lows of €2.9/MWh on 21 May for day-ahead and €3.4/MWh on 28 May for June 2020. Such low levels of prices had not been seen in Europe for over 10 years.

In spite of these strong disruptions, PEG and TTF spot prices, as well as in a large part of north-western Europe, showed very good convergence in 2020, with decreasing spread compared to 2019.

At the end of 2020, gas prices started to return to normal, with the month-ahead price ending the year at €18.9/MWh.

The calendar futures product experienced similar but smaller variations. It began the year at €16.3/MWh, bottomed out at €11.8/MWh on 1st June, and ended the year at €16.9/MWh.

The increase in volumes traded in France continued compared to 2019, reflecting the proper functioning of France's single market area.

This report concerns data for the 2020 calendar year. Where appropriate, the key events from surveillance activities during the first few months of the year 2021 are also given.

CRE and REMIT: Market surveillance, a European concern

The French Energy Regulatory Commission (CRE) has been tasked with monitoring the French wholesale electricity and natural gas markets since 2006. Each year, it publishes a surveillance report on French wholesale electricity and natural gas market operations, as well as its wholesale market quarterly reports.

Since 28 December 2011, CRE's role in monitoring the wholesale energy markets has been subject to European Regulation 1227/2011 of the European Parliament and of the Council of 25 October 2011 on the wholesale energy market integrity and transparency (REMIT).

Pursuant to the provisions of Article L. 131-2 of the French Energy Code, CRE monitors the wholesale electricity and natural gas markets and enforces compliance, in particular, with Articles 3, 4, 5, 8, 9 and 15 of the REMIT Regulation.

As such, CRE pays special attention to the provisions ensuring wholesale energy market integrity and transparency by:

- prohibiting market manipulations and insider trading (Articles 3 and 5);
- requiring market participants to disclose any inside information at their disposal (Article 4).

CRE also strives to ensure that persons professionally arranging transactions (PPAT)³ comply with their obligations to detect and report potential insider trading or market manipulations pertaining to Article 15 of the REMIT Regulation.

Finally, the application of specific articles of the REMIT Regulation has been extended to the French capacity guarantees market. Pursuant to Article L.131-2 of the French Energy Code, CRE ensures compliance with the prohibition of insider trading (Article 3), the obligation to disclose all inside information (Article 4) and the ban on market manipulation (Article 5) relating to the capacity liability mechanism.

At European level, the implementation of the REMIT Regulation is governed by provisions under Article 16 of the REMIT Regulation which provides, in particular, for cooperation between ACER, the European Securities and Markets Authority (ESMA), other European Union Members State energy regulators, as well as the financial and competition authorities.

³PPAT: *Persons Professionally Arranging Transactions*.

CRE's activities in 2020 as part of its surveillance role



5.2 million transactions monitored

1,826 TWh traded

Over €52bn in traded value



394 alerts received from ACER since October 2017

Some thirty cases currently being analyzed

1,538 market participants registered with CRE



2 investigations underway

2 investigations closed

2 investigations currently examined by CoRDIS

The French wholesale market in 2020

Electricity price



€32.2/MWh average spot prices, i.e. -18% compared to 2019

€44.9/MWh average annual futures prices, i.e. -12% compared to 2019

Natural gas price



€9.3/MWh average spot prices, i.e. -31% compared to 2019

€13.4/MWh average annual futures prices, i.e. -27% compared to 2019

SECTION 1
CRE WHOLESALE MARKET SURVEILLANCE

1. CRE WHOLESALE MARKET SURVEILLANCE UNDER THE REMIT REGULATION FRAMEWORK IN 2020

CRE carries out its surveillance role by monitoring general developments on the energy markets, in particular during specific events, and by analysing the individual actions of market participants in order to detect abnormal behaviour that may constitute a suspected breach of the REMIT Regulation.

CRE's surveillance powers over the wholesale energy markets are pursuant to the French Energy Code and the REMIT Regulation. Pursuant to the French Energy Code, CRE monitors, in particular, operations undertaken on the wholesale electricity, natural gas and capacity guarantees markets. As such, it detects any unusual events or behaviour that could constitute a breach of the REMIT Regulation.

To achieve this objective, over the past few years, CRE has set up channels for collecting data from exchanges, brokers, network operators, storage operators, but also from some of the market participants. Since 2016, CRE's information sources have been supplemented by data collected by ACER at European level.

In 2020, the scope monitored by CRE within the REMIT framework represented 5.2 million transactions on the wholesale energy markets, i.e. the equivalent of 1,826 TWh traded, worth more than €52bn.

During 2020, CRE received 34 alerts from ACER regarding potentially suspicious behaviour from a total of 394 alerts received from ACER between October 2017 and March 2020. CRE is currently analysing some thirty cases of suspicious behaviour detected by other sources than ACER alerts.

1.1. Statistics by source of detection of potentially suspicious behaviours

CRE's surveillance activities are based on ex-post detection of potentially suspicious behaviour, either through internal detection tools or from reports sent by external parties.

Internal detection is based on monitoring market conditions, as well as on tools aimed at monitoring market segments to detect specific scenarios and behaviour of market participants.

External detection is based on the reports of suspicions received by various sources, including, first and foremost, PPATs, which, as organizers of trading operations on their platforms⁴, represent a valuable source of information for CRE. Pursuant to Article 15 of the REMIT Regulation, PPATs have the obligation to notify the national regulatory authority without delay if they have reason to suspect a breach of Articles 3 or 5 of the REMIT Regulation.

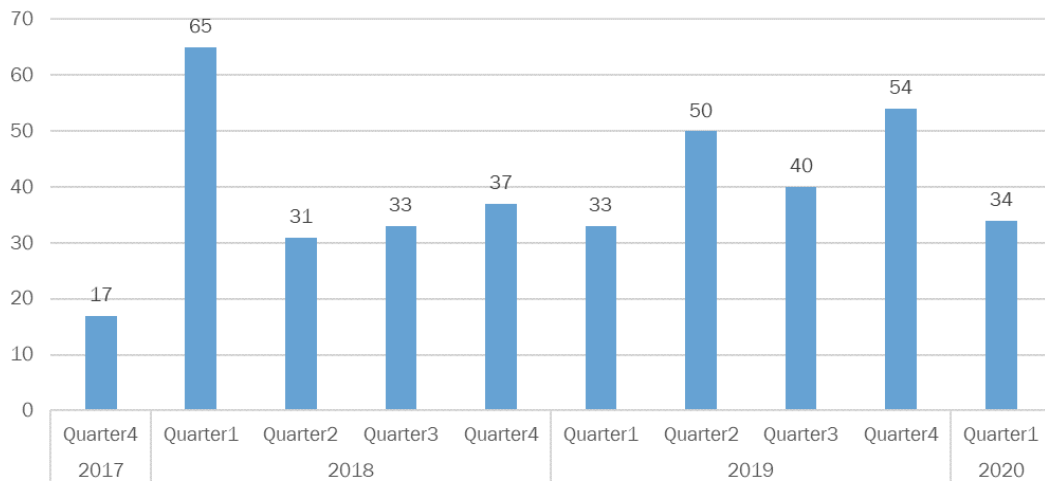
ACER also reports suspicious cases that it detects, as well as alerts issued by its automatic internal detection systems. Concerning the latter, since the end of 2017, ACER has been sending alerts to national regulators on a monthly basis, pointing out transactions that it deems suspect. These alerts help identify unusual transactions, the study of which may lead to an in-depth analysis and possibly an investigation. However, the transmission of surveillance alerts by ACER was interrupted as of April 2020, due to difficulties encountered by ACER in connection with the generalization of teleworking following the health crisis, in the context of the special IT security measures it had put in place to preserve the confidentiality of the transactional data it receives and the analyses it conducts⁵.

The surveillance platform currently being developed by ACER has generated over 394 alerts of potentially suspicious behaviour, transmitted to CRE from October 2017 to March 2020 (Graph 1). Some of these alerts are exclusively related to the French market which falls under CRE's responsibility, while others relate to cross-border products and therefore other regulators.

⁴ Among the PPATs identified as concerned by the French markets, the main ones are currently: EPEX SPOT, EEX, Nord Pool, TP ICAP Group (various entities), Griffin, Aurel BGC, GFI Brokers, HPC, Marex Spectron Europe, Tradition Financial Services, RTE, JAO, Prisma.

⁵ ACER communicated on the continuity of its wholesale market surveillance activities in the context of the health crisis in the edition No.20 of ACER REMIT Quarterly Q1 2020 newsletter: https://documents.acer-remit.eu/wp-content/uploads/REMITQuarterly_Q1_2020_corr.pdf.

Graph 1: Changes in the number of alerts received by CRE from ACER



Source: CRE

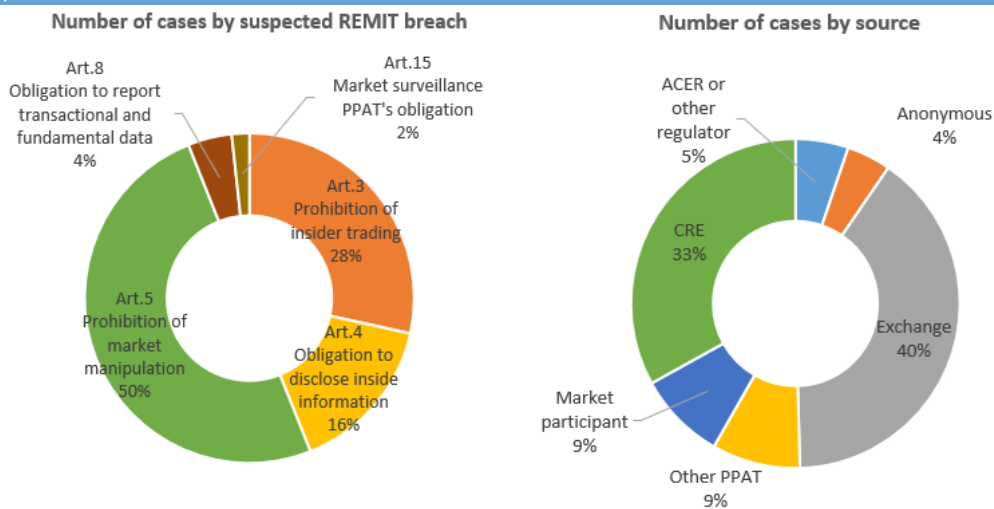
Similarly, other regulatory authorities, in France as well as in other countries, transmit information to CRE about cases of potentially suspicious behaviour.

CRE also receives information about suspicious behaviour from market participants. CRE encourages this vigilance and wishes to remind all individuals who suspect a breach of the REMIT Regulation that they can report their concerns anonymously, if they wish, to the following e-mail address surveillance@cre.fr or to the dedicated European notification platform⁶.

Suspicious behaviour detected, either internally by CRE or externally, is analysed to ensure that the suspicion is reasonable. In addition to detailed analyses of these cases, CRE also analyses unusual market events and the specific behaviour of certain participants. On the date the present report was published, CRE was conducting in-depth analysis on some thirty cases, in addition to analysing ACER alerts. Some analyses conducted in 2020 led to the opening of investigations in the first half of 2021, and eight analyses were closed in 2020 without leading to the opening of an investigation.

The suspicions of a breach of the REMIT Regulation that were analysed most often concerned suspected breaches of Articles 3 and 5 of the Regulation (prohibition of insider trading and market manipulation), in 28% and 50% of cases respectively.

Graph 2: Breakdown of surveillance cases analysed by CRE (excluding analyses of cases arising from automated ACER alerts)



Source: CRE

⁶ <https://www.acer-remit.eu/np/home>.



1.2. Specific surveillance context during the COVID period impacted by the health crisis

2020 was marked by several successive periods of lockdown, making teleworking compulsory for most CRE members of staff. Given the confidentiality of market data and of analyses conducted on the basis of the REMIT Regulation, CRE's market surveillance mission was subject to reinforced IT security measures. These measures meant that teleworking was limited for market surveillance staff.

During the first lockdown, the remote work of staff carrying out market surveillance made it possible to continue monitoring the market situation but not the analyses based on market data. This last activity resumed normally with the return of the staff concerned to CRE premises.

During 2020, and again during the second lockdown, security measures were tailored to fully enable remote work for market surveillance activities.

1.3. Surveillance of practices related to managing inside information

The proper functioning of the wholesale energy markets requires that information concerning system state be made public by the market participants concerned. CRE attaches the greatest importance to the quality of publications relating to this information as well as to compliance with the obligations imposed on market participants in this respect, particularly those relating to the availability of electricity production facilities.

1.3.1. Two European regulations govern the publication of information on the availability of electricity production units

The unavailability of production units, whether unplanned or planned, is information that must be published pursuant to two European regulations:

- Regulation (EU) No 543/2013⁷, known as the Transparency Regulation, which provides for the systematic publication of unplanned and planned unavailability of a certain level;
- the REMIT Regulation, which requires market participants to publish inside information pursuant to its Article 4(1). Information on the availability of production units constitutes information within the meaning of Article 2(1)(b) of REMIT.

The criteria for the publication of such information pursuant to the Transparency Regulation are summarized in Table 1 hereinafter. Publications must be made within a maximum of one hour after the start of the unplanned outage or after the decision on the planned shutdown of the facility.

In contrast to the Transparency Regulation, REMIT does not provide for quantitative criteria for the publication of information on each unavailability. Information is considered as inside when four cumulative criteria defined under Article 2(1) of REMIT are met: the information must (1) be information of a precise nature, (2) which has not been made public, (3) which relates, directly or indirectly, to one or more wholesale energy products and (4) which, if it were made public, would be likely to significantly impact the prices of those wholesale energy products.

While the REMIT Regulation requires this publication to be made "in a timely manner", ACER's Guidance⁸ on REMIT recommends that publication be made within a maximum of one hour and, in any event, prior to carrying out any trading in relation to this information (Article 3 of REMIT on the prohibition of insider trading).

⁷ REGULATION No 543/2013 OF THE COMMISSION of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council

⁸ Guidance on the application of Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency 5th Edition, section 7.3

Table 1: Criteria⁹ for publishing unavailability pursuant to the Transparency Regulation

Transparency Regulation			
	Generation unit ¹⁰	Production unit ¹¹	Publication lead-time
Planned unavailability	Unavailable volume ≥ 100 MW Unavailability variations ≥ 100 MW Duration ≥ a unit of market time	Unavailable volume ≥ 200 MW Availability variations ≥ 100 MW Duration ≥ a unit of market time	As soon as possible, at the latest 1h after the planned unavailability decision
Unplanned unavailability	Availability variations ≥ 100 MW Duration ≥ a unit of market time	Availability variations ≥ 100 MW Installed capacity ≥ 200 MW Duration ≥ a unit of market time	As soon as possible, at the latest 1h after the change of the actual availability status

1.3.2. Centralizing disclosure of inside information

Pursuant to Article 4(1) of REMIT, market participants shall publicly disclose in an effective and timely manner inside information which they possess. Transparency in wholesale energy markets requires the publication of inside information in a manner that enables the dissemination of information to as wide an audience as possible. ACER, in its Guidance on REMIT (5th edition updated on 11 May 2021), considers that in order to achieve effective publication pursuant to Article 4 of REMIT, information should be published using an Inside Information Platform (IIP).

In 2020, the Agency started a process of registration of IIP platforms based on minimum requirements as defined under Section 7.2.2 of the updated ACER Guidance Version 5.

The ultimate goal is to provide a list of IIPs that comply with the requirements and can as such be used by market participants for the efficient publication of inside information.

Furthermore, pursuant to Article 4(4) of REMIT, the publication of inside information pursuant to the Transparency Regulation constitutes simultaneous, complete and effective public disclosure. This is in particular the case for information published by ENTSO-E, ENTSO-G and the network operators under the Transparency Regulation.

ACER as such invited ENTSO-E, ENTSO-G and network operators operating central platforms concerned by the Transparency Regulation to ensure that their platforms complied with the minimum quality requirements provided for under section 7.2.2 of the ACER Guidance.

In France, RTE announced its desire for its platform to be an IIP. It is currently being certified by ACER.

The ACER website¹² contains all the registration applications received by the Agency and the status of their assessment.

1.3.3. CRE monitors the proper application of the REMIT and Transparency Regulations, in particular regarding the publications of unavailability

Given that market participants are expected to publish the unavailability of their generation units, whether under the Transparency or REMIT Regulations, within a maximum of one hour, CRE conducted a study over the period 2016-2020 to assess compliance with this obligation by participants operating electricity production units in France.

CRE analysed the publications declaring the start of unavailability as well as those relating to its extension and end. Publication delays identified concern three main types of sequences:

- Type 1: the publication is made more than one hour after the start of the unavailability;

⁹ Defined under Article 15 of the Transparency Regulation

¹⁰ Article 2(17) of the Transparency Regulation defines "generation unit" as a single electricity generator belonging to a production unit.

¹¹ Article 2(24) of the Transparency Regulation defines "production unit" as a facility for generation of electricity made up of a single generation unit or of an aggregation of generation units.

¹² <https://www.acer-remit.eu/portal/list-inside-platforms>



- Type 2: the publication is updated to extend the unavailability. This update occurs more than one hour after the end of the previously announced unavailability and the unavailability is extended by more than 30 minutes;
- Type 3: the participant publishes the early resumption of a facility more than one hour after the end time announced in the previous publication.

Whenever an item of information is published late, the purchases and sales made by the participants who held it during the so-called insider period or the attempted purchases and sales of the wholesale products concerned are likely to constitute insider transactions. The analyses carried out by CRE as such also pointed out the cases of delays for which there is suspicion of insider trading, particularly as regards the transactions carried out by the participant on the electricity markets.

The study was based on the unavailability data published on the RTE transparency website. It should be noted that, pursuant to the provisions of the Transparency Regulation, information concerning the unavailability of French power plants is collected by RTE and subsequently communicated to ENTSO-E. ACER's guidance to use centralized platforms for the disclosure of inside information was not applicable during the period analysed. Participants were therefore able to make publications on their own websites, on the RTE website and on other platforms offering such a service. For specific cases, CRE also took into account the other sources of public information available.

During the period studied, the publication delays observed followed a downward trend, nonetheless with an increase in 2020 in particular as a result of the specific management of nuclear facilities against the backdrop of the health crisis. More specifically, in 2019 and 2020, 1.2% and 2.6% of all publications were late, excluding some specific cases concerning particular publication practices, notably in the hydraulic sector, which are analysed separately.

CRE then discussed with all the participants who had potentially incurred delays in publication. These discussions brought to light false positives due to technical issues encountered.

Nonetheless, CRE identified certain occurrences for which participants' responses did not make it possible to rule out suspicion of late publication. These occurrences are studied in greater detail.

This study enabled CRE to better calibrate its tools for detecting publication delays and insider trading, and to remind producers of their regulatory obligations, which contributes to a continuous improvement as regards the quality of the data available to market participants.

In addition to the studies on the publication of past inside information, CRE carries out targeted surveillance when exceptional events take place. This was in particular the case when the health crisis began in 2020 and when nuclear facilities were extremely unavailable (see section 3, §1.2).

1.3.4. CRE studied the sensitivity of the electricity market price to the publication of information concerning the unavailability of production facilities in France

In 2020, CRE conducted a study on the sensitivity of the French electricity market price to the publication of information on the unavailability of production facilities in France. This study provides quantitative information on the average sensitivity of the intraday price of electricity in France as regards the publication of inside information and will be published by CRE in the second half of 2021.

1.4. Support for entities organizing transactions (exchanges, brokers, etc.) in their surveillance mission

Pursuant to Article 15 of the REMIT Regulation, persons professionally arranging transactions (PPAT) in wholesale energy products must establish and maintain effective provisions and procedures to detect breaches of Article 3 or 5 of the REMIT Regulation and notify the national regulatory authority without delay if they have reason to suspect that a transaction may infringe Article 3 or 5 of REMIT.

CRE has long considered it essential that PPATs conduct surveillance activities and maintains active collaboration with them. This enables CRE not only to step up wholesale energy market surveillance in France but also to benefit from the expertise of each PPAT on the market segments they operate. In this respect, CRE maintained its discussions with exchanges, brokers and TSOs active in France in 2020. These discussions make it possible to monitor the development and changes in the surveillance tools and procedures implemented by the PPATs and to share analyses of suspicious cases detected within their scope.

As such, the cooperation already established with the EPEX SPOT and Nord Pool exchanges (which started its activities on the French intraday market in June 2018 and on the day-ahead market in August 2019) continued on a regular basis and led to fruitful exchanges. Moreover, on 1st January 2020, the activities of the Powernext gas

exchange were integrated into its shareholder EEX. It is, therefore, now the German financial regulator, BaFin¹³, which is in charge of monitoring the French futures gas markets for financial support products¹⁴. This was already the case for French futures electricity markets. This new organization leads to the development of new relationships between CRE, EEX, BaFin and BNetzA¹⁵.

CRE's relationships with French-based brokers operating on the wholesale energy markets were also strengthened in 2020. As PPATs may be active in several countries, a coordinated approach at European level (between all regulators) was implemented to ensure a more systematic follow-up of surveillance activities. As such, brokers active in the scope of the markets monitored by CRE have been met or will be approached by CRE. Furthermore, given the United Kingdom's withdrawal from the European Union, several brokers operating Organized Trading Facilities (OTF¹⁶) in the UK have decided to relocate their activities to France. Relations with brokers based in France are monitored jointly with the Autorité des Marchés Financiers in France (AMF).

Finally, relations with RTE, the only grid operator qualified as a PPAT in France, were also fostered in 2020. The French gas network and storage operators GRT gaz, Téréga and Storengy are not currently qualified as PPATs within the meaning of REMIT because, to date, they do not meet the qualification criteria. Discussions have taken place with them to develop data and alert sharing with CRE.

1.5. Registration of market participants

Pursuant to Article 9(1) of the REMIT Regulation, market participants are required to register "*with the national regulatory authority in the Member State in which they are established or resident or, if they are not established or resident in the Union, in a Member State in which they are active*". **In April 2021, 1,538 participants were registered with CRE**, i.e. an increase of 126 participants compared with 1st January 2020. These participants may be producers, suppliers, consumers, traders or network operators.

Each market participant must ensure that the information registered is accurate and up to date. Any changes to the information provided in the registration form must be forwarded in a timely manner to the relevant national regulatory authority. Any subsequent erroneous or obsolete information must be amended as soon as possible.

In order to register or to update their data in their participant profile, market participants are invited to use the Centralised European Register of Energy Market Participants - CEREMP platform¹⁷. For any questions on registering, market participants can consult a dedicated¹⁸ page on CRE's website or contact CRE's departments at enregistrement.remit@cre.fr.

The exit of the United Kingdom from the European Union took effect on 31 January 2020 and a transitional period applied until 31 December 2020. During this period the European Union rules, including the REMIT Regulation, continued to apply. However, from 1st January 2021, market participants registered in the United Kingdom with the UK regulator OFGEM, issuing orders and trading in wholesale energy products in the European Union, had to re-register with a regulator in one of the remaining 27 Member States. A total of 181 participants previously registered in the United Kingdom re-registered with another European regulator, including 12 with CRE in France.

¹³ BaFin - Bundesanstalt für Finanzdienstleistungsaufsicht - the German Federal Financial Supervisory Authority

¹⁴ Previously, pursuant to Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on Market Abuse (MAR), which provides that supervisory competences between the financial authorities of the Member States shall be established according to the geographical location of the trading platform, it was the Autorité des Marchés Financiers in France (AMF) that was responsible for their supervision.

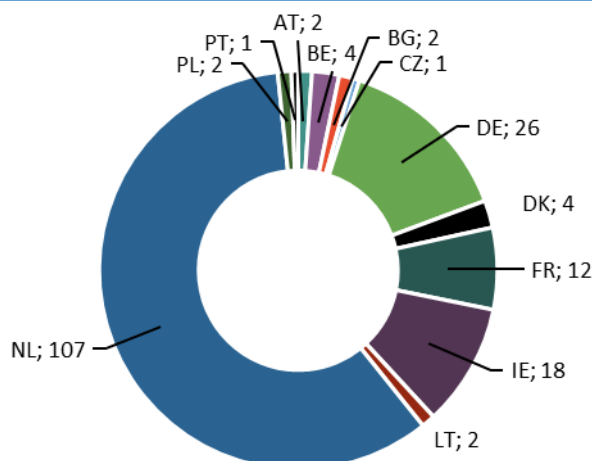
¹⁵ BNetzA - Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen - German Federal Network Agency

¹⁶ The OTF is a multilateral system which brings together multiple purchasing and selling interests, at the discretion of its operator, to enter into transactions in bonds, structured finance products, emissions allowances or derivatives. In France, OTF operations are subject to approval by the prudential control authority (ACPR) after consultation with the financial market authority (AMF) when its operator is an investment service provider, or to authorization by AMF when it is operated by a market undertaking.

¹⁷ https://www.acer-remit.eu/ceremp/home?nraShortName=9&lang=en_FR

¹⁸ <https://www.cre.fr/Electricite/REMIT/Enregistrement-et-FAQ>

Graph 3: Re-registration of participants previously registered in the United Kingdom with European Union regulators



Source: ACER - Analysis: CRE

Furthermore, in its open letters of 30 May 2018¹⁹ and 20 November 2020²⁰, and in its FAQ "REMIT fundamental data and inside information collection" of 30 April 2021²¹, ACER reiterates the importance of publishing the inside information held by the participants in an efficient way. Consequently, it is essential that market participants publishing inside information pursuant to Article 4(1) of the REMIT Regulation correctly enter their chosen publication platform on CEREMP (in the "publication inside"²² field). ACER Guidance²³ states that inside information must be published on centralized platforms certified by ACER (see also Section 1, §1.3.2), the list of which can be found on this page: <https://www.acer-remit.eu/portal/list-inside-platforms>.

Furthermore, ACER indicated in its 4th open letter on REMIT data quality, dated 22 October 2020²⁴, as well as in its letter of 20 November 2020²⁵, that issues with the type X "Energy Identification Codes" (EIC) i.e. the codes used to identify market participants in CEREMP when reporting data under Article 8 of REMIT to ACER, had been identified. In particular, it was observed that some participants reporting data were not registered as market participants in CEREMP, that some had not entered their EIC X code in CEREMP or were using a different EIC X code to report data, or that other participants were using an EIC X code not listed in the register maintained by ENTSO-E.

CRE contacted these participants to regularize their situations. CRE joins ACER in reminding all market participants that they must register on CEREMP to comply with Article 9 of the REMIT Regulation and must also provide a unique EIC X code to be used when reporting data to ACER.

In this respect, in 2020²⁶, ACER amended its validation rules²⁷ for data reported by market participants pursuant to Article 8 of the REMIT Regulation: all data reports made with an EIC X code that does not enable identification of the participant on CEREMP will be rejected. CRE reiterates that failure to comply with data reporting rules may constitute a breach of the REMIT Regulation, subject to a sanction before the CoRDs.

1.6. CRE's openness to the Open Data and Open Source communities

CRE's mission is to ensure the proper functioning of the energy markets on which the participants execute their trading strategies and adjust their positions according to commodity price expectations, supply and demand. These markets are central to the functioning of the European energy system.

Effective monitoring of these markets requires the analysis of massive data flows of various origins and contents. This means studying the trading activity of all participants on all market segments with regard to changes in

¹⁹ https://documents.acer-remit.eu/wp-content/uploads/20180531_Open-Letter_Inside-Information-disclosure-and-the-use-of-IIPs.pdf

²⁰ https://documents.acer-remit.eu/wp-content/uploads/20201120_Open-Letter-on-impact-of-Covid-19-on-compliance-deadlines-under-RE-MIT-1.pdf

²¹ https://documents.acer-remit.eu/wp-content/uploads/FAQs-on-REMIT-fundamental-data-and-inside-information_V7.pdf

²² If not applicable, specify "N/A"

²³ <https://documents.acer-remit.eu/wp-content/uploads/5th-Edition-ACER-Guidance-updated.pdf>, §7.2

²⁴ https://documents.acer-remit.eu/wp-content/uploads/20201022_Fourth-Open-Letter-on-REMIT-data-quality.pdf

²⁵ https://documents.acer-remit.eu/wp-content/uploads/20201120_Open-Letter-on-impact-of-Covid-19-on-compliance-deadlines-under-RE-MIT-1.pdf

²⁶ <https://www.acer.europa.eu/Media/News/Pages/ACER-updates-validation-rules-under-REMIT.aspx>

²⁷ https://documents.acer-remit.eu/wp-content/uploads/ACER_REMIT_Information-System-Data-Validation_v4.6.pdf

fundamentals, in particular stocks, the availability of production and transmission assets, rainfall, wind, sunshine as well as temperature, which have a significant impact on consumption.

As such, CRE has developed several tools to illustrate this fundamental data using the flows published by RTE, ENTSO-E and Météo-France (the French national meteorological service). These tools generate different views of the availability of production facilities, weather conditions and consumption forecasts for Europe. They are available under an Open Source licence at the following address: <https://github.com/cre-dev>.

This transparency approach aims to promote these public datasets, to contribute to their better interpretation and to collaborate by adopting a modern exchange infrastructure open to European market participants, the academic world and any developer motivated by illustrating these European energy system mechanisms.

Suggestions are welcome at opensource@cre.fr.

2. INVESTIGATIONS AND SANCTIONS FOR REMIT REGULATION BREACHES

Under Article L.135-3 of the French Energy Code, the President of CRE can entitle its staff to proceed with investigations required to fulfil the missions entrusted to the Commission. As such, in case of suspicion of a breach of the REMIT Regulation, the President of CRE can name an investigator to conduct an investigation.

Pursuant to Article L.135-12 of the French Energy Code, breaches of the provisions of the REMIT Regulation are first established by the investigating officer mentioned under Article L. 135-3. These breaches are recorded in an official report and the individual(s) concerned, notified.

Pursuant to Article L.134-25, the President of CRE can, if required, refer the case to the Dispute Settlement and Sanctions Committee (CoRDIS).

2.1. Investigations conducted by CRE

Between 2014 and 2019, CRE opened 9 investigations under the REMIT Regulation, broken down as follows: 2 investigations in 2014, 3 in 2016, 2 in 2017, 1 in 2018, 1 in 2019. No investigations were opened in 2020.

All these investigations focus on the prohibition of insider trading and market manipulation (Articles 3 and 5 of REMIT), as well as the requirement to disclose inside information (Article 4 of REMIT).

Of these investigations:

- one was closed because the behaviour examined during the investigation occurred before the entry into effect of Act 2013-312 of 15 April 2013, which gave CoRDIS the power to sanction this type of breach;
- one was closed in 2020 for reasons related to the statute of limitations;
- one was closed in 2020 by a finding of non-breach;
- two were closed by a CoRDIS sanction decision (Table 2);
- two are currently being investigated by CoRDIS;
- for the two investigations remaining at end 2020, the investigating officer's analyses were still in progress.

As part of these investigations, powers granted to request information (accounting documents, invoices and all other supporting documents, including telephone recordings and existing data exchanges), pursuant to Article L.135-4 of the French Energy Code and Article 13(2) of the REMIT Regulation, were implemented.

As part of one of the investigations, which was completed in 2020, the President of CRE initiated a formal notice procedure pursuant to Article L.134-29 of the French Energy Code.

2.2. Summary of the key decisions sanctioning breaches of the REMIT Regulation pronounced by regulators in the European Union

ACER keeps an updated summary²⁸ on its website of the main decisions sanctioning breaches of provisions of the REMIT Regulation.

Table 2: Sanction decisions in Europe related to breaches of provisions of the REMIT Regulation

Decision date	Authority, Member State	Market participant	Type of REMIT breach	Penalty enforced	Decision status
25/02/2021	CNMC, Spain	Rock Trading World S.A.	Article 5	€60,000	Potential appeal
16/12/2020	OFGEM, United Kingdom	EDF Energy (Thermal Generation) Limited	Article 5	£6,000,000 (approx. €6.7M)*	Final
25/03/2020	OFGEM, United Kingdom	InterGen (UK) Ltd, Coryton Energy Company Ltd, Rocksavage Power Company Ltd, Spalding Energy Company Ltd	Article 5	£37,291,000 (approx. €42.5M)*	Final
03/01/2020	VERT, Lithuania	UAB Geros dujos	Article 5	€28,583	Final
19/12/2019	CRE, France	BP Gas Marketing Limited	Article 5	€1,000,000	Under appeal
December 2019	MEKH, Hungary	Valahia Gaz S.R.L.	Article 5	Ft30,000,000 (approx. €90,000)	Final
September 2019	MEKH, Hungary	MAVIR ZRt.	Article 5	Ft1,000,000 (approx. €3,000)	Final
05/09/2019	OFGEM, United Kingdom	Engie Global Markets	Article 5	£2,128,236 (approx. €2,393,427.80)	Final
20/02/2019	BNetzA, Germany	Uniper Global Commodities SE + Deux Traders	Article 5	€150,000 plus penalties of €1,500 and €2,000 respectively for each trader.	Final
21/12/2018	Agent/DUR, Denmark	Neas Energy A/S	Article 5	DKK153,000 (approx. €20,400)*	Final
28/11/2018	CNMC, Spain	Multienergía Verde, S.L.U.	Article 5	€120,000	Under appeal
28/11/2018	CNMC, Spain	Galp Gas Natural, S.A.	Article 5	€80,000	Final
30/10/2018	Agent/DUR, Denmark	Energi Denmark A/S	Article 5	DKK1,104,000 (approx. €147,000)*	Final
05/10/2018	CRE, France	VITOL S.A.	Article 5	€5,000,000	Final
24/11/2015	CNMC, Spain	Iberdrola Generación S.A.U.	Article 5	€25,000,000	Under appeal

*The sum includes (i) the penalty and (ii) compensation to prejudiced parties.

²⁸ ACER Enforcement decisions publication – Overview of the sanction: <https://extranet.acer.europa.eu/en/remit/REMITATACER/Pages/Enforcement-decisions.aspx>



Of these decisions, CRE would like to briefly present the only one pronounced in 2020 for an amount greater than €1M and which was not already described in the 2019 wholesale market surveillance report. This relates to the recent sanction decision for £6M pronounced in 2020 by OFGEM against the company EDF Energy (Thermal Generation) Limited. It should be noted that OFGEM's sanction decision for £37M had already been the subject of a presentation by CRE in its wholesale market surveillance report for 2019²⁹.

On 16 December 2020, the Office of Gas and Electricity Market (OFGEM) declared that EDF Energy (Thermal Generation) Limited (UK-FR) Ltd (ETG), a company incorporated and registered in Great Britain, had agreed to pay £6M to OFGEM's Voluntary Redress Fund for committing market manipulation prohibited by Article 5 of the REMIT Regulation for the electricity market, as well as for failing to comply with the Grid Code regarding obligations relating to the electricity production licence.

For more than two years, in particular over the period from September 2017 to March 2020, ETG regularly sent misleading signals to the National Grid Electricity System Operator (NG) regarding the capacity of its West Burton B (WBB) production facility; information which is required for the United Kingdom balancing mechanism.

As such, OFGEM found that ETG frequently overstated the declared minimum production capacity that WBB could provide. This behaviour occurred at times when WBB was not scheduled to produce energy. In many cases and, as a result of this behaviour, the NG had to purchase more energy from the facility than was needed, when the facility was used to balance the electricity system. This led to the NG spending money unnecessarily in trying to balance the electricity system.

According to OFGEM, this behaviour constitutes a breach of the obligations relating to the electricity production licence. This behaviour is characterized by a failure to comply with the requirements of the UK Grid Code. This Code, which sets out the technical requirements that producers must comply with when connecting to and using the national electricity transmission network, provides that the technical data ("dynamic parameters") submitted by producers to the NG must reasonably reflect the true expected operating characteristics of a production unit. By overestimating the production capacity that WBB could provide, ETG did not comply with this requirement.

Furthermore, OFGEM notes that, by overestimating the minimum energy capacity that WBB could provide, it gave a misleading signal to the NG, which had to pay ETG for energy that did not correspond to the quantity actually available on the market, thereby increasing the overall cost of NG adjustments. As such, ETG also breached Article 5 of the REMIT Regulation prohibiting market manipulation by giving a misleading signal on supply and demand.

ETG had not considered that its behaviour could increase the overall cost of NG adjustments. Rather, the company had considered that by attempting to cover its fixed costs, by offering overpriced capacity, it could have lowered the price offered to the NG for adjustment offers. OFGEM says that ETG now acknowledges that its behaviour, involving the contracting of more energy from the NG, sometimes led to it spending money unnecessarily in trying to balance the electricity system.

ETG admitted to breaching Article 5 of REMIT, as well as the obligations of the United Kingdom Grid Code inadvertently. The company promptly implemented measures to comply with the obligations of the REMIT Regulation and the Grid Code, to avoid any recurrence of such breaches.

Given ETG's cooperation in investigating the case, OFGEM did not consider it necessary to open an investigation, as ETG agreed to pay £6M (approximately €6.7M) into OFGEM's voluntary redress fund³⁰.

²⁹ <https://www.cre.fr/en/Documents/Publications/Thematic-reports/functioning-of-the-wholesale-electricity-and-natural-gas-markets-2019>

³⁰ <https://www.ofgem.gov.uk/publications-and-updates/authority-guidance-allocation-redress-funds>

2.3. CRE actively participates in the inter-IAA cooperation

Exchanges within the inter-IAA working group are one of the levers for innovation and enable CRE to constantly question its surveillance and investigation methods and, where appropriate, to pool resources relating to investigative powers (for example, IT tools specific to the needs of investigations), in particular the "enhanced" powers not yet implemented by CRE to date.

Cooperation between the French independent administrative authorities (IAA), which was initiated in 2019, continues to be a privileged means of exchange with the working groups of other French independent administrative authorities (ACPR, ADLC, AMF, ART, ARCEP, CNIL, HATVP)³¹. In 2020, CRE actively participated in these groups, which worked in particular on the implementation of investigative powers, in connection with:

- on the one hand, the implementation of general powers such as acts suspending or interrupting the statute of limitations, the constitution of investigation teams and files, phone searches, home visits, the management of lawyer-client privilege and other secrets (business, private life);
- on the other hand, with the continuation of the investigation and control missions during and after the health crisis, and in particular the measures for adapting to the health context, the impact of the health crisis on procedural deadlines, visits and seizures, obstruction and hindrance, and computer security.

In this regard, it should be recalled that CRE and AMF concluded a memorandum of understanding in 2010 to enable the two authorities to benefit from each other's information and expertise and to ensure that their respective missions are carried out and made fully effective, pursuant to the provisions of Article L. 621-21 of the French Monetary and Financial Code and Articles 28 and 29 of French Act 2000-108 of 10 February 2000. As such, several meetings between CRE and AMF took place in 2020.

3. WHOLESALE MARKET SURVEILLANCE AT EUROPEAN LEVEL

A number of working groups and associated task forces exist within ACER and the Council of European Energy Regulators (CEER). These groups and task forces contribute in particular to the operational implementation of the REMIT Regulation by ensuring that the national energy regulatory authorities carry out their tasks under the REMIT Regulation in a coordinated and consistent manner. They are also involved in the development of the non-binding guidance on REMIT issued by ACER.

This collaborative environment within ACER changed in 2020. A new centralized structure under a single steering group, the ACER REMIT Committee with fewer sub-groups and task forces was created, to better coordinate the work on the different aspects underlying the REMIT Regulation. The new, simpler and more transparent structure is also intended to enable regulators to better target the relevant groups to deal with the different topics and to mandate the appropriate experts.

CRE attaches great importance to the rigorous progress of the REMIT work as regards constructive European collaboration and remains a very active member, both as co-chair of certain groups and as a participant. CRE's mandate to chair the REMIT Policy Task Force was renewed for 2 years. Finally, in the first half of 2021, CRE was given the mandate of vice-chair of the ACER REMIT Committee. CRE is pleased with the confidence and recognition of its commitment reflected through these appointments.

The development of a common and consistent approach for the implementation of REMIT does not rely on the expertise of the competent authorities alone, but also on the contributions of the various market participants. In particular, in addition to the regular organization of forums and roundtables, ACER can set up expert groups, whose purpose is to share their expertise and advice on topics related to REMIT and certain aspects of the functioning of wholesale energy markets in general. The composition of these groups is established to ensure a balanced representation of market participants, organized markets and other persons professionally arranging transactions (PPATs), users and distributors of wholesale energy market information (e.g. information providers, analysts) and ENTSOs.

As the mandate of the previous expert group had expired, a call for a new REMIT expert group was launched on 1st October 2020. From the numerous candidates that applied, 12 experts were selected by ACER for a period of 2.5 years³².

³¹ ACPR - French Prudential Supervisory and Resolution Authority, ADLC - French Competition Authority, AMF - French Financial Markets Authority, ART - French Transport Regulation Authority (formerly ARAFER), ARCEP - French Electronic, Telecommunications and Postal Regulatory Authority, CNIL - French Commission for Information Technology, Data Files and Civil Liberties, HATVP - French High Authority for Transparency in Public Life

³² https://extranet.acer.europa.eu/en/The_agency/Organisation/Expert_Groups/REMIT/Pages/Members-of-the-REMIT-Expert-group.aspx

3.1. Changes in ACER non-binding guidance

The non-binding guidance issued by ACER consists to date of four main documents:

- general guidance on applying the REMIT Regulation, and
- three thematic guidance notes on practices likely to constitute market manipulation under Article 5 of the REMIT Regulation:
 - one guidance note on "Wash Trade", a form of manipulative practices, defined as entering into arrangements for the sale or purchase of a wholesale energy product, where there is no change in beneficial interests or market risk, or where beneficial interest or market risk is transferred between parties who are acting together or colluding, published in June 2017³³;
 - a guidance note on blocking transmission capacity, or "capacity hoarding" in the intraday electricity market. This is defined as the acquisition of all or part of the available transmission capacity without using it or without using it effectively, published in March 2018³⁴;
 - a guidance note on "layering" and "spoofing" in continuous wholesale markets, defined as issuing a large order or multiple orders to trade at different price levels (layers) on one side of the order book, in order to make one or more transactions on the other side of the order book, published in March 2019³⁵.

ACER's Guidance was successively updated during 2020 and early 2021.

On 8 April 2020, ACER published the fifth³⁶ edition of its guidance. In this new version, Chapter 5 has changed to provide more detailed guidance on the qualification of *information* and *inside information* within the meaning of REMIT. In particular, it provides clarification and practical examples with regard to the four cumulative criteria mentioned in Article 2(1) of REMIT, which must be met to qualify information as inside information.

On 18 November 2020, ACER published a first update³⁷ of the fifth edition of its guidance. This update updates references to the envisaged new legal framework for financial markets (MAR, MiFIR, MiFID II) as well as the Regulation concerning common rules for the domestic electricity market³⁸.

On 11 May 2021, ACER published a new update³⁹ of the fifth edition of its guidance. This update provides additional information on the practice of capacity retention, which can be qualified, in certain circumstances, as market manipulation under Article 5 of REMIT.

ACER also publishes a list of questions and answers ("Q&A") regarding the implementation of REMIT⁴⁰. It published two updates to this document in 2020, on 30 June and 16 December.

ACER's guidance on REMIT may be supplemented as necessary by guidance given by ACER in the quarterly REMIT newsletters, in the Q&A document and in open letters specifying the agency's position on issues related to the interpretation of REMIT and its operational implementation⁴¹. In particular, ACER published in 2020, in these forms, guidance intended for adapting the implementation deadlines of certain changes, in order to take into account the particular difficulties encountered by market participants against the background of the health crisis⁴². In particular, ACER's recommendation to use centralized platforms for the publication of inside information was postponed to 1st January 2021, with the possibility of using the participant's own website until 31 December 2021 as a fallback solution if the chosen platform was unavailable.

CRE continues to be involved in drafting common positions on the definition and supervision of abuse practices in the wholesale markets under the REMIT Regulation. It played an active role during the preparation of the various amendments to the guidance.

³³ Available on the ACER website at: <https://www.acer-remit.eu/portal/document-download?documentId=u518na123yg>

³⁴ For further information, visit: <https://acer.europa.eu/Media/News/Pages/ACER-publishes-guidance-on-capacity-hoarding-in-intraday-electricity-markets-that-could-constitute-market-manipulation.aspx>

³⁵ For further information, visit: <https://www.acer.europa.eu/Media/News/Pages/ACER-publishes-guidance-on-layering-and-spoofing-in-continuous-wholesale-energy-markets.aspx>

³⁶ 5th Edition ACER Guidance: <https://documents.acer-remit.eu/wp-content/uploads/5th-Edition-ACER-Guidance.pdf>

³⁷ For further information: <https://documents.acer-remit.eu/category/guidance-on-remit/>

³⁸ Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (Text with EEA relevance.)

³⁹ 5th Edition ACER Guidance: https://documents.acer-remit.eu/wp-content/uploads/202105_5th-Edition-ACER-Guidance-Update2.pdf

⁴⁰ Available on the ACER website at: <https://documents.acer-remit.eu/questions-answers-on-remit/>

⁴¹ The history of the different ACER documents and communications related to the implementation of REMIT can be consulted on the REMIT portal of the ACER REMIT website: <https://documents.acer-remit.eu/>

⁴² <https://documents.acer-remit.eu/acer-staff-letters/open-letter-on-the-impact-of-covid-19-on-certain-compliance-deadlines-under-remit/>

3.2. Fees owed to ACER under the REMIT Regulation

From 2021, fees are owed to ACER for the collection, management, processing and analysis of the information communicated pursuant to Article 8 of the REMIT Regulation. These fees (commonly known as REMIT fees) and their terms of payment are set by the European Commission in its Decision (EU) 2020/2152 of 17 December 2020 applicable from 1st January 2021⁴³.

This European Commission Decision implements Article 32 of Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing ACER. Article 32(1) of said Regulation provides that fees shall be payable to ACER for its tasks under the REMIT Regulation and for the services it provides to market participants or entities acting on their behalf

The fee is levied on Registered Reporting Mechanisms (RRMs), which is a term used in the REMIT regulatory corpus to refer to market participants reporting information to ACER on their behalf, as well as entities reporting information on behalf of third parties.

ACER accompanied the adoption of the Commission Decision with the first version of the Questions and Answers on REMIT fees published on 17 December 2020, providing further details on the methodology underlying the calculation of the fees⁴⁴.

3.3. Data quality: a key issue for market surveillance

ACER's centralized data collection started in October 2015 for standard data and in April 2016 for non-standard data. ACER transmits the data to the appropriate regulators provided that their IT systems meet the security criteria it has implemented. CRE has been receiving this data since 2016.

As it is essential to have good quality transactional and fundamental data to conduct its missions, CRE is actively involved in ACER's efforts to this effect. As such, CRE, in conjunction with other European authorities, has helped define the key components to improve harmonization of data reporting as well as quality and completeness tests.

Discussions between ACER, reporting parties, regulators and other stakeholders have in particular focused on updates and clarifications to ACER's non-binding guidance, through changes to the Transaction Reporting User Manual (TRUM⁴⁵) and the Frequently Asked Question (FAQ) document⁴⁶. The new versions of these documents were published on 30 June 2020. Finally, on 22 October 2020 ACER published its fourth open letter⁴⁷ on the quality of the data collected, listing the issues identified and calling on the participants concerned to roll out corrective measures.

However, teleworking conditions imposed following the health crisis have slowed down the work undertaken by ACER, as well as by the other regulators, on improving the centralized collection of data pursuant to Article 8 of the REMIT Regulation and its use for surveillance activities. The IT security constraints decided by ACER to ensure the confidentiality of the data it collects do not allow it to access REMIT data by working remotely. Furthermore, ACER's information system experienced operational difficulties and periods of unavailability in 2020, thus impacting the processing times of the reported data.

As long as this work to improve data quality has not been completed, CRE will maintain the national data collection system from the organized marketplaces (exchanges and brokers), to avoid any discontinuity or interruption as regards the scope of CRE surveillance.

3.4. REMIT and the United Kingdom's exit from the European Union

The United Kingdom left the European Union on 31 January 2020. During the transition period from February to December 2020, the United Kingdom remained subject to European Union law, including the REMIT Regulation.

In order to inform market participants and the wider market about some of the implications of Brexit on the implementation of REMIT after 31 December 2020, on 18 December 2020⁴⁸ ACER published an update to its open letter dated 9 January 2019⁴⁹.

In particular, ACER provided clarification as to which United Kingdom entities would be considered market participants and the scope of wholesale energy products within the scope of REMIT after the end of the transition period.

⁴³ <https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32020D2152&from=EN>

⁴⁴ <https://documents.acer-remit.eu/category/remit-fees/>

⁴⁵ Available on the ACER website at: <https://documents.acer-remit.eu/category/remit-reporting-user-package/transaction-reporting-user-manual-trum/>

⁴⁶ Available on the ACER website at: <https://documents.acer-remit.eu/category/qas-and-faq-on-remit/>

⁴⁷ Available on the ACER website at: https://documents.acer-remit.eu/wp-content/uploads/20201022_Fourth-Open-Letter-on-REMIT-data-quality.pdf

⁴⁸ <https://documents.acer-remit.eu/acer-staff-letters/updated-open-letter-on-the-withdrawal-of-uk-from-eu/>

⁴⁹ <https://documents.acer-remit.eu/acer-staff-letters/open-letter-on-the-withdrawal-of-uk-from-eu/>

This has direct consequences in particular for the collection of data under Article 8 of REMIT and for the registration of participants from the United Kingdom under Article 9 of REMIT (see Section 1, §1.5).

Useful references

For suspicions of market abuse

To ensure the best possible market surveillance, any person suspecting market abuse is advised to alert:

- CRE departments tasked with market surveillance at the following address: surveillance@cre.fr;
- or ACER, by visiting the agency's ad hoc notification platform: <https://www.acer-remit.eu/np/home>.

For registering market participants

Market participants may contact CRE's wholesale market surveillance department with any question concerning registration, at: enregistrement.remit@cre.fr.

For REMIT

All public documents concerning implementation of the REMIT Regulation can be found on the REMIT Portal provided by ACER at: <https://documents.acer-remit.eu/>.

**SECTION 2
THE ENERGY MARKET CONTEXT**

1. THE IMPACT OF THE HEALTH CRISIS ON THE GLOBAL ECONOMY

Although the COVID-19 epidemic appeared to be largely confined to China at the beginning of the year, it subsequently spread to all continents. As a result of government lockdown measures to curb the epidemic, the global economy was hit by a downturn on a scale not seen since World War II. Growth was impacted by a significant decline in supply and demand. In January 2020, the World Bank forecast that global economic growth would increase by 2.5% in 2020. After several months of the pandemic, the Bank reviewed this figure in December 2020, estimating a 4.3% fall in global activity in 2020.

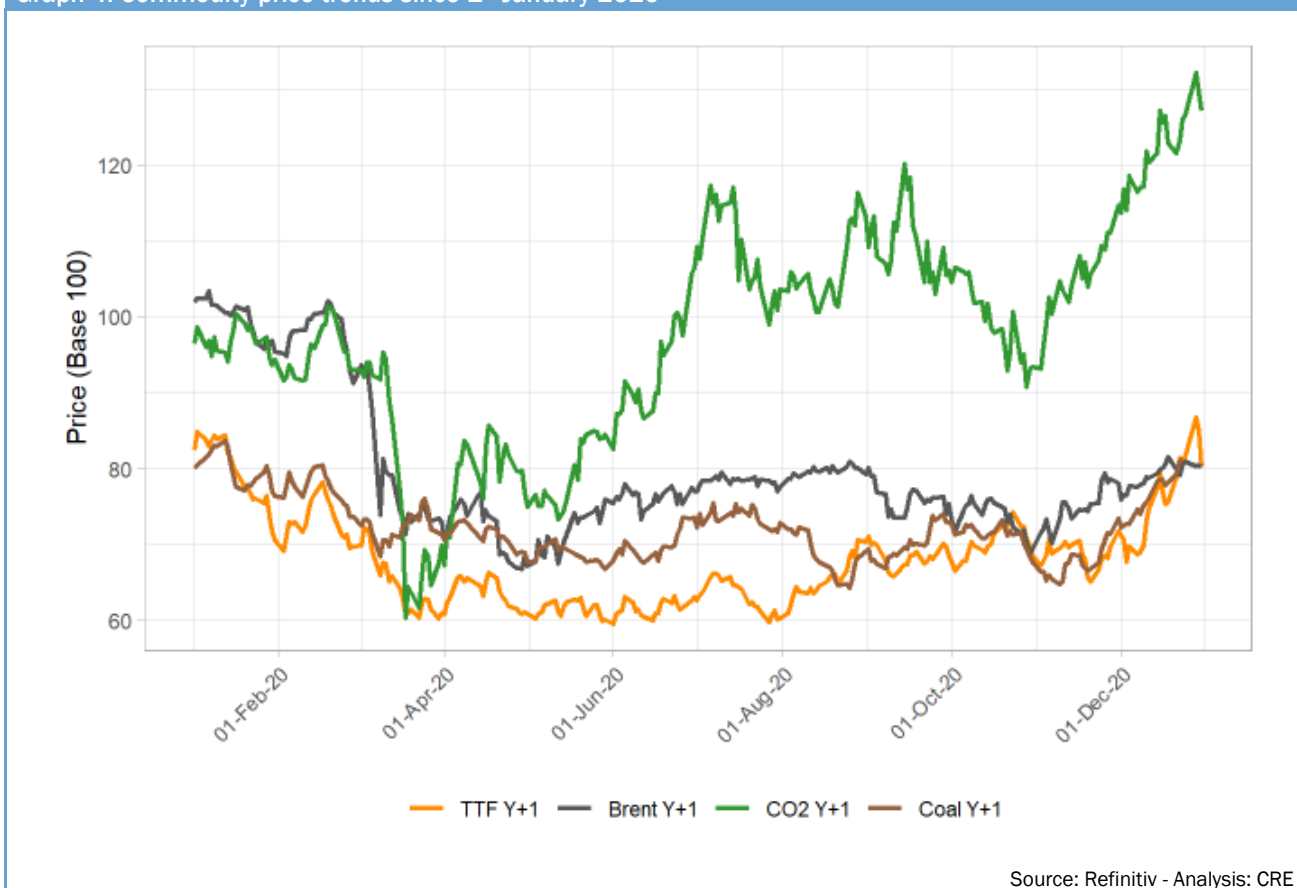
The economies of European countries have been severely hit by this health crisis. According to the OECD⁵⁰, France was amongst the countries whose economy was most impacted in 2020 with an annual GDP decline of -8.3%, comparable to that of its Italian neighbour (-8.9%) but lower than that of the United Kingdom, estimated at -9.8%. The German economy was impacted to a lesser extent with a -4.8% drop in GDP compared to 2019.

The fall in GDP in the Eurozone was on average (-6.1%) and that of the United States -3.5%. The only country amongst the world's major economies to have experienced a year of growth in 2020 was China (+2.3%).

The exceptional measures taken in France, as well as in most other countries, to deal with the COVID-19 pandemic have led to new balances in energy supply and demand caused by the very disrupted functioning of the economy over the short term and by its long-term consequences.

2. COMMODITY PRICES: SHARP FALL DURING THE HEALTH CRISIS AND STRONG RECOVERY AT THE END OF THE YEAR

Graph 4: Commodity price trends since 1st January 2020



2020 started with strain on oil prices, in particular with the fear of a new rise in tensions in the Middle East following the US attack in Iraq. This was compounded by rumours of an agreement between China and the US on trade and OPEC+ production cuts. The price of Brent crude oil at the beginning of the year was €52.4/barrel.

During the first months of the year, the oil market was mainly influenced downwards by the outbreak of the COVID-19 epidemic in China, which threatened a drop in demand. This decline was heightened by Russia's refusal to cut production despite OPEC+'s request. April was marked by an unprecedented situation: global demand was reduced

⁵⁰ Organisation for Economic Co-operation and Development.



by a third given that over three billion people were under lockdown throughout the world. As land-based stocks reached at peak levels, offshore storage on board ships was used, albeit at a higher cost. US oil (WTI) even recorded negative prices in late April. At the beginning of May, gradual lockdown-lifting helped the market recover. Prices were somewhat stable between July and October 2020 amid uncertainty about a potential second wave of the pandemic.

Finally, the last two months of the year were marked by a rise in the oil markets, largely as a result of the hopes raised by the arrival of effective vaccines to curb the pandemic.

For the year as a whole, 2020 was marked by a sharp drop in crude oil prices, with an average price of USD41.80/barrel, a fall of 35% compared to 2019.

According to the International Energy Agency (IEA), global oil demand is not expected to return to its previous level, due to government action on active climate policies and lifestyle changes such as the development of teleworking, which reduces demand for commuting.

2020 was also a particular year for coal markets. Global coal demand in 2020 was -5% compared to 2019, recording the largest drop since World War II. Coal demand for electricity production was impacted by the exceptional drop in electricity demand, particularly during lockdown periods. The same applies to its use in industrial production, which was also strongly impacted by the pandemic, with the exception of China. As such, the sturdiness of the economy of Asia's leading power limited the fall in demand, given its share of over half of global coal consumption.

3. THE PRICE OF CO₂ EMISSION ALLOWANCES ENDED ON A SHARP RISE

The EU Emissions Trading Scheme (ETS) is a mechanism to facilitate the achievement of politically determined greenhouse gas (GHG) emission reduction targets. The annual volume of allowances is defined by the European Commission and is made available free of charge (for part of industry and aviation) or sold at auction. During the year, the allowances can then be traded freely by market participants in order to adjust the coverage of the CO₂ emissions forecast for the year within their scope (effective emissions are then checked and the emitters must transmit an equivalent volume of allowances in order not to be penalized). The European Union implemented this system in 2005 to measure, monitor and reduce the emissions of its industry and electricity producers. Its implementation was planned over several phases of increasing duration.

2020 marked the end of the 3rd phase (2013-2020). This 3rd phase was characterized by important reforms and adjustments to the mechanism, correcting its design flaws (excess allowances leading to low prices). The main reform was the introduction of a Market Stability Reserve (MSR) in 2019. This reserve makes it possible to adjust the quantity of allowances in circulation so as to restore a real constraint in the ETS (to absorb excess allowances, absorb possible shocks and ultimately increase the price of CO₂ by cancelling allowances that have not been used up). This reserve enabled withdrawing 378 million allowances (EUAs) in 2020, for a total of 1,578 million allowances in circulation (24% placed in reserve for 12 months), thus making it possible to absorb the surplus caused by the fall in demand induced by the health crisis and the decline in economic activity.

With an average annual price of €24.8/tCO₂ in 2020 close to that of 2019 (€24.9/tCO₂), the price of CO₂ in 2020 stood at a range between €15.3 and €33.4/tCO₂. The average price of CO₂ in 2020 was above the level where coal could be substituted by gas for electricity production. Furthermore, CO₂ allowance trading volumes increased by 22% (8.1 billion allowances traded) compared to 2019 even though emissions (and, as such, demand) decreased over the year. Trading volumes reached 2.74 billion in the 4th quarter of 2020, the highest value since 2011.

2020 started with a price of €24.4/tCO₂ which gradually decreased in February as Brexit was enacted and CO₂ volumes from UK auctions were scheduled to be put back on the market in March⁵¹. March was strongly impacted by both the supply of these additional allowances (UK auctions on 4 March) and the fears linked to the COVID-19 pandemic (economic slowdown impacting the functioning of the industry). The allowance price fell to €15.3/tCO₂ on 18 March, a drop of 35% compared to the beginning of the month. Prices finally quickly returned to their pre-crisis level in April, rising to around €20/tCO₂.

The end of May was marked by lockdown-lifting and economic recovery with the announcement of a 750 billion euro recovery plan from Brussels. In the wake of this, a remarkable rise in the price of CO₂ was observed throughout June and early July. The price peaked on 6 July at €29.7/tCO₂, close to the previous year's historic peak.

The third quarter and the month of October ended with a drop in the price to €23/tCO₂ on 28 October, whilst European countries were facing the second wave of COVID-19 and stepped up their health measures.

Finally, November marked the end of the decline in the price of CO₂ allowances, boosted by the improvement in the health situation and by the prospects for vaccination. The rise continued throughout December, reaching a new

⁵¹ Free allowance allocations from UK companies had actually been suspended in November 2018 by the European Commission pending an agreement on the United Kingdom's exit from the European Union.

record high of €33.4/tCO₂ on 28 December, against the backdrop of the 11 December 2020 agreement to increase the reduction in emissions by European Union countries to 55% by 2030 compared to 1990 levels (versus 43% previously).

Graph 5: CO₂ allowance price changes



2021, which sees the beginning of phase 4, which will continue until 2030, marks new prospects for the carbon market to adapt to the 2050 carbon neutrality objective.

4. 2020, THE HOTTEST YEAR IN FRANCE SINCE THE BEGINNING OF THE 20TH CENTURY

Following the trend of recent years, and in particular 2019 (3rd hottest year), 2020 was again characterized by record temperatures, placing it in 1st place among the warmest years France has experienced since 1900.

In its weather report for the year, Météo France (the French national meteorological service)⁵² indicates an average temperature measurement of 14.1 °C in France, 1.5 °C above normal* and as such exceeding the previous average temperature record of 13.9 °C recorded in 2018.

Winter 2019-2020:

France did not experience a cold snap during this winter. Moreover, the winter was particularly mild (especially February) with an average temperature of 8.2 °C, i.e. 2.7 °C above the seasonal normal* and maximum temperatures often exceeding 20 °C in the south of the country. Furthermore, there was excess sunshine** of 10-30% over much of the country.

Spring 2020:

After a very turbulent start (4 storms in the first week of March), spring 2020 was dominated by dry and exceptionally sunny weather. The weather was very mild throughout the country, with an average temperature of 13.3 °C, i.e. 2 °C above the seasonal normal*.

Summer 2020:

⁵² <http://www.meteofrance.fr/climat-passe-et-futur/bilans-climatiques/843/bilan-climatique-de-l-annee-2020>

* Benchmark average 1981-2010

** Benchmark average 1991-2010



The summer of 2020 was exceptionally dry throughout the country, especially in July, with rainfall down by 15% compared to seasonal averages*. Temperatures were initially rather cool before warming up significantly in August. With two successive heat waves from 30 July to 13 August and a heat peak on 20 and 21 August, the summer of 2020 was one of the hottest since the beginning of the 20th century. During the heatwaves, maximum temperatures were often 6 to 12 °C above the seasonal values over a large part of the country. The average temperature of 21 °C over France and over the season was 1.1 °C above normal*. Sunshine was close to normal or slightly above normal** over most of the country.

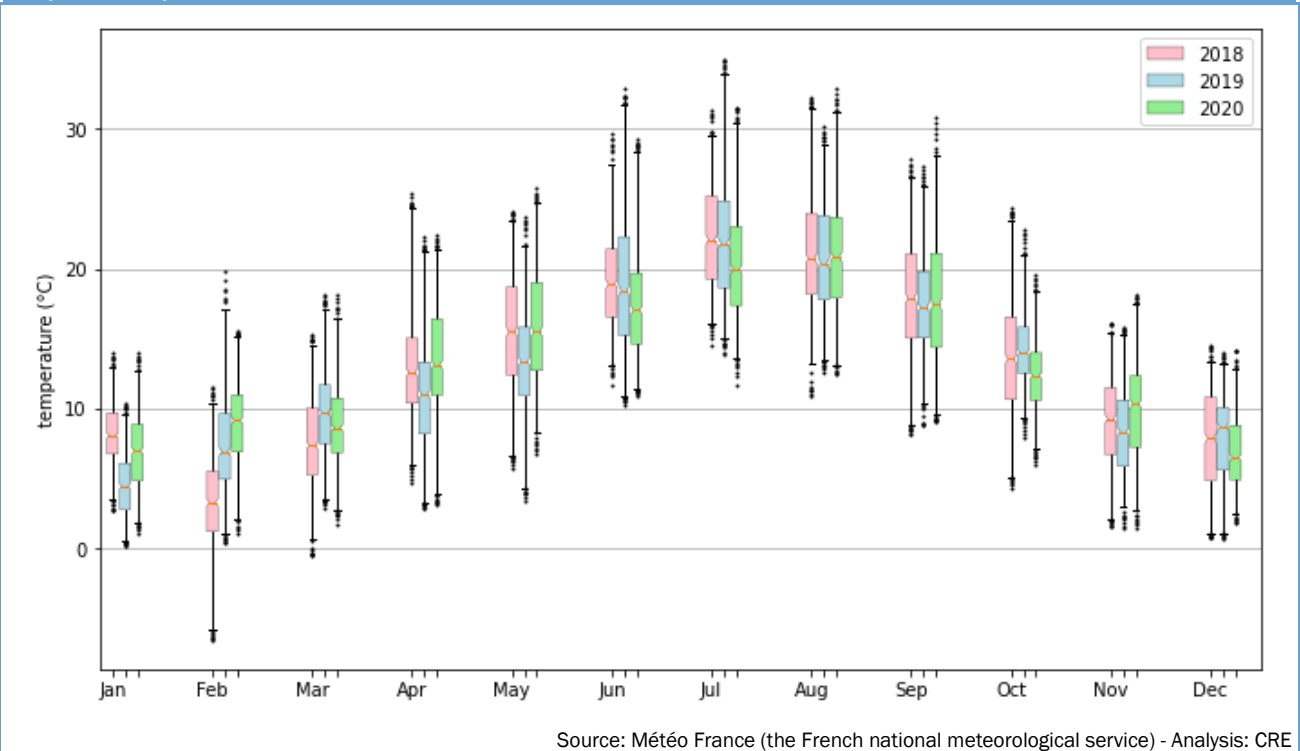
Autumn 2020:

Autumn was very mild (average temperature of 14.2 °C above normal* by 1.1 °C) despite a remarkably cool period from late September to mid-October. An exceptional late heat episode marked mid-September with maximum temperatures above 30 °C throughout the country. October was a very turbulent month with two storms and a historic Mediterranean episode. Sunshine was on average above normal** over most of the country but was very mixed during the season.

December 2020:

Temperatures in December 2020 were very mixed, with very cold spells at the beginning and end of the month, marked by snowfall in the plains, and very mild temperatures, well above seasonal normals between 10 and 22 December. The average temperature of 6.9 °C over France and over the month was 1.3 °C above normal.

Graph 6: Temperature curve for France

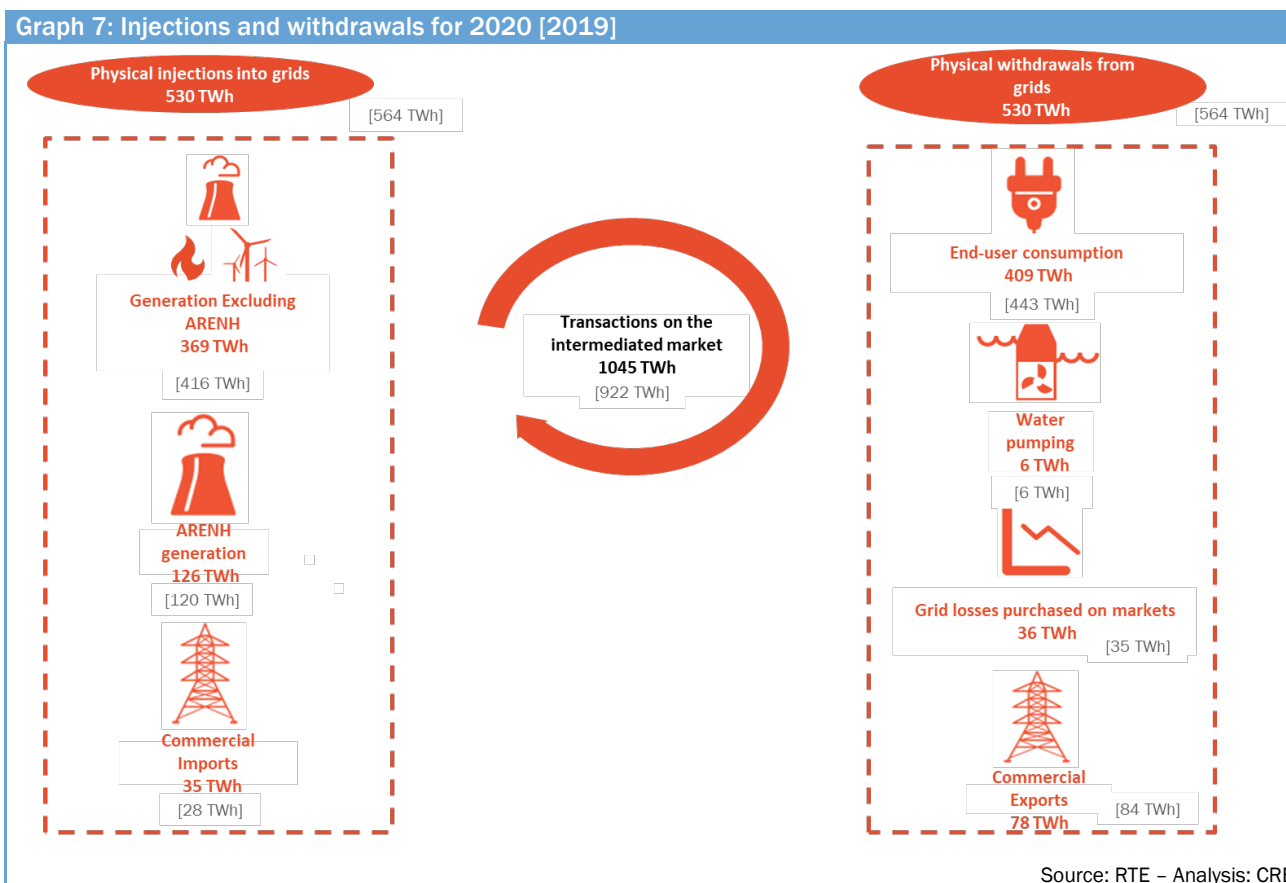


**SECTION 3
WHOLESALE ELECTRICITY MARKETS**

1. CHANGES TO SUPPLY AND DEMAND IN FRANCE, IN 2020

In 2020, wholesale electricity markets were considerably impacted by the COVID-19 pandemic. The health measures and the drop in economic activity had significant impacts on electricity consumption and production, with notable consequences on wholesale prices.

Graph 7 presents a simplified version of the main flows for 2020 in the French electricity system and compares them to 2019 figures (in brackets).



Injections into the network fell significantly, by 6.1%, from 564 TWh to 530 TWh. This decrease is largely due to the reduction in consumption by end customers.

ARENH⁵³ subscriptions for delivery in 2020 increased from 121 to 126 TWh (including 26 TWh to cover losses on the networks) due to the competitiveness of the ARENH product and the fact that the 100 TWh ceiling for suppliers of end customers excluding losses was reached.

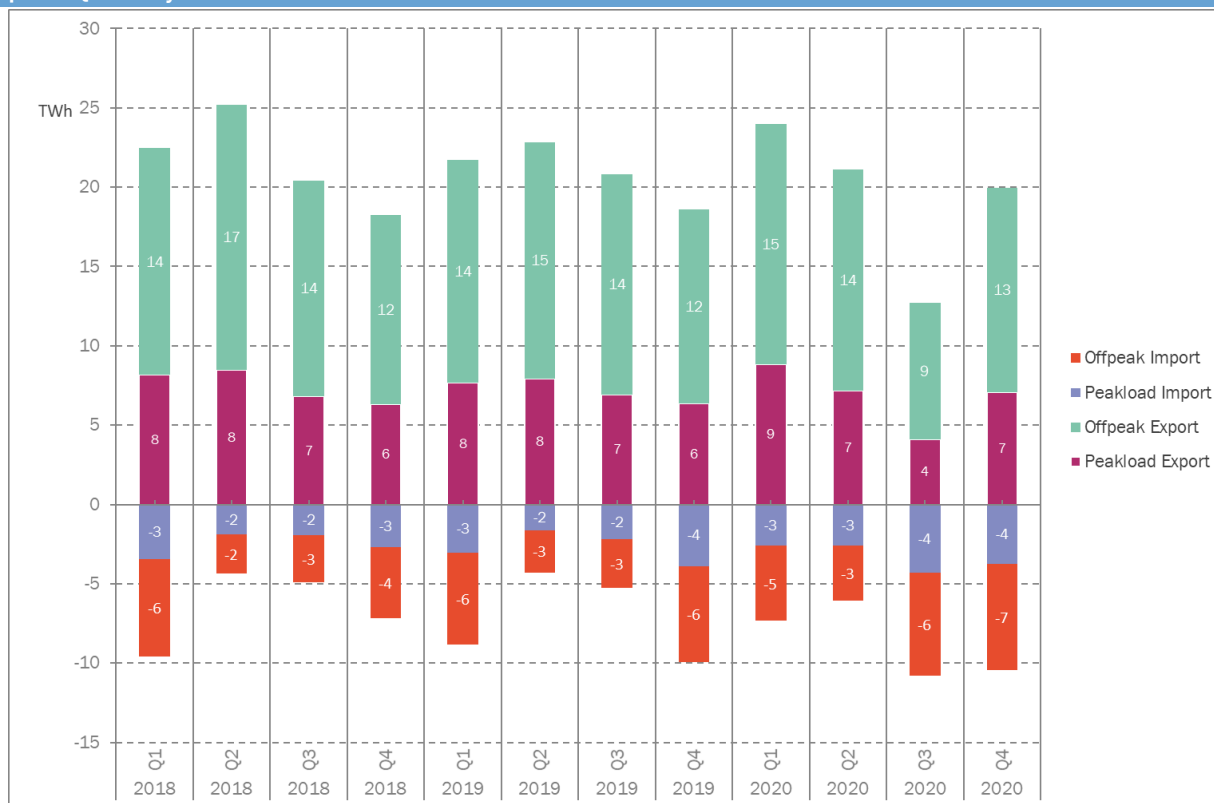
Taking all sectors together, total electricity production in France also fell to 495.1 TWh⁵⁴ (-7.6%). This is the lowest level of production observed in France for 20 years. This observation essentially reflects the lower availability of nuclear power (see section 3, §1.2) but also the drop in consumption.

However, France still had a positive export trade balance in 2020 of 43.2 TWh, down sharply from 2019 (55.7 TWh) and 2018 (60.2 TWh).

⁵³ Regulated Access to Historical Nuclear Electricity (ARENH) is a system that came into effect on 1st July 2010 and obliged EDF to sell part of its nuclear electricity to alternative suppliers at a regulated price of €42/MWh in 2020.
⁵⁴ 2020 RTE electricity report



Graph 8: Quarterly volumes traded at borders



Source: RTE – Analysis: CRE

1.1. The impact of the health crisis on consumption

The health measures, and in particular lockdown of the population, leading to the reduction, or even interruption, of part of the economic activity, had significant impacts on French electricity consumption.

Total gross consumption in France in 2020 fell sharply from 2019 levels to around 449⁵⁵ TWh (473 TWh in 2019), a drop of 5.1%. (Graph 9). This decline can be explained by the impacts of the health crisis and by temperatures that were generally warmer than in 2019, which was already a milder than normal year (see section 2, §4).

To facilitate structural comparison from one year to the next, RTE corrects consumption by taking into account meteorological contingencies⁵⁶ and calendar effects⁵⁷. As such, the consumption corrected by RTE for 2020 is 460 TWh, which is 3.5% lower than the consumption corrected for 2019 and reflects the direct impact of the health crisis.

In particular, consumption was very marked by the first lockdown and fell sharply in March. RTE noted an average one-day drop of over 15% in consumption compared to that usually observed (all other things being equal, after correction for meteorological contingencies) and up to 20% at the height of the crisis. Consumption then gradually recovered as economic activity picked up. From June onwards electricity consumption finally returned to a level close to normal, as a result of lockdown-lifting and the approach of the summer holidays.

In mid-October, as the health situation deteriorated, electricity consumption remained 2 to 3% below normal. Then, from the end of October, the stepping up of health measures (curfews and second lockdown) led to a further decrease in consumption, but much more moderate than in the spring, bringing the decrease to about 3-4% below normal. The second lockdown-lifting and the end of the year saw electricity consumption rise slightly to levels close to 2019.

⁵⁵ See RTE 2020 electricity report.

⁵⁶ In France, electricity consumption is highly dependent on temperatures. Electricity is consumed both for heating in winter (France is equipped with a large number of electric heaters) and for air-conditioning in summer (although the effect is more marginal).

⁵⁷ As years do not have the same number of days from one year to the next (e.g. leap years), a correction is applied to compare years on the basis of 365 days.



Graph 9: Consumption in France



1.2. The availability of nuclear power facilities seriously disrupted by the health crisis

1.2.1. Lockdown measures seriously disrupted the maintenance schedule of nuclear facilities: uncertainties on the security of supply for the winter of 2020-2021

Population lockdown measures rolled out to tackle the COVID-19 pandemic impacted the availability of French nuclear facilities. In the short term, the maintenance of facilities that had already begun had to be extended because less staff was available on-site to carry out maintenance and industrial fabric operation was disrupted. The start of periodic maintenance had to be postponed for the same reasons.

These disruptions lead to a "cascading" effect on the longer-term planned shutdowns: in order to avoid too many facilities being shut down simultaneously, the shutdowns had to be rescheduled, whilst complying with the operational constraints of fuel management and ensuring security of supply, particularly for the winter of 2020-2021. From the end of March, EDF totally reviewed the scheduled shutdowns of its nuclear facilities for 2020 to 2022.

On 11 June 2020, at a press conference on the security of electricity supply given by the French Minister for Ecological and Solidarity Transition, Elisabeth Borne⁵⁸, and the Chairman of the Executive Board of RTE, François Brottes⁵⁹, strain on the balance between supply and demand due to the repercussions of the health crisis was confirmed, but it was emphasized in particular that the adjustments to the schedule of nuclear maintenance had constituted an important and necessary lever for ensuring security of supply during the winter. Additional levers, including load-shedding, were also mentioned.

Updates to the maintenance schedules of the nuclear facilities also involved changes in the use of the facilities. EDF implemented the following practices during the health crisis:

- **modulation shutdowns**⁶⁰: these shutdowns are carried out in particular to save fuel in order to postpone unit shutdowns for refuelling,
- **constrained operation periods**: these periods consist of prioritizing the operation of certain units so that they reach a sufficiently low fuel level to be able to carry out the necessary maintenance operations earlier.

⁵⁸ <https://www.vie-publique.fr/discours/275274-elisabeth-borne-11062020-approvisionnement-electricite-hiver-2020-2021>

⁵⁹ On 11 June 2020, and in conjunction with the public authorities, RTE published an initial analysis of the impact of the health crisis on electricity supply: <https://www.rte-france.com/actualites/point-sur-la-securite-dapprovisionnement-en-electricite-des-francais>.

On 8 April 2020, RTE had already published an analysis of the consequences of lockdown on the electricity system: <https://assets.rte-france.com/prod/public/2020-09/Impacts-crise-sanitaire-COVID-19-systeme-electrique.pdf>.

⁶⁰ Nuclear modulation occurs when a unit operates at reduced power or is shut down for reasons other than technical.

Modulation shutdowns remove some capacity from the market and, as such, have an upward effect on prices. Conversely, periods of constrained operation lower the economic variable cost of the units concerned, which are offered at lower prices on the market, as such provoking a downward effect on prices.

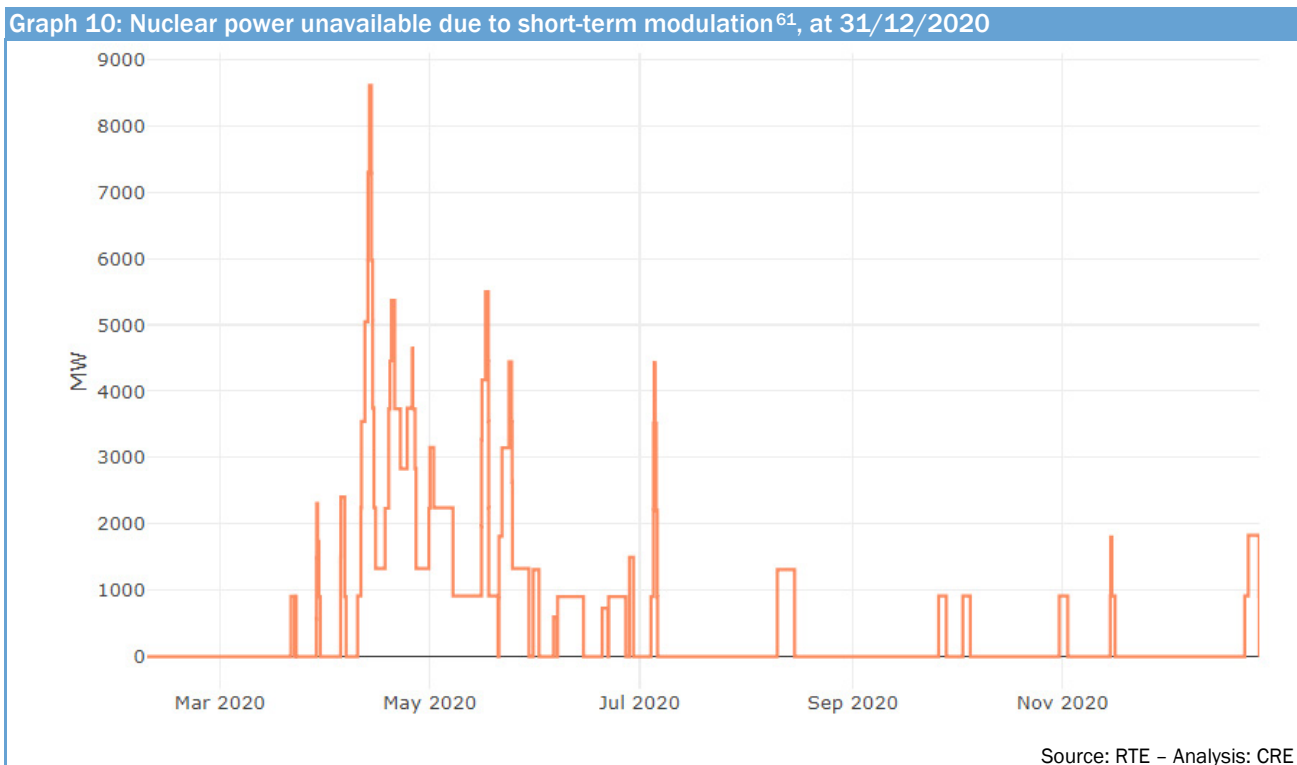
1.2.2. EDF made greater use of the flexibility of its nuclear units to optimize their availability for the winter of 2020-2021

As mentioned above, 2020 was marked by a strong modulation of the power of nuclear units. EDF stated it had carried out two types of modulation:

- production modulations due to a lack of short-term physical openings. This type of modulation is, for example, used in case of very low prices due to low demand or high renewable production. Hereinafter, "short-term modulation",
- fuel-saving modulation. This means optimizing a constrained fuel stock over a period of time. Hereinafter, "long-term modulation".

Short-term modulation

EDF may be required to reduce the production of its power facilities for a few hours or even a few days if the conditions envisaged justify it (high renewable production, low demand, etc.). There was an increase in this type of shutdown or power reduction during the first lockdown, with up to 8.6 GW unavailable on 13 April 2020. Around 30 different units were shut down or curtailed due to modulation.



For this type of modulation, the decision to shut down a unit is taken at very short notice, and most periods of notice prior to the start of shutdown for modulation are, as such, less than 24 hours. Thus, out of 216 updates published before the start of the shutdowns concerned, 98 were updated after the day-ahead auction and for shutdowns starting during the delivery day concerned by this same auction.

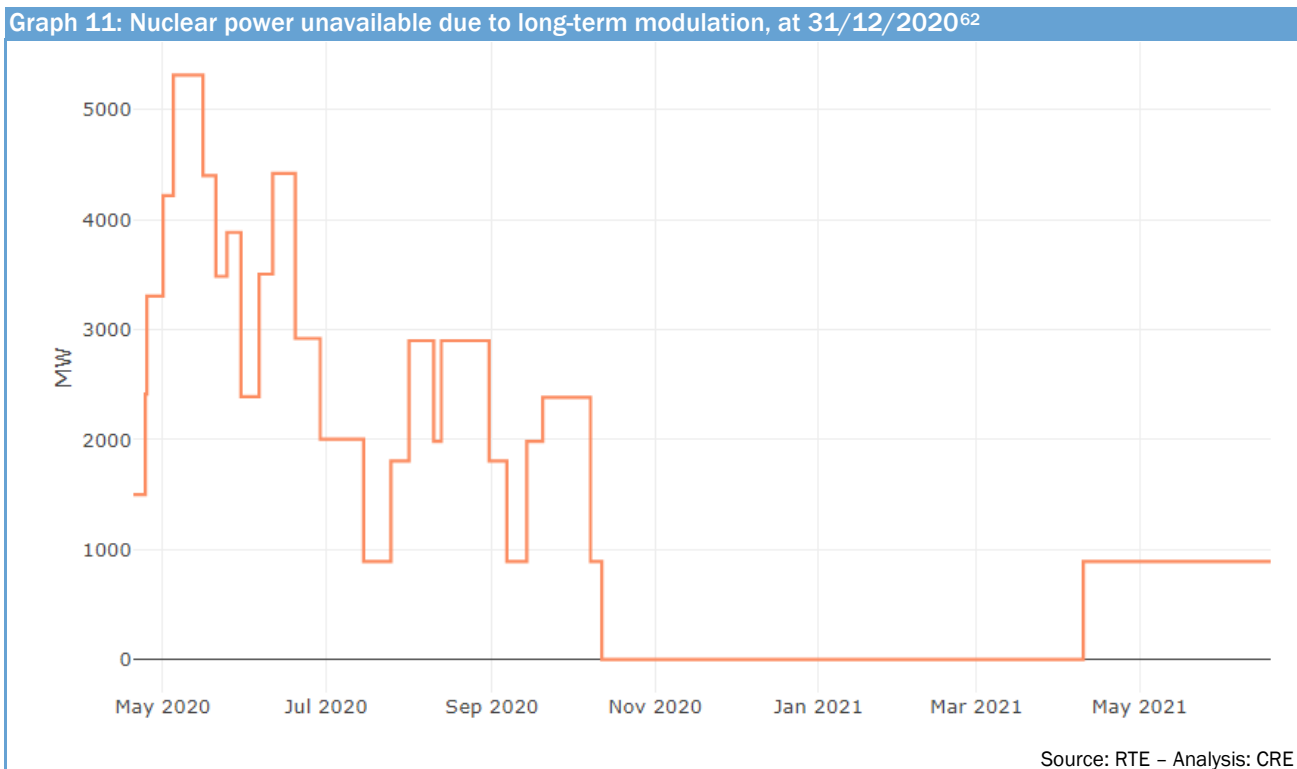
Modulation over longer periods

EDF resorted to unit shutdowns for modulation over several days/weeks for certain units. In order to maintain the highest possible availability of facilities during the winter, EDF waived certain maintenance operations, particularly for refuelling. As such, the units concerned have a limited stock of fuel that must be preserved for use during winter. EDF therefore shut down the facilities for modulation for a certain period of time in advance so that they would not

⁶¹ This calculation is based on the analysis of unavailability published by EDF on the transparency website <https://www.services-rte.com/> and in particular the reasons for unavailability given.



be solicited. Graph 11 below shows the nuclear capacity unavailable due to long-term modulation (actual values for 2020 and forecast values for 2021, based on publications at 31/12/2020).



These long-term modulation shutdowns were announced by EDF to the market in an initial communication on 23 April 2020, via a message in the "additional information" section, which targeted Dampierre 1, Cruas 1, Chooz 2 and Civaux 2. On 24 April 2020, EDF again communicated additional information to specify the number of weeks during which these units, as well as Saint-Laurent 2, would be shut down. EDF then transcribed these messages into unavailability and progressively counted the number of weeks remaining under modulation and announced the end of these special management arrangements where applicable. Furthermore, on 27 July 2020, EDF announced that the Cruas 2 unit would also be shut down.

The communications made by EDF via the additional information messages concerning the shutdowns for long-term modulation were generally consistent with the unavailability subsequently reported for each unit, particularly as regards the estimates of the number of weeks of shutdown. EDF also published a regular breakdown by unit of the number of weeks remaining.

1.2.1. The quality of the publications concerning the production facility availability forecast was of key importance in 2020

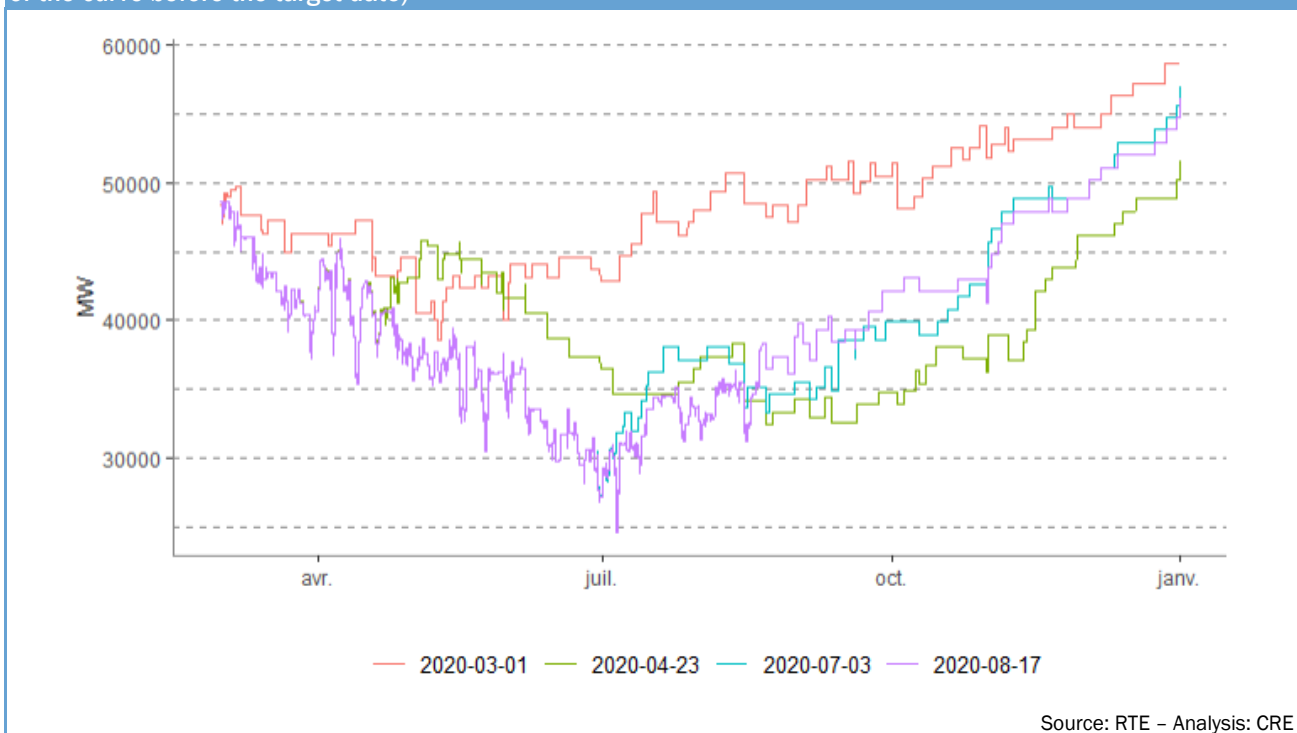
Graph 12 below shows the variations in the availability forecasts for nuclear facilities observed from 1st March 2020 to 17 August 2020 for the period 2020-2021.

Nuclear facility availability for the second half of 2020 was significantly impacted and EDF, before freezing its schedule, was able to announce more pessimistic forecasts of the order of 5 GW for this same period.

⁶² This calculation is based on the analysis of unavailability published by EDF on the transparency website <https://www.services-rte.com/fr/visualisez-les-donnees-publiees-par-rte/indisponibilites-des-moyens-de-production.html> and in particular the reasons for unavailability given.



Graph 12: Nuclear power availability forecasts in 2020 seen at different dates (and actual availability for the part of the curve before the target date)



These significant variations in availability had a strong influence on market prices in 2020 (see section 3, §2.4). It was therefore essential for market participants to have the most accurate information possible, as soon as such information was available.

Pursuant to Article 4(1) of the REMIT Regulation, inside information must be disclosed "publicly in an effective and timely manner". Pursuant to Article 2(1) of REMIT, 'inside information' means information "of a precise nature which has not been made public, which relates, directly or indirectly, to one or more wholesale energy products and which, if it were made public, would be likely to significantly impact the prices of those wholesale energy products". As such, information concerning production facility availability is likely to constitute inside information when these four cumulative criteria are met.

As regards the availability of nuclear facilities over the short and longer term, EDF published a great deal of information throughout 2020 on the RTE and EDF transparency platforms. The table hereinafter presents a selection of EDF's main publications concerning the availability of nuclear facilities impacted by the health crisis. These publications were made in three forms: press releases for information of a global scope, unavailability published unit by unit reflecting changes in the shutdown programme, and additional information.

Table 3: Key EDF publications on the impacts of the health crisis on nuclear production

Date	Communication means	Key information
23/03/2020	Press release	Review of the shutdown programme for nuclear units Withdrawal of the nuclear production target for 2020 and perhaps 2021
09/04/2020	Unavailability reported on the transparency platform	Modification of the unavailability message for 17 units (about 40 messages) to announce their forced operation
14/04/2020	Press release	Nuclear production target being reassessed at a significantly lower level Abandonment of financial targets
16/04/2020	Press release	Announcement of potential modulation of reactors during summer and autumn. Nuclear target of 300 TWh in 2020 and 330-360 TWh for 2021 and 2022.
22/04/2020	Press release	Publication of the message "The disruptions caused by the health crisis are leading EDF to review the duration and schedule of maintenance shutdowns at its facilities. Levers are being studied to secure nuclear facility production capacity during the winter of 20-21. They may result in the postponement of

		<i>certain shutdowns scheduled for 2020, which EDF will communicate as soon as decisions can be made (see press release of 16 April 2020)."</i>
22/04/2020	Unavailability reported on the transparency platform	Modification of the unavailability of 41 nuclear units (approximately 47 publications) to take into account delays in the maintenance schedule. Unavailability is not moved but extended. In addition, 3 shutdowns have been cancelled and 4 others postponed (mainly to 2021)
23/04/2020	Additional information on the transparency platform	Announcement of the potential shutdown of the Dampierre 1, Cruas 1, Chooz 2 and Civaux 2 facilities from 24/04/2020 depending on economic conditions
24/04/2020	Additional information on the transparency platform	Details of the number of weeks of shutdowns for modulating Dampierre 1, Cruas 1, Chooz 2, Civaux 2 and Saint-Laurent 2 are published
02/07/2020	Additional information on the transparency platform	The nuclear production target for 2020 is reassessed upwards (315-325 TWh instead of 300 TWh)
02/07/2020	Additional information on the transparency platform	Modification of the unavailability of 22 units to take into account lesser delays in maintenance in 2020

CRE carried out in-depth analyses on the publication of this insider information pursuant to Article 4(1) of the REMIT Regulation. In periods of great uncertainty, such as the period impacted by the health crisis, particular attention must be paid to the balance between the level of accuracy of the information and the timeframe in which the information is published.

1.3. Change in installed capacities: wind and solar energy continue to grow

2020 was marked by the closure of the two Fessenheim nuclear units, the first in February and the second in June. Installed nuclear capacity in France decreased, as such, for the first time (-1.8 GW) to a total of 61.3 GW.

The installed capacity of fossil-fired power remains stable (19 GW) but is expected to decrease significantly from 2022 onwards due to the French government's intention to close the remaining coal-fired units (~ 3 GW),⁶³ as set out in the French Multi-annual Energy Programme (PPE) and confirmed by French Act No. 2019-1147 of 8 November 2019 on energy and climate.

Installed hydraulic capacity is stable.

Only the solar and wind sectors were to see their installed capacity increase significantly in 2020. The solar park stood at 10.4 GW (+ 8.5%) and the wind park at 17.6 GW (+ 6.7%). However, these growth rates are lower than the average growth rates observed since 2014 (see Table 4).

As a reminder, the French Multi-annual Energy Programme (PPE⁶⁴) target for renewable electricity production stands at 24.1 GW in onshore wind by 2023 and 33 GW by 2028. These targets for solar power are 20 GW and 35 GW respectively.

Production from renewable sources (excluding hydro) increased by 11% compared to 2019, reaching 61.5 TWh. Wind generation increased by 16%, or 39.2 TWh, given the growth of facilities installed but also given favourable weather conditions. This sector was only slightly impacted by the COVID-19 crisis. The production volume of the wind units now exceeds that of the gas units.

The solar sector was also up by 4.5% compared to 2019 with 12.6 TWh of production in 2020.

⁶³ Only 4 coal-fired electricity production sites remained in France in 2020: Le Havre, Cordemais, Saint-Avold and Gardanne

⁶⁴ French Multi-annual Energy Programmes (PPEs): <https://www.ecologie.gouv.fr/programmations-pluriannuelles-lenergie-ppe>

Table 4 Change in installed capacity in the renewable energy sector

	2014	2015	2016	2017	2018	2019	2020	AAGR ⁶⁵ 2014/2020
Wind (GW)	9.3	10.3	11.8	13.5	15.1	16.5	17.6	+ 11%
Solar (GW)	5.3	6.2	6.8	7.7	8.5	9.6	10.4	+ 12%

Graph 13: Comparative change of the installed capacities of renewable energy (excluding hydro) and fossil-fired energy (excluding nuclear)

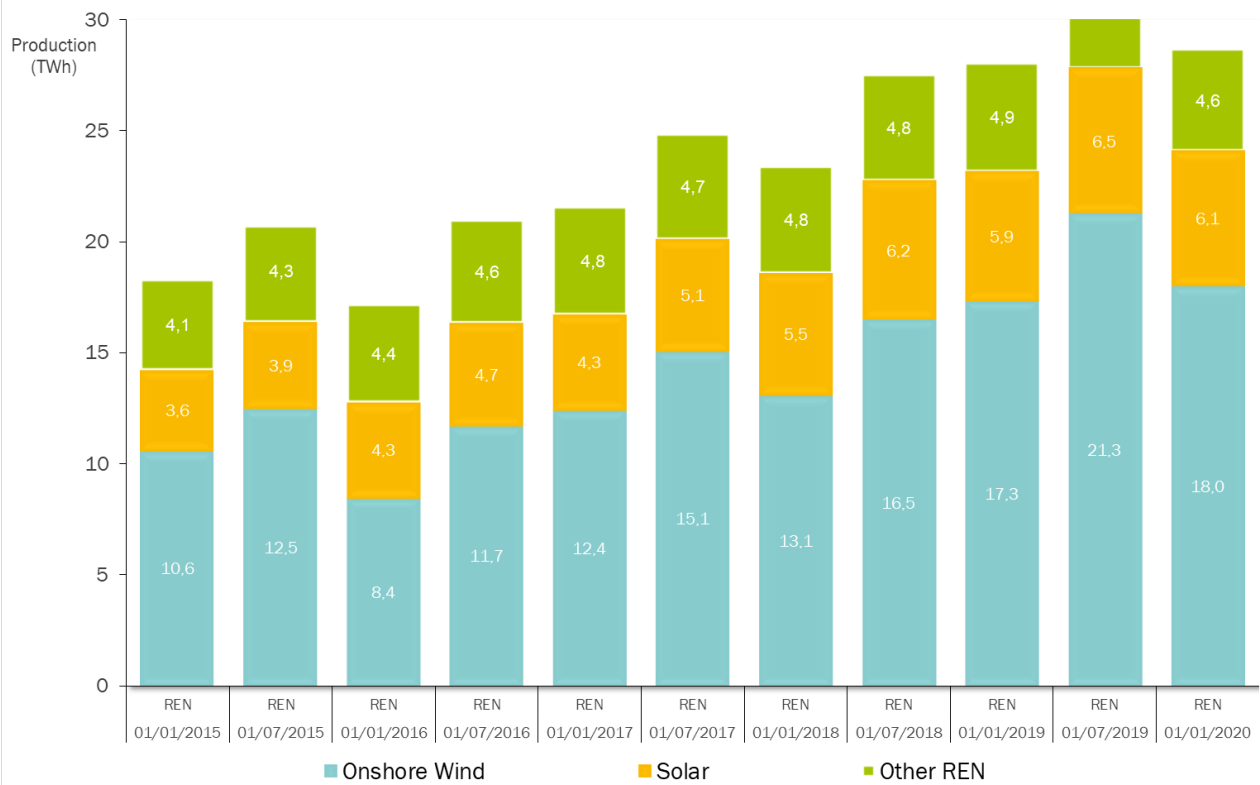


Source: RTE – Analysis: CRE

⁶⁵ Average annual growth rates.



Graph 14: Comparison of half-yearly production of renewable energy (excluding hydro) and fossil-fired energy (excluding nuclear) energies



Source: RTE – Analysis: CRE

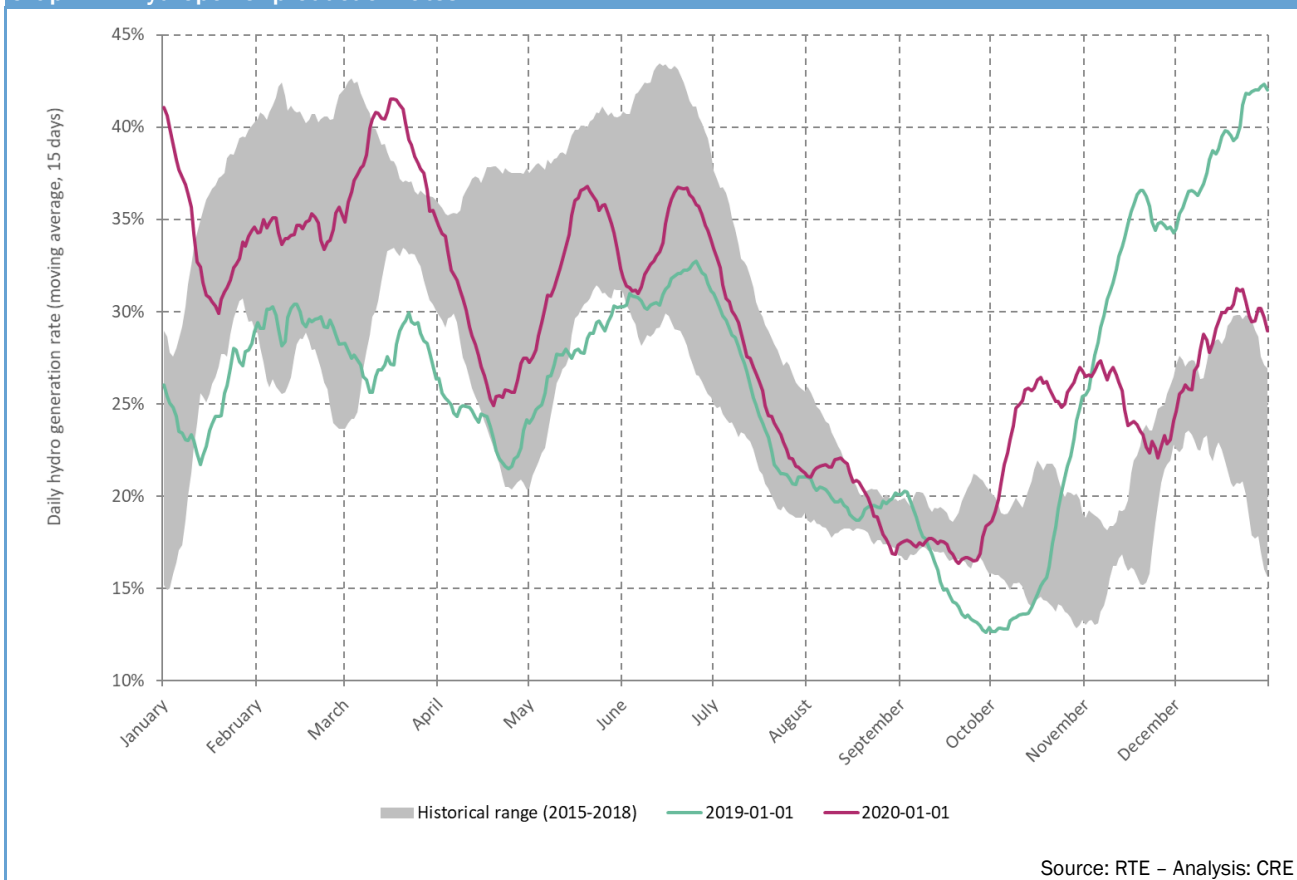
1.4. Hydraulic production in 2020 benefited from high stocks at the end of 2019 and normal rainfall

2019 ended with particularly high hydraulic stock. As a result, hydraulic production at the beginning of 2020 was significantly higher than the historical levels observed in recent years. The sector was relatively little used subsequently, particularly due to the drop in energy demand in France. Notwithstanding, the annual production of the sector finally finished the year at over 64.4 TWh, i.e. an increase of 8.2% compared to 2019.

At the same time, rainfall in 2020 was particularly contrasted. There was a great lack of rain in July, a record for the 1959-2020 period, with less than 20 mm on average over France, which also saw one of the driest Novembers in recent years⁶⁶. In contrast, December and October were particularly rainy. On average, rainfall was close to normal in 2020.

Hydraulic stocks remained high at the end of the year as such, enabling the sector to ensure additional production in anticipation of the tense winter of 2020-2021.

Graph 15: Hydropower production rates



Source: RTE – Analysis: CRE

1.5. The production of the gas sector decreased given the drop in consumption and the unfavourable economic environment

The gas sector, which now accounts for almost all of the fossil-fired production, showed a drop in production of 9.4% in 2020 compared to 2019 and amounted to 33.6 TWh. This fall in production was part of an overall backdrop of falling consumption. It should also be noted that there was an increase in the unavailability of gas-fired production facilities, which stood at 1,500 MW on average over the year (+ 500 MW compared with 2019).

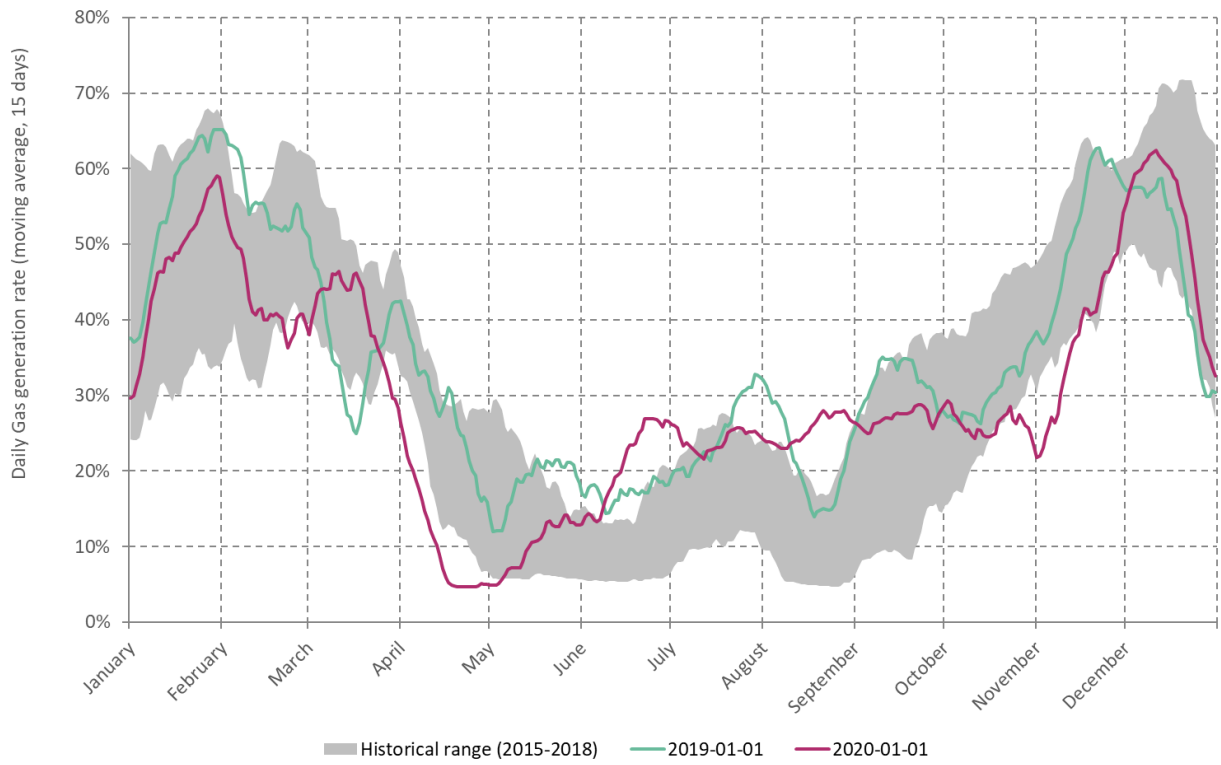
Gas-fired thermal production was mainly concentrated in winter, when installed capacity was running at 70% on average. The increase in spot prices in September did not benefit the sector. The level of unavailability of gas-fired production facilities was high at the end of the summer (over 3.5 GW of unavailability recorded) and coproduction facilities were generally not yet operating.

The production profile of gas-fired facilities illustrates the contribution of this sector to security of supply in winter and its necessity as regards energy transition.

⁶⁶ 2020 weather report, Météo France (the French national meteorological service)

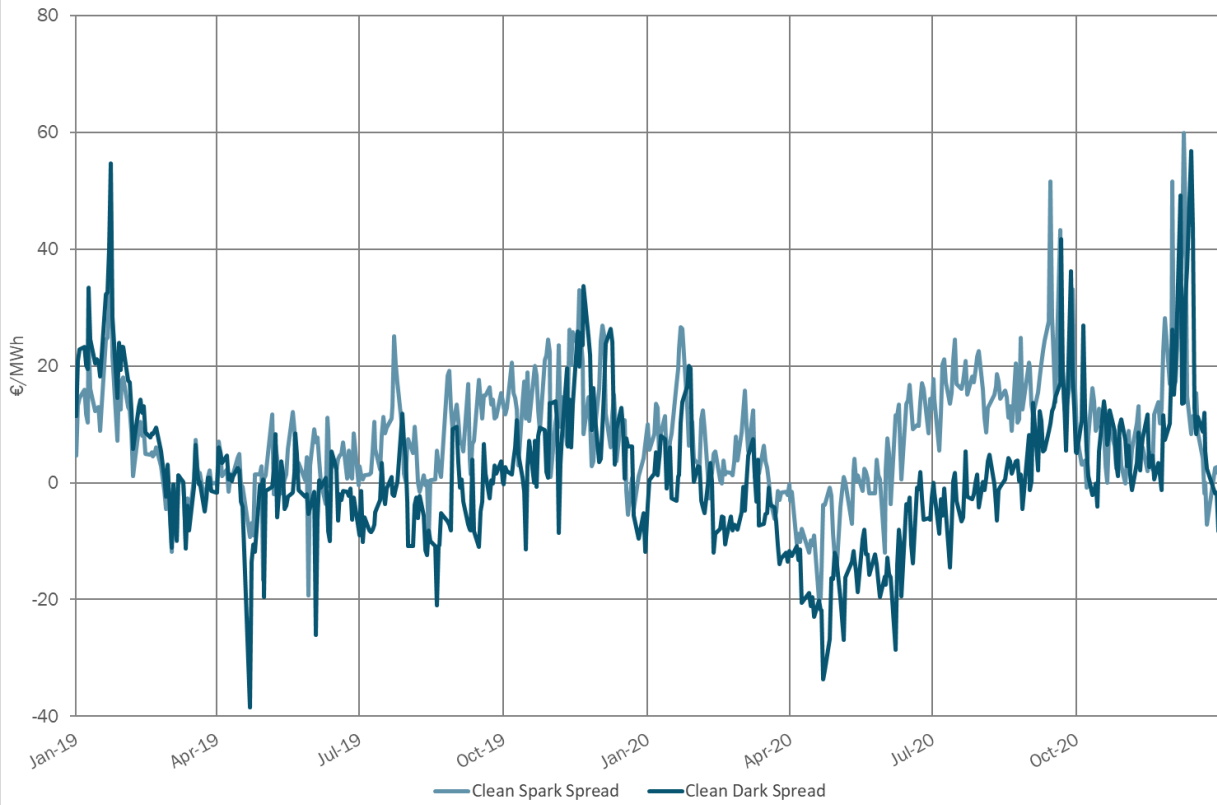


Graph 16: Gas sector production rate



Source: RTE – Analysis: CRE

Graph 17: Peak spot clean dark and clean spark spreads



Sources: ECX, Heren, EPEX Spot – Analysis: CRE

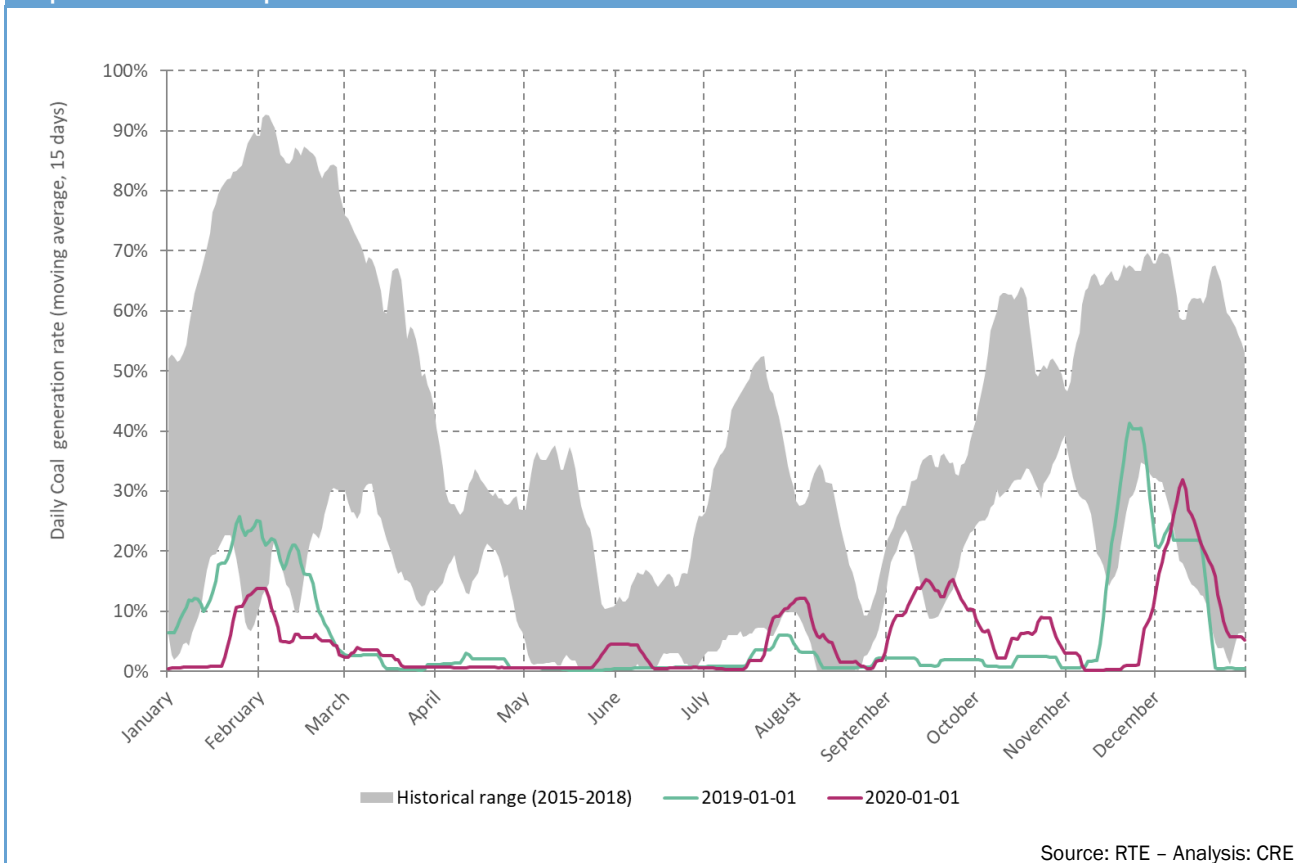
1.6. The contribution of coal-fired power facilities to the French energy mix is decreasing, in line with the gradual withdrawal of this sector from the national mix

Electricity production from coal continued to fall (-13% between 2019 and 2020) and appears to be increasingly marginal (1.4 TWh in 2020, i.e. less than 0.3% of national production). A high CO₂ price and high technical unavailability (almost 40% of the installed base on average) largely explain this result. The French public authorities' intention to close the remaining coal-fired units (~ 3 GW) in 2022 should further exclude this sector from the French energy mix.

Coal-fired production resumed sporadically however during the heat waves of July and September to compensate for the drop in nuclear production during this period of high temperatures and drought.

At the end of the year, coal-fired production increased slightly due to the increase in winter consumption, but also to a rising gas price and a falling CO₂ price until November⁶⁷.

Graph 18: Coal sector production rate



Source: RTE – Analysis: CRE

1.7. Marginality of the various production sectors in 2020

An energy production sector is referred to as "marginal" when the last production unit required to meet demand belongs to that sector. Its marginal production cost therefore theoretically determines the market price in the day-ahead auction. The marginality of a production sector can be very different from its share of annual production.

However, as CRE stated in its deliberation of 6 May 2021⁶⁸, it is difficult in practice to identify the marginal mean.

The main issue in identifying the marginal means is the proximity of the variable costs of the means of production of different sectors. For example, water-use values may be very close to the marginal costs of gas-fired production facilities.

⁶⁷ The clean spark and dark spread are calculated on the basis of the following assumptions: Gas (efficiency - 49%, emission rate - 0.46 tCO₂/MWh) and Coal (efficiency - 35%; emission rate - 0.96 tCO₂/MWh)

⁶⁸ Deliberation of the French Energy Regulatory Commission (CRE) of 6 May 2021 approving the RTE report on the emission factor associated with the French electricity market



Furthermore, producers are not obliged to bid for an offer at their variable cost in the day-ahead auction: they may want to include their startup costs or agree to sell at a loss over an hour to avoid restart costs or to participate in the reserve market.

Finally, the definition of "marginal technology" itself may be problematic as it is often the case that several facilities (possibly of different technologies) have to adjust their production to cope with even an infinitesimal variation in demand. This may be the case, as such: (i) because of market coupling and flow-based pricing, which means that the price of an area is not necessarily determined by a single means of production, and (ii) when the management, even if infinitesimal, of one means impacts on others. For example, "block" bids on the market that cover several time steps and are accepted or rejected simultaneously.

As such, the determination of the marginality rates of the different sector has a normative character.

To better reflect this observation, CRE has modified its method for determining marginal sectors. This new method enables several technologies to be considered as marginal at the same time.

CRE's calculations are based on the marginal cost data transmitted directly by the producers.

The description of the method for each hour of the year is given below:

1. If France is coupled to at least one country (coupling threshold of €0.01/MWh), and if there is no production with marginal cost of less than €1/MWh of the spot price, then the border is part of the marginal means;
2. The production means⁶⁹ whose marginal cost is close to the spot price are also part of the marginal means. The contribution of each means to marginality decreases according to the difference between the spot price and its marginal cost;
3. If France is not coupled to at least one country, and if there are no means with a marginal cost close to the spot price, then marginality is set to "other".

The result for 2019 of this new method is presented for comparison (Graph 19).

Firstly, we observe great stability in the marginality durations of the main sources of energy between 2019 and 2020.

Although nuclear accounts for nearly 70% of electricity production in France, it is marginal only 28% of the time. This result illustrates the baseline operation of this technology. However, the marginality of nuclear power increased compared to 2019, due to the decrease in consumption and prices observed in 2020. This increase in marginality resulted in a greater need for flexibility in nuclear facilities, which is consistent with the modulation shutdowns implemented by EDF (see section 3, § 1.2).

More than half of the time, spot prices are close to the value of use of a hydro facility or are equal to those of another market coupled with the French market. This trend was confirmed in 2020, but with a reversal of the merit order⁷⁰ between hydro and borders, which could be explained by a larger hydro stock.

Gas-fired combined-cycle facilities still appear as a semi-basic means in France, with a relatively low share of the sector in electricity production, but fairly high marginality (> 11.5%).

Coal is increasingly being pushed out of the merit order and now appears as a peak capacity. This result is explained by the rise in the price of CO₂, which weighs on its operating costs compared to other technologies, particularly gas combustion turbines, which are now less expensive.

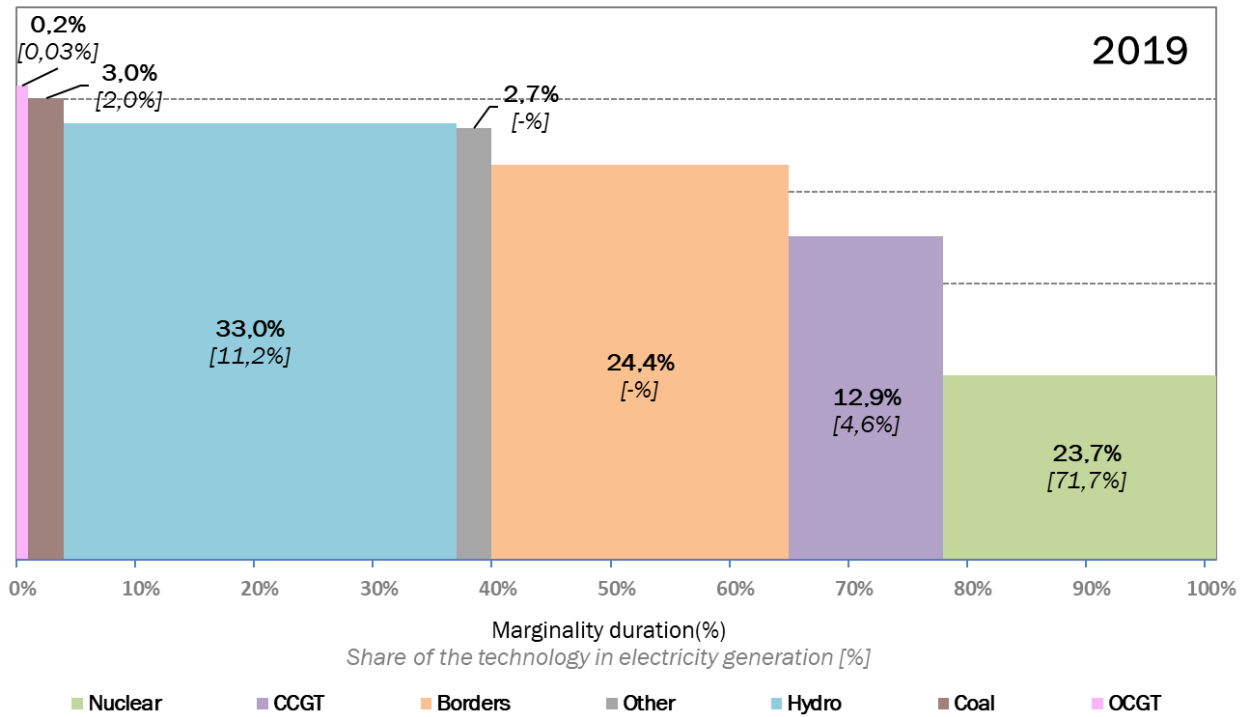
All other things being equal, the average price of all technologies decreased in 2020. This phenomenon illustrates the sensitivity of the marginal costs of all technologies, including non-thermal ones, to the price of commodities and CO₂, notably due to their opportunity cost management.

⁶⁹ Provided for in the call programme

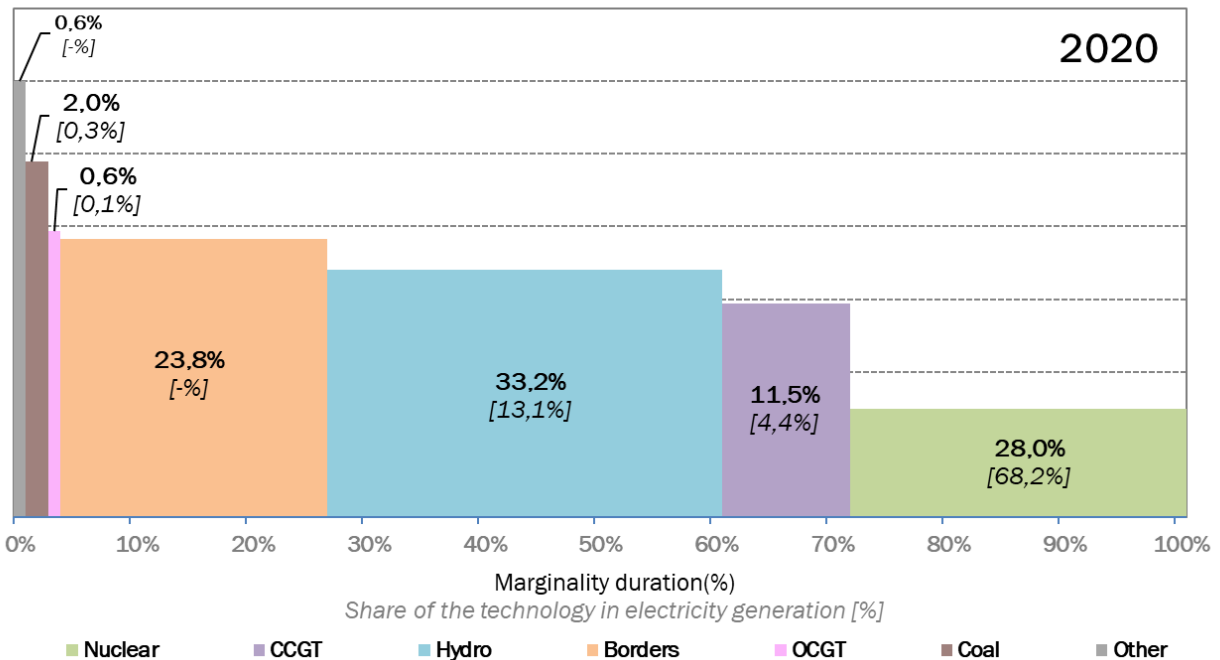
⁷⁰ Merit order

Graph 19: Marginality on the various production sectors in 2019 and 2020

Average price



Average price



Sources: EPEX SPOT, RTE, Producers – Analysis: CRE

2. WHOLESALE ELECTRICITY PRICES

2.1. The spot price collapsed during the health crisis and fell by 18% on average in 2020

The average base spot price for 2020 fell sharply to €32.2/MWh on average, a decrease of 18% compared to 2019 (€39.45/MWh) (Graph 20). Such a low level has not been reached since 2004 and can be explained by the drop in electricity consumption due to the COVID-19 health crisis (see section 3, § 1.1) and milder than normal temperatures, particularly during the winter at the beginning of the year (see section 2, § 4). This decline in spot prices was observed throughout Europe in 2020.

The health crisis had a strong impact on the spot price of electricity, especially during the first lockdown period, when electricity consumption fell the most. Given the decline in consumption, electricity production had to adapt. The means of electricity production are called in order of increasing marginal cost. As such, the first means called are renewable energies (wind, solar, run-of-river hydro) whose production cannot be controlled and whose variable cost is low or zero, then nuclear facilities and finally semi-base and peak means, such as gas-fired and coal-fired facilities and hydraulic dams.

Low demand and high wind and photovoltaic production (7.7 TWh instead of 6.5 TWh over this period in 2019) led to less use of thermal resources (production from gas and coal fell by 53% compared with the same period the previous year) and forced "controllable" electricity production to adapt. Nuclear production fell by 18% between 17 March and 11 May to 49.5 TWh, the absolute historical minimum for this period (see section 3, § 1.2). This new balance of supply and demand and the sharp drop in commodity prices (see section 2, § 2), particularly natural gas, led to a very sharp fall in prices on the spot markets: the average price in France over this period was €15.3/MWh (€37.8/MWh in 2019). The first lockdown was also marked by a large number of negative hours. The French price even fell to -€75.8/MWh on Monday 13 April, when consumption was particularly low (Easter Monday) and wind and solar production was high in Europe. Overall, negative prices⁷¹ were observed for 102 hours in 2020 (compared to 27 hours in 2019).

Lockdown-lifting and consumption recovery enabled a gradual rise in spot prices from June and over the summer.

September was marked by episodes of strain on the supply-demand balance, the prolonged maintenance of several nuclear reactors due to the pandemic and environmental constraints (low river flows) reducing the availability of production facilities (see section 3, § 1.2). This strain led to high spot price levels. Moreover, periods where high pressure dominated significantly reduced wind production in Europe on certain days, leading to price peaks. The French price was above €100/MWh for 6 hours and reached up to €200.04/MWh on Monday 21 September at 7pm. This peak was the highest since November 2018. However, it remained limited compared to some previous episodes where the French price moved beyond €1,000/MWh.

High spot price levels were also observed in December (price above €100/MWh for a total of 19 hours), which was characterized by very cool and below-seasonal temperatures until 10 December and during the end-of-year festivities (see section 2, §4), leading to an increase in consumption with, as in September, high-pressure periods reducing wind production in Europe.

Intraday prices followed the same pattern as baseload spot prices to reach an average of €32.92/MWh for hourly products, which corresponds to a 17% reduction compared to 2018 (Table 5).

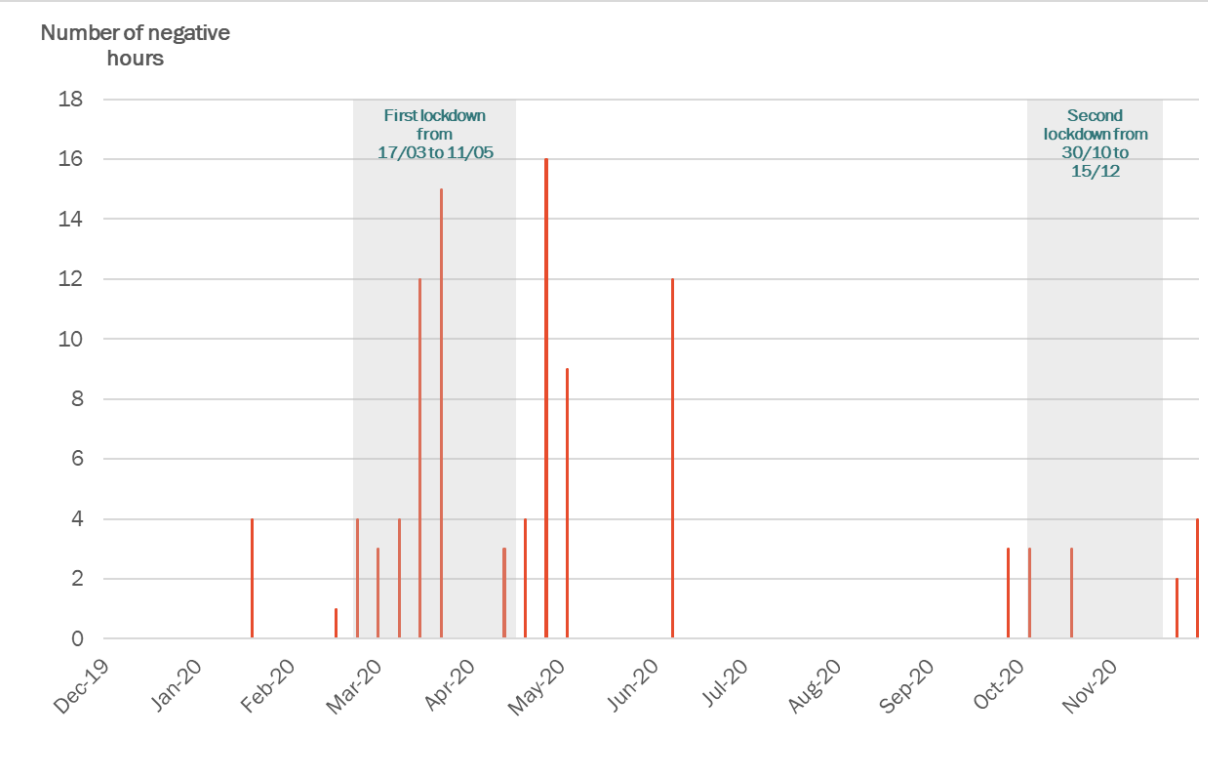
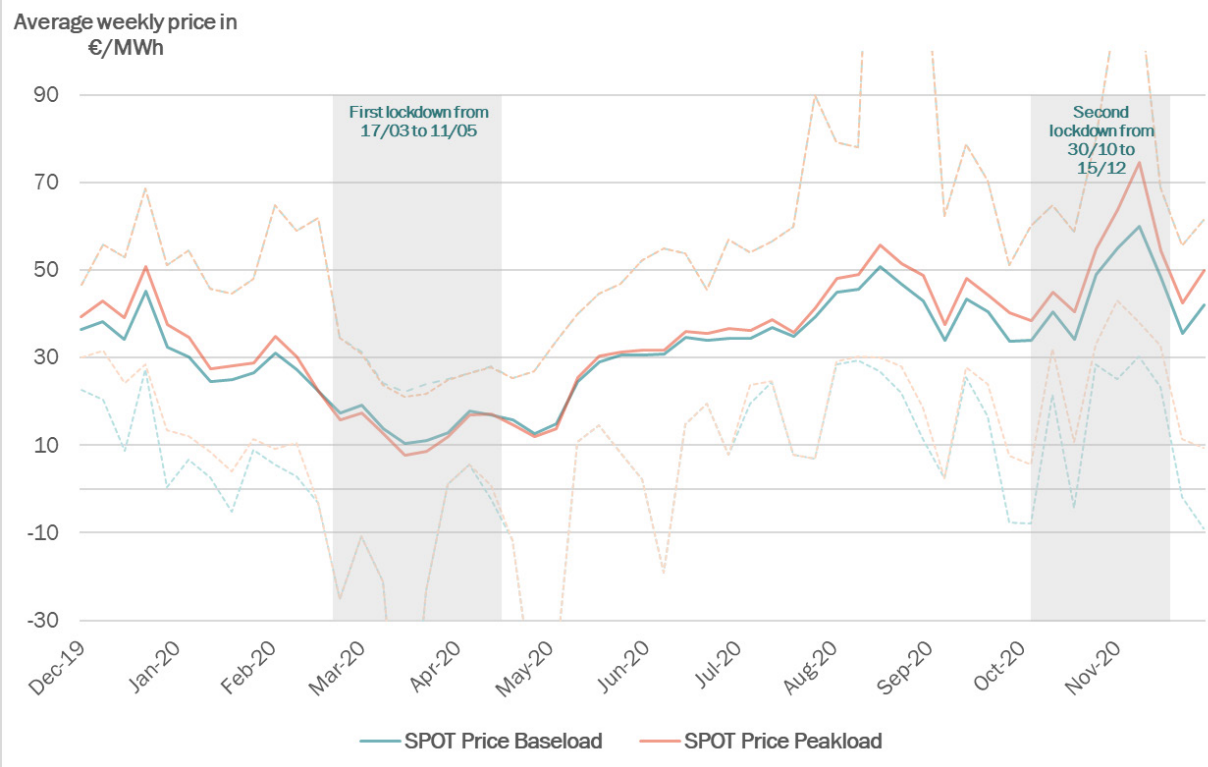
Table 5: Average day-ahead and intraday prices

Period	Average day-ahead price	Average intraday price
2018	€50.20/MWh	€51.19/MWh
2019	€39.45/MWh	€39.4/MWh
2020	€39.29/MWh	€39.92/MWh

Source: EPEX SPOT

⁷¹ Negative prices are rare, but increasingly frequent, episodes that occur in particular when supply exceeds demand (consumption peaks, overproduction of fatal production means such as wind or solar power) and when the production means in operation are not flexible enough to modulate their production in a rapid and profitable manner. The market price may then fall sharply, or even become negative, informing the market of the need to reduce production or increase consumption. The price then no longer reflects the variable cost of the means of production over a given period, but the producers' trade-off between their costs of stopping and restarting with the costs of selling their energy at a negative price over this period.

Graph 20: Change in day-ahead prices in France (average weekly prices)



Source: EPEX SPOT

2.2. Difference between spot prices and EDF marginal costs in 2020

In terms of the formation of spot prices, CRE reviews spreads between the spot market prices and the marginal costs reported by EDF using calculations from its daily optimization models.

Since 2017, the indicator presented by CRE is determined as the monthly arithmetic average of the spreads between the spot price and the marginal cost⁷² of EDF's facilities, divided by the average spot price.

$$Ecart\ moyen = \frac{1}{12} \sum_{m=1}^{12} \frac{\sum_{hem} (prix_{spot,h} - cout_{marginal_{EDF,h}})}{\sum_{hem} (prix_{spot,h})}$$

On average, the price-cost spread in 2020 was 1.5%, i.e. a level equivalent to that observed in 2019 but lower than that of 2018, which was 3.5% (see the 2019 and 2018 surveillance reports).

The various spreads published in successive surveillance reports⁷³ are presented in the table below.

Table 6: Changes in price spreads and EDF marginal costs

Year	Price/cost spread
2008	6.0%
2009	6.5%
2010	3.2%
2011	5.0%
2012	2.2%
2013	4.5%
2014	5.5%
2015	5.3%
2016	2.9%
2017	1.5%
2018	3.5%
2019	1.5%
2020	1.5%

CRE stresses that this indicator is based on reporting data and does not call into question the correct level of EDF's marginal costs. Furthermore, the average spread does not reflect the occurrence of exceptional spreads, for which CRE is likely to implement additional controls.

Without pre-empting additional checks, CRE considers that the average spread measured in 2020 is not indicative of the exercise of market power by EDF.

2.3. Convergence of French spot prices with neighbouring countries

The coupling of the European spot markets makes it possible to improve the management of interconnections and market liquidity, by means of a so-called "implicit" allocation which enables allocating the energy asked or bid by market participants and the capacity at the interconnectors in a single process. Market participants can buy and sell electricity the day before for the day after through power exchanges⁷⁴. As such, the daily market prices are identical as long as interconnection capacities are not saturated by trading (exchanges). Since 2006, CRE has been a driving force for the integration of electricity markets and coupling with other European markets. Market coupling has now become a European mechanism, implemented in all electricity-connected countries of the European Union since June 2021⁷⁵.

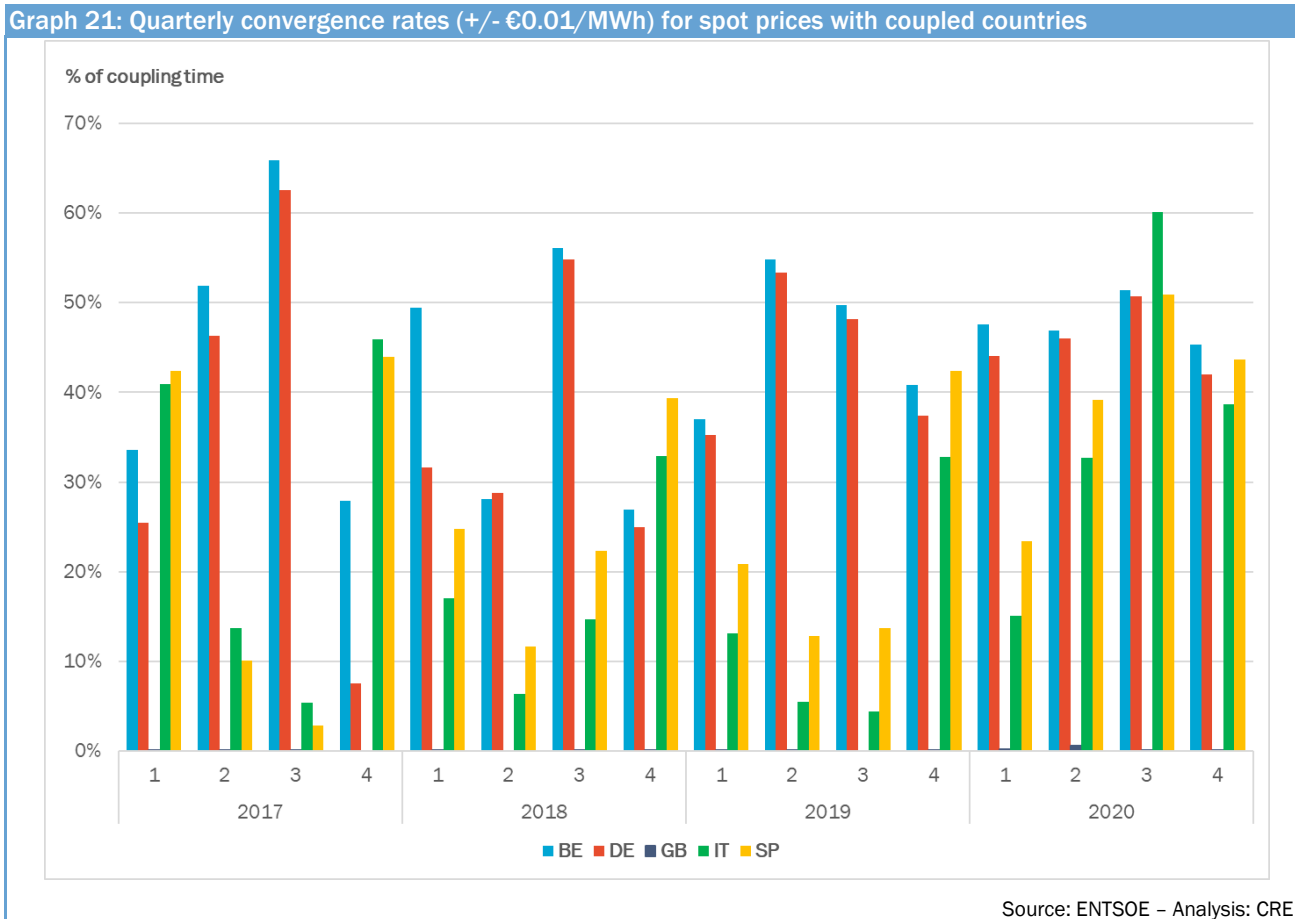
⁷² This is the cost for EDF of producing 1 extra MWh from its production facilities. EDF declares this quantity for each hour to CRE.

⁷³ The method for calculating the average spread changed in 2017.

⁷⁴ The transmission capacity needed for energy exchange is allocated "implicitly" in the auction system. Since 2015, the coupling of the CWE region is carried out using a flow-based multi-border optimization method.

Special cases exist, where capacity allocation can be carried out "explicitly", instead of or in addition to "implicit" allocation.

⁷⁵ The particular case of Switzerland, where the daily and intraday markets are not coupled, should be noted. There are, however, long-term contracts, which have free priority access to interconnection capacity.



In 2020, convergence rates increased significantly compared to 2019, especially for Italy (average increase of 163%) and Spain (average increase of 75%). Convergence rates also increased for Belgium and Germany, but to a lesser extent (around 5%). This increase can be explained by more homogeneous market conditions between the different countries in the region, as well as by an increase in the interconnection capacity made available to the market (in particular thanks to improved coordination between TSOs for the flow-based calculation). Moreover, the drop in consumption in Europe linked to the COVID-19 pandemic was also an important factor in this increase in the convergence of European spot prices. Given the drop in consumption, certain interconnections were less solicited, facilitating spot price convergence.

The details of the convergence rates and price spreads for the different countries in 2020 are given in Graph 22.

Table 7: Average convergence rate with the French price per country in 2019 and 2020

Year / Country	Belgium	Germany	Great Britain ⁷⁶	Italy	Spain
2019	87%	87%	87%	87%	87%
2020	87%	87%	87%	87%	87%

Source: ENTSO-E

⁷⁶ With the exit of the United Kingdom from the European Union, the United Kingdom has not been part of the European daily and intraday market coupling mechanisms since 1st January 2021.



Graph 22: Spread between European spot prices and French prices in 2020



On average, spot prices in Italy, Spain, Switzerland and Great Britain were higher in 2020 than the French spot price, as has been the case since 2017. In contrast, the German price is still lower. Nevertheless, these price differences are reduced compared to 2019, reflecting the easing of the market due to the COVID-19 crisis.

Table 8 Average European spot prices compared with the French spot price since 2017 (prices in red are higher than French prices and prices in green are lower)

Country	BE	CH	DE	FR	GB	IT	SP
2017	44.6	45.9	34.2	45.0	45.3	54.4	52.2
2018	55.2	52.2	44.4	50.1	57.4	60.7	57.2
2019	39.4	40.9	37.7	39.5	42.9	51.3	47.7
2020	31.8	34.0	30.4	32.2	35.2	37.8	33.9

2.4. Futures prices in France and Europe

Wholesale futures prices, in particular the annual product, play a key role in the economics of the electricity system: they determine the price paid by consumers to a large extent, and also make up a large part of producers' income.

Futures markets enable electricity trading in advance of given delivery periods in the future. They group products for different time horizons ranging from a few days to several years in advance. For financial delivery products, settlement prices are assessed daily until the last delivery day of the contract and are ultimately the average of the spot prices over the delivery period of the contract. These contracts are used by market participants to exchange price variation risks, for example, for a producer, to "secure" a volume and a price before delivery, or for a supplier, to determine a supply price to consumers or "secure" a supply margin. Over the longer term, futures prices are a signal for investment and can be used as a reference in negotiating long-term contracts.

Futures markets were also strongly impacted by the health crisis. At the beginning of the crisis, the global economic slowdown and falling commodity prices led to a general decline in prices in Europe (Graph 23).

The French Y+1 calendar base product⁷⁷ traded in 2020 on average at €44.9/MWh, a decrease of 11.6% compared to the average price in 2019 (€50.8/MWh). The German price traded at an average of €40.5/MWh in 2020, a decrease of about 16% compared to the 2019 price (€48.1/MWh).

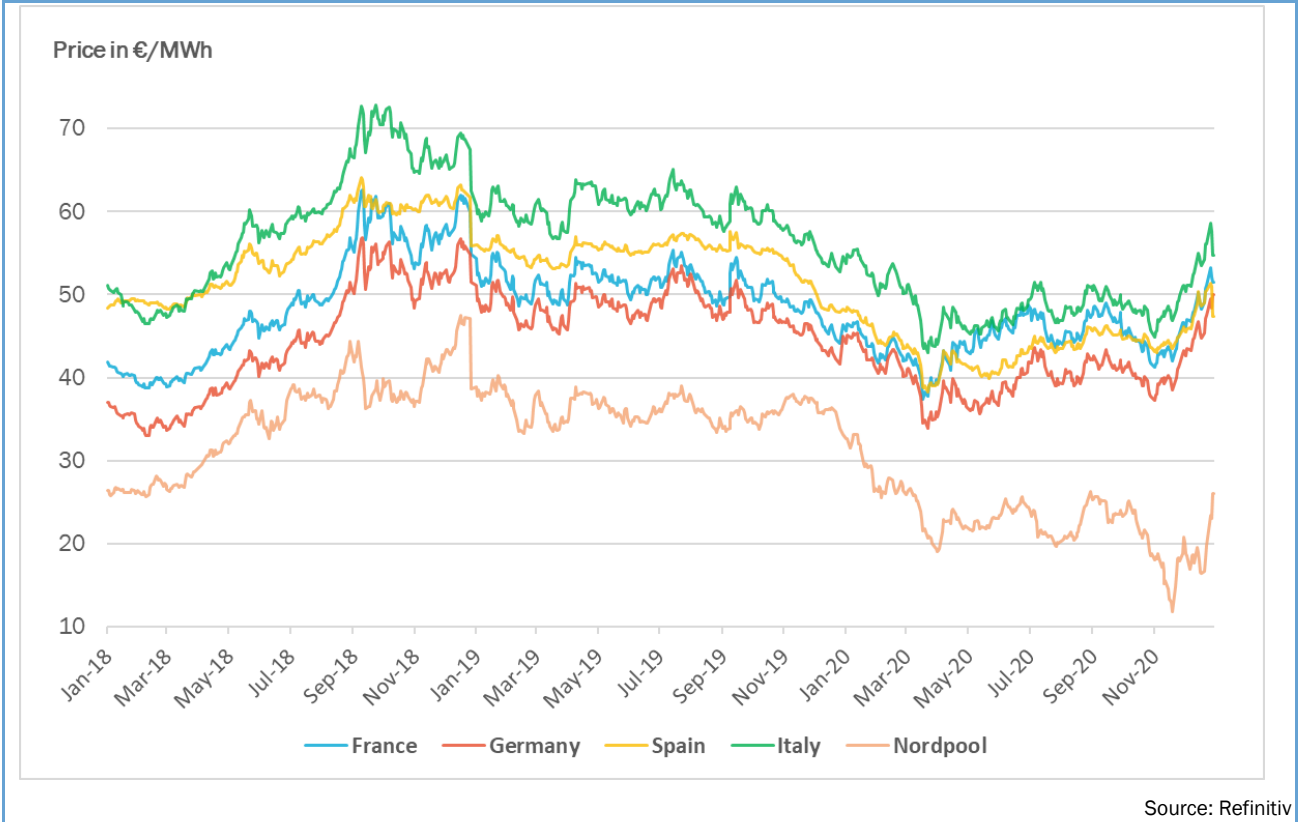
In France, the 2021 annual product price, which was €45.7/MWh on 2 January 2020, fell to €37.4/MWh on 18 March. Futures prices then rose again, mainly due to concerns about the availability of nuclear facilities for the winter of 2020-2021 (see section 3, § 1.2). On 30 June, the 2021 annual product reached €48.7/MWh. In July, the

⁷⁷ A particularly interesting index to analyse is the calendar product for delivery in the following year (noted Y+1 for "Year + 1"). As such in 2020, the Y+1 product corresponded to the electricity delivery contract for all days in 2021.

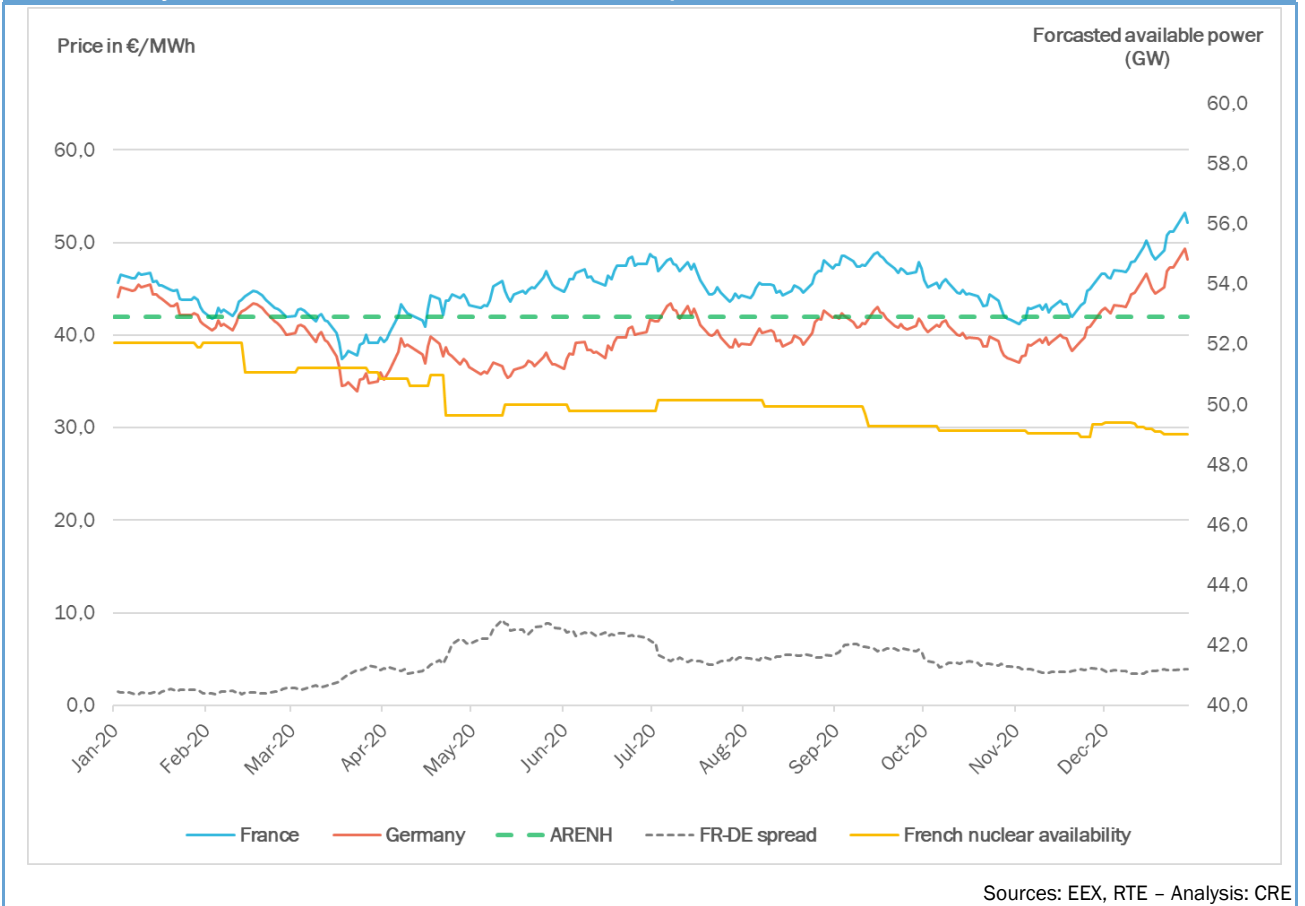


availability forecast for nuclear facilities for the winter improved, leading to a decrease in futures prices. Then, in October, the prospect of a vaccine and economic recovery led to a rebound in commodity prices (in particular the price of CO₂, see section 2, § 3), causing futures prices to rise again. As such, between 20 November and 28 December, the 2021 annual product increased by 27%, from €42.0/MWh to €53.2/MWh.

Graph 23: Y+1 base product prices in Europe



Graph 24: Price spread between the French and German Y+1 calendar base products put into perspective with the availability forecast of French nuclear facilities for the period

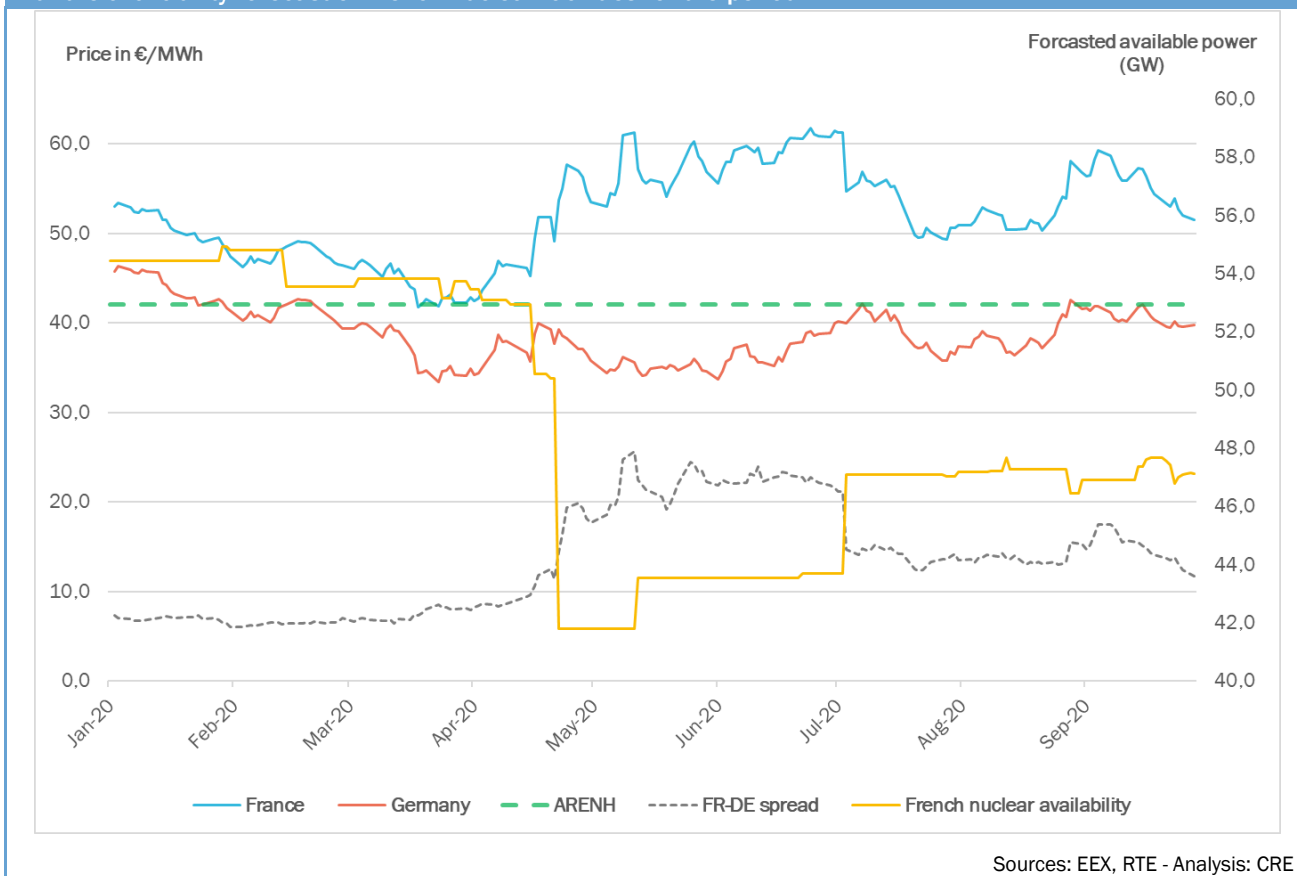


The price differential of the futures Y+1 base product between Germany and France increased to an average of €4.4/MWh in 2020, compared to an average of €2.7/MWh in 2019 (Graph 24). French and German prices were not impacted in the same way by the health crisis. Unlike the German price, the French price is not only sensitive to the price of commodities (gas, coal, CO₂) but also, to a greater extent, to the availability forecast for its nuclear facilities for the coming year.

On 22 April, the average availability forecast for nuclear facilities for 2021 fell from 50.97 GW to 49.65 GW. As a result, between 21 and 24 April, the price spread between France and Germany widened by almost 33% (from €4.45 to €6.66/MWh), whilst the German price appeared to follow the downward trend of coal and CO₂ between mid-April and mid-May. The price spread remained fairly high throughout June before narrowing on 3 July with a slight improvement in the French nuclear facility production outlook for the winter and especially for the beginning of 2021.

Although the Y+1 product was significantly influenced by these health crisis impacts, it was the quarterly product for the end of 2020 (Q4 2020) that experienced the most exceptional variations.

Graph 25: Price spread between the French and German Q4 2020 quarterly base products put into perspective with the availability forecast of French nuclear facilities for the period



The price spread between France and Germany for the Q4 2020 product widened considerably from mid-April to 3 July. This spread was directly linked to EDF's publications concerning the nuclear production forecast:

- on **14 April**, EDF announced that a "significantly lower" production target was being estimated,
- on **16 April**, EDF reviewed its annual production target to 300 TWh instead of 375-390 TWh,
- on **22 April**, EDF announced reviewed shutdowns (around 47 shutdown messages), the availability forecast for nuclear facilities for the 4th quarter of 2020 fell sharply from 50.4 to 41.8 GW (a 17% drop). The price spread widened even further from €11.42 to €14.39/MWh, an increase of 26%.
- on **24 April**, EDF announced several weeks of unavailability,
- on **11 May**, EDF modified the unavailability of approximately 42 nuclear units for 2020 to 2023. The availability forecast for the nuclear facilities for Q4 2020 rose to 43.6 GW. The spread rose to its highest level ever, to €25.67/MWh.
- on **3 July**: EDF's nuclear availability forecasts finally improved from 43.7 to 47.1 GW, leading to a reduction of almost 30.5% in the spread between the French and German price (from €21.13 to €14.69/MWh).

Announcements on the availability of nuclear facilities have a major influence on the French wholesale price, but a much more limited influence on the German price. The correct publication of inside information, and in particular the accuracy and efficiency of publications, and the absence of intervention on the markets before publication, are therefore key issues for the monitoring of the wholesale markets in 2020 and are the subject of specific analyses.

Price spreads between physical and financial contracts appeared on the Q4 2020 base product.

A market participant needing physical delivery⁷⁸ at a given time can take two approaches: a purchase on the spot market, hedging the price risk with a financially-settled futures product, or directly purchasing a physical product on the futures markets.

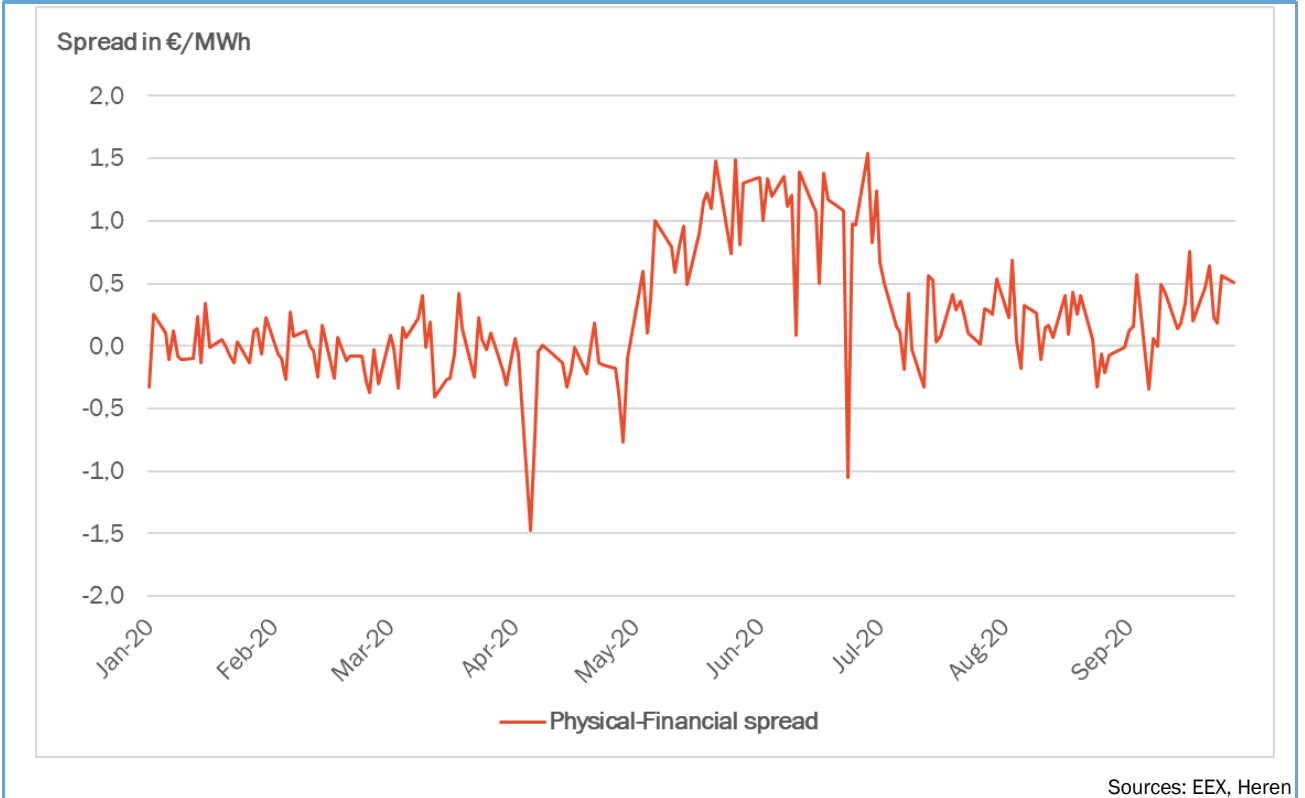
However, in the event of extreme strain, it may be possible that not all buyers are served on the spot market, thus generating an imbalance or "curtailment". In this theoretical case, the spot market auction price reaches the €3,000/MWh ceiling.

In this case, participants who purchase the entire volume via the spot market by hedging with financial products may find themselves in an energy deficit, while participants who purchase physical futures are effectively delivered (unless their counterparty defaults).

Participants who hedge with financial products are as such potentially exposed to the intraday market price and then to the price of settlement of discrepancies, which can be as high as €10,000/MWh, for the volumes they are short of, and are only covered for €3,000/MW on these volumes.

As a result, when extreme strain is anticipated, market participants may have a preference for physical delivery futures products, due to the difference in ceiling between the daily market on the one hand and the intraday market and the spread settlement price on the other. This leads to an increase in the price of physical products compared to financial products.

Graph 26: Price spread between futures products with physical delivery (Heren index) and with financial settlement (EEX) for the Q4 2020 base product



From the beginning of May, market participants began to fear a very strained situation for winter 2020, which resulted in a certain divergence of the physical price from the financial price of Q4 2020 base product. This spread widened to around €1.5/MWh from 22 May to 29 June before finally narrowing from 3 July onwards with the improvement in the availability forecast for nuclear facilities for the winter.

The spread between the prices of physically-delivered products and financially-settled products is most likely the result of economically rational behaviour by market participants, given the existence of different price ceilings for

⁷⁸ Two types of futures delivery exist:

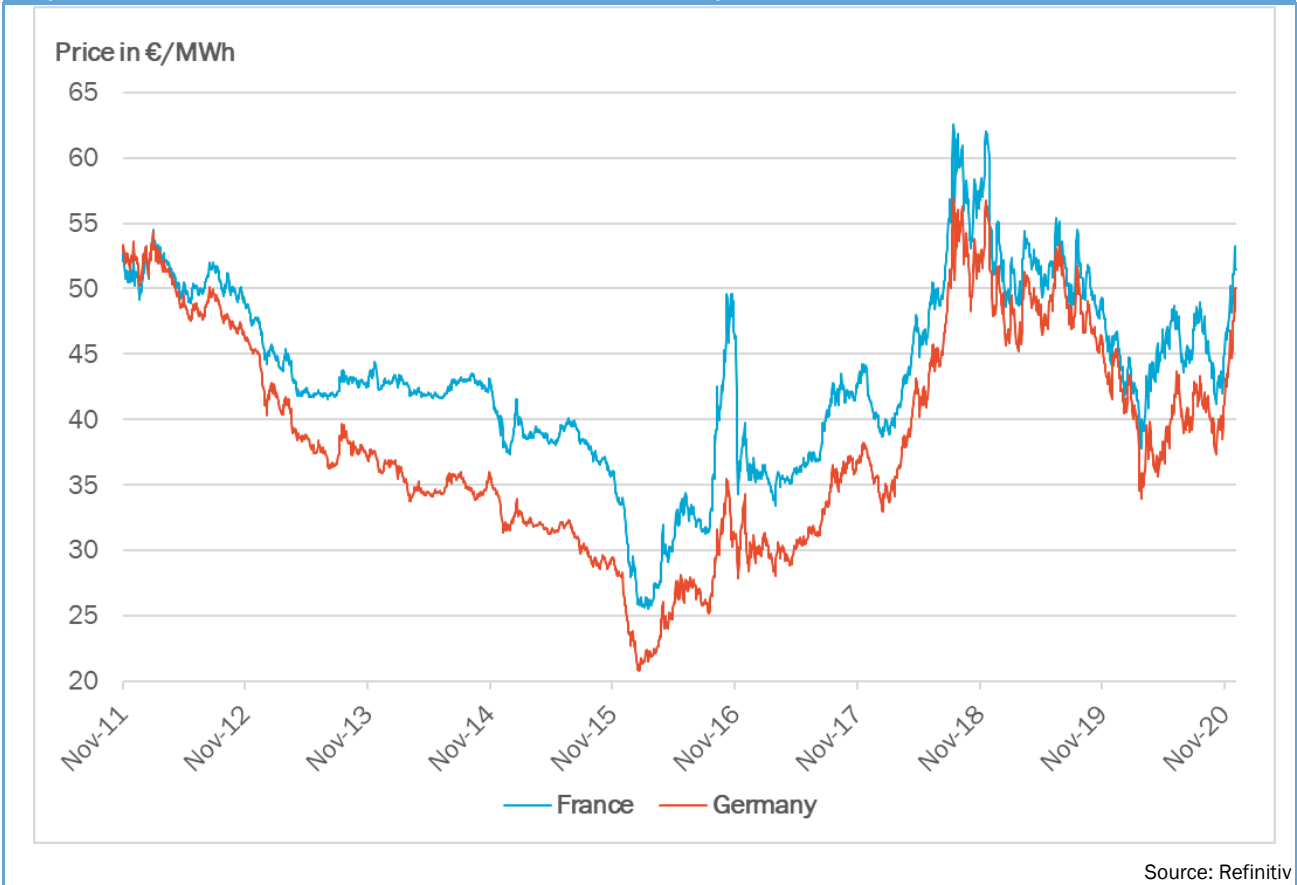
- **Physical delivery:** the contract provides for a delivery of electricity that will be "debited" from the seller's BR balance perimeter and "credited" to the buyer's.
- **Financial delivery:** the parties agree on a price and a price reference (usually the D-1 spot market). The parties make a financial transfer between them corresponding to the difference between the agreed price and the reference price multiplied by the agreed volume, as soon as the reference price is known.
- From a financial point of view, these two types of delivery are equivalent.



daily auctions on the one hand and the intraday market and the spread settlement price on the other, which lead to different risks for these two types of products when situations of great strain are anticipated.

Nevertheless, this is a situation that should remain exceptional and requires further analysis.

Graph 27: Timeline of French and German Y+1 calendar base products



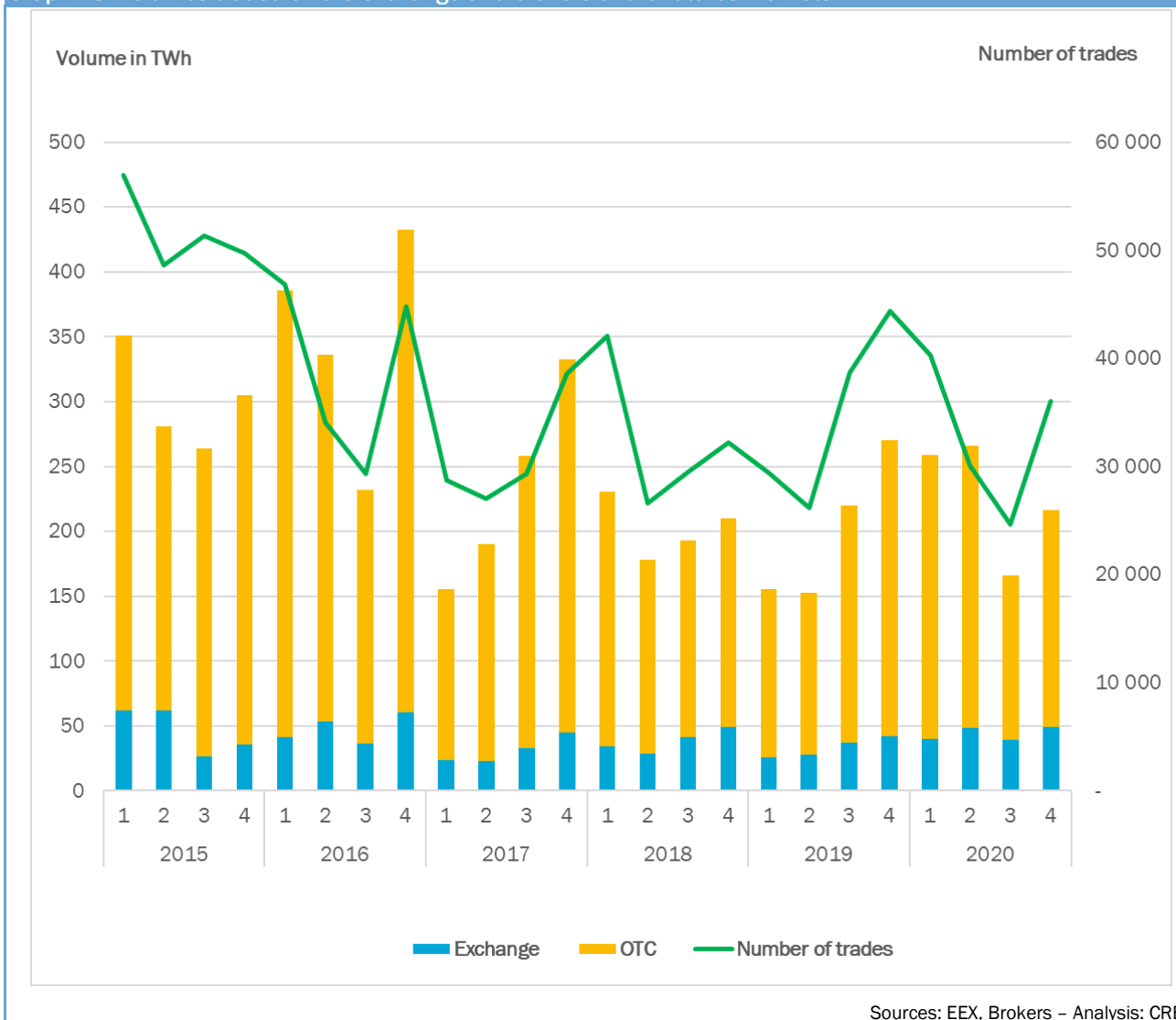
In order to put 2020 prices into perspective, a timeline of French and German Y+1 calendar base prices since the end of 2011 is presented in Graph 27. The average electricity price over the period 2012-2020 stood at around € 43.4/MWh (€44.9/MWh in 2020) with a maximum over the period of €62.6/MWh reached in 2018 (€53.2/MWh in 2020) and a minimum of €25.5/MWh reached in 2016 (€37.4/MWh in 2020). 2016 was marked by low prices (on average €33.4/MWh), which contrasted with older or recent price levels. Futures prices in 2020, a year marked by exceptional market conditions, remained within the historical range of variations experienced in recent years.

3. CHANGES TO VOLUMES TRADED ON THE WHOLESALE MARKET

The volumes traded on the wholesale markets were up by 13% compared with 2019. In total, almost 1,045 TWh were traded in 2020 on all the different markets and for the different maturities (compared with 922 TWh in 2019).

On the futures markets, volumes were up with a total of approximately 906 TWh traded in 2020. The volumes traded on the futures market exchange were up by 34% to 178 TWh (133 TWh in 2019). The volumes traded on the intermediated forward market, which remains the preferred place for futures trading, were also up by around 10%, with a total of 729 TWh traded (665 TWh in 2019) (Graph 28). On the other hand, the number of transactions carried out on the futures markets was down by around 5%. This decrease in the number of transactions in a context of higher volumes traded reflects either higher unit transaction volumes or a change in the products traded, with a preference for products with longer maturities (Graph 29).

Graph 28: Volumes traded on the exchange and brokers of the futures markets



The typology of products traded on the futures markets changed compared to 2019 (Graph 29).

The proportion of **annual** products in relation to other products traded on the futures markets did not change and remained at around 35%, as in 2019.

In contrast, the quantity of **quarterly** products increased by +25% compared to 2019, reaching a share of 33%. This increase came at the expense of monthly and weekly products, which were proportionally less traded. The proportion of monthly products fell to 24%, i.e. 5% less than in 2019, despite an increase in volume of 8.6% (214 TWh against 197 TWh). **Weekly** products accounted for only 6% of traded products in 2020, down 40% from 2019.

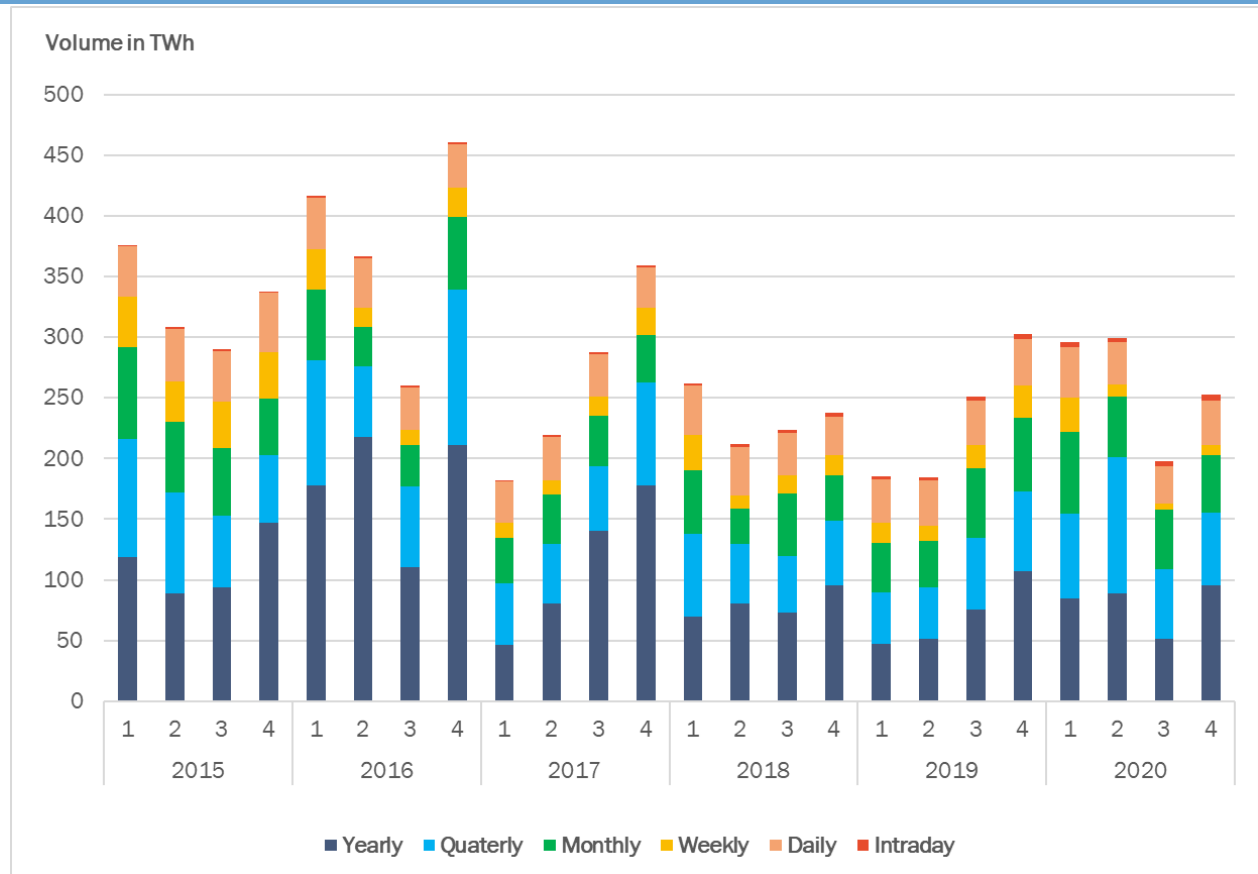
Consequently, the lower number of transactions for a higher trading volume observed on the futures markets can be partly explained by the increase in trading volumes on quarterly products in 2020 to the detriment of monthly, weekly and daily products.



Hourly products traded on the spot markets were up by 8% in 2020 compared with 2019, with 122 TWh traded.

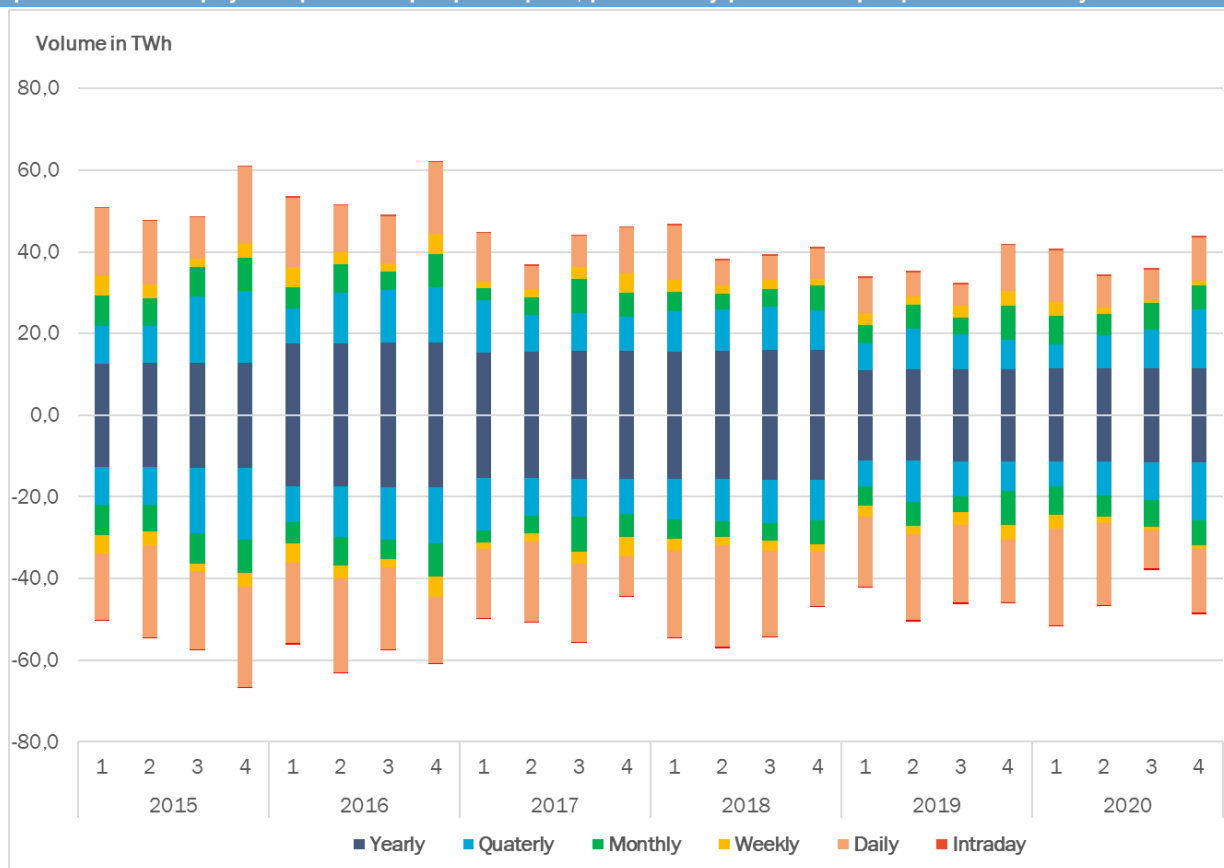
Finally, trade on the intraday market saw a sharp increase of 45%, even if their volume remained low (around 17 TWh). The development of the single intraday coupling favoured trade and contributed to the increase in liquidity on the French intraday market, and also enabled the arrival of the Nord Pool exchange in France in 2018 with the entry into effect of the multi-NEMO agreements allowing several market operators (nominated electricity market operators - NEMOs) to operate in the same market area.

Graph 29: Volumes traded on wholesale markets by maturity



Sources: EPEX SPOT, EEX, Nord Pool, Brokers – Analysis: CRE

Graph 30: Total net physical positions per participant, per delivery period and per product maturity



Sources: EPEX SPOT, EEX, Brokers, Nord Pool – Analysis: CRE

Graph 30 presents the total of net physical positions delivered in France by participants on the wholesale markets by delivery period and by product maturity.

It can be seen that the total of net positions was significantly lower than the gross transaction volumes (Graph 29), which is mainly explained by successive purchases and sales of the same product by the same participant during the product's trading period⁷⁹. This effect is particularly important for products with a long trading period (futures) and may reflect the level of market liquidity. Furthermore, it is worth noting that at daily and intraday maturities, the total of sell positions was greater than the total of buy positions: this reflects the overall export balance of the spot market in France through market coupling.

⁷⁹ For daily auctions, market participants may also have positions of opposite signs with different portfolios, which are reflected in the trading volumes, but not in the net positions.



4. BALANCING MARKETS AND THEIR SURVEILLANCE BY THE CRE

Pursuant to the REMIT Regulation, products traded on the balancing markets can be viewed as wholesale energy products. As such, CRE has the task of monitoring these markets. Furthermore, pursuant to the European regulation on balancing⁸⁰ and Article 321-11 of the French Energy Code, CRE approves the operating rules for these markets.

4.1. Recap of the general operating principles for balancing markets and changes to come

RTE is responsible for the stability of the electricity network. To instantaneously balance consumption and production, it seeks out services from balancing service providers to adjust electricity consumption or production. RTE has various types of reserves that it can use to secure this balance. These can be balancing reserves with automatic activation comprising frequency containment reserve and automatically activated frequency restoration reserve, as well as manually activated frequency restoration reserve. In addition, balancing responsible parties also have financial incentives to balance their injections and withdrawals ahead of real-time to limit imbalance volumes.

The activation and contracting of balancing reserves is moving towards a generalization of market mechanisms, especially within the context of the European integration of balancing markets. CRE is heavily involved in these changes with the aim of improving system performance for the benefit of consumers and ensuring that these new markets function properly.

4.1.1. Frequency containment reserve (FCR)

The Frequency containment reserve is contracted by RTE with French and foreign balancing service providers, through the FCR cooperation, which RTE joined at the beginning of 2017. This cooperation results in calls for tenders jointly run by TSOs in 6 countries (Germany, Austria, Belgium, France, the Netherlands and Switzerland)⁸¹.

Only FCR capacity is subject to a market mechanism. Due to the activation method for this reserve (based on frequency deviations), there is no competitive tendering for energy activations. Furthermore, transactions between countries resulting from FCR activation is never restricted by cross-border capacities as these are provided for in the safety margins for interconnections.

4.1.2. Automatic Frequency Restoration Reserve (aFRR)

The aFRR is automatically activated by RTE through a signal sent to all production facilities contributing to this reserve. Its aim is to reabsorb spreads between scheduled commercial transactions at interconnections and actual physical transactions. Currently, this reserve is activated by a single signal sent to all participants without competitive tendering for balancing energy activations.

RTE splits its entire aFRR capacity needs between producers on a pro rata basis according to mandatory capacities of their facilities and these capacities are paid for at a regulated price of roughly €20/MW.h. This capacity obligation is split freely within a market participant's portfolio, or between different participants, through privately-agreed transactions of reserves, with notification to RTE.

The contracting and activation of capacity will change and will be the subject of two distinct market mechanisms. The capacity will be contracted to French participants through a system of daily day-ahead calls for tender, from the 4th quarter of 2021. Activation will take place pursuant to economic precedence from the 1st quarter of 2022, and activations will then be subject to bids submitted by participants close to real time, the selection of which will be optimized in France by RTE and at European level through the European aFRR platform, which will take into account all the bids submitted in Europe, the real-time needs of each TSO and the transaction capacities available at the borders.

4.1.3. Manual Frequency Restoration Reserve (mFRR) / Replacement Reserve (RR)

RTE activates mFRR through the adjustment mechanism that it has been operating since 2004. Balancing service providers submit bids to RTE from contracted or non-contracted capacities. These bids set out technical conditions for activation, a price for the activated energy and, if required, a start-up cost. RTE activates mFRR and RR based on its needs and pursuant to a "technical and economic" priority that considers bid prices as well as their technical characteristics. RTE activates bids to balance supply and demand in France but also to resolve potential network

⁸⁰ Regulation (EU) 2017/2195 of the Commission of 23 November 2017 establishing a guideline on electricity balancing

⁸¹ The TSOs of Denmark and Slovenia joined the cooperation in January 2021.

congestions, replenish automatic reserves capacities, and to restore the margin of available flexible balancing capacity in the system.

RTE contracts part of mFRR and RR through an annual tendering process (and partially daily from 1st June 2021), so as to have reserves with specific technical characteristics called Manual Frequency Restoration Reserve and Replacement Reserve. All production facilities connected to the transmission network are obliged to offer the available upwards flexibility via tenders submitted to the adjustment mechanism. RTE uses the adjustment mechanism to gather bids from balancing service providers, producers, consumers and participants as well as network operators based abroad, through interconnections.

Since 2 December 2020, RTE has been using the RR platform, which enables it to trade bids for "standard" replacement energy reserves with other European TSOs. In this case, "standard" refers to specific predefined technical characteristics that are harmonized among TSOs participating on the platform. RTE uses the platform for balancing the French system only part of the time but aims to use it continuously from the end of 2021.

Thereafter, RTE will join the mFRR platform, once it has been introduced in 2022, to trade rapid mFRR energy bids. To date, RTE has no cooperation projects to jointly contract these reserves.

4.1.4. The Balance Responsible Parties system

Through the Balance Responsible Parties system (BRPs), RTE provides market participants with incentives to do their utmost to balance power produced and consumed within their scope, based on each connection point to the network being attached to the scope covered by a Balance Responsible Party. Imbalance (deficit or surplus of energy for a given 30-minute period) are subject to a settlement price based on the value of the balancing energy activated by RTE, if required, to reabsorb imbalance.

Up to one hour ahead of real-time, participants can change production schedules and can import or export energy via cross-border markets to adjust the BRP imbalance and the "physical" position of the French area. Beyond this point, and up to five minutes before real-time, French participants can continue to trade energy between themselves on the French intraday market, without adjusting production, import or export schedules. These final trades subsequently impact the balance of the BRPs concerned but not the physical balance in the French load-frequency control area. During this period, RTE is the sole entity instituting "physical" balancing actions.

4.2. Review of balancing markets in 2020

4.2.1. Overview

Table 9 hereinafter presents a summary of balancing reserves contracted by RTE, together with figures on balancing energy activated.

2020 Reserve	Contracting			Activations			
	Direction	MW (av.)	€M	Upwards		Downwards	
				GWh	€M	GWh	€M
FCR	Upward and downwards	516	16.8	524	46.0	540	-44.0
aFRR	Upward and downwards	603	103.4	1,145		1,145	
mFRR	Upwards	1,508	8.2	1,816	286.2	1,385	-65.1
RR				2,725		2,387	
Total		2,627	128.4	6,210	332.1	5,458	-109.1

aFRR, which is based on compulsory participation with a regulated price, is the most expensive contracted reserve (€104M), due, in particular, to a steep drop in the cost of the other reserves over the last few years, contracted through calls for tenders. These contracting costs are covered by tariffs for the use of the French public electricity transmission network (hereinafter referred to under its French acronym: "TURPE").

Activations of balancing energy resources represented a particularly high net cost in 2020, totalling €223M (€110M in 2019). This significant increase in costs can be explained firstly by the very low prices in 2020 of downward bids

on the adjustment mechanism, and secondly by the significant volumes and costs of calls on the adjustment mechanism for replenishing system services.

The low prices of downward bids represent a cost for the system because in the general case of downward activations, the balancing service provider "reimburses" RTE for the variable cost saved as a result of the activation, with the energy remaining valued by the market participant. During the health crisis, there was an overabundance of production, which led to very low prices for downward bids.

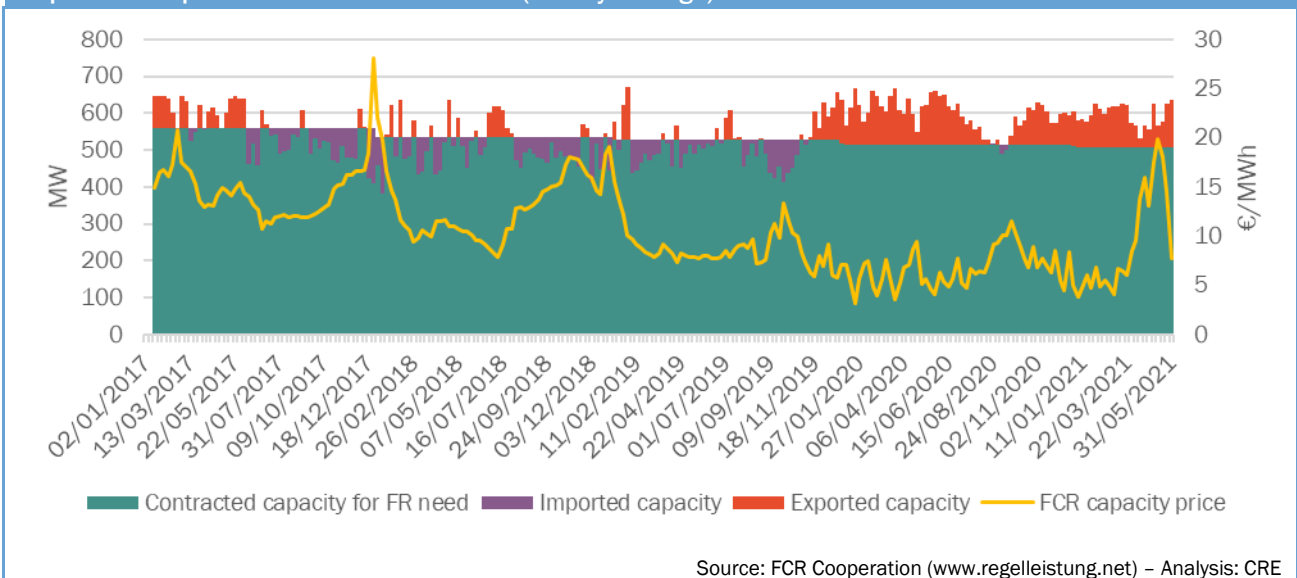
The net value of activated FCR and aFRR is moreover low as, on average, the activations are centred on zero. Activation costs are covered by the BRPs and paid for through the spread settlement scheme, apart from surcharges for activations for reasons other than balancing, which are covered by the TURPE (network tariffs).

4.2.2. The FCR cooperation

After the shift in 2019 to daily auctions and settlement of bids at the marginal auction price, the call for tender changed again on 1st July, 2020. Products contracted for daily delivery periods were replaced with products contracted for four-hour slots. The six products are now contracted through the daily tender conducted at 8am each day for the following day.

Graph 31 features weekly averages for the prices and volumes of the FCR contracted, imported, and exported in France. RTE demand is constant for a given year. The actual volume contracted in France corresponds to the total RTE demand and the balance of exports to and imports from other countries within the FCR cooperation.

Graph 31: FCR prices and volumes in France (weekly average)



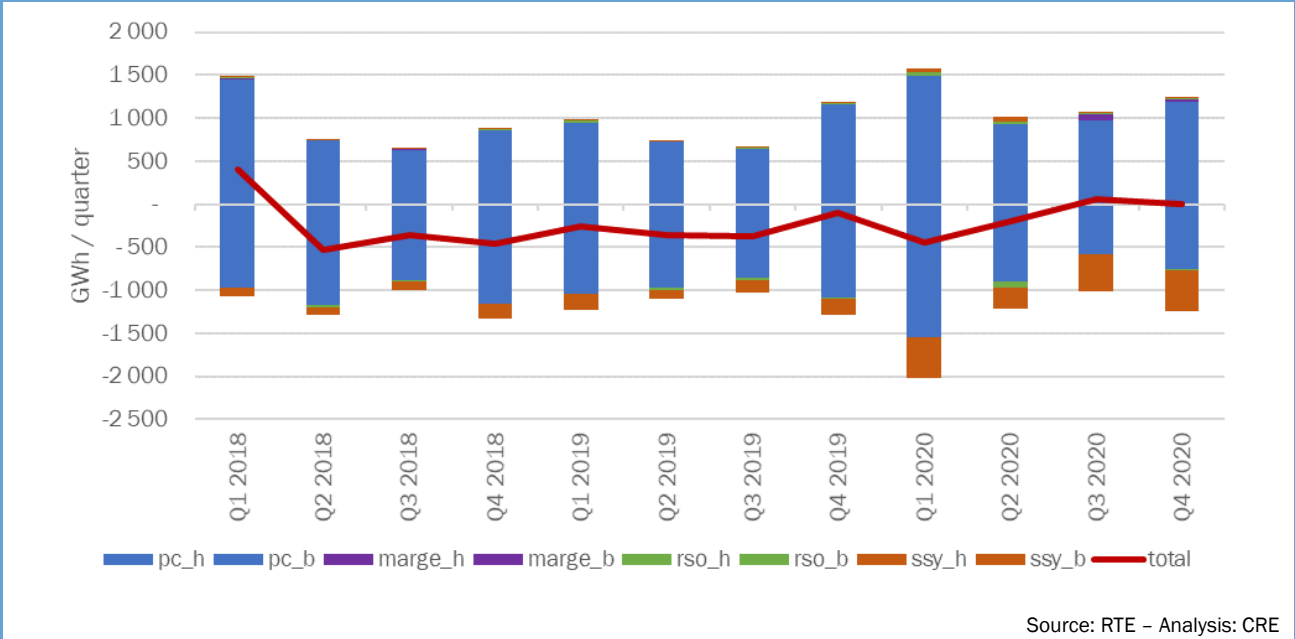
Since RTE joined the FCR cooperation in 2017, FCR prices have followed a downward trend. The shift to marginal pricing and the increase in the number of products has led to a higher variability in the FCR price, which continues a downward trend, although showed a peak in the first half of 2021.

The increase in the number of products and the move towards real-time auction did not lead to any malfunctioning of this market in 2020.

4.2.3. The adjustment mechanism

Graph 32 presents upwards and downwards balancing energy volumes activated by RTE for various purposes in 2020.

Graph 32: Quarterly activation volumes by purpose and net volume

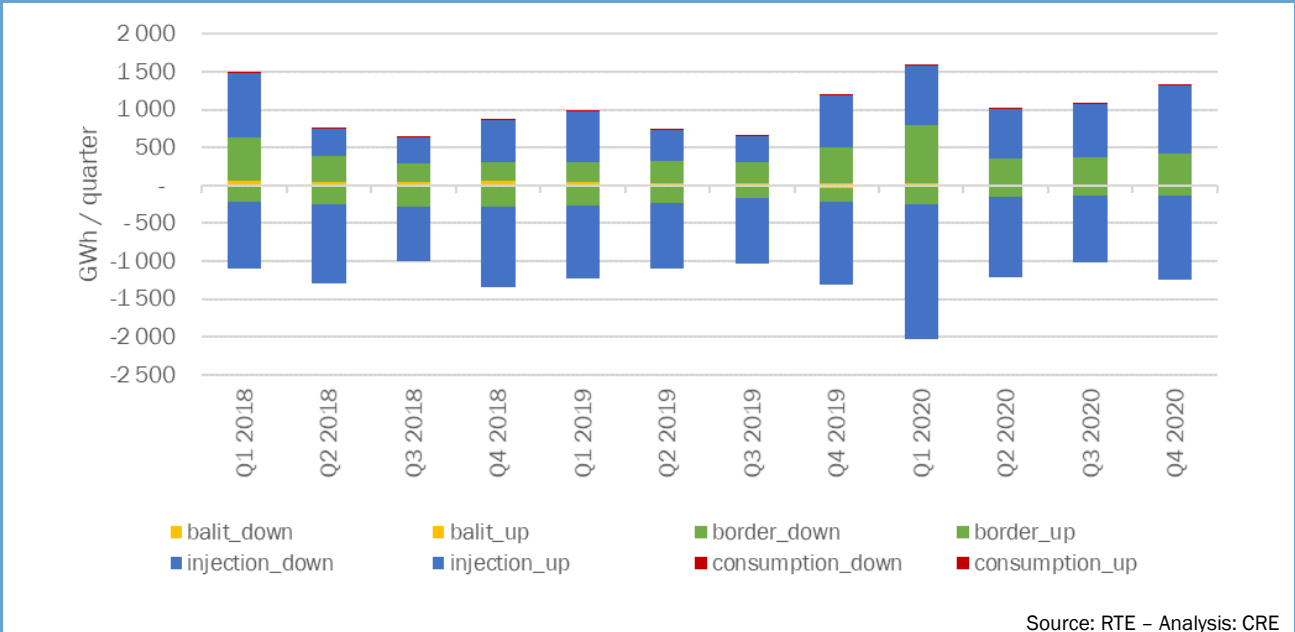


Source: RTE - Analysis: CRE

Activations to keep the system balanced ("P=C" purpose) account for most cases. Replenishing automatic reserves capacities ("SSY") also represents a significant volume, though only downwards and higher in 2020 than in the past. Activations to resolve network congestion ("RSO") and system margins ("MAR") account for very low volumes. Net activated volumes are on average negative, which indicates that BRPs tend to over-deliver energy.

Graph 33 presents the average volumes of adjustments by type of entity and by direction of activation.

Graph 33: Adjustment volumes by entity type



Source: RTE - Analysis: CRE

The graph shows that injection-type balancing entities (production units) take the lion's share, and also that balancing entities located outside France ("trading points") play an important role, especially for upwards adjustments.

4.3. CRE's surveillance of the adjustment mechanism

Balancing markets represent less important financial stakes than spot and futures energy markets. Notwithstanding, they play a very important role in the proper functioning of the electricity system and are rapidly changing.

In 2020, CRE as such stepped up its surveillance of balancing markets, in particular by analysing RTE's adjustment mechanism. In this respect, CRE wishes to draw the attention of market participants who operate balancing entities

such as trading points on the French-Swiss or French-German border and propose adjustment offers upwards and downwards to RTE, that it is forbidden to obtain supplies on the French intraday market in order to respond to a request from RTE as regards the adjustment mechanism. This behaviour is explicitly contrary to RTE's terms and conditions for balancing ("règles RE-MA" in French) (Article 4.2.1.2):

"the activation of an offer from a trading point balancing entity must not lead to a supply (for upward offers) or a sale (for downward offers) by the balancing service provider on the French intraday market, either through an explicit flow or an implicit nomination."

Finally, ACER also draws market participants' attention to the fact that balancing markets are considered as wholesale energy product trading markets and that the actions of participants on these markets are as such subject to obligations and prohibitions defined under the REMIT Regulation. In particular, ACER has communicated⁸² examples of practices that may, under certain circumstances, be considered abusive within the meaning of REMIT.

5. THE CAPACITY GUARANTEE MARKET AND CRE SURVEILLANCE

After a year-long investigation, the European Commission issued its decision on 8 November 2016, approving the French capacity mechanism under European Union and State aid rules⁸³. The mechanism was actually introduced in December 2016 for a first delivery year (DY) in 2017.

5.1. The decline in nuclear availability as a result of the health crisis has significantly altered the fundamentals of the capacity market

5.1.1. The capacity price reflects the strain on security of supply

The provisions of Articles L-335-1 et seq. of the French Energy Code set out a capacity obligation mechanism. The French regulation stipulates that "each electricity supplier contributes in mainland France to the security of electricity supply based on the power and energy consumption patterns of its customers". Each supplier is therefore obliged to obtain capacity guarantees to cover the consumption needs of its customer portfolio during peak consumption periods in France. These guarantees can be obtained by investing in new production or load-shedding facilities, or by securing them either from capacity operators or on the market. The cost of the obligation, introduced to ensure security of supply for consumers, is passed on by the suppliers to their customers.

Those market participants under obligation, as well as operators, can bilaterally exchange capacity guarantees on the OTC market (Over-The-Counter) or on the market organized by EPEX SPOT, in the form of auctions. 15 such auctions are organized on a rolling basis prior to the given delivery year.

Pursuant to Article L. 335-2 of the French Energy Code, "the obligations imposed on suppliers are determined in such a way as to encourage compliance over the medium term with the level of security of electricity supply adopted for the preparation of the multi-annual provisional review specified under Article L. 141-1.". The capacity mechanism must therefore send relevant economic signals to the participants to encourage them to invest in production resources, load-shedding and consumption control that will enable them to attain the objective set by public authorities.

The criterion for electricity system downtime is set by Article D. 141-12-6 of the French Energy Code at an annual curtailment duration of less than 3 hours. The capacity mechanism is set up in such a way that the cumulative obligation of all participants is consistent with an installed capacity that enables this criterion to be met.

In a situation where supply would be substantially lower than demand, the capacity price would have to increase up to the cost of the cheapest way to meet the criterion to enable its development. The rules defining the mechanism's price cap are in line with the strain that should appear in the event of undersizing facilities: "[the price cap] corresponds to the minimum annual capacity revenue that ensures the economic viability of developing or maintaining in-service the capacities required to meet the security of supply criterion defined by public authorities, over the medium-term horizon studied by the provisional review".

The price cap for 2021 and 2022 was set by CRE deliberation on 18 December 2019 at €60,000/MW. Participants who are unable to supply capacity when the system is imbalanced by more than 2 GW are penalized by RTE up to the price cap. The 2020 price cap was also set at €60,000/MW. The 2020 outcome is not yet known⁸⁴ at this stage, but in the event of an imbalance of more than 2 GW, a substantial penalty could then be requested from producers

⁸² ACER communicated on these practices in edition No.24 of its ACER REMIT Quarterly Q1 2021 newsletter: https://documents.acer-remit.eu/wp-content/uploads/REMITQuarterly_Q1_2021_1.0.pdf

⁸³ The operating principles for this market were reiterated in the surveillance report for the functioning of the wholesale electricity and natural gas markets 2016-2017 (Section 3, page 45: 2.5 First capacity guarantee trades in 2016).

⁸⁴ The imbalance is known in DY+3 when the exact obligation of all participants is known

for spreads in certified unavailable capacity, and paid to RTE in 2023. The amount of this penalty would, if applicable, be returned to network users through changes in TURPE (network tariffs).

In practice, in the absence of new capacity development⁸⁵, a situation of high strain on the mechanism can, in principle, have two consequences:

- a penalty for imbalanced participants under obligation at the price cap of **€60,000/MW/year**. The imbalance settlement price should spread to the market⁸⁶;
- the system security of supply criterion will not be met. The likelihood of rotating load-curtailement in France during periods of strain will be increased.

5.1.2. The health crisis has resulted in a sharp increase in capacity prices

The lockdown of the French population to tackle the COVID-19 epidemic led to a reduced availability of the resources required to carry out maintenance activities for the scheduled nuclear facility shutdowns and impacted the ability to carry out scheduled operations normally (see in particular section 3, §1.2). The travel limitations of EDF staff and its contractors and the health measures applied had a direct impact on the dynamics of the activities carried out on the nuclear installations during the unit shutdowns. Delays in carrying out the work led to an increase in shutdown duration.

Based on this observation, on 5 May 2020, EDF reassessed the estimated volume of capacity guarantees made available on the capacity market for the 2020, 2021 and 2022 delivery years. This volume corresponded, to date, to the estimated availability of production resources as perceived by EDF and was made public on the RTE website. This is important information for participants in the capacity mechanism, which enables them to estimate capacity price.

This reassessment of certified capacity level, combined with the previous reassessments since the beginning of lockdown (17 March 2020), was one of considerable scale, in particular given the previously tense situation of the mechanism before taking into account the impacts of the health crisis.

Table 10: Change in the forecast supply-demand (bid/ask) balance of the capacity mechanism

	Potential margins ⁸⁷ before the COVID-19 crisis	Reassessment of the "changed" certified capacity (CC) between 17 March 2020 and 05 May 2020	Potential margins on 16 May 2020
2020 delivery year	2.5 GW	-8.5 GW	-6 GW
2021 delivery year	2.3 GW	-4.8 GW	-2.5 GW
2022 delivery year	[2.4 GW; 1.6 GW]	-3.0 GW	[-1.4 GW; -0.6 GW]

On 11 June 2020, the French Minister for Ecological and Solidarity Transition and RTE communicated an estimate of the supply-demand (bid/ask) balance on the capacity mechanism for the winter of 2020/2021, reflecting the strain on security of supply in France. The June assessment showed a very large capacity deficit for the 2020 delivery year and a potential shortage for 2021. This calculation did not however take into account the impacts of the health crisis on the demand for electricity and the possible optimization of the maintenance of nuclear facilities to get through the winter.

RTE integrated the missing elements in its simulations and communicated again on the provisional balance in France on 18 September 2020. This new estimate showed that the impact of the crisis on security of supply would be lower than initially anticipated, as a result of the interplay between lower consumption and higher capacity availability. The 2020 delivery year however remained tense and the security of supply criterion did not seem to be ensured for the months of November and December.

⁸⁵ An interest in developing new load-shedding capacities could appear as a reaction to the price signal.

⁸⁶ Participants under obligation generally hedge ahead of the delivery year. Strain that would appear during the delivery year would as such only impact participants under obligation that are not sufficiently covered and imbalanced producers.

⁸⁷ Views from the register and pursuant to the central demand scenario. Certification of around 2.5 GW of load-shedding is envisaged for 2021.

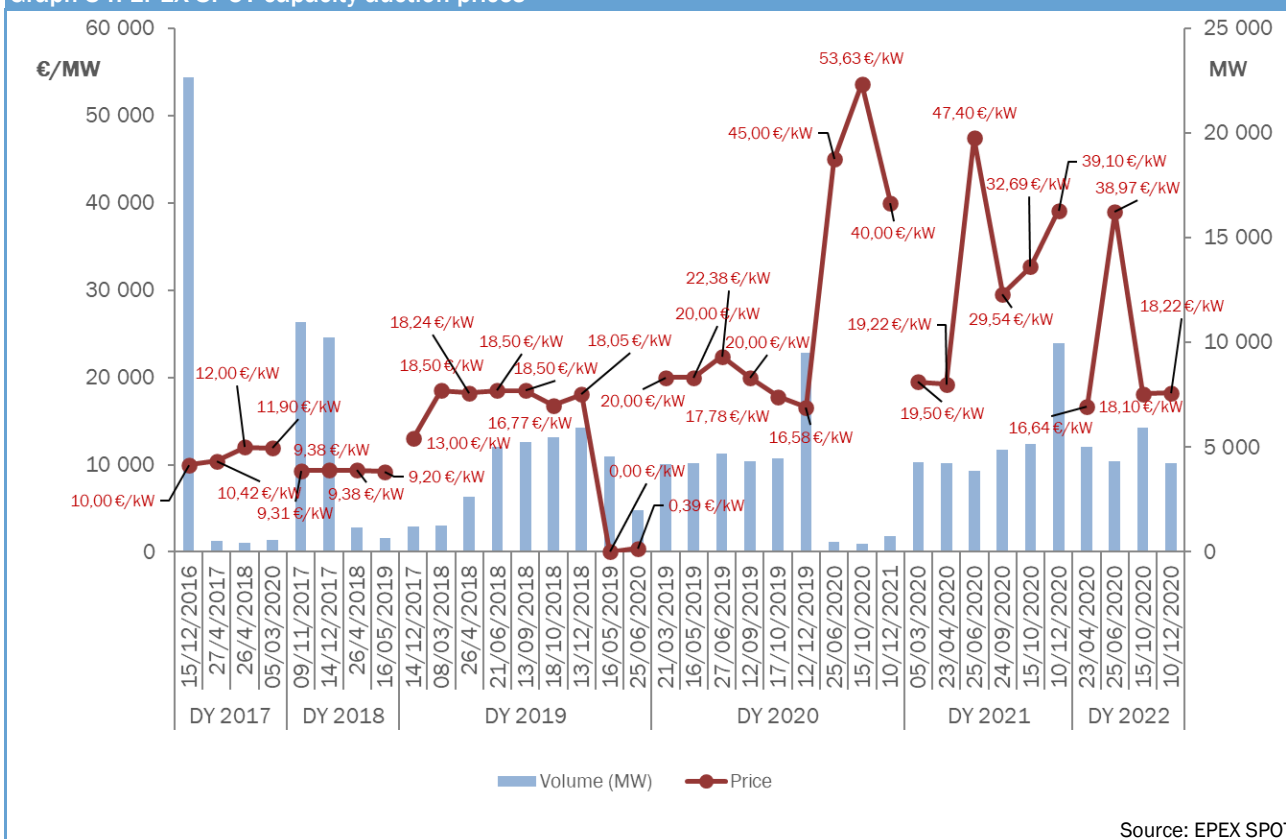
Table 11: Change in the provisional balance of the capacity mechanism from June to September 2020

	Margins assessed on 11 June 2020	Margins assessed on 18 September 2020
2020 delivery year	- 7.7 GW	-3.7 GW
2021 delivery year	- 1.8 GW	+ 2.2 GW

These different variations in provisional supply and demand (bid/ask) had a very strong impact on capacity prices, particularly for delivery years (DY) 2020 and 2021. The auction of 25 June 2020, when the demand update by RTE had not yet been implemented, set the highest prices ever observed: almost €48,000/MW for the 2021 DY and €54,000/MW for the 2020 DY.

On 2 July 2020, a few days after this auction, EDF published a significant upward revision of the availability of its nuclear facilities for winter 2020/2021. Prices subsequently eased slightly as a result of RTE's more optimistic announcements on security of supply.

Graph 34: EPEX SPOT capacity auction prices



Source: EPEX SPOT

5.1.3. On a proposal made by RTE, the rules were made more flexible to reinforce the signals sent by the capacity mechanism

Given security of supply issues for the coming winter, by way of exception, RTE wished to reinforce the signals sent by the capacity mechanism and proposed to adapt certain terms and conditions of the capacity mechanism rules in order to relax certain regulatory constraints that could weigh on capacity operators wishing to increase their availability during the 2020-2021 period of strain.

These modifications to the capacity mechanism rules were the subject of deliberation by the French Energy Regulatory Commission on 10 September 2020⁸⁸.

RTE's proposal focused on three amendments to capacity mechanism rules intended to encourage production and load-shedding operators to maximize their availability for winter 2020/2021: removal of upward rebalancing fees for the 2020 and 2021 delivery years, removal of fees for late certification of new load-shedding sites during 2020

⁸⁸ Deliberation No. 2020-222 of 10 September 2020 on the draft amendment to the capacity mechanism rules proposed by RTE to facilitate security of supply for winter 2020-2021



and 2021, and simplification of the procedures for sharing certified and effective capacity levels in the event of a production site entering/leaving the purchase obligation mechanism.

At the same time, RTE asked EPEX SPOT to increase the number of auctions for 2020.

In order to minimize the cost of the mechanism for the consumer and to ensure that the security of the supply criterion was complied with as much as possible, CRE welcomed RTE's proposals.

Notwithstanding, CRE reiterated that this flexibility should remain limited to the 2020 and 2021 delivery years. In fact, as things stand, it is not possible to definitively withdraw upward rebalancing charges because of the French authorities' commitment to the European Commission to strengthen the incentive for participants to balance before the delivery year.

Concurrently, CRE also recommended to the French Minister for Ecological and Solidarity Transition to amend RTE's proposal by increasing the contribution of the border with Great Britain by 400 MW for the 2021 delivery year to take into account the commercial commissioning of the IFA2 interconnection (with a nominal capacity of 1 GW) before the end of 2020.

5.2. Structural changes to the capacity mechanism will be implemented following RTE's feedback

In 2020, RTE organized a feedback session with the aim of assessing the mechanism and rethinking its architecture and practical implementation methods. RTE's work focused in particular on

- the capacity mechanism's contribution to security of supply;
- how the mechanism fits with the energy-climate roadmap;
- participants' behaviour and incentives returned by the capacity mechanism;
- and the level of complexity regarding accuracy issues.

In March 2020, RTE consulted all participants on their expectations for the feedback session and presented its analyses during working group sessions.

Due to the health crisis, the full report will now be published in 2021; several strong conclusions were already expressed by RTE on the contribution of the mechanism in terms of security of supply and its economic benefits for the community, as well as the cost for consumers. The issues raised by RTE's feedback session are intended to be addressed in 2 stages.

Firstly, for the simplest corrective measures to be implemented, RTE plans to submit a new set of "v4 rules" to the authorities in the second half of 2021.

As regards the more structural changes, the French Directorate General for Energy and the Climate (DGEC) and RTE are considering new architecture for the mechanism to be implemented in 2025. These structural changes may require exchanges with European authorities.

5.3. Capacity mechanism review

The price of capacity auctions held in 2020 increased significantly for all delivery years concerned. The average price for the 2021 delivery year, resulting from the auctions, stood at €31,241/MW in comparison to €19,458/MW for the 2020 delivery year.

CRE, as such, undertook an in-depth analysis of the conditions for price formation in 2020 to ensure they took into account market fundamentals.

Furthermore, CRE reiterated the criticisms made in its 2018 and 2019 wholesale market surveillance reports regarding the current architecture of the capacity market.

CRE was also satisfied that RTE had, as CRE had requested, organized a feedback session to assess the system and provide input for rethinking necessary changes. Given the first documents made public by RTE within this framework, CRE deemed it urgent to initiate reflection on how this market operates. In the short term, it will step up its surveillance in order to analyse in detail the conditions under which participants draw up and submit offers.

6. MAIN TAKEAWAYS ON THE FUNCTIONING OF THE ELECTRICITY MARKET IN 2020

Despite the exceptional conditions in 2020, electricity markets continued to operate smoothly. Lockdown of populations decided to curb the epidemic, and in particular the first lockdown in France, had a significant impact on electricity consumption, with up to a 20% drop compared to normal. Lockdown measures severely disrupted the nuclear production facility maintenance programme, with consequences over the short term as well as over the longer term, raising concerns about security of supply for winter 2020-2021.

Short-term electricity prices remained at exceptionally low levels in the first half of the year, due to lower consumption and low commodity prices. In the second quarter, some strain emerged, with short-term prices driven up by low nuclear availability and the general rise in commodity prices at the end of the year. Daily prices in 2020 showed a better convergence rate with the other European countries than in 2019, notably due to the drop in consumption which could ease the constraints on interconnections.

Futures electricity prices proved to be highly-sensitive to EDF's announcements concerning the availability of production facilities, especially nuclear. As such, the "cascading" disruptions of scheduled maintenance on nuclear facilities led to concerns about the supply-demand (bid/ask) balance in the winter of 2020-2021, resulting in a rise in futures prices for this period. Strong correlation was noticed between the price spread between France and Germany and the availability forecast for nuclear power in France announced by EDF.

From the summer onwards, the improvement in the availability forecast for the winter eased the strain. At the end of the year, the overall rise in commodity prices and CO₂ allowances contributed to a further increase in futures prices.

Volumes traded on electricity markets were up compared to 2019, reflecting improved liquidity in 2020.

Balancing markets experienced significant changes in 2020 and further changes are expected in 2021 and 2022, wherein the extension of market mechanisms and of European integration will be pursued. These changes call for CRE to continue its vigilance as regards monitoring these markets.

Finally, the price of capacity guarantees increased sharply in 2020. CRE, as such, undertook an in-depth analysis of the conditions for price formation in 2020 to ensure they took into account market fundamentals. However, the design flaws of this market make it difficult to monitor, and CRE therefore reiterates the criticisms made in its 2018 and 2019 wholesale market surveillance reports regarding the current architecture of the capacity market.

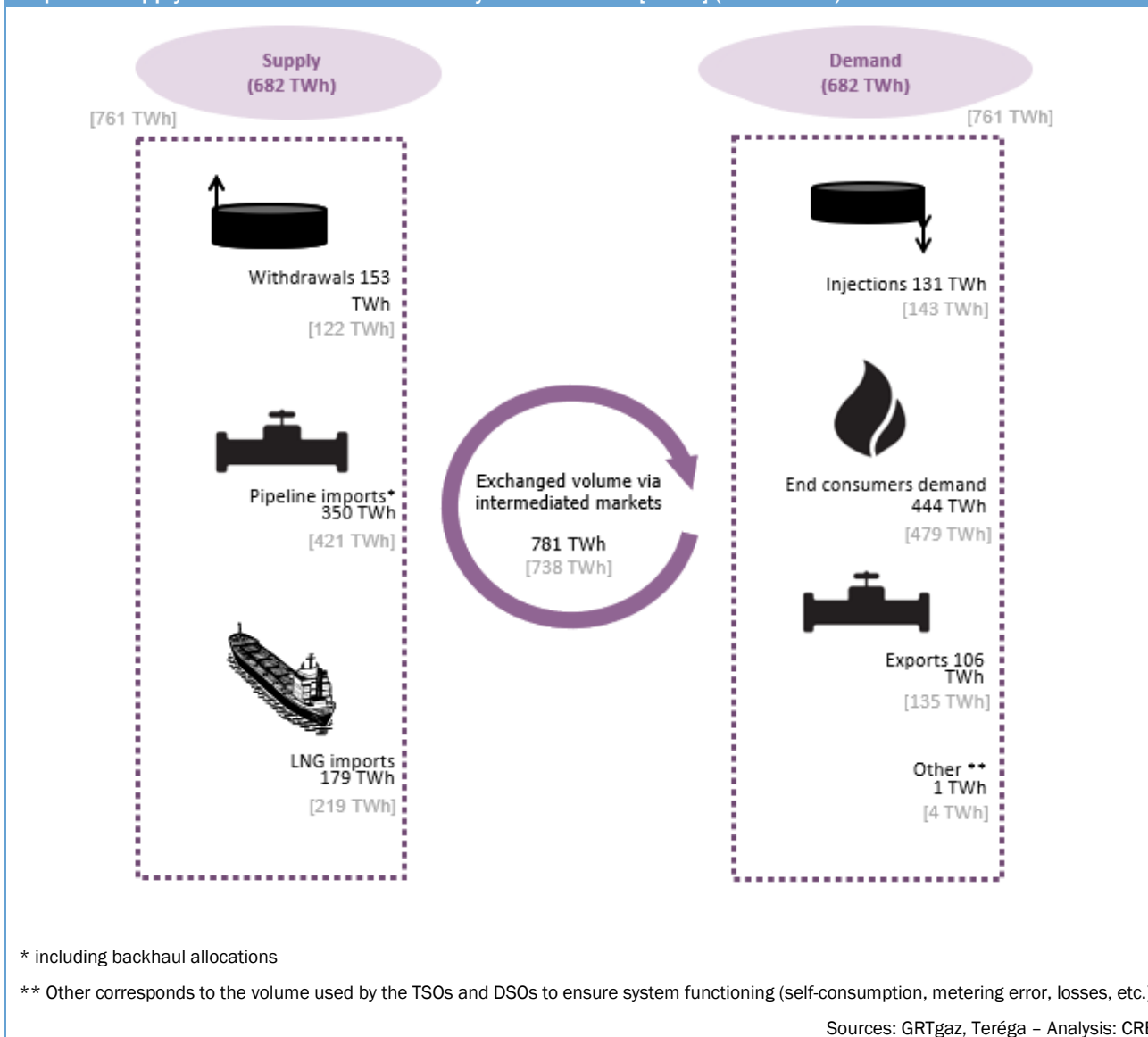
**SECTION 4
WHOLESALE NATURAL GAS MARKETS**

1. TRENDS IN THE WHOLESALE GAS MARKET IN 2020

1.1. Balance in the French system

In 2020, the gas balance was down with supply volumes and outlets 79 TWh lower than in 2019. This year again, market balance fundamentals differ from those from last year, due in particular to the impact of the COVID-19 global health crisis.

Graph 35: Supply and demand in the French system for 2020 [2019] (trade flows)



Consumption by end customers decreased by 34 TWh to 444 TWh, a decrease of 7% compared to 2019 (479 TWh). This value was also lower than 2018 levels (469TWh). The health crisis and the mild weather explain this decrease.

Storage injections fell to 131 TWh in 2020, compared with 143 TWh in 2019, a year which saw a drop of only 1 TWh compared with 2018. The high levels of storage at the beginning of the year following a very mild winter had the effect of limiting the quantities needed to inject to fill them. Withdrawals were significantly higher in 2020, reaching 153 TWh, after two years of relative stability around 120 TWh. The main reason for this was the last few months of the year, during which global demand for LNG was largely absorbed by Asia due to the cold snap on that continent.

Pipeline imports were down 17% year-on-year in response to lower consumption, the influx of LNG into the market and high storage levels. The utilization rate of the Dunkerque IP which supplies France with Norwegian gas decreased by 8% to 78%, and that of the Virtualys VIP (imports from Belgium) was only 34%, 19% lower than in 2019.

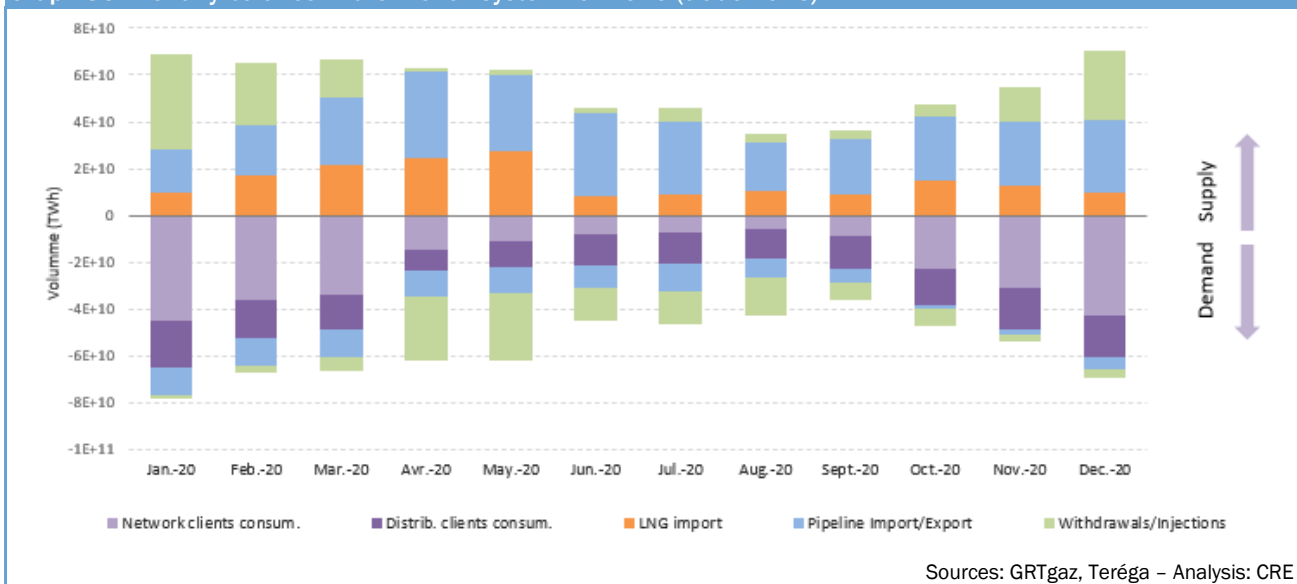
After the record level of 219 TWh in 2019, LNG imports remained high but decreased in 2020 to 179 TWh. LNG supply contributed to lower prices during the spring of 2020. Likewise, pipeline imports fell sharply compared to

2019, from 421 TWh to 350 TWh. It should be noted that the share of LNG in imports in 2020 (34%) remained constant compared to 2019.

Exports decreased by 21% compared to 2019, reaching 106 TWh. It can be seen that the utilization rate of the Pirineos VIP was only 40% compared to 58% in 2019 and allocations to Spain totalled only 92 GWh/d on average compared to 134 GWh/d the previous year.

Liquidity on the wholesale markets continued its rise from the previous year, increasing by 6% with 783 TWh of volumes traded on the French market, proof of the efficient operation of the single market area in France in effect since November 2018.

Graph 36: Monthly balance in the French system for 2020 (trade flows)



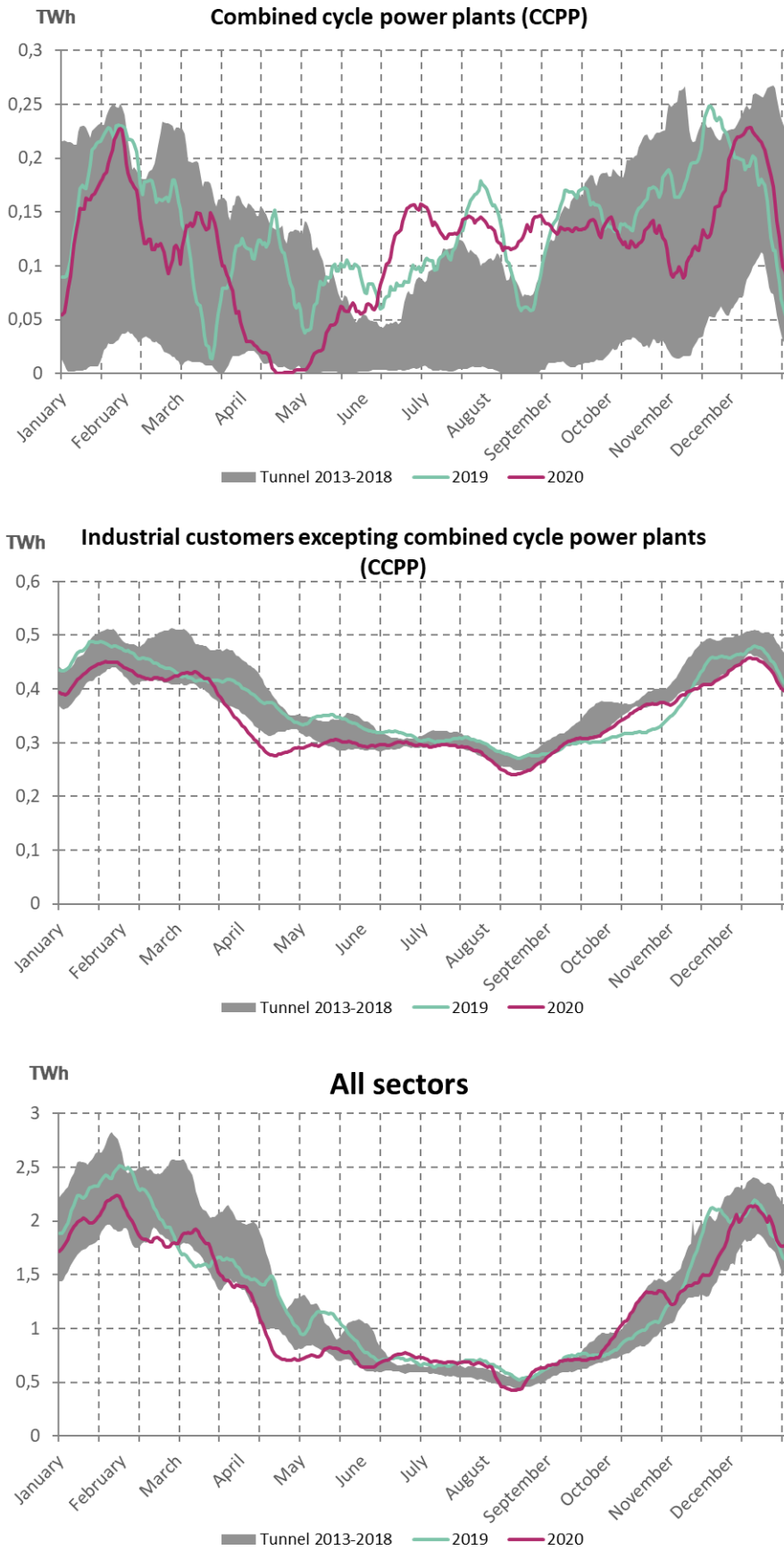
1.2. A drop in consumption due to economic activity weakened by the health crisis

Consumption reached 444 TWh over the year, i.e. a drop of 7% compared to 2019.

The drop in economic activity induced by the first lockdown from 17 March to 11 May had a strong downward impact on French consumption. Gas-fired combined cycle power plants almost stopped operating during the first lockdown. Industrial customer consumption excluding that of highly-modulated sites stood at 418 GWh/d on 16 March before falling to a value of 276 GWh/d a month later on 18 April. Total consumption over this first lockdown period was up to -267.4 GWh below the 2013-2019 historical tunnel value reached on 20 April and representing -27% of that minimum.

Exceptionally mild temperatures in 2020 also had a downward impact on gas demand. GRTgaz indicated that this climatic effect was the key factor in the fall in gas consumption by public distribution and public utilities (around 75% of the fall), ahead of other effects, including the health crisis.

Graph 37: Consumption of Gas-fired Combined Cycle Power Plants (CCPP), network customers excluding CCPP and all sectors



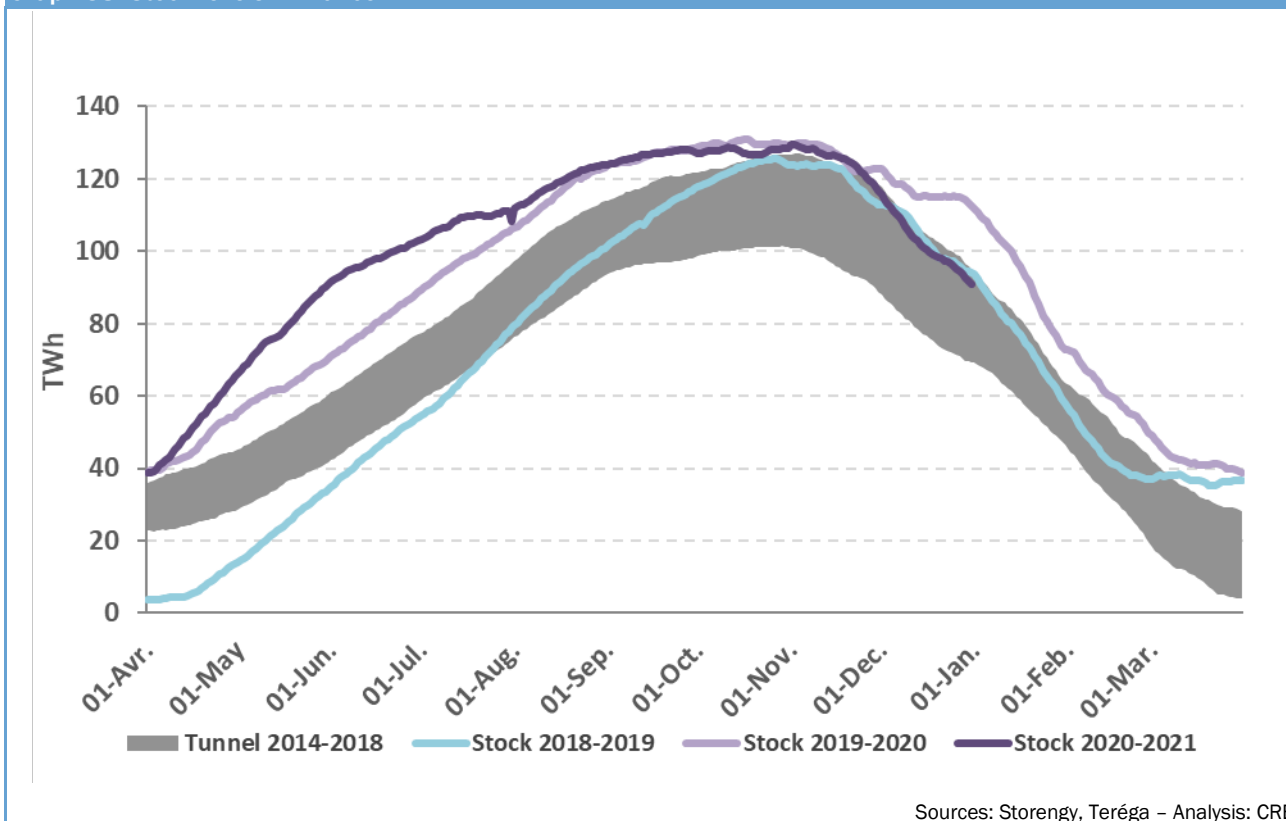
Sources: GRTgaz, Teréga – Analysis: CRE

1.3. Storage levels higher than the previous five years for most of the year

2020 started with historically high storage levels (111.7 TWh) due to the winter of 2019-2020 being the warmest since the beginning of the 20th century according to Météo France (the French national meteorological service), and a market saturated by LNG supply. Storage levels in 2020 subsequently remained above the historical levels of the previous five years for the vast majority of the year. Storage injections were sustained to reach a level of 90 TWh at the end of the second quarter, which is usually reached by mid-summer. The interest for injections remained consistent thanks to the favourable price context (high winter-summer differential). Storage levels then fell sharply in the fourth quarter of 2020, reaching 91 TWh on 31 December, a value well below the 113 TWh recorded on the same day the previous year. The higher spot gas prices at the end of the year favoured gas withdrawals.

The subscription of full storage capacity for the season made it possible to guarantee the country's security of supply for the winter of 2020-2021. This shows that the 2018 reform of third-party access to gas storage, the marketing terms and conditions of which were defined by CRE in its deliberations of 22 February 2018⁸⁹ and 27 September 2018⁹⁰, is working well.

Graph 38: Stock levels in France



1.4. LNG imports remained at a high level

After a strong increase of 56% between 2018 and 2019, the number of LNG shipments received in France in 2020 amounted to 205, a decrease of 24% compared to the previous year.

Before the health crisis spread to other countries around the world, China refused to honour its long-term LNG contracts, citing force majeure. The first quarter of the year was also marked by a very sharp drop in consumption by Asian industry, which led to a drop in global LNG demand. Europe and France then absorbed the surplus of world supply, thanks to its efficient gas infrastructures and its liquid markets offering flexibility. This phenomenon contributed to the collapse of wholesale prices to the benefit of consumers, particularly those in France with regulated gas sales contracts whose rates follow short-term wholesale price movements. The fourth quarter also had an impact on this drop in annual LNG imports due to the price spread between deliveries to Asia and those to Europe, which favoured the influx of LNG tankers to the former continent at the expense of the latter.

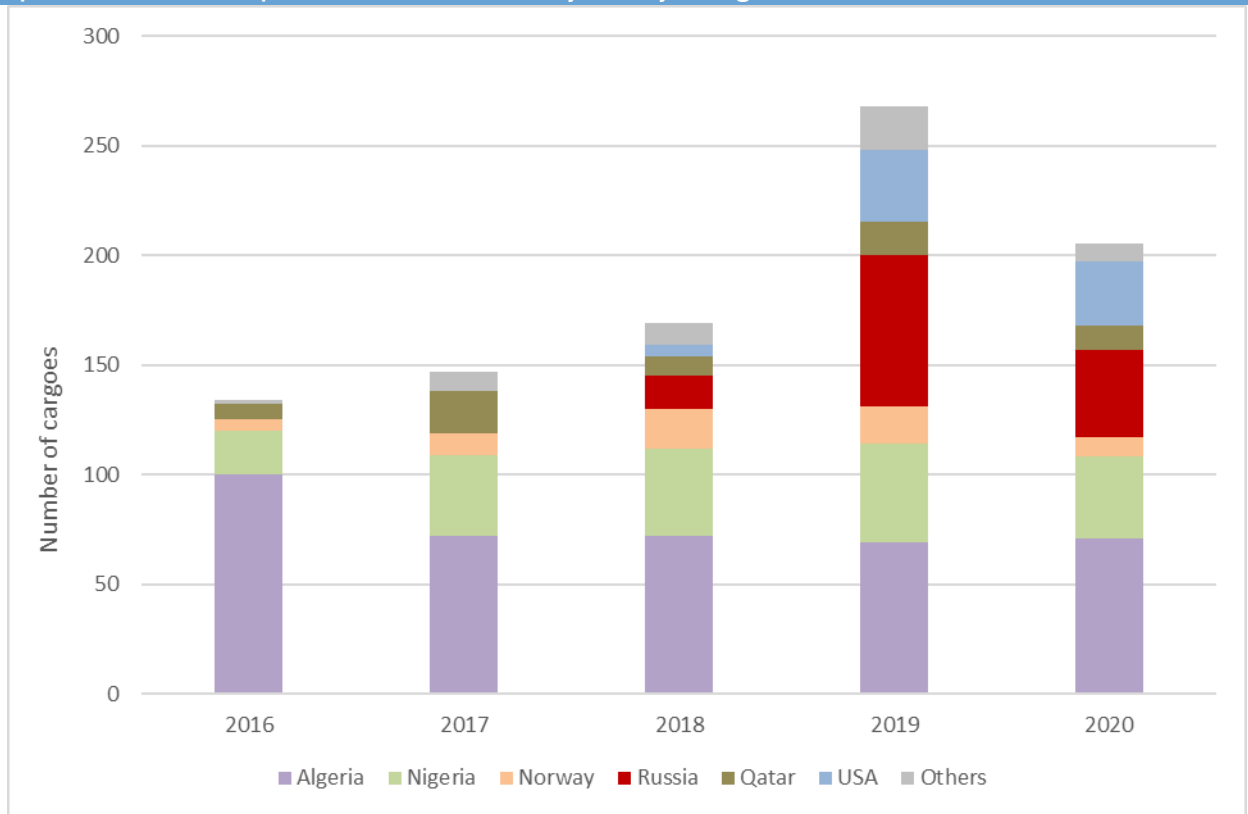
⁸⁹ Deliberation of the French Energy Regulatory Commission No.2018-039 of 22 February 2018 resolving the methods for marketing storage capacities when implementing regulated third-party access to underground natural gas stocks in France

⁹⁰ Deliberation of the French Energy Regulatory Commission No.2018-202 of 27 September 2018 resolving the methods for marketing natural gas storage capacities as of October 2018



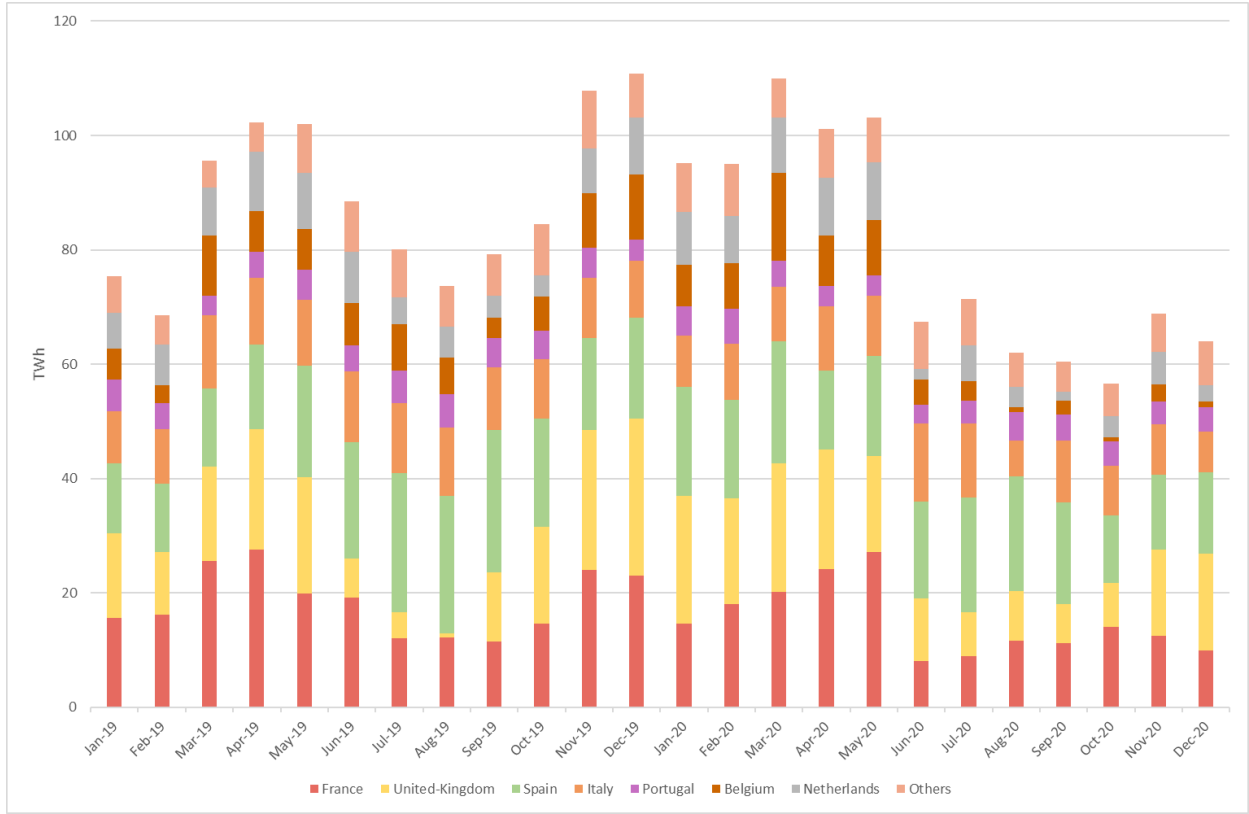
As a result, French LNG imports in terms of volume fell by a total of 18%, reaching 179 TWh, a level that remained high and represented 40% of national consumption. After being the leading European importer in 2019, France fell to second place in 2020 behind Spain (221 TWh) and ahead of the United Kingdom (174 TWh).

Graph 39: Number of shipments received in 2018 by country of origin



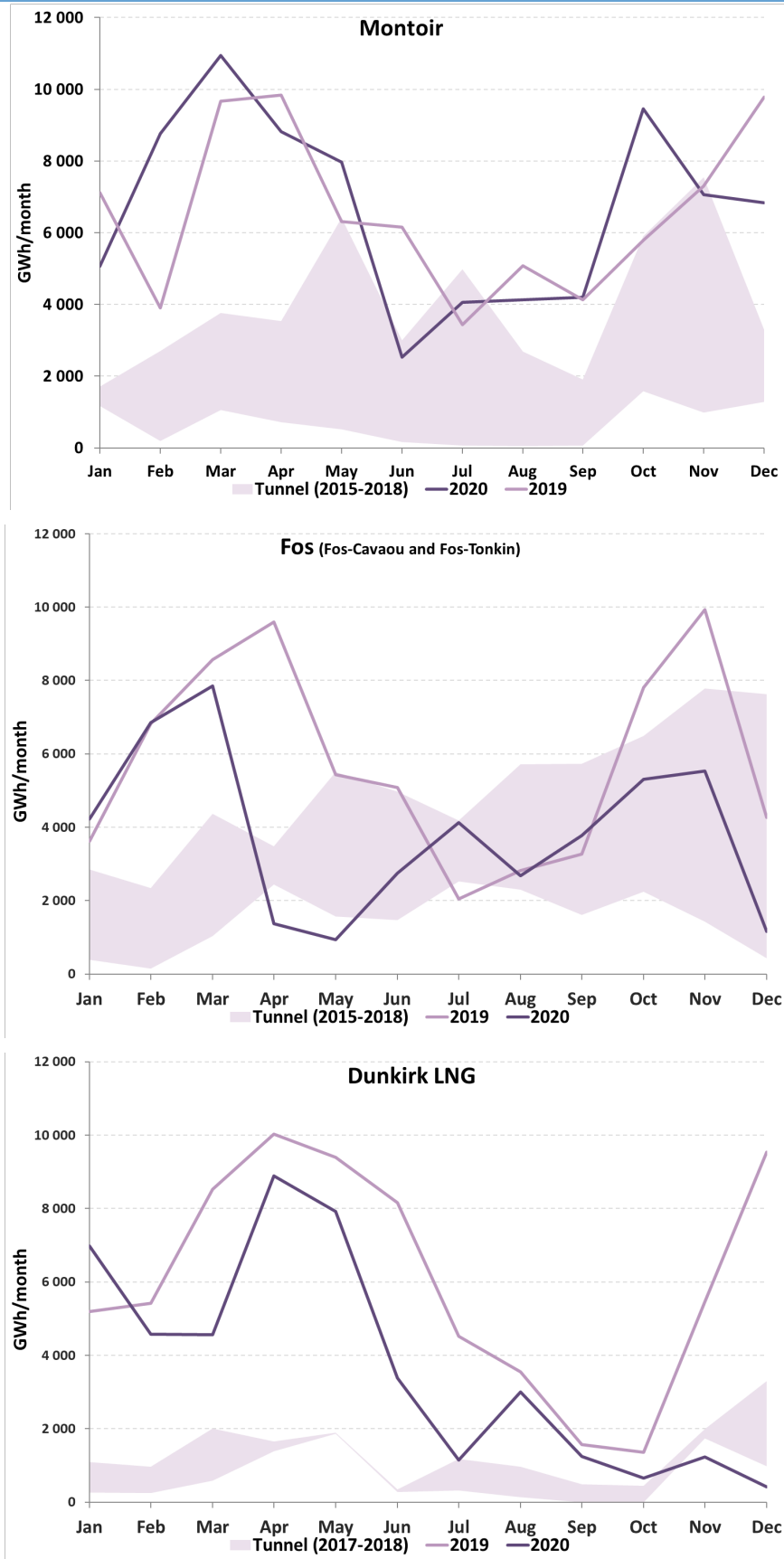
Source: Argus – Analysis: CRE

Graph 40: LNG imports by European Union country



Sources: Refinitiv, GRTgaz – Analysis: CRE

Graph 41: LNG terminals sendouts (trade flows)



Source: GRTgaz – Analysis: CRE

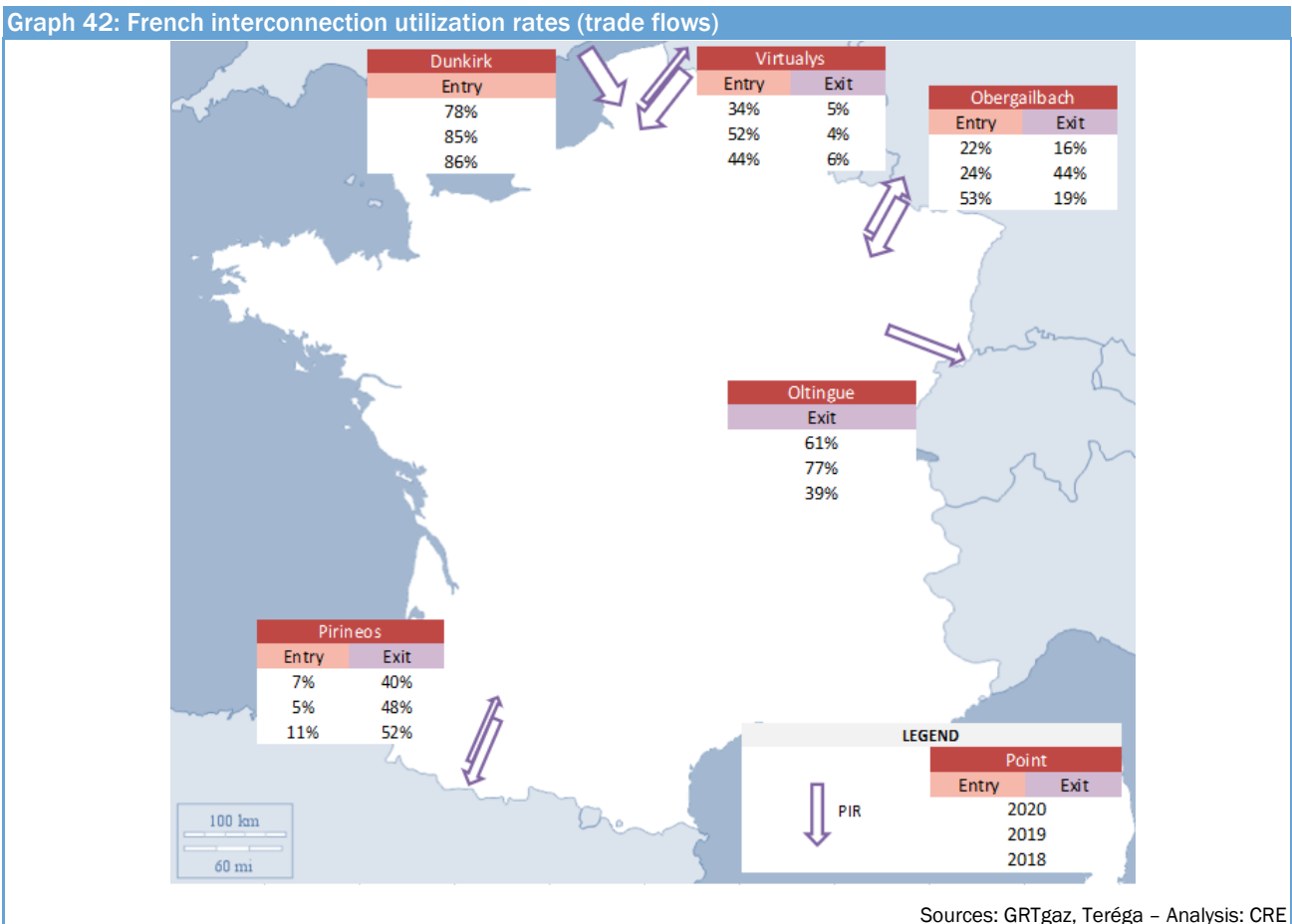
Sendouts from LNG terminals decreased by 30% compared to 2020 to an average of 467 GWh/d.

1.5. Decline in pipeline imports and exports

Pipeline imports pursued their decline from the previous year with 350 TWh in 2020 compared to 421 TWh in 2019, i.e. -17%. This was reflected in particular by the lower entry utilization rates at the Virtualys (-18%) and Dunkerque (-7%) interconnection points compared with the previous year. The former showed an import volume of 77 TWh compared with 119 TWh the previous year, the latter an import volume of 172 TWh compared with 190 TWh the previous year. The Obergailbach IP on the German-French border recorded further decline in its entry utilization rate from 24% in 2019 to 22% in 2020, well below the 2018 figure of 53%. Russian imports to Europe in 2020 fell particularly sharply, competing in the first half of the year with excess LNG supply.

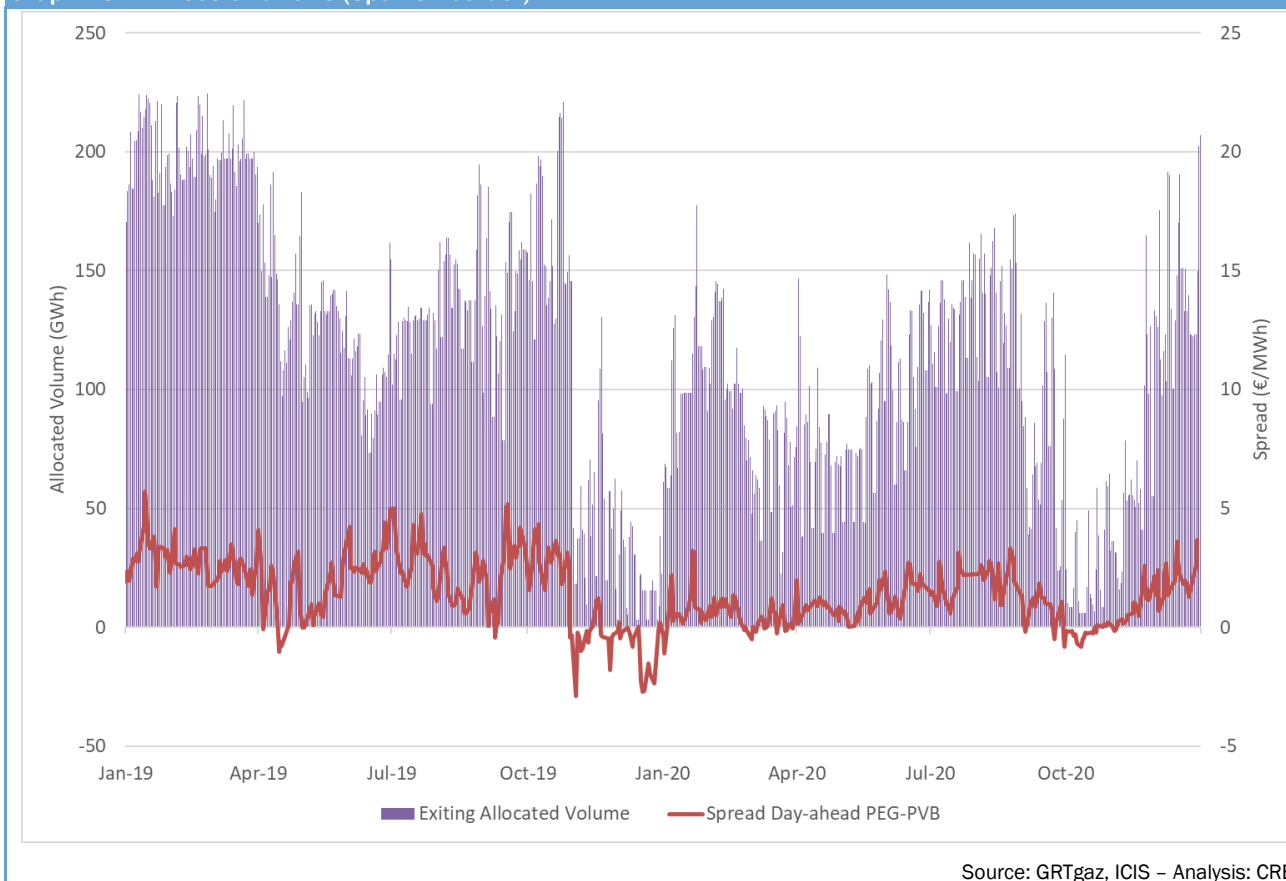
Exports fell by 21% from 135 TWh in 2019 to 106 TWh. Exit utilization rates at the Pirineos VIP on the Spanish border and the Oltingue IP on the Swiss border decreased by 8% and 16% respectively. As such, exports to Spain decreased from 49 TWh in 2019 to 34 TWh in 2020 and those to Switzerland and Italy from 6 TWh in 2019 to 3 TWh in 2020.

The drop in national consumption and the overabundance of LNG supply in Europe during the first nine months of the year explain this drop in pipeline imports. The same held true for exit flows, with Spain and Italy being among the most LNG-consuming European countries. Average price differentials between France and these two countries narrowed, with an average spread with Spanish PVB (the Spanish price index) of €0.8/MWh compared to €1.6/MWh in 2019 and an average spread with Italian PSV (the Italian price index) of €1.0/MWh compared to €2.4/MWh the previous year. High storage levels also had a downward impact on pipeline imports.



Pirineos VIP exit volumes observed a good correlation with the PEG-PVB spread (virtual gas exchange point in Spain) in 2020. The average spread in 2020 was €1/MWh compared to €1.9/MWh in 2019, a factor which as such contributed to the decrease in exports to Spain compared to the previous year.

Graph 43: Pirineos exit flows (Spanish border)



1.6. A low level of congestion in 2020

The locational spread mechanism was introduced in winter 2017/2018 to manage congestion on the French gas network, mainly from North to South. It works by allowing the transmission system operator to issue calls to market participants to purchase gas upstream of the congestion and resell it downstream.

In 2020, the locational spread mechanism was activated 16 times and only in August. The period with most strain on the network corresponds to the gas summer (April-October), characterized by shippers' injections into storages in anticipation of the following winter. As summer is a period of low national consumption, the main gas outflows from the French network corresponded to injections into the Atlantic and Lussagnet storage facilities and to transit flows to Spain, all three of which are located downstream of the network and thus led to congestion in a North-South pattern.

The locational spread mechanism had a total cost of €0.9M in 2020 compared to €7.2M in 2019.

Table 12: Locational spread activation review for 2020

	2019 Total	2020 Total
Number of activations	44	16
Total allocated volume (GWh)	1,807	659
Average transaction price (€/MWh)	3.99	1.4

The situation improved with a lower total number of locational spreads compared to 2019, which totalled 44. The total allocated volume and the average transaction price also fell by 1,148 GWh and €2.6/MWh respectively.

As with any episode of market strain, the locational spread mechanism is closely reviewed as part of CRE's wholesale market surveillance activities.



2. 2020 WAS AN EXCEPTIONAL YEAR FOR NATURAL GAS PRICES

2.1. Collapse of short-term prices with the health crisis and strong rebound at year end

Short-term gas prices collapsed on a global scale, when lockdown measures were implemented during the first quarter of 2020, as a result of the decline in demand in a market context that was already saturated by supply, in particular due to high storage levels and abundant LNG supply. The price of the day-ahead PEG product remained below the €8.0/MWh threshold until mid-August, reaching €2.9/MWh at the end of May, its lowest price level since the PEG was set up. The fall in European prices did, however, allow the monthly PEG, TTF and NBP contracts to show values below the Henry Hub on several days in June, July and August, with the lowest price recorded for the year even being the NBP, at €3.3/MWh, on 28 May.

Short-term prices rebounded strongly at the end of the year, driven by the growth in the price differential with Asia. South-East Asia was hit by a cold snap of historic proportions at the end of the year, which had the effect of seeing the price of LNG delivered to this continent soar, with the maximum price of the GNL East Asia price index (EAX) of €33.9/MWh reached on 17 December, i.e. a spread of €17.8/MWh with the monthly PEG contract, compared with an average of €3.5/MWh for the year. As such, the size of the price differential between the two continents encouraged LNG tankers to head for Asia rather than Europe during this period.

Over the year, PEG spot prices fell by an average of 31% compared to 2019, averaging €9.3/MWh. The monthly PEG contract saw an average decrease of 33% compared to the previous year, with an average of €9.8/MWh. Moreover, the average spread between PEG and TTF spot prices was smaller than the previous year. The average spread between the two gas exchange points decreased compared to 2019, from €0.06/MWh to €0.10/MWh.

Graph 44: Day-ahead prices for gas in France and the Netherlands (PEG and TTF respectively)



Graph 45: Day-ahead prices for gas in Europe



Sources: EEX, ICIS - Analysis: CRE

Graph 46: Global month-ahead gas prices



Source: ICIS - Analysis: CRE

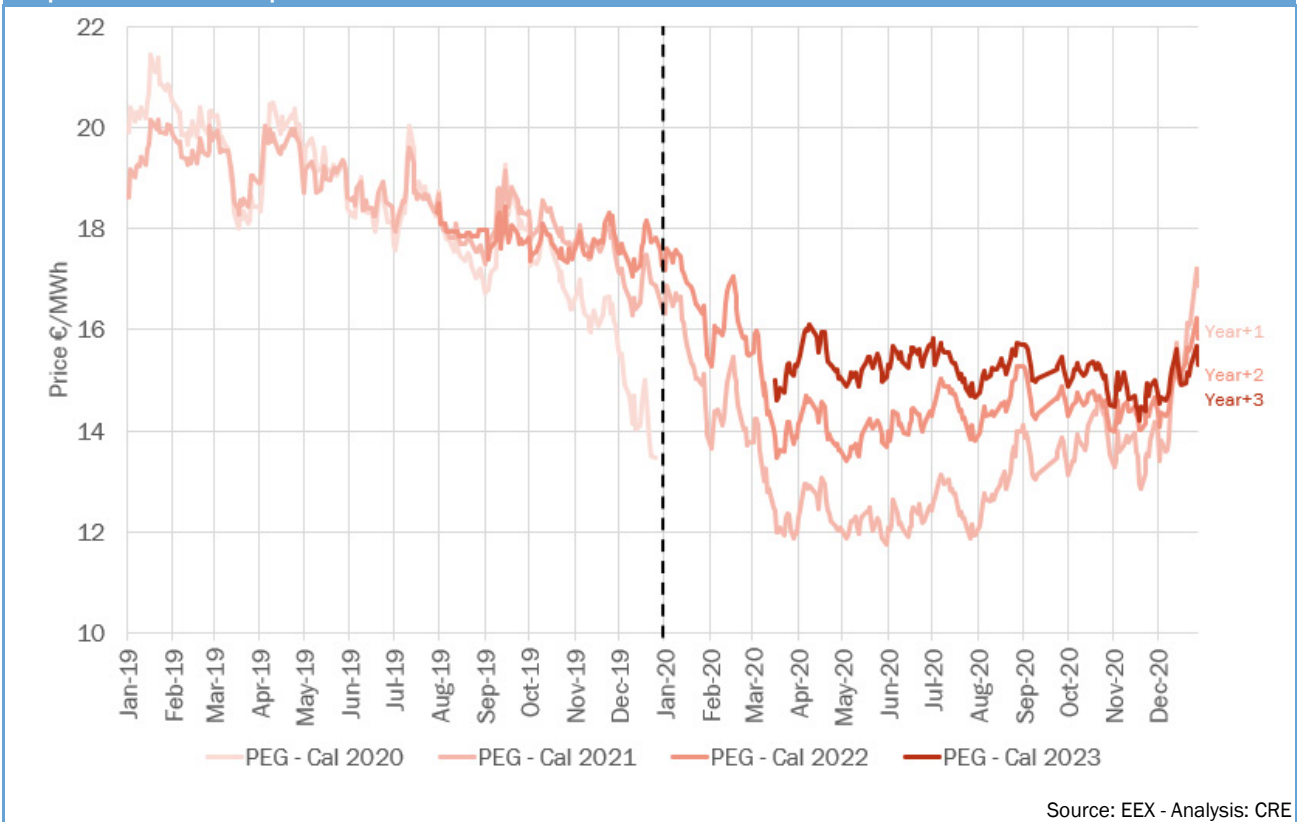
2.2. Falling futures prices given the uncertainty of economic recovery

2020 started with futures prices following a downward trend pursuing the decline began in 2019. The development of the pandemic contributed to pulling futures prices even further downwards, in particular the 2021 PEG calendar product, without it falling below the €11.8/MWh threshold. Price movements subsequently evolved between €11.8/MWh and €14.2/MWh from March to September.

At the end of the year, the prospects for economic recovery with the announcement of the forthcoming COVID-19 vaccines helped to drive futures prices upwards. The 2021 PEG calendar product rose at the end of the year to €16.9/MWh, a price level close to that of the beginning of the year of €16.3/MWh. At the end of the year, futures prices were also driven up by carbon and oil prices, the influence of LNG prices delivered in Asia and the strong demand for storage.

Over 2020, the 2021 TTF calendar product averaged €13.4/MWh, down 27% compared to 2019 when it stood at €18.3/MWh. The minimum price for this product was reached on 1st June with €11.8/MWh and the maximum price was recorded on 31 December with €17.3/MWh.

Graph 47: PEG futures prices



Source: EEX - Analysis: CRE

2.3. Continued strong demand for storage injection

The 2020-2021 winter/summer price spread started the 2019-2020 gas year at a level of €2.3/MWh. After rising to €4.9/MWh in January, the price spread fluctuated and fell back to €3.2/MWh on 19 March before rising again. The price spread reached its maximum for the gas year on 13 July with €6.5/MWh before starting a sharp decline at the end of the period to close at €1.6/MWh. The average price of the winter/summer differential was €4.2/MWh over the 2019-2020 gas year, i.e. €0.2/MWh higher than the previous year.

For the 2020-2021 gas year, the 2021-2022 winter/summer price differential started on 1st October at €2.3/MWh and averaged €1.6/MWh in the last quarter of 2020.

Graph 48: Winter/summer price spread in France



All the gas storage capacities for 2020-2021 were subscribed during the auctions held in June 2019, November 2019 and February 2020, representing a total volume of 128 TWh. These capacities were traded with an average auction price of €3.85/MWh. This price is higher than that of 2019-2020, which amounted to €1.84/MWh. During that year, the auctions took place from 13 November 2018 to 21 February 2019, which constituted a period with a lower winter/summer price spread than the different auction periods of 2020-2021.

Storage capacities put up for sale for 2021-2022 were also all traded for the third consecutive year for a volume identical to the previous year. The average auction price for this auction campaign was €1.91/MWh, lower than the previous year, which is consistent with the lower summer/winter price spread compared to 2019-2020 auction periods.

3. INCREASE IN VOLUMES TRADED ON WHOLESALE MARKETS IN FRANCE IN 2020 PURSUED

Volumes traded on wholesale markets in France totalled 781 TWh, an increase of 6% compared with the previous year. In relation to national consumption for the year, the volumes traded in 2020 represented 176% of national consumption compared with 154% in 2019.

On the French intermediated market (via EEX or brokers), volumes traded in spot contracts totalled 190 TWh over the year, i.e. an increase of 20% compared to the previous year. This increase followed on from a 13% drop the previous year, which itself followed ten consecutive years of increases in traded volumes. Likewise, 132,050 transactions in spot contracts were recorded, 6% more than the previous year, but 13% less than in 2018. Spot volumes traded on the exchange returned to their 2018 level at 161 TWh, 18% higher than in 2019. On the other hand, spot

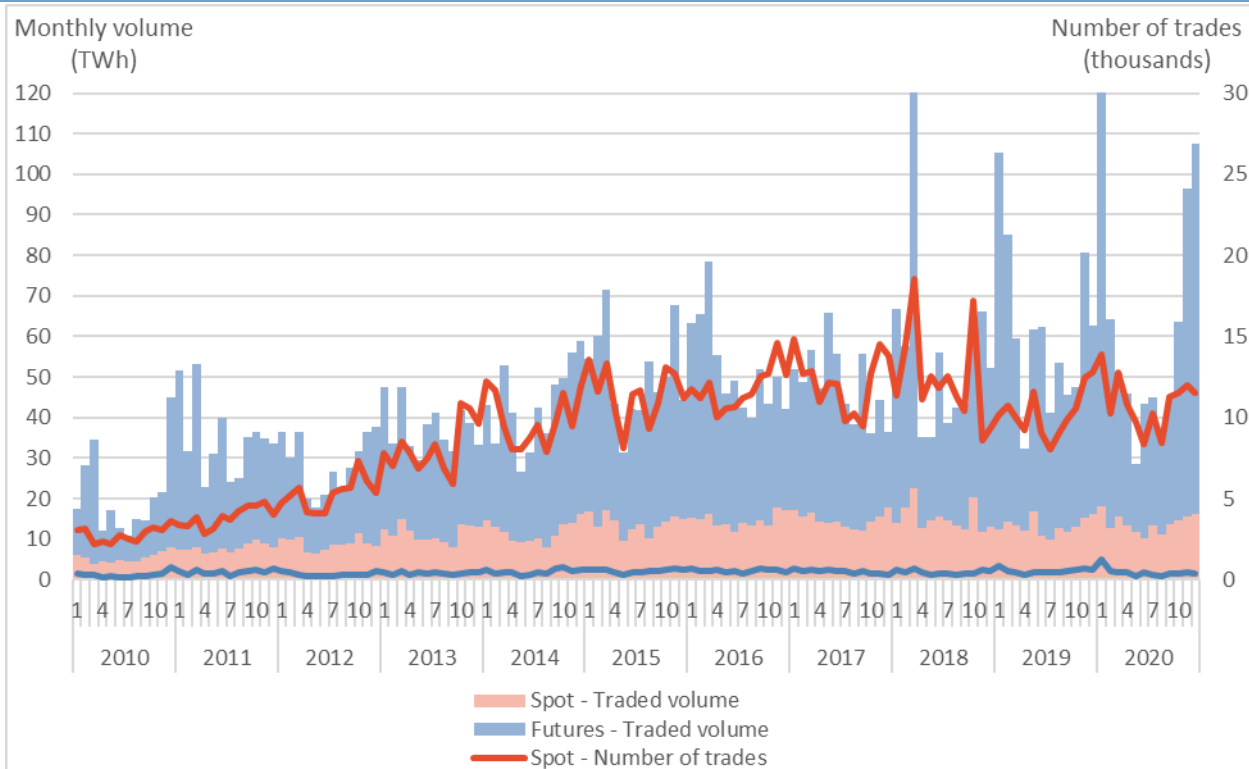
contracts intermediated via brokers fell by 20% compared with the previous year to reach 29 TWh. The exchange thus accounted for 85% of spot contract trading on the intermediated market, compared with 15% for brokers.

The increase in the volumes of futures contracts traded in 2020 compared to 2019 was less significant than that of spot contracts, amounting to only 2% for 593 TWh. On average, the contracts traded included higher volumes than the previous year due to the lower number of futures transactions in 2020 (5,093) than in 2019 (5,828), a decrease of 13%. The overwhelming majority of futures contracts remain intermediated via brokers (96% versus 4% for EEX). The volumes traded via brokers increased by 2% compared to the previous year, totalling 572 TWh. The exchange continued to grow in terms of volumes on this market with 21 TWh traded in 2020, i.e. 24% more than the previous year.

Volumes traded for the Q+1, S+1 and Y+1 futures products all decreased in 2020 compared to 2019 (-11% for the quarterly, -46% for the seasonal and -12% for the annual), while those for the M+1 monthly product rose by 47%. This observation reflects the uncertainty surrounding the health situation, which has seen short-maturity futures contracts favoured at the expense of those with longer maturities, due to a lack of visibility on how the situation will evolve.

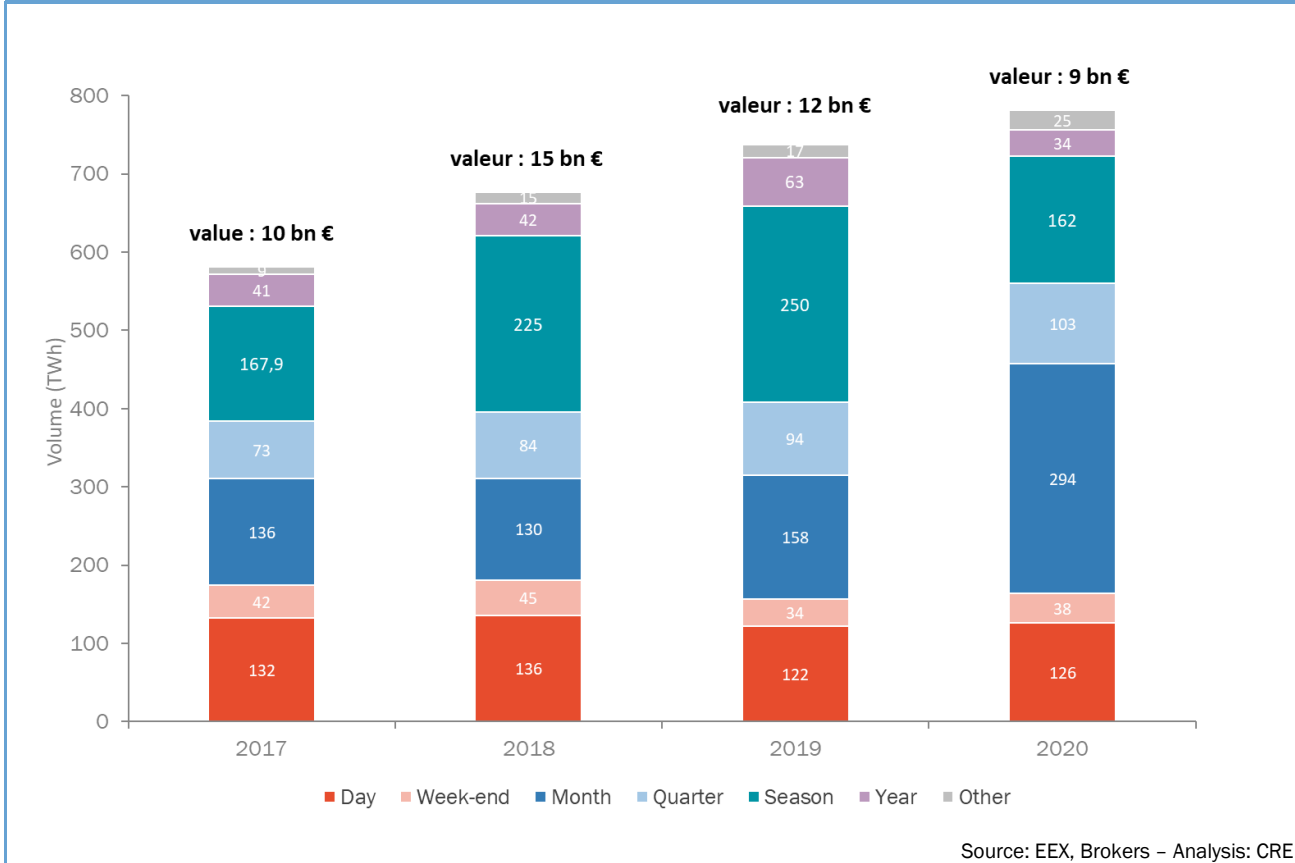
Although total traded volumes were higher than the previous year, the total value of these volumes was down by €3 billion to €9 billion in 2020.

Graph 49: Changes in volumes traded and number of transactions on the French intermediated market



Source: ICIS - Analysis: CRE

Graph 50: Volumes and values traded by product on the French intermediated market



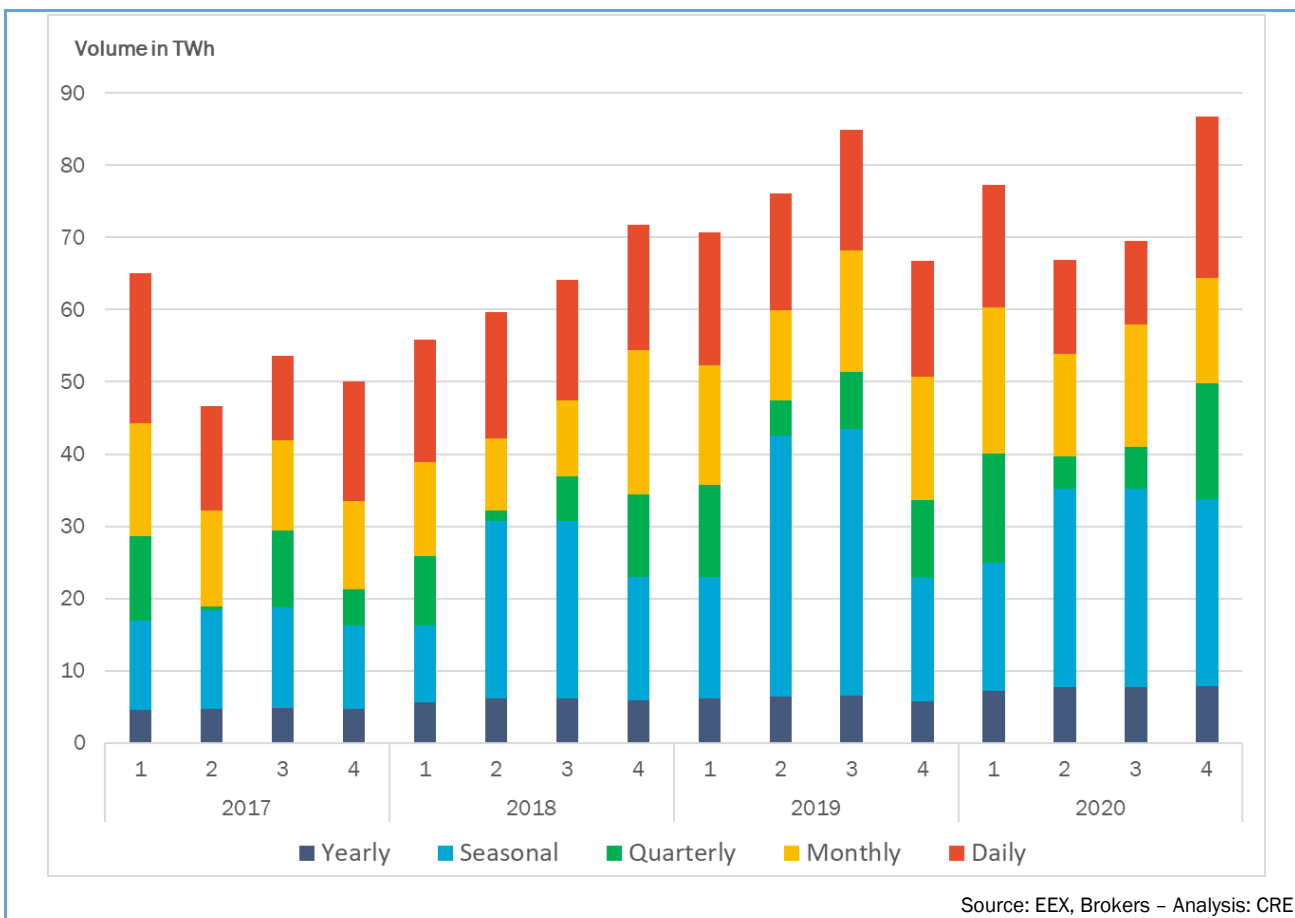
Graph 51 presents the quarterly sum of net physical purchase positions by participant on the wholesale markets in France by delivery period and product maturity. Since the trades considered do not involve imports or exports, the total of net buying positions is equal to the total of net selling positions.

It can be seen that the sum of net positions was significantly lower than the volume of transactions (Graph 49 and Graph 50), which can be explained by successive purchases and sales of the same product by the same participant, which offset each other when calculating the net position. This difference may reflect the level of market liquidity.

The average value of the total of the net positions of participants over the four quarters of the year was only 1% higher than in 2019. This small difference, despite the drop in consumption, can be explained in particular by the increase in trading compared to the previous year.

The final physical positions include proportionally more short-term products and less seasonal products in quarters 1 and 4 than in quarters 2 and 3, reflecting the greater uncertainty about demand during the winter season.

Graph 51 : Total of net buying positions per participant, per delivery period and per product maturity



4. MAIN TAKEAWAYS ON THE FUNCTIONING OF WHOLESALE NATURAL GAS MARKET IN FRANCE IN 2020

The exceptional nature of 2020 on the gas markets in France and worldwide was due to the effects of the COVID-19 pandemic, which had a decisive impact on demand. Exceptionally low wholesale gas prices reflected a supply that was significantly higher than demand for most of the year in a context of overabundance of LNG which was already the case in 2019.

For the third year in a row, storage auctions saw all the capacity put on the market being subscribed, confirming the smooth functioning of the auctions and its contribution to the country's security of supply.

The French spot market became the most competitive in Europe in 2020 with an average price of €0.1/MWh lower than the Dutch TTF and €0.2/MWh lower than the German NCG. The convergence of calendar prices between France and the reference price at the TTF was also strong, with an average price spread of the Y+1 product of -0.04 €/MWh after 0.13 €/MWh in 2019 and 0.26 €/MWh in 2018.

These performances were made possible by efficient and complementary gas infrastructures offering the Trading Region France (TRF) strong arbitrage opportunities in relation to the global markets. Furthermore, the single market area since 1st November 2018 contributed to an increase in liquidity on the markets, ensuring security of supply in winter and generating optimized transit to the area's downstream markets (Spain, Switzerland and Italy).

KEY FIGURES

1. THE ELECTRICITY MARKET

Table 13 Installed production capacity in France

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Installed capacity (GW)	133,0	135,6	136,2	0,5%	0,7
Nuclear	63,13	63,13	61,37	-3%	-1,76
Hydro	25,5	25,7	25,7	0%	0,03
Fossil-fuel	18,6	18,5	18,9	2%	0,39
Coal	3,0	3,0	3,0	0%	0,00
Oil	3,5	3,4	3,4	1%	0,02
Gas	12,1	12,2	12,6	3%	0,37
RES (excluding hydro)	25,7	28,2	30,2	7%	1,99
On-shore Wind	15,1	16,5	17,6	7%	1,10
Solar	8,5	9,6	10,4	9%	0,82
Biomass	2,0	2,1	2,2	3%	0,07

Source: RTE

Table 14 Production in the various technology sectors in France

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Generation (TWh)	546,6	535,4	497,5	-7,1%	-37,8
Nuclear	393,0	379,2	335,2	-12%	-44,02
Hydro	67,4	59,5	64,4	8%	4,90
Fossil-fuel	38,0	41,1	36,6	-11%	-4,43
Coal	5,7	1,6	1,4	-13%	-0,20
Oil	2,1	2,4	1,7	-31%	-0,74
Gas	30,2	37,1	33,6	-9%	-3,50
RES (excluding hydro)	48,3	55,6	61,3	10%	5,71
On-shore Wind	28,1	33,8	39,2	16%	5,43
Solar	10,6	12,1	12,6	5%	0,55
Biomass	9,5	9,7	9,4	-3%	-0,26
Consumption including network losses (TWh)	476	470	446	-5%	-24,9

Source: RTE

Table 15 Imports and exports in France

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Import (TWh)	26,1	28,3	34,6	22,2%	6,3
Import Peak (TWh)	10,0	10,7	13,2	23,5%	2,5
Import Offpeak (TWh)	16,1	17,6	21,3	21,4%	3,8
Export (TWh)	86,3	84,0	77,8	-7,4%	-6,2
Export Peak (TWh)	29,8	28,9	27,2	-5,9%	-1,7
Export Offpeak (TWh)	56,5	55,1	50,6	-8,1%	-4,5
Export balance (TWh)	60,2	55,7	43,2	-22,4%	-12,5

Source: RTE

Table 16: Balance at borders

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Balance at border (TWh)					
CWE	6,1	2,7	0,6	-77%	-2,1
Italy	18,5	18,9	15,4	-19%	-3,5
Spain	12,0	9,7	5,2	-46%	-4,5
Switzerland	10,6	13,1	13,2	0%	0,0
Great Britain	13,0	11,2	8,8	-22%	-2,5
Total (TWh)	60,2	55,7	43,2	-22,4%	-12,5

Source: RTE

Table 17: Clean dark and clean spark spread and coal

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Contract (Y+1)					
Coal (€/t)	73,8	62,0	50,8	-18%	-11,3
Clean dark spread peak (€/MWh)	21,1	17,9	16,3	-9%	-1,6
Clean spark spread peak (€/MWh)	12,1	14,7	18,9	28%	4,2

Sources: ICE, EPEX SPOT, EEX

Table 18: Injections and withdrawals in the French electricity system

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Physical injections into grids (TWh)	578	564	530	-6,1%	-34,3
Generation Excluding ARENH	452,0	415,0	369,0	-11%	-46,00
ARENH generation	96,0	121,0	126,1	4%	5,10
Commercial Imports	30,0	28,0	34,6	24%	6,60
Physical withdrawals from grids (TWh)	580	564	530	-6,1%	-34,60
End-user consumption	444,0	443,0	409,2	-8%	-33,80
Water pumping	7,0	7,0	6,3	-10%	-0,70
Commercial Exports	93,0	84,3	77,8	-8%	-6,50
Grid losses purchased on markets	36,0	30,0	36,4	21%	6,40

Source: RTE

Table 19 French electricity market participants

	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percent	In value
Balance responsible party	220	189	203	7%	14,0
Active electricity producers	24	16	38	138%	22
ARENH receiving party	19	21	26	24%	5
Customers suppliers	29	27	41	52%	14
Import/export operators	49	42	64	52%	22
Block trading operators	89	79	110	39%	31
Active on the spot exchange	84	72	106	47%	34

Sources: RTE, EPEX Spot, Brokers

Table 20: Spot and futures prices in the French electricity market

	Annual values			Annual variation 2019/2020	
	2018	2019	2020	As a percentage	As a value
Spot market prices					
Intraday price France €/MWh	50,92	39,74	32,92	-17,2%	-6,82
Day-Ahead price France Baseload €/MWh	50,20	39,45	32,20	-18,4%	-7,25
Day-Ahead price France Peakload €/MWh	54,54	42,52	35,03	-17,6%	-7,49
France-Germany Day-Ahead Baseload spread €/MWh	-5,73	-1,78	-1,73	-2,8%	0,05
France-Germany Day-Ahead Peakload spread €/MWh	-6,37	-2,09	-2,29	9,8%	-0,20
Day-Ahead France-Germany convergence rate €/MWh	0,35	0,44	0,46	4,9%	0,02
Forward market prices					
M+1 price France €/MWh	53,33	45,26	36,52	-19,3%	-8,74
M+1 France-Germany spread €/MWh	6,31	3,02	3,27	8,4%	0,25
Q+1 price France €/MWh	53,44	49,33	41,93	-15,0%	-7,40
Q+1 France-Germany spread €/MWh	6,60	4,17	6,05	45,0%	1,88
Y+1 price France €/MWh	48,96	50,87	44,87	-11,8%	-6,00
Y+1 France-Germany spread €/MWh	4,84	2,71	4,58	69,2%	1,87
Y+1 Peakload/Baseload ratio					
France	1,27	1,25	1,29	3,1%	0,04
Germany	1,23	1,21	1,22	1,2%	0,01

Sources: EPEX SPOT, EEX

Table 21: Spot and futures volumes in the French electricity market

	Annual values			Annual variation 2019/2020	
	2018	2019	2020	As a percentage	As a value
NEB					
NEB volumes TWh	431,75	383,66	406,29	5,9%	22,6
NEB/French consumption ratio	97,2%	86,6%	99,3%	14,7%	0,1
Spot market					
Volumes in the EPEX SPOT intraday market TWh	9,10	11,50	16,70	45,2%	5,2
Portion of intraday cross-border volumes	70,0%	70,8%	76,0%	7,4%	0,1
Volumes in the EPEX SPOT Day-Ahead market TWh	113,75	113,16	122,00	7,8%	8,8
Forward market					
Volumes TWh	811	798	906	13,5%	108,0
Brokers market share	81,0%	83,3%	80,5%	-3,4%	0,0
EEX market share	19,0%	16,7%	19,5%	17,2%	0,0
Number of Trades	130 475	138 532	130 991	-5,4%	-7541,0
Brokers market share	85,2%	85,8%	76,1%	-11,3%	-0,1
EEX market share	14,8%	14,2%	23,9%	68,6%	0,1
Y+1 product					
Volumes TWh	241,55	202,59	230,46	13,8%	27,9
Number of Trades	7 359	8 152	9 928	21,8%	1776,0
Q+1 product					
Volumes TWh	106,81	105,75	121,86	15,2%	16,1
Number of Trades	8 294	8 897	8 366	-6,0%	-531,0
M+1 product					
Volumes TWh	129,96	137,04	135,60	-1,1%	-1,4
Number of Trades	28 558	31 316	29 699	-5,2%	-1617,0
W and D products					
Volumes TWh	104,11	109,63	72,58	-33,8%	-37,0
Number of Trades	65 051	63 887	47 248	-26,0%	-16639,0

Sources: EPEX SPOT, EEX, Brokers, RTE

Table 22: Concentration index (HHI) of various French wholesale electricity market segments

	HHI - Market Concentration	
	2019	2020
Deliveries		
Forward market (Physical) - purchases	512,78	559,59
Forward market (Physical) - sales	505,89	579,04
EPEX - purchases	986,00	1386,69
EPEX - sales	2609,01	2786,69
Injections		
Production	6 714,98	6 447,33

Sources: RTE, EPEX Spot, Brokers

2. THE GAS MARKET

Table 23: Gas market fundamentals in France

Market fundamentals	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percentage	In value
Entry and exit flows					
Supply (TWh)	704	761	682	0	-79
Storages withdrawals	119	122	153	26%	32
Imports	585	639	529	-17%	-110
Pipeline	468	421	350	-17%	-71
LNG	117	219	179	-18%	-40
Production	0	0	0	-58%	0
Demand (TWh)	704	761	682	-10%	-79
Storages injections	144	143	131	-8%	-12
End consumers demand	469	479	444	-7%	-34
Distribution consumers	291	288	269	-7%	-20
Consumers connected to the transmission system	178	190	176	-8%	-15
Exports	88	135	106	-21%	-29
Other	3	4	1	-83%	-4
Deliveries at PEG (TWh)	860	868	864	0%	-4

*PEG Nord before 1st November 2018

Sources: GRTgaz, Teréga – Analysis: CRE

Table 24: Gas prices in France

Price	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percentage	In value
Spot prices (€/MWh)					
PEG day-ahead (avg.)*	22,8	13,6	9,3	-31%	-4,2
Day-ahead PEG Nord/TTF Spread (avg.)*	-0,2	0,1	-0,1	-276%	-0,2
Forward prices (€/MWh)					
PEG M+1 (avg.)*	22,4	14,6	9,4	-35%	-5,2
PEG Y+1 (avg.)*	20,9	18,3	13,4	-27%	-4,9
M+1 PEG/TTF spread (avg.)*	0,3	0,1	0,0	-129%	-0,2
Summer-ahead/Winter-ahead spread (avg.)	1,1	4,0	4,2	6%	0,2

*PEG Nord before 1st November 2018

Sources: EEX, ICIS – Analysis: CRE

Table 25: Gas trading in France

Trading activity	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percentage	In value
Natural gas exchanged at PEG* (TWh)	677	738	781	6%	43
% of national consumption	144%	154%	176%		22%
Trading volumes in the French intermediated markets					
Spot market (TWh)	183	159	190	20%	31
Intraday	32	33	35	6%	2
Day Ahead	102	88	91	3%	3
Exchange (DA, WD, WE, other spot)	161	137	161	18%	24
Brokers (DA, WD, WE, other spot)	22	37	29	-20%	-7
Forwards market (TWh)	494	579	593	2%	14
M+1	96	112	164	47%	52
Q+1	40	40	35	-11%	-4
S+1	132	124	67	-46%	-58
Y+1	19	25	22	-12%	-3
Exchange (all maturities)	11	17	21	24%	4
Brokers (all maturities)	482	562	572	2%	10
Number of transactions in the French intermediated markets					
Spot market	149 605	124 139	132 050	6%	7 911
Intraday	32 716	31 883	33 042	4%	1 159
Day Ahead	93 065	74 127	78 792	6%	4 665
Exchange (DA, WD, WE, other spot)	137 891	114 095	128 163	12%	14 068
Brokers (DA, WD, WE, other spot)	11 714	10 044	3 887	-61%	-6 157
Forwards market	4 978	5 828	5 093	-13%	-735
M+1	2 468	2 673	2 255	-16%	-418
Q+1	375	390	337	-14%	-53
S+1	520	446	311	-30%	-135
Y+1	106	143	203	42%	60
Exchange (all forward maturities)	554	1 019	1 169	15%	150
Brokers (all forward maturities)	4 424	4 809	3 924	-18%	-885

* Deliveries from trading on intermediated markets in France

Sources: GRTgaz, Teréga, EEX, brokers – Analysis CRE

Table 26: French gas market participants

Market participants on French gas markets	Yearly values			Yearly variation 2019/2020	
	2018	2019	2020	In percentage	In value
Number of active shippers by type of point					
PEG	112	127	115	-9%	-12
PIR	52	60	53	-12%	-7
PITD	40	41	44	7%	3
PITS	52	56	47	-16%	-9
Number of companies importing LNG					
Montoir	5	5	8	60%	3
Fos Tonkin	2	4	1	-75%	-3
Fos Cavaou	5	4	5	25%	1
Dunkerque	2	5	2	-60%	-3

Sources: GRTgaz, Teréga – Analysis: CRE

NOTICE

The sources of some of the data have been updated in relation to previous surveillance reports to provide greater accuracy, which may explain the variation in some of the graphs for the periods before 2020.

The underlying data for key figures are available from the CRE website, in the "Open data" section (www.cre.fr/Pages-annexes/Open-Data).

LIST OF TABLES

Table 1: Criteria for publishing unavailability pursuant to the Transparency Regulation.....	16
Table 2: Sanction decisions in Europe related to breaches of provisions of the REMIT Regulation	21
Table 3: Key EDF publications on the impacts of the health crisis on nuclear production.....	38
Table 4 Change in installed capacity in the renewable energy sector	40
Table 5: Average day-ahead and intraday prices.....	47
Table 6: Changes in price spreads and EDF marginal costs.....	49
Table 7: Average convergence rate with the French price per country in 2019 and 2020	50
Table 8 Average European spot prices compared with the French spot price since 2017 (prices in red are higher than French prices and prices in green are lower)	51
Table 9: Balancing reserves contracted by RTE and balancing energy activated	61
Table 10: Change in the forecast supply-demand (bid/ask) balance of the capacity mechanism	65
Table 11: Change in the provisional balance of the capacity mechanism from June to September 2020	66
Table 12: Locational spread activation review for 2020.....	78
Table 13 Installed production capacity in France.....	86
Table 14 Production in the various technology sectors in France.....	86
Table 15 Imports and exports in France	86
Table 16: Balance at borders.....	87
Table 17: <i>Clean dark</i> and <i>clean spark spread</i> and coal	87
Table 18: Injections and withdrawals in the French electricity system	87
Table 19 French electricity market participants	87
Table 20: Spot and futures prices in the French electricity market	88
Table 21: Spot and futures volumes in the French electricity market	88
Table 22: Concentration index (HHI) of various French wholesale electricity market segments.....	89
Table 23: Gas market fundamentals in France	89
Table 24: Gas prices in France	89
Table 25: Gas trading in France	90
Table 26: French gas market participants	90

LIST OF GRAPHS

Graph 1: Changes in the number of alerts received by CRE from ACER	14
Graph 2: Breakdown of surveillance cases analysed by CRE (excluding analyses of cases arising from automated ACER alerts)	14
Graph 3: Re-registration of participants previously registered in the United Kingdom with European Union regulators	19
Graph 4: Commodity price trends since 1 st January 2020	28
Graph 5: CO ₂ allowance price changes	30
Graph 6: Temperature curve for France	31
Graph 7: Injections and withdrawals for 2020 [2019].....	33
Graph 8: Quarterly volumes traded at borders	34
Graph 9: Consumption in France.....	35
Graph 10: Nuclear power unavailable due to short-term modulation, at 31/12/2020	36
Graph 11: Nuclear power unavailable due to long-term modulation, at 31/12/2020.....	37
Graph 12: Nuclear power availability forecasts in 2020 seen at different dates (and actual availability for the part of the curve before the target date)	38
Graph 13: Comparative change of the installed capacities of renewable energy (excluding hydro) and fossil-fired energy (excluding nuclear)	40
Graph 14: Comparison of half-yearly production of renewable energy (excluding hydro) and fossil-fired energy (excluding nuclear) energies	41
Graph 15: Hydropower production rates.....	42
Graph 16: Gas sector production rate.....	43
Graph 17: Peak spot clean dark and clean spark spreads.....	43
Graph 18: Coal sector production rate.....	44
Graph 19: Marginality on the various production sectors in 2019 and 2020.....	46
Graph 20: Change in day-ahead prices in France (average weekly prices)	48
Graph 21: Quarterly convergence rates (+/- €0.01/MWh) for spot prices with coupled countries	50
Graph 22: Spread between European spot prices and French prices in 2020	51
Graph 23: Y+1 base product prices in Europe.....	52
Graph 24: Price spread between the French and German Y+1 calendar base products put into perspective with the availability forecast of French nuclear facilities for the period.....	53
Graph 25: Price spread between the French and German Q4 2020 quarterly base products put into perspective with the availability forecast of French nuclear facilities for the period.....	54
Graph 26: Price spread between futures products with physical delivery (Heren index) and with financial settlement (EEX) for the Q4 2020 base product	55
Graph 27: Timeline of French and German Y+1 calendar base products	56
Graph 28: Volumes traded on the exchange and brokers of the futures markets.....	57
Graph 29: Volumes traded on wholesale markets by maturity.....	58
Graph 30: Total net physical positions per participant, per delivery period and per product maturity	59
Graph 31: FCR prices and volumes in France (weekly average)	62
Graph 32: Quarterly activation volumes by purpose and net volume	63
Graph 33: Adjustment volumes by entity type	63
Graph 34: EPEX SPOT capacity auction prices	66
Graph 35: Supply and demand in the French system for 2020 [2019] (trade flows).....	70
Graph 36: Monthly balance in the French system for 2020 (trade flows)	71
Graph 37: Consumption of Gas-fired Combined Cycle Power Plants (CCPP), network customers excluding CCPP and all sectors.....	72
Graph 38: Stock levels in France.....	73
Graph 39: Number of shipments received in 2018 by country of origin.....	74
Graph 40: LNG imports by European Union country	75
Graph 41: LNG terminals sendouts (trade flows)	76
Graph 42: French interconnection utilization rates (trade flows)	77
Graph 43: Pirineos exit flows (Spanish border)	78

Graph 44: Day-ahead prices for gas in France and the Netherlands (PEG and TTF respectively)..... 79

Graph 45: Day-ahead prices for gas in Europe 80

Graph 46: Global month-ahead gas prices 80

Graph 47: PEG futures prices 81

Graph 48: Winter/summer price spread in France 82

Graph 49: Changes in volumes traded and number of transactions on the French intermediated market..... 83

Graph 50: Volumes and values traded by product on the French intermediated market 84

Graph 51 : Total of net buying positions per participant, per delivery period and per product maturity 85