National Electricity Transmission System Performance Report

Report to the Office of Gas and Electricity Markets (Ofgem)

2022 – 23

ESO

Contents

Introduction

This report details the performance of the National Electricity Transmission System in Great Britain for 2022-23, as required by Transmission Licence Standard Condition C17: Transmission System Security Standard and Quality of Service.

The National Electricity Transmission System (NETS) in Great Britain is comprised of both onshore and offshore transmission networks.

The onshore transmission networks are owned by National Grid Electricity Transmission plc (NGET) in England and Wales, SP Transmission plc (SPT) in south and central Scotland and Scottish Hydro Electric Transmission plc (SHE Transmission) in the north of Scotland. There is also a 2250MW HVDC undersea link between Hunterston in Western Scotland and Flintshire Bridge in North Wales, that is jointly owned by SPT and NGET.

The offshore transmission networks are owned by Transmission Capital (TC), Blue Transmission Investments Ltd (BT), Greater Gabbard OFTO plc, Gwynt-Y-Mor OFTO plc, Thanet OFTO Ltd, Humber Gateway OFTO Ltd, West of Duddon Sands (WoDS) Transmission plc, Diamond Transmission Partners (DTP) BBE Ltd, DTP RB Ltd, DTP Galloper Ltd, DTP Walney Extension Ltd and DTP Hornsea One Ltd.

Following legal separation of the Electricity System Operator from NGET on 1st April 2019, National Grid Electricity System Operator Ltd became the National Electricity Transmission System Operator (NETSO) for the onshore and offshore transmission networks.

In accordance with Standard Licence Condition C17 (Transmission System Security Standard and Quality of Service) of the Transmission Licence, the NETSO is required by the Office of Gas and Electricity Markets, to report on the annual performance of the National Electricity Transmission System in terms of availability, system security and quality of service.

The onshore and offshore transmission system broadly comprises circuits operating at 400, 275 and 132kV. The formal definition of the National Electricity Transmission System is contained in the NETS Grid Code and NETS Security and Quality of Supply Standard (NETS SQSS).

The fully interconnected transmission system provides a consistently high quality of supply and allows for the efficient bulk transfer of power from remote generation to demand centres.

Information relating to NG Electricity Transmission plc, SP Transmission plc, SHE Transmission plc, TC Robin Rigg OFTO Ltd, TC Barrow OFTO Ltd, TC Gunfleet Sands OFTO Ltd, TC Ormonde OFTO Ltd, TC Lincs OFTO Ltd, TC Westermost Rough OFTO Ltd, TC Dudgeon OFTO plc, TC Beatrice OFTO Ltd, TC Rampion OFTO Ltd, TC East Anglia One OFTO Ltd, BT Walney 1 Ltd, BT Walney 2 Ltd, BT Sheringham Shoal Ltd, BT London Array Ltd, Greater Gabbard OFTO plc, Gwynt-Y-Mor OFTO plc, Thanet OFTO Ltd, Humber Gateway OFTO Ltd, WoDS Transmission plc, DTP BBE Ltd, DTP RB Ltd, DTP Galloper Ltd, DTP Walney Extension Ltd and DTP Hornsea One Ltd have been provided by the Transmission Owners in accordance with Licence Condition D3 (Transmission System Security Standard and Quality of Service) of their Transmission Licences.

When considering the performance of the transmission networks it should be recognised that this can be influenced by both the Transmission Owners and the NETSO.

The National Electricity Transmission System is connected via interconnectors to transmission systems in Northern Ireland, Republic of Ireland, France, the Netherlands, Belgium and Norway.

The interconnectors with Northern Ireland and the Republic of Ireland fall outside the scope of this report, as they are regulated by the Northern Ireland Authority for Utility Regulation (NIAUR) and the Commission for Regulation of Utilities (CRU) respectively. The ElecLink interconnector is also excluded as it is regulated by Commission De Régulation De L'Énergie (CRE) of France.

Information relating to interconnectors with France (Interconnexion France–Angleterre IFA and IFA2), the Netherlands (BritNed), Belgium (Nemo Link) and Norway (North Sea Link) has been provided by National Grid Ventures.

National Electricity Transmission System (GB Network)

Availability

The definitions and criteria for system availability can be found in the Glossary of terms at the end of this report.

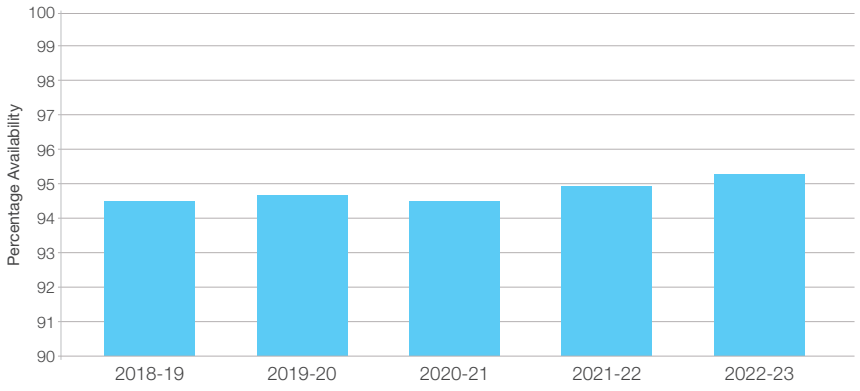
National Electricity Transmission System performance is monitored by reporting variations in Annual System Availability, Winter Peak System Availability and Monthly System Availability.

Annual System Availability

Annual System Availability of the National Electricity Transmission System for 2022-23 was: 95.24%

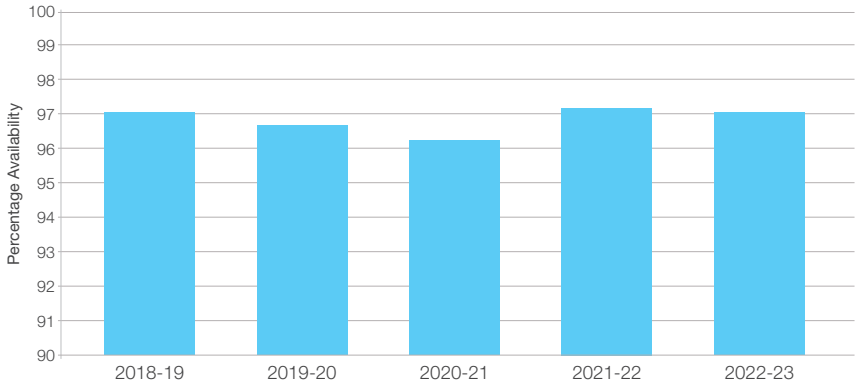
% Annual System Availability

GB % Annual System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
94.55	94.69	94.50	94.99	95.24

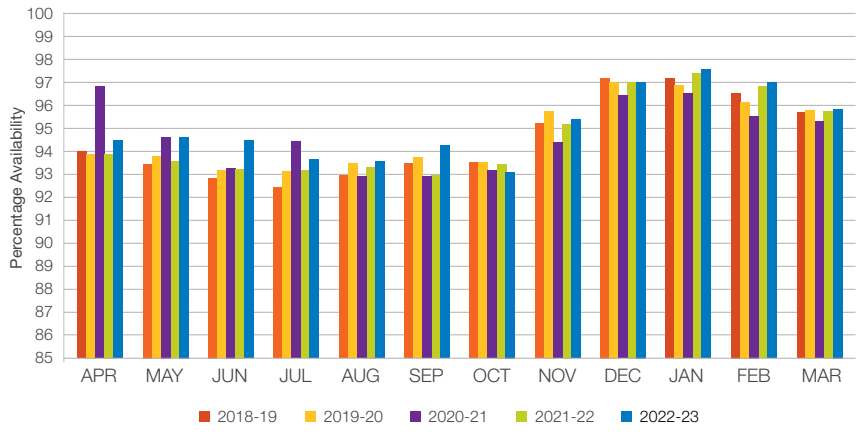


% Winter Peak System Availability

GB % Winter Peak System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
97.05	96.72	96.22	97.19	97.03



% Monthly System Availability



GB % Monthly System Availability					
	2018-19	2019-20	2020-21	2021-22	2022-23
Apr	94.00	93.88	96.84	93.83	94.48
May	93.39	93.77	94.68	93.55	94.73
Jun	92.80	93.16	93.24	93.22	94.47
Jul	92.39	93.11	94.43	93.16	93.70
Aug	92.97	93.51	92.92	93.31	93.60
Sep	93.55	93.71	92.90	92.96	94.28
Oct	93.52	93.52	93.10	93.40	94.72
Nov	95.26	95.70	94.32	95.21	95.38
Dec	97.24	97.05	96.45	97.01	97.01
Jan	97.29	96.89	96.58	97.39	97.63
Feb	96.58	96.17	95.57	96.78	96.99
Mar	95.74	95.80	95.30	95.73	95.86

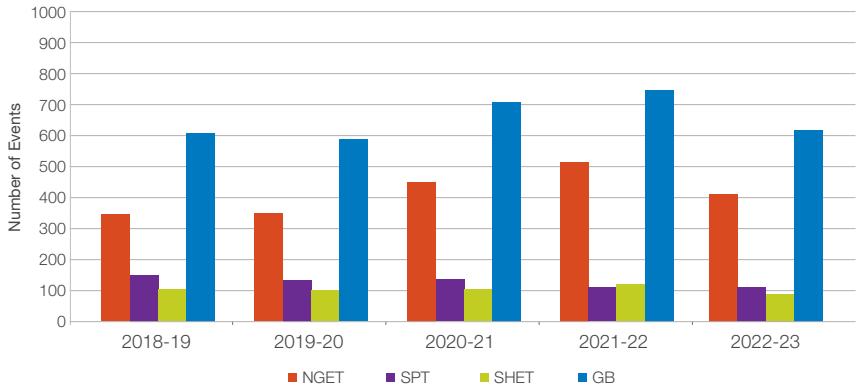
Security

The definitions and criteria for system security can be found in the Glossary of terms at the end of this report.

System performance is monitored by the Estimated Unsupplied Energy from the National Electricity Transmission System for each incident.

During 2022-23 there were 619 NETS events where transmission circuits were disconnected either automatically or by urgent manual switching. The vast majority of these events had no impact on electricity users with 16 resulting in loss of supplies to customers.

GB System Events

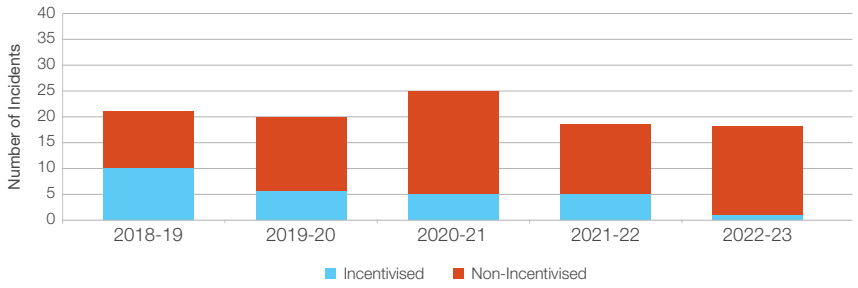


GB System Events					
	2018-19	2019-20	2020-21	2021-22	2022-23
NGET	347	355	455	517	412
SPT	157	131	138	115	118
SHET	108	100	113	119	89
GB	612	586	706	751	619

Number of Loss of Supply Incidents

The chart shows the annual comparison of the number of Loss of Supply Incidents that occurred within the National Electricity Transmission System.

GB System – Number of Incidents					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	10	6	5	5	1
Non-Incentivised	12	14	20	13	15

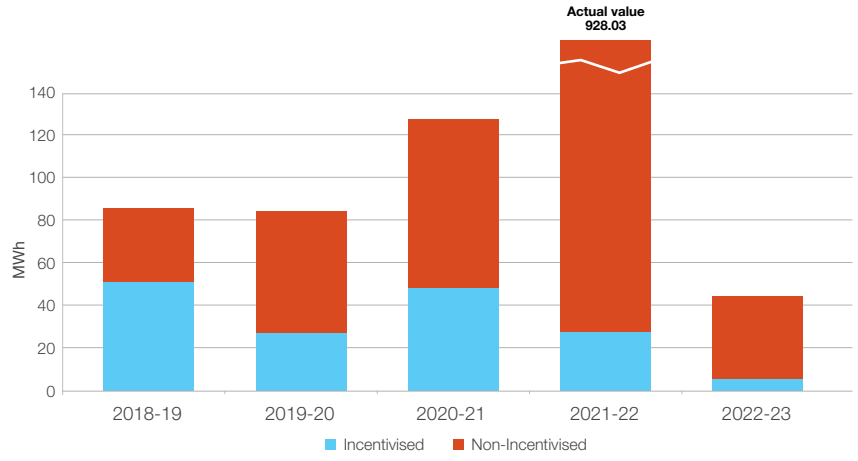


Total Estimated Unsupplied Energy

The total Estimated Unsupplied Energy from the National Electricity Transmission System during 2022-23 was: **43.68 MWh**

The chart shows the annual comparison of the Estimated Unsupplied Energy for Loss of Supply Incidents that occurred within the National Electricity Transmission System.

GB System – Estimated Unsupplied Energy (MWh)					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	51.14	57.59	47.98	26.84	5.20
Non-Incentivised	34.31	26.10	76.85	928.03	38.48



Reliability of Supply

The Overall Reliability of Supply for the National Electricity Transmission System during 2022-23 was: **99.999981%**

compared with 99.999612% in 2021-22 and 99.999948% in 2020-21.

Quality of Service

Quality of service is measured with reference to system Voltage and Frequency. The criteria for reportable Voltage and Frequency Excursions can be found in the Glossary of terms at the end of this report.

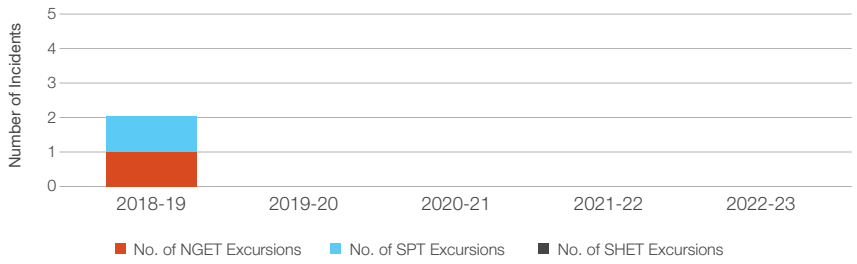
Voltage Excursions

During 2022-23 there were no reportable Voltage Excursions within the National Electricity Transmission System.

The chart below summarises the reportable Voltage Excursions that have occurred on the National Electricity Transmission System.

GB System Voltage Excursions

GB System – Voltage Excursons					
	2018-19	2019-20	2020-21	2021-22	2022-23
Number of NGET Excursions	1	0	0	0	0
Number of SPT Excursions	1	0	0	0	0
Number of SHET Excursions	0	0	0	0	0



GB System Voltage Excursion

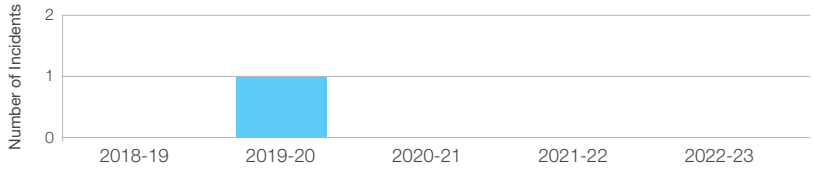
Incident Date, Time and Location	Nominal Voltage	Max Voltage	Duration
None			

Frequency Excursions

During 2022-23, there were no reportable Frequency Excursion within the National Electricity Transmission System. The previous Frequency Excursions were in the 2019-20 and 2008-09 reporting periods.

GB System Frequency Excursions

GB System – Frequency Excursons					
	2018-19	2019-20	2020-21	2021-22	2022-23
Number of Excursions	0	1	0	0	0



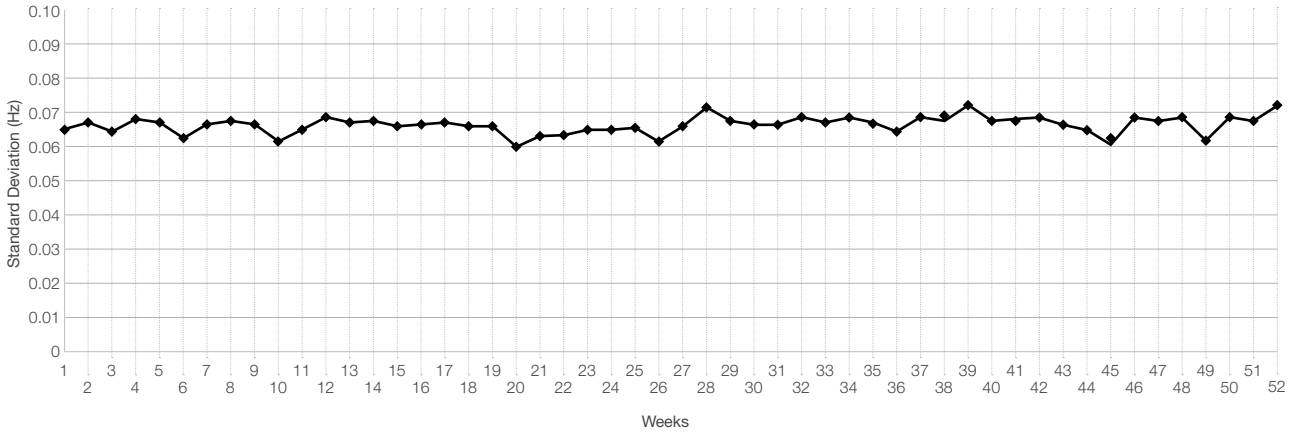
GB System Frequency Excursion

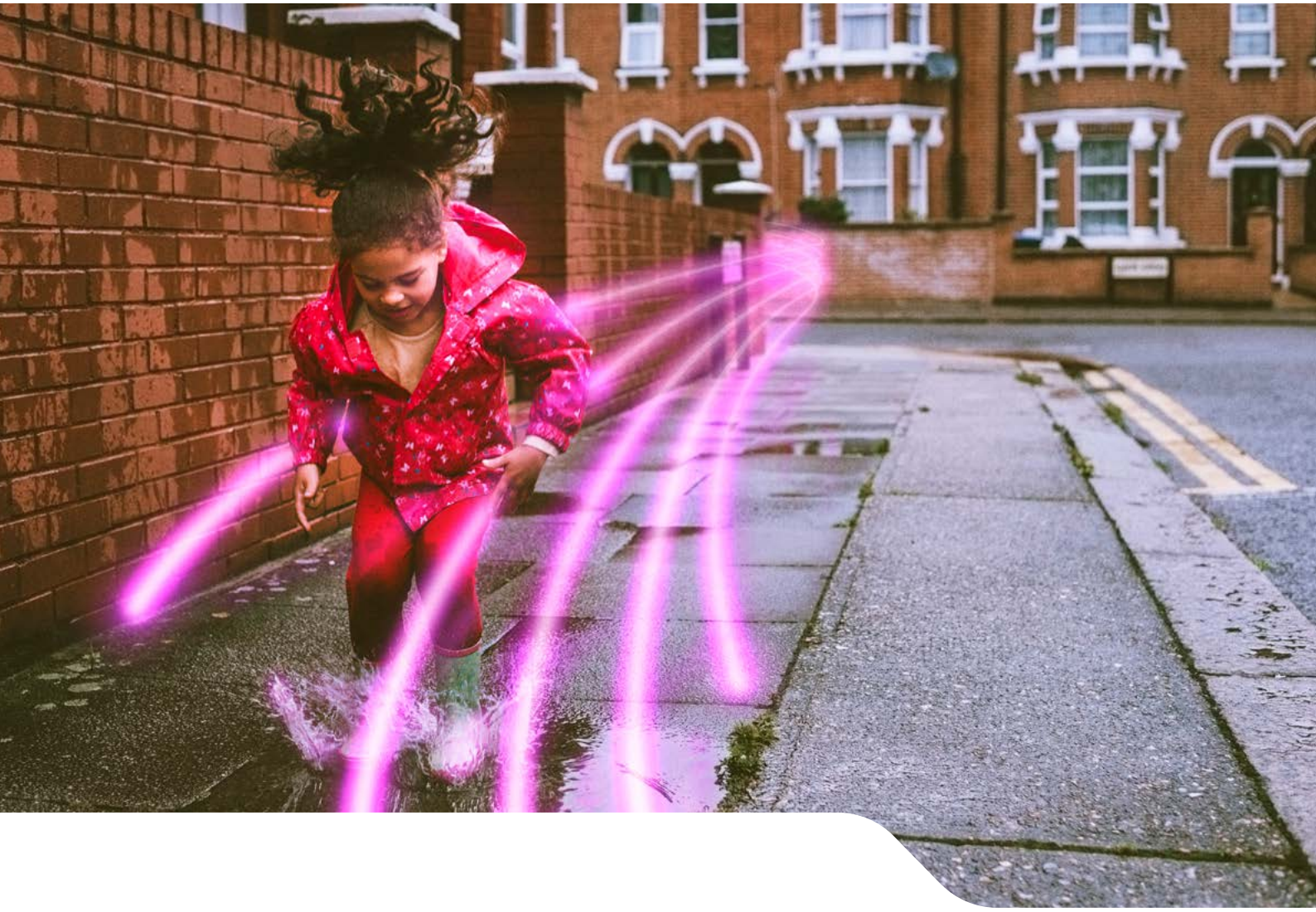
Incident Date & Time	Statutory Limits	Frequency	Duration
None	49.5 - 50.5Hz	N/A	0 seconds

Frequency Standard Deviation

The chart below displays the recorded Frequency Standard Deviation from 50Hz on a weekly basis for the year 2022-23.

GB System – Frequency Standard Deviation





National Grid Electricity Transmission System

System Description

The National Grid Electricity Transmission System operates at 400, 275 and 132kV supplying electricity to England and Wales.

The system covers an area of approximately 151,000 square kilometres and consists of over 14,000 circuit kilometres of overhead line and over 650 kilometres of underground transmission cable routes interconnecting over 300 substations.

It is connected to the SP Transmission System to the north and through six HVDC interconnectors to the Republic of Ireland, France, the Netherlands, Belgium and Norway.

There are 68 large power stations totalling 55GW of generation capacity connected to the England and Wales transmission system. The NGET system supplies 12 distribution networks via over 132GVA of installed transformer capacity and a small number of directly connected customers such as steelworks and traction supplies.

In 2022-23 the maximum recorded demand on the network was 41.62GW.

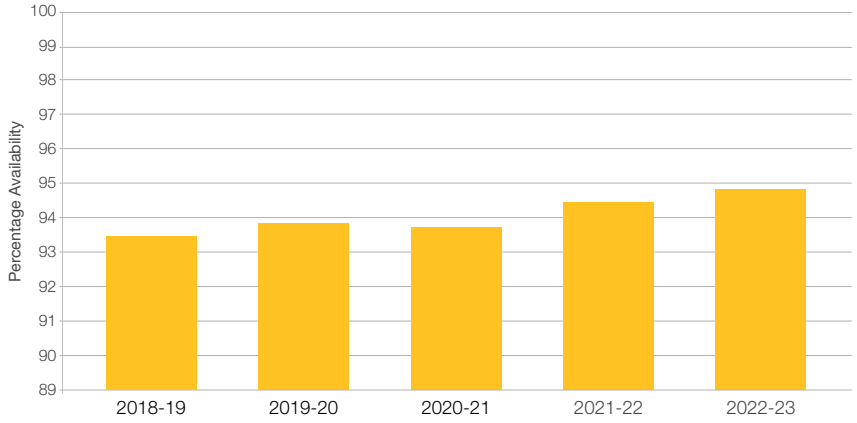
Availability

The definitions and criteria for system availability can be found in the Glossary of terms at the end of this report.

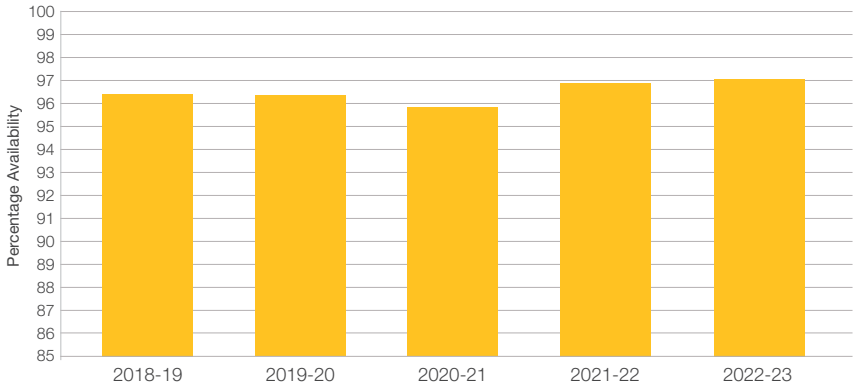
System performance is monitored by reporting variations in Annual System Availability, Winter Peak System Availability and Monthly System Availability. There is also a breakdown of Planned and Unplanned System Unavailability.

NGET % Annual System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
93.45	93.88	93.76	94.38	94.83

% Annual System Availability

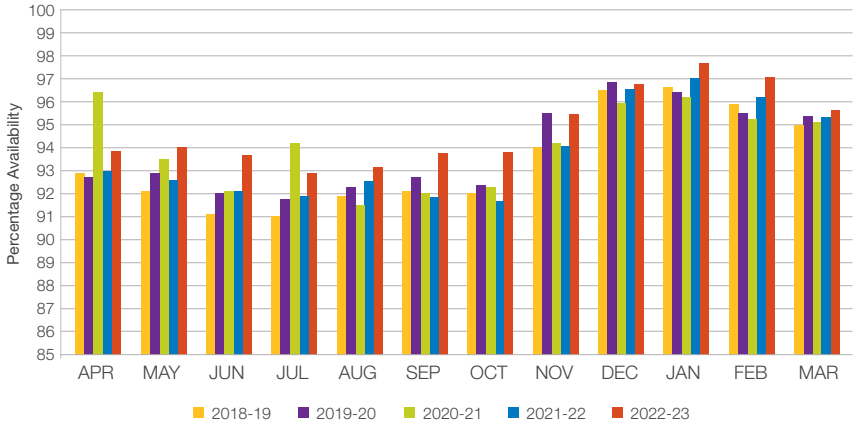


% Winter Peak System Availability



NGET % Winter Peak System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
96.37	96.26	95.84	96.86	97.04

% Monthly System Availability

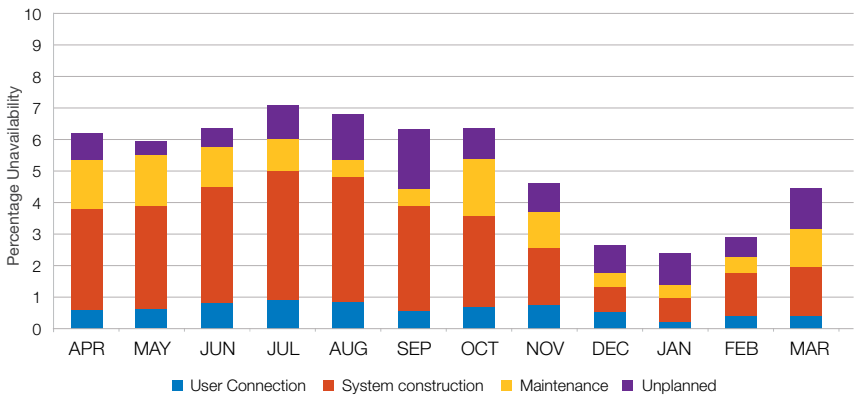


NGET % Monthly System Availability					
	2018-19	2019-20	2020-21	2021-22	2022-23
Apr	92.91	92.73	96.41	93.04	93.80
May	92.19	92.92	93.49	92.56	94.05
Jun	91.16	92.08	92.25	92.25	93.68
Jul	91.09	91.78	94.24	91.91	92.81
Aug	91.88	92.25	91.56	92.58	93.17
Sep	92.17	92.74	92.08	91.85	93.71
Oct	92.07	92.39	92.26	91.68	93.74
Nov	94.08	95.60	94.19	94.11	95.40
Dec	96.57	96.84	95.95	96.65	97.34
Jan	96.63	96.38	96.21	97.05	97.61
Feb	95.85	95.51	95.31	96.22	97.08
Mar	95.00	95.38	95.12	95.32	95.57

Monthly Planned and Unplanned System Unavailability

The table and the chart show the monthly variation in Planned and Unplanned System Unavailability.

Unavailability is defined as (100 – Availability) %



Planned and Unplanned Unavailability (%) for NGET Transmission System					
	User Connection	System Construction	Maintenance	Unplanned	Total
Apr	0.51	3.33	1.53	0.83	6.20
May	0.54	3.38	1.54	0.48	5.95
Jun	0.81	3.66	1.31	0.54	6.32
Jul	0.90	4.12	1.02	1.15	7.19
Aug	0.80	3.97	1.24	0.83	6.83
Sep	0.59	3.30	1.45	0.95	6.29
Oct	0.68	2.89	1.75	0.93	6.26
Nov	0.76	1.81	1.17	0.87	4.60
Dec	0.50	0.71	0.46	1.00	2.66
Jan	0.22	0.77	0.31	1.09	2.39
Feb	0.32	1.49	0.48	0.62	2.92
Mar	0.31	1.65	1.23	1.25	4.43

Security

The definitions and criteria for system security can be found in the Glossary of terms at the end of this report.

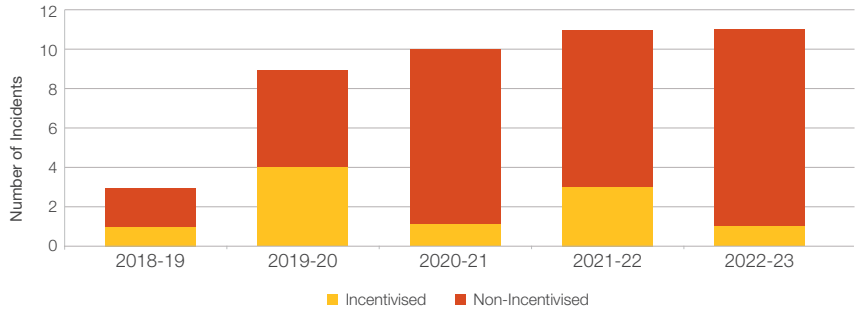
System performance is monitored by the Estimated Unsupplied Energy from the NGET Transmission System for each incident.

During 2022-23 there were 412 NGET system events where transmission circuits were disconnected either automatically or by urgent manual switching. The vast majority of these events had no impact on electricity users with 11 resulting in loss of supplies to customers.

Number of Loss of Supply Incidents

The chart shows the annual comparison of the number of Loss of Supply Incidents that occurred within the NGET Transmission System.

NGET System – Number of incidents					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	1	4	1	3	1
Non-Incentivised	2	5	9	8	10

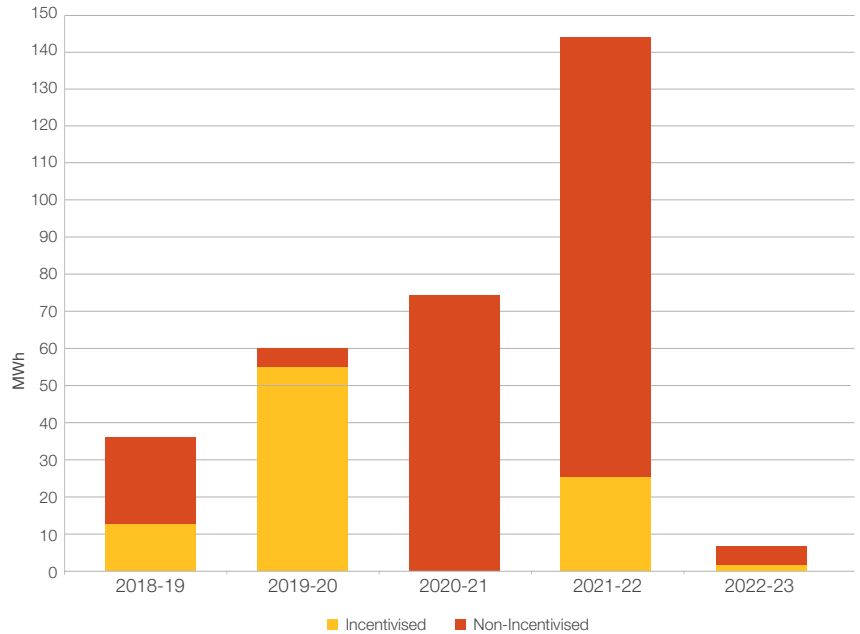


Total Estimated Unsupplied Energy

The total Estimated Unsupplied Energy from the NGET Transmission System during 2022-23 was: **7.10 MWh**

The chart shows the annual comparison of the Estimated Unsupplied Energy for Loss of Supply Incidents that occurred within the NGET Transmission System.

NGET System – Estimated Unsupplied Energy (MWh)					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	12.06	54.45	0.00	26.70	5.20
Non-Incentivised	25.16	4.98	74.36	116.70	1.90



Reliability of Supply

The Overall Reliability of Supply for the NGET Transmission System during 2022-23 was: **99.999997%**

compared with 99.999936% in 2021-22 and 99.999966% in 2020-21.

Loss of Supply Incident Details

NGET Loss of Supply Incidents – Incentivised

Incident Date, Time and Location	MW Lost	Mins	MWh Unsupplied
24 August 2022 12:54 at Watford South 275/132kV Substation Protection operated on SGT3A at Watford South 275kV substation and tripped the SGT3A/3B banked transformer pair. Due to existing outages and the resultant running arrangement adopted at Watford South 132kV substation, the loss of SGT3A/3B meant that around 81,000 customers were disconnected. All demand was restored via four stages of UKPN switching in 4 minutes and 18 seconds	79.9	4*	5.20
Total			**5.20**

NGET Loss of Supply Incidents – Non-Incentivised

Incident Date, Time and Location	MW Lost	Mins	MWh Unsupplied
15 April 2022 04:17 at Rugeley 400/25kV Substation At Rugeley 400kV substation, Main Busbar 2 busbar protection operated, tripping all circuits selected to it. One of these circuits was SGT4 which supplies Network Rail Brereton demand, although no demand was being taken at the time of the trip. The cause of the trip was not identified. SGT3 circuit was available to supply demand at all times without the need for further action to be taken by NGET, this is a customer choice connection site.	0.0	10	0.00
21 April 2022 22:29 at Rugeley 400/25kV Substation At Rugeley 400kV substation, Reserve Busbar 1/2 busbar protection operated, tripping all circuits selected to it. One of these circuits was SGT4 which supplies Network Rail Brereton demand, although no demand was being taken at the time of the trip. The cause of the trip was not identified. SGT3 circuit was available to supply demand at all times without the need for further action to be taken by NGET, this is a customer choice connection site.	0.0	2	0.00
24 April 2022 01:31 at Rugeley 400/25kV Substation At Rugeley 400kV substation, Reserve Busbar 1/2 busbar protection operated, tripping all circuits selected to it. One of these circuits was SGT4 which supplies Network Rail Brereton demand, although no demand was being taken at the time of the trip. The cause of the trip was not identified. SGT3 circuit was available to supply demand at all times without the need for further action to be taken by NGET, this is a customer choice connection site.	0.0	3	0.00
17 July 2022 04:10 at Barking 132/25kV Substation At Barking 132kV substation, Barking Grid T4B tripped. This is one of two transformers which supply Network Rail at Barking, although no demand was being taken at the time of the trip. Investigations showed the cause of the trip to be a helium balloon that had drifted too close to the live circuit. Grid T1B circuit was available to supply demand at all times without the need for further action to be taken by NGET, this is a customer choice connection site.	0.0	10	0.00
03 August 2022 17:45 at Barking 132/25kV Substation At Barking 132kV substation, Barking Grid T4B tripped on low voltage overcurrent protection, indicating it had been overloaded. This is one of two transformers which supply Network Rail at Barking, although they are not interconnected at the LV side so the load was not being shared equally. Network Rail confirmed their network had been running in an abnormal configuration which was likely to have led to the unintentional overloading. Grid T1B circuit was available to supply demand at all times without the need for further action to be taken by NGET, this is a customer choice connection site.	23.4	3	1.10
17 August 2022 17:01 at Singlewell 400/25kV Substation At Singlewell 400kV substation, SGT1 circuit tripped. UKPN own SGT1 and NGET own the associated 400kV circuit breaker. UKPN confirmed that they were undertaking work on the out of service SGT2 circuit and had inadvertantly caused SGT1 to trip. No demand was being supplied at the time.	0.0	2	0.00
30 September 2022 09:01 at Rugeley 400/25kV Substation At Rugeley 400kV substation, SGT3 circuit tripped due to a falling branch. SGT4 circuit was available to supply demand at all times without the need for further action to be taken by NGET, this is a customer choice connection site.	1.5	2	0.10
21 December 2022 12:30 at Iron Acton 132kV Substation At Iron Acton 132kV substation, Main Busbar 1 and Reserve Busbar 1 tripped, along with all associated circuits. Investigations confirmed that a fault had occurred on Bus Coupler circuit breaker 130. Some NGED demand was picked up immediately via lower voltage interconnections, and NGED undertook switching in very short timescales to restore the remainder of the demand..	37.1	2*	0.60
24 March 2023 14:15 at Redbridge 275/33kV Substation At Redbridge 275/33kV substation, SGT2, mesh corner 2 and the Barking - Redbridge 2 circuit tripped. SGT2 auto-isolated and the 275kV circuit was automatically returned to service. The auto-close scheme at Redbridge 33kV substation operated within 1 second to restore demand to all disconnected customers. Investigations have found evidence that lightning struck SGT2 directly.	49.4	0	0.10
31 March 2023 05:33 at Tinsley Park 275/33kV Substation SGT1B auxiliary transformer buchholz gas alarm operated, therefore it was necessary to switch SGT1B circuit out of service for further investigations. With SGT2B already out of service, SGT1B was the only circuit supplying the steelworks furnace demand. The steelworks shift manager confirmed there was no furnace demand being taken and agreed to the switch out of the circuit. Upon investigation it was found that the alarm was not genuine - weather conditions had caused a false alarm. This is a customer choice connection site.	0.0	762	0.00
Total			**1.90**

*Minutes quoted is the overall time following staged restoration to customers.

Scottish Power Transmission System

System Description

The SPT Transmission System comprises approximately 4,000 circuit kilometres of overhead line and cable and 159 substations operating at 400, 275 and 132kV supplying approximately 2 million customers and covering an area of 22,951 square kilometres. It is connected to the SHE Transmission System to the north, the NGET Transmission System to the south and the Northern Ireland Transmission System via an HVDC interconnector.

There are 9 major demand customers supplied directly from the SP Transmission System with the majority of the load being taken by approximately 2 million customers connected to the SP Distribution System via 14.8GVA of installed transformer capacity. There is approximately 6.4GW of directly connected and Large Embedded generation capacity connected in the SP Transmission area, including 47 power stations directly connected to the SP Transmission system. In 2022-23 the maximum recorded demand on the network was 3.98GW.

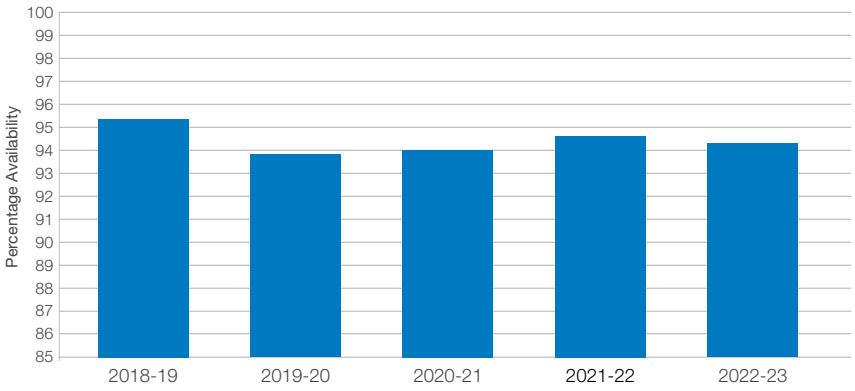
Availability

The definitions and criteria for system availability can be found in the Glossary of terms at the end of this report.

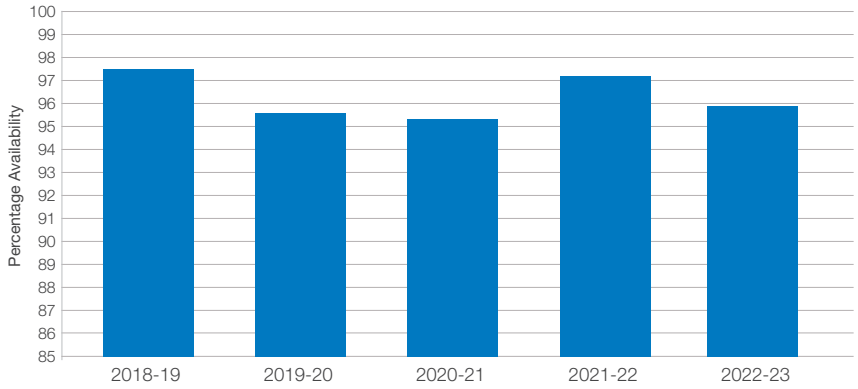
System performance is monitored by reporting variations in Annual System Availability, Winter Peak System Availability and Monthly System Availability. There is also a breakdown of Planned and Unplanned System Unavailability.

% Annual System Availability

SPT % Annual System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
95.31	93.90	94.00	94.67	94.25

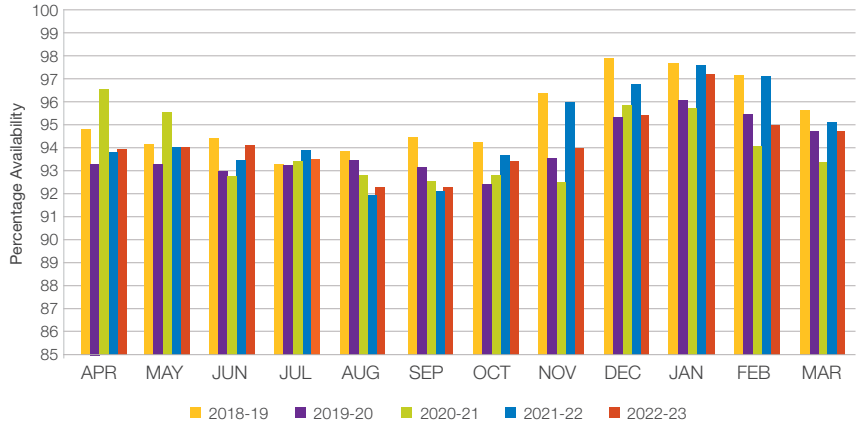


% Winter Peak System Availability



SPT % Winter Peak System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
97.55	95.64	95.24	97.11	95.88

% Monthly System Availability

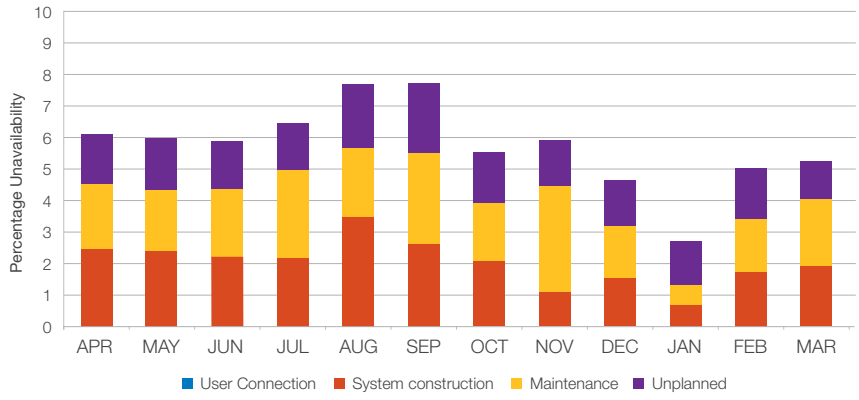


SPT % Monthly System Availability					
	2018-19	2019-20	2020-21	2021-22	2022-23
Apr	94.80	93.21	96.61	93.81	93.91
May	94.16	93.29	95.61	94.06	94.05
Jun	94.35	93.01	92.82	93.31	94.16
Jul	93.24	93.15	93.27	93.81	93.45
Aug	93.79	93.43	92.81	91.95	92.29
Sep	94.41	93.12	92.51	92.07	92.25
Oct	94.27	92.40	92.81	94.68	94.41
Nov	96.36	93.56	92.53	96.04	94.03
Dec	97.87	95.39	95.75	96.67	95.31
Jan	97.58	96.08	95.77	97.57	97.25
Feb	97.17	95.44	94.09	97.08	94.99
Mar	95.69	94.69	93.39	95.11	94.76

Monthly Planned and Unplanned System Unavailability

The table and the chart show the monthly variation in Planned and Unplanned System Unavailability.

Unavailability is defined as (100 – Availability) %



Planned and Unplanned Unavailability (%) for SP Transmission System					
	User Connection	System Construction	Maintenance	Unplanned	Total
Apr	0.00	2.46	2.04	1.60	6.09
May	0.00	2.30	1.95	1.70	5.95
Jun	0.00	2.21	2.15	1.48	5.84
Jul	0.00	2.18	2.76	1.62	6.55
Aug	0.00	3.44	2.29	1.97	7.71
Sep	0.00	2.64	2.85	2.26	7.75
Oct	0.00	2.07	1.78	1.74	5.59
Nov	0.00	2.11	2.40	1.45	5.97
Dec	0.00	1.57	1.61	1.50	4.69
Jan	0.00	0.63	0.67	1.45	2.75
Feb	0.00	1.68	1.67	1.66	5.01
Mar	0.00	1.91	2.19	1.14	5.24

Security

The definitions and criteria for system security can be found in the Glossary of terms at the end of this report.

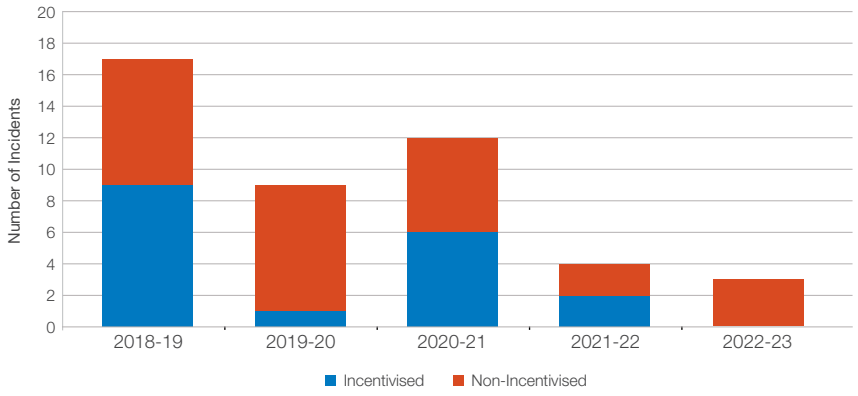
System performance is monitored by the estimated unsupplied energy from the SP Transmission System for each incident.

During 2022-23 there were 118 SPT system events where transmission circuits were disconnected either automatically or by urgent manual switching. The vast majority of these events had no impact on electricity users with 3 resulting in loss of supply to customers.

Number of Loss of Supply Incidents

The chart shows the annual comparison of the number of Loss of Supply Incidents that occurred within the SP Transmission System.

SPT System – Number of incidents					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	9	1	4	2	0
Non-Incentivised	8	8	8	2	3

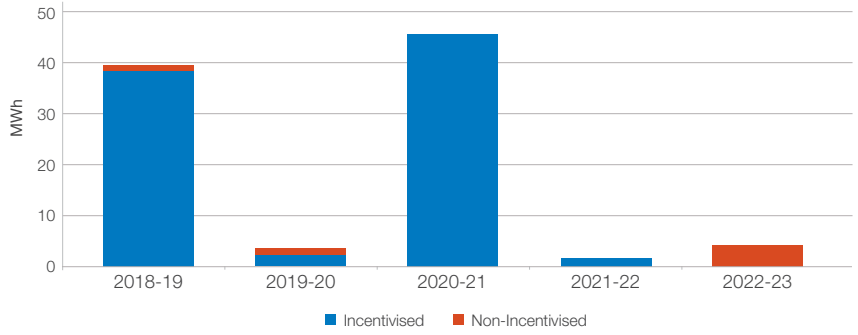


Total Estimated Unsupplied Energy

The total Estimated Unsupplied Energy from the SP Transmission System during 2022-23 was: **3.81 MWh**

The chart shows the annual comparison of the Estimated Unsupplied Energy for Loss of Supply Incidents that occurred within the SP Transmission System.

SPT System – Estimated Unsupplied Energy (MWh)					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	39.08	1.99	47.98	0.14	0.00
Non-Incentivised	0.35	1.22	0.00	0.00	3.81



Reliability of Supply

The Overall Reliability of Supply for the SP Transmission System during 2022-23 was: **99.999975%**

compared with 99.999999% in 2021-22 and 99.999688% in 2020-21.

Loss of Supply Incident Details

SPT Loss of Supply Incidents – Incentivised

SPT Loss of Supply Incidents – Incentivised	MW Lost	Mins	MWh Unsupplied
Total			**0.00**

SPT Loss of Supply Incidents – Non-Incentivised

Incident Date, Time and Location	MW Lost	Mins	MWh Unsupplied
15 August 2022 06:52 at New Cumnock - Blackcraig - Black Craig South Trip and Auto-Reclose on the New Cumnock - Blackcraig - Black Craig South circuit trip, Number 1 circuit, due to lightning. Affecting 1 customer for 19 minutes.	0.0	19	0.00
17 September 2022 22:20 at New Cumnock - Blackcraig - Black Craig South New Cumnock -Blackcraig Main Protection & 1st Intertrip Fault. Circuit switched out of service, resulting in Blackcraig -Black Craig South circuit & Black Craig South Windfarm 33kV feeder circuit being deenergised & Windfarm remaining off until circuit restored.	0.0	438	0.00
14 November 2022 17:44 at Bathgate - Bonnybridge - Drumcross Circuit tripped due to an extended mobile crane arm coming into contact with the double circuit 132kV overhead conductor. Bathgate - Drumcross section auto-isolated and Bonnybridge-Bathgate 1 DAR. 5,621 customers off for 11 minutes. *Exceptional Event claim submitted and currently with OFGEM, SPT awaiting response regarding claim.	18.7	11	3.81
Total			**3.81**

Scottish Hydro Electric Transmission System

System Description

The SHE Transmission system comprises of over 199km of 400kV, 1945km of 275kV and 2747km of 132kV overhead line and approximately 991km of AC high voltage underground transmission cables, interconnecting 151 substations. There is also an HVDC link with 163km of cable connecting Caithness to the Moray Coast. The system covers an area of approximately 55,000 square kilometres or 24% of the Great Britain land mass. It is connected to the SP Transmission system to the South and several large Offshore Transmission Owners in the Highlands.

In 2022-23 the maximum recorded demand on the network was 1.34GW. Mostly the demand is taken by approximately 0.8 million customers connected to the Scottish Hydro Electric Power Distribution network via more than 13GVA of installed transformer capacity, with 1 other major customer also supplied directly from the SHE Transmission system. There are a growing number of large generators, with over 45 directly connected to the SHE Transmission system and many smaller units combining to produce more that 10GW capacity, of which 9.2GW is renewable.

The unreliability of supply figure can be distorted when compared against other systems at 275kV and 400kV due to the higher proportion of 132kV Transmission network and the consequent reduced power flows, however unreliability remains low in our network across all voltages.

80% of these transmission assets form the main interconnected transmission system whilst the remaining 20% radially supply the more remote areas of the territory including the outlying islands. Some connections, mainly in the more remote areas, can involve non-standard connection or running arrangements chosen by the customer and as such might experience greater risk of disruption, but on the whole reliability of the network has been very high.

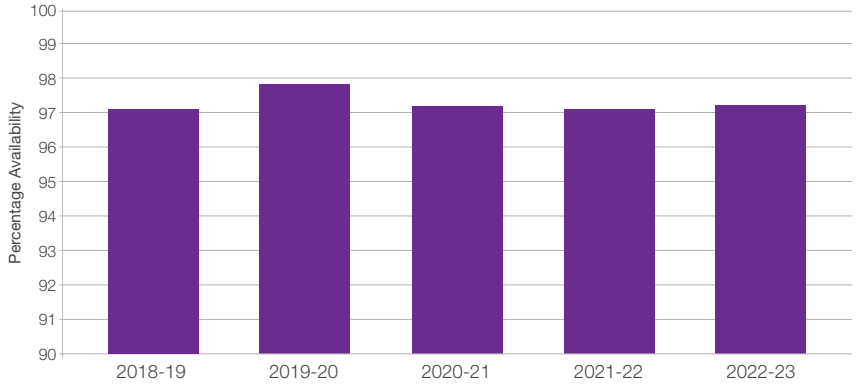
Availability

The definitions and criteria for system availability can be found in the Glossary of terms at the end of this report.

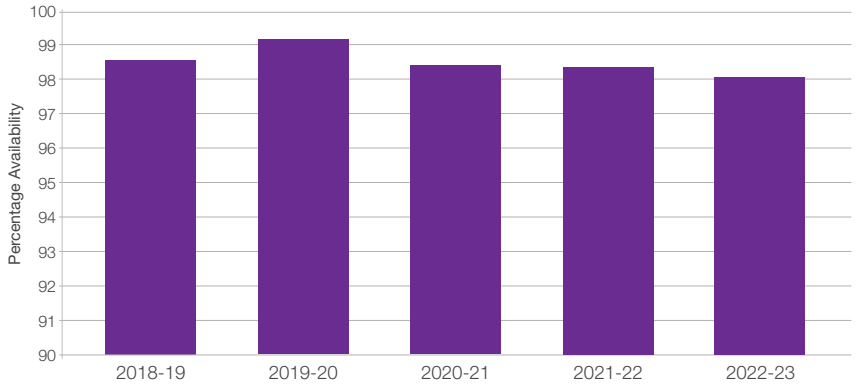
System performance is monitored by reporting variations in Annual System Availability, Winter Peak System Availability and Monthly System Availability. There is also a breakdown of Planned and Unplanned System Unavailability.

% Annual System Availability

SHE Transmission % Annual System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
97.09	97.83	97.17	97.07	97.19

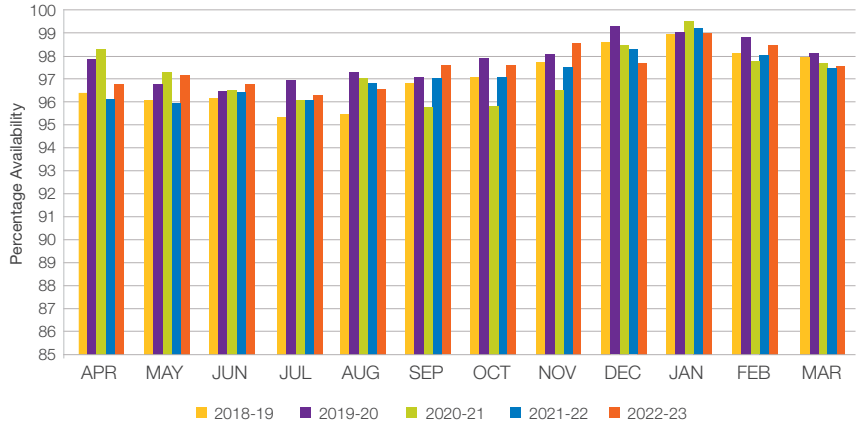


% Winter Peak System Availability



SHE Transmission % Winter Peak System Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
98.61	99.10	98.30	98.22	98.03

% Monthly System Availability

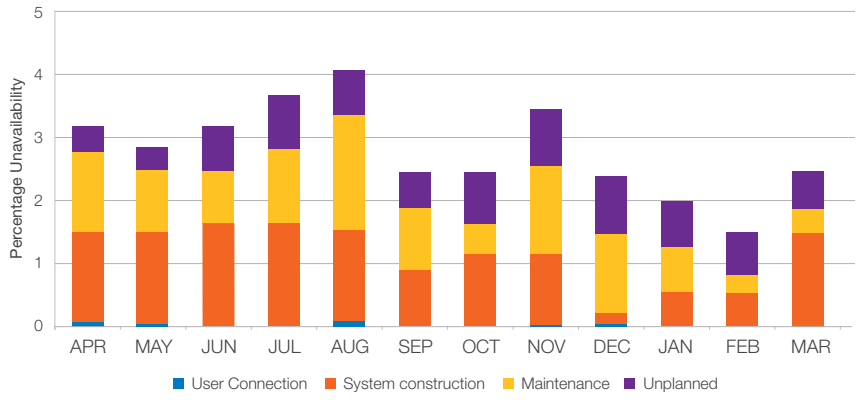


SHE Transmission % Monthly System Availability					
	2018-19	2019-20	2020-21	2021-22	2022-23
Apr	96.48	97.87	98.35	96.10	96.79
May	96.19	96.72	97.33	95.90	97.13
Jun	96.14	96.48	96.56	95.93	96.83
Jul	95.39	96.95	96.13	96.12	96.30
Aug	95.42	97.28	97.04	96.78	95.91
Sep	96.81	97.10	95.72	97.05	97.59
Oct	97.07	97.94	95.88	97.09	97.58
Nov	97.72	98.07	96.44	97.55	96.53
Dec	98.62	99.29	98.58	98.37	97.63
Jan	98.99	99.18	98.48	98.22	98.00
Feb	98.17	98.82	97.80	98.07	98.50
Mar	97.99	98.13	97.69	97.51	97.59

Monthly Planned and Unplanned System Unavailability

The table and the chart show the monthly variation in Planned and Unplanned System Unavailability.

Unavailability is defined as (100 – Availability) %



Planned and Unplanned Unavailability (%) for SHE Transmission System for 2018-19					
	User Connection	System Construction	Maintenance	Unplanned	Total
Apr	0.05	1.49	1.29	0.37	3.21
May	0.02	1.47	0.93	0.45	2.87
Jun	0.00	1.64	0.78	0.74	3.17
Jul	0.00	1.63	1.15	0.93	3.70
Aug	0.16	1.49	1.66	0.79	4.09
Sep	0.00	0.90	0.96	0.55	2.41
Oct	0.00	1.18	0.45	0.79	2.42
Nov	0.02	1.19	1.42	0.85	3.47
Dec	0.08	0.24	1.32	0.73	2.37
Jan	0.00	0.52	0.75	0.73	2.00
Feb	0.00	0.48	0.27	0.75	1.50
Mar	0.00	1.50	0.31	0.60	2.41

Security

The definitions and criteria for system security can be found in the Glossary of terms at the end of this report.

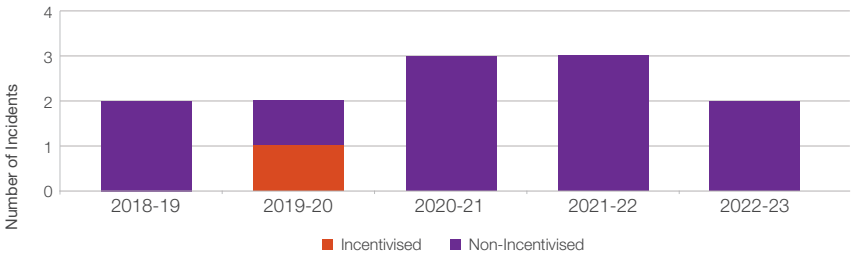
System performance is monitored by the Estimated Unsupplied Energy from the SHE Transmission System for each incident.

During 2022-23 there were 89 SHE Transmission system events where transmission circuits were disconnected either automatically or by urgent manual switching. The vast majority of these events had no impact on electricity users with 2 resulting in loss of supplies to customers.

Number of Loss of Supply Incidents

The chart shows the annual comparison of the number of Loss of Supply Incidents that occurred within the SHE Transmission System.

SHE Transmission System – Number of Incidents					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	0	1	0	0	0
Non-Incentivised	2	1	3	3	2

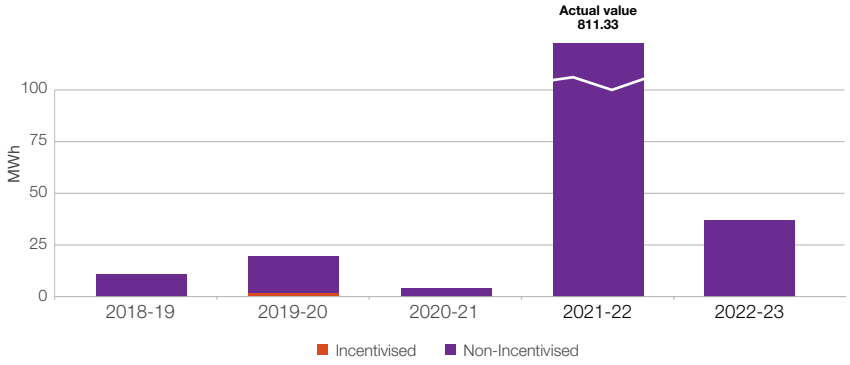


Total Estimated Unsupplied Energy

The total Estimated Unsupplied Energy from the SHE Transmission System during 2022-23 was: **32.77 MWh**

The chart shows the annual comparison of the Estimated Unsupplied Energy for Loss of Supply Incidents that occurred within the SHE Transmission System.

SHE Transmission System – Estimated Unsupplied Energy (MWh)					
	2018-19	2019-20	2020-21	2021-22	2022-23
Incentivised	0.00	1.15	0.00	0.00	0.00
Non-Incentivised	8.80	19.90	2.49	811.33	32.77



Reliability of Supply

The Overall Reliability of Supply for the SHE Transmission System during 2022-23 was: **99.999218%**

compared with 99.983546% in 2021-22 and 99.999948% in 2020-21.

Loss of Supply Incident Details

SHE Transmission Loss of Supply Incidents – Incentivised

Incident Date, Time and Location	MW Lost	Mins	MWh Unsupplied
None	0.0	0	0.00
Total			**0.00**

SHE Transmission Loss of Supply Incidents – Non-Incentivised

Incident Date, Time and Location	MW Lost	Mins	MWh Unsupplied
12 August 2022 - Quoich 132/11kV Grid Transformer 1 A faulty relay at Quoich 132/11kV S/S caused Grid Transformer 1 to trip and lockout. Demand was restored via DNO.	0.0	4	0.00
12 March 2023 - Fort Augustus - Quoich - Broadford - Edinbane - Dunvegan - Ardmore 132kV circuit (FQ/QQ/QB1/BE1/ED1/DA) During a period following heavy snow, Fort Augustus - Quoich - Broadford - Edinbane - Dunvegan - Ardmore 132kV circuit tripped and locked out. Demand was partially restored in stages via DNO Generation and backfeeds.	31.3	132	32.77
Total			**32.77**

Interconnectors

England – France Interconnector

System Description

The NGET transmission system is interconnected with France between Sellindge and Les Mandarins, via a 70km cross-channel HVDC link owned and operated jointly by National Grid and Réseau de Transport d'Electricité (RTE); the French transmission system owner since 1986 and is called IFA.

The total capability of the Interconnector is 2000MW. This is made up of four 'circuits', each of 500MW. There is no redundancy of the major components making up each circuit, hence all outages affect real time capability.

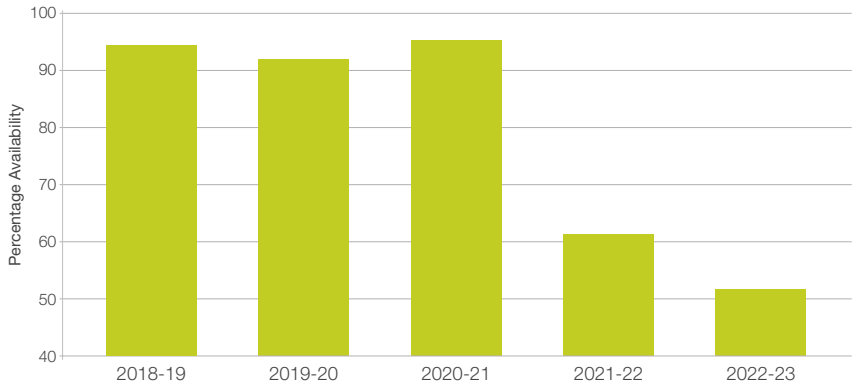
Annual Availability

Annual Availability of England – France Interconnector: **51.73%**

The chart below shows the annual comparison of availability of the England – France Interconnector.

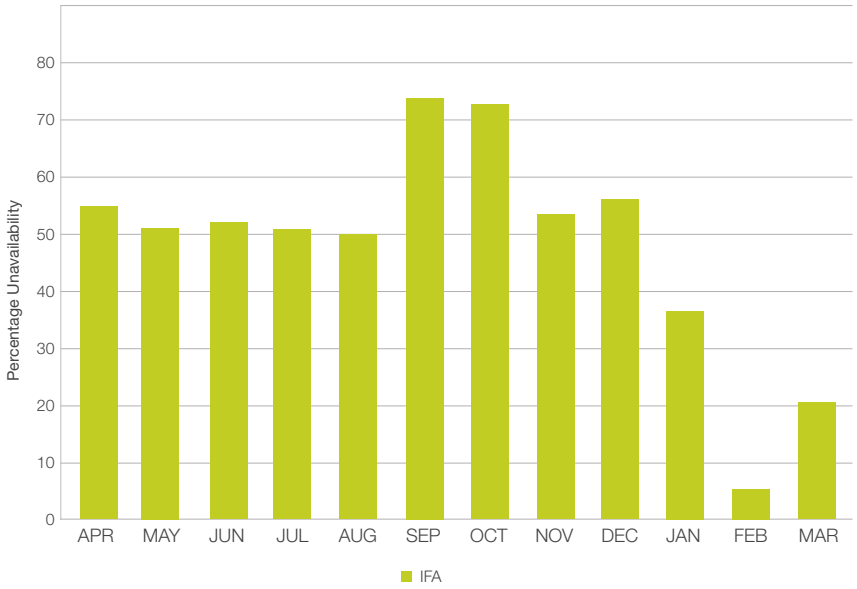
England – France Interconnector % Annual Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
93.86	91.45	95.40	61.22	51.73

% Annual System Availability



Monthly Unavailability

% England – France Interconnector Monthly Unavailability

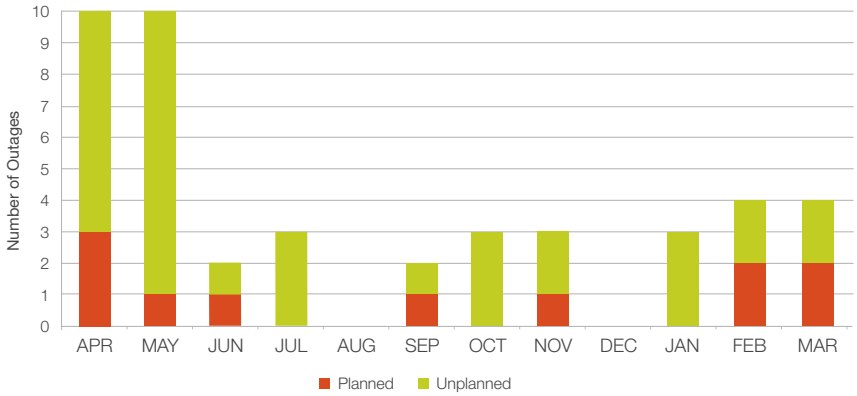


England – France Interconnector % Monthly Unavailability	
	IFA
April	54.45
May	50.72
June	51.70
July	50.13
August	50.00
September	73.82
October	73.55
November	52.73
December	56.28
January	36.81
February	6.04
March	20.14
Average	48.27

Outages 2022-23 (April - March)

The chart refers to Planned and Unplanned Outages. In this context Planned are notified prior to Day Ahead and Unplanned are notified at Day Ahead or within the Contract Day.

The chart below shows the number of Interconnector Planned and Unplanned Outages on a per month basis.



Interconnector Planned and Unplanned Outages		
	Planned	Unplanned
April	3	7
May	1	9
June	1	1
July	0	3
August	0	0
September	1	1
October	0	3
November	1	2
December	0	0
January	0	3
February	2	2
March	2	2
Total	11	33

England – Netherlands Interconnector

System Description

The NGET transmission system is interconnected with The Netherlands between Isle of Grain and Maasvlakte, via a 260km subsea cable owned and operated by BritNed Development Limited ("BritNed") since 2011. The total capability of BritNed is 1000MW and is made up of two 'poles', 500MW each.

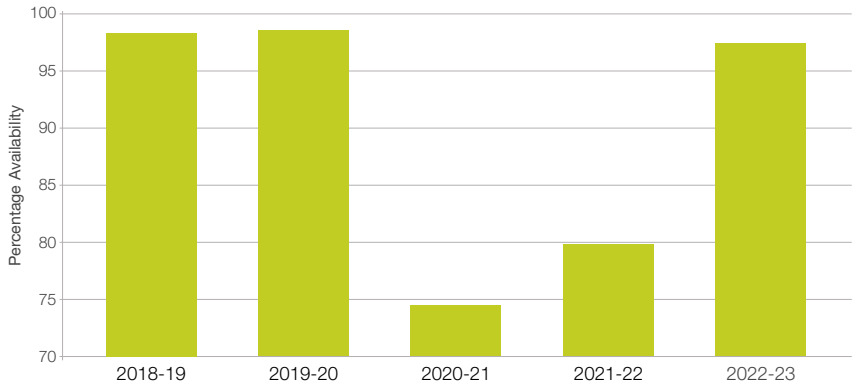
Annual Availability

Annual Availability of England – Netherlands Interconnector: **97.25%**

The chart below shows the availability of the England – Netherlands Interconnector.

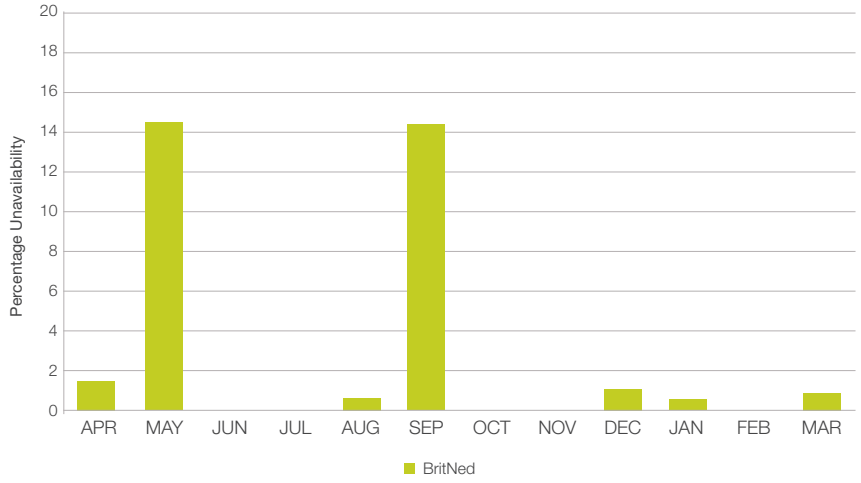
England – Netherlands Interconnector % Annual Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
98.22	98.52	74.48	79.91	97.25

% Annual System Availability



Monthly Unavailability

% England – Netherlands Interconnector Monthly Unavailability

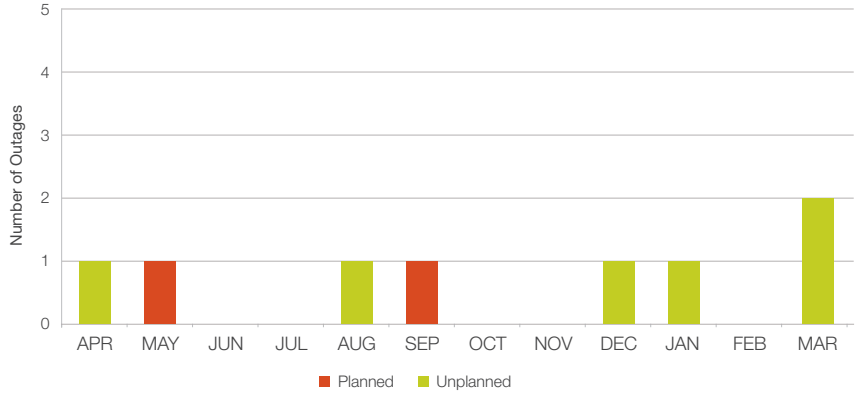


England – Netherlands Interconnector % Monthly Unavailability	
	BritNed
April	1.69
May	14.25
June	0.00
July	0.00
August	0.27
September	14.17
October	0.00
November	0.00
December	1.34
January	0.42
February	0.00
March	0.81
Average	2.75

Outages 2022-23 (April - March)

The chart refers to Planned and Unplanned Outages. In this context Planned are notified prior to Day Ahead and Unplanned are notified at Day Ahead or within the Contract Day.

The chart below shows the number of Interconnector Planned and Unplanned Outages on a per month basis.



Interconnector Planned and Unplanned Outages		
	Planned	Unplanned
April	0	1
May	1	0
June	0	0
July	0	0
August	0	1
September	1	0
October	0	0
November	0	0
December	0	1
January	0	1
February	0	0
March	0	2
Total	2	6

England – Belgium Interconnector

System Description

The NGET transmission system is interconnected with Belgium between Richborough and Zeebrugge, via a 140km subsea cable owned and operated by Nemo Link Limited ("Nemo Link") since January 2019. The total capability of the link is 1000MW and is a single 1000MW monopole design.

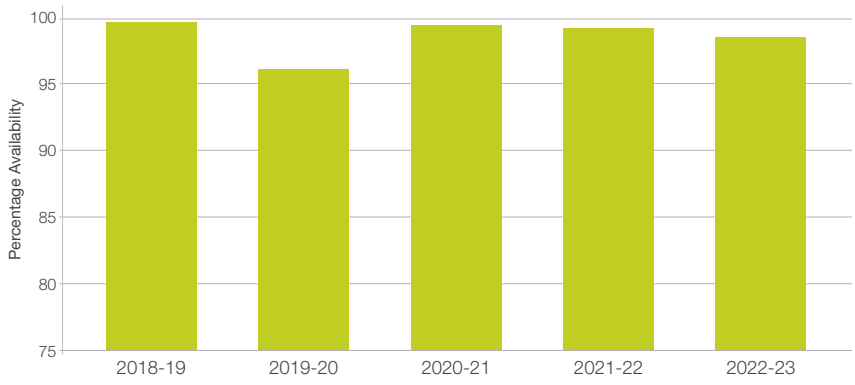
Annual Availability

Annual Availability of England – Belgium Interconnector: **98.09%**

The chart below shows the availability of the England – Belgium Interconnector.

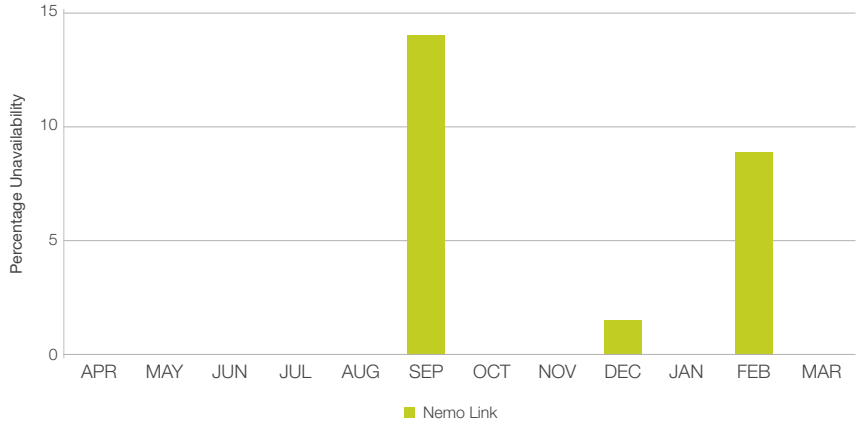
England – Belgium Interconnector % Annual Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
99.86	96.14	99.22	99.00	98.09

% Annual System Availability



Monthly Unavailability

% England – Belgium Interconnector Monthly Unavailability

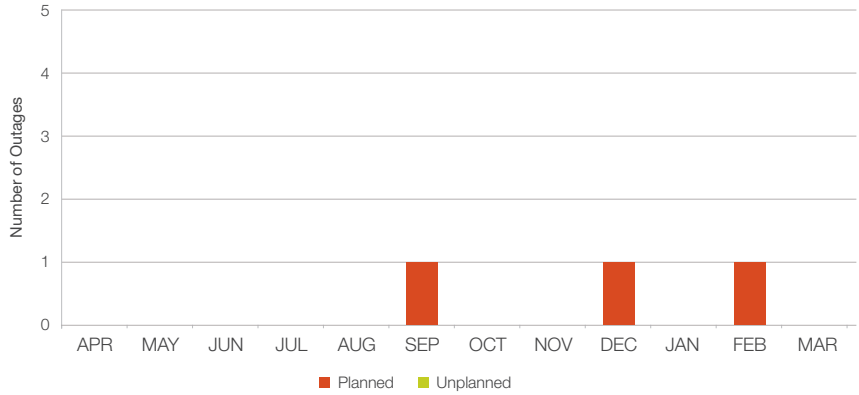


England – Belgium Interconnector % Monthly Unavailability	
	Nemo Link
April	0.00
May	0.00
June	0.00
July	0.00
August	0.00
September	14.03
October	0.00
November	0.00
December	1.08
January	0.00
February	8.73
March	0.00
Average	1.91

Outages 2022-23 (April – March)

The chart refers to Planned and Unplanned Outages. In this context Planned are notified prior to Day Ahead and Unplanned are notified at Day Ahead or within the Contract Day.

The chart below shows the number of Interconnector Planned and Unplanned Outages on a per month basis.



Interconnector Planned and Unplanned Outages		
	Planned	Unplanned
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	1	0
October	0	0
November	0	0
December	1	0
January	0	0
February	1	0
March	0	0
Total	3	0

England – France Interconnector 2

System Description

The NGET transmission system is interconnected with France between Lee-on-the-Solent and Tourbe, via a 240km HVDC link owned and operated jointly by National Grid and Réseau de Transport d'Electricité (RTE); the French transmission system owner since January 2021 and is called IFA2.

The total capability of the Interconnector is 1000MW and is of a single 1000MW monopole design.

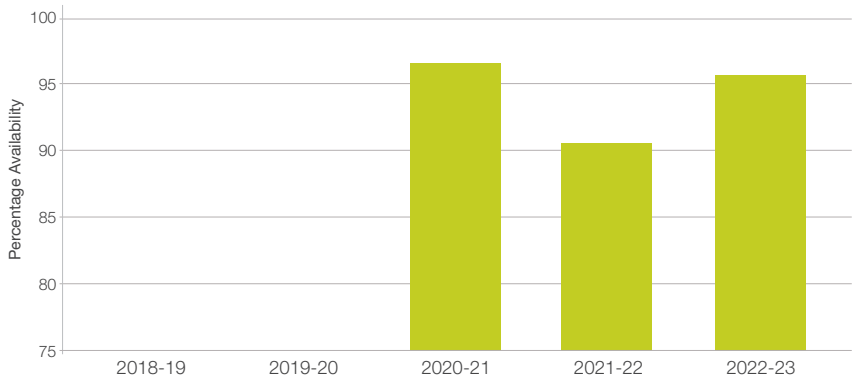
Annual Availability

Annual Availability of England – France Interconnector 2: **95.68%**

The chart below shows the annual comparison of availability of the England – France Interconnector 2.

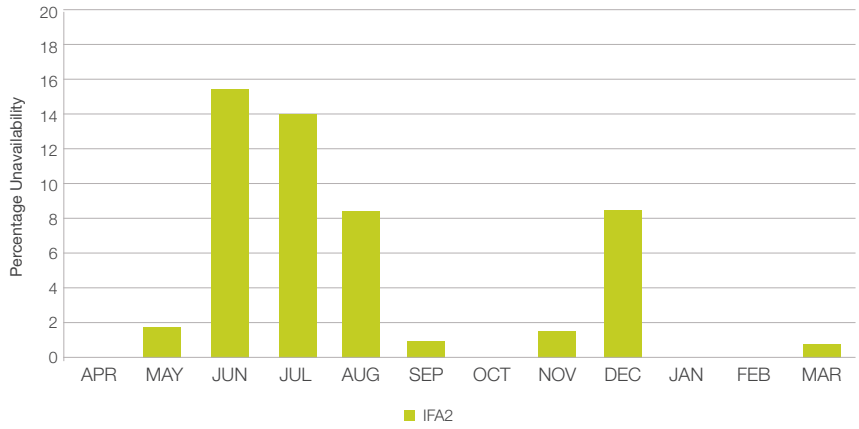
England – France Interconnector 2 % Annual Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
N/A	N/A	96.55	90.34	95.68

% Annual System Availability



Monthly Unavailability

% England – France Interconnector 2 Monthly Unavailability

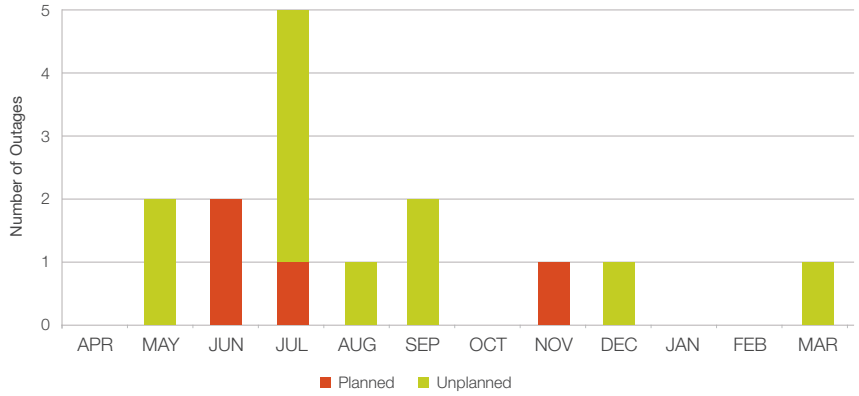


England – France Interconnector 2 % Monthly Unavailability	
	IFA2
April	0.00
May	1.88
June	15.81
July	14.00
August	8.24
September	1.04
October	0.00
November	1.60
December	8.25
January	0.00
February	0.00
March	0.69
Average	4.32

Outages 2022-23 (April – March)

The chart refers to Planned and Unplanned Outages. In this context Planned are notified prior to Day Ahead and Unplanned are notified at Day Ahead or within the Contract Day.

The chart below shows the number of Interconnector Planned and Unplanned Outages on a per month basis.



Interconnector Planned and Unplanned Outages		
	Planned	Unplanned
April	0	0
May	0	2
June	2	0
July	1	4
August	0	1
September	0	2
October	0	0
November	1	0
December	0	1
January	0	0
February	0	0
March	0	1
Total	4	11

England – Norway Interconnector

System Description

The NGET transmission system is interconnected with Norway between Blyth, Northumberland and Kvilldal, Rogland via a 720km HVDC link owned and operated jointly by National Grid Ventures and Statnett, the Norwegian transmission system owner.

The interconnector is called Northsealink and is a bipole design with a total capacity of 1400MW.

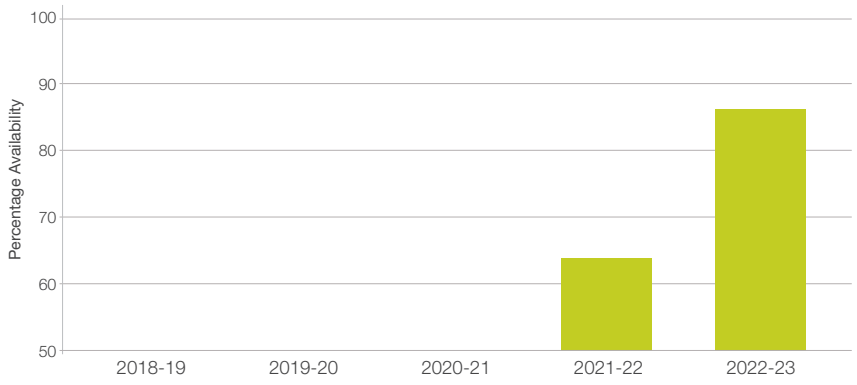
Annual Availability

Annual Availability of England – Norway: **86.67%**

The chart below shows the annual comparison of availability of the England – Norway Interconnector

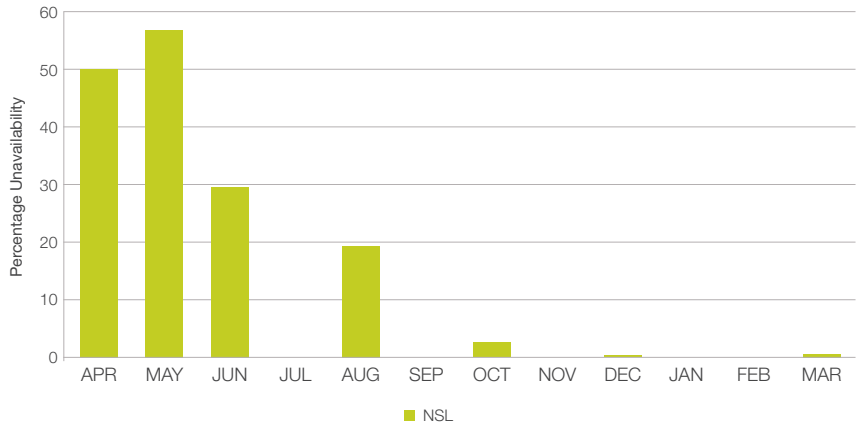
England - Norway Interconnector % Annual Availability				
2018-19	2019-20	2020-21	2021-22	2022-23
N/A	N/A	N/A	63.61	86.67

% Annual System Availability



Monthly Unavailability

% England – Norway Interconnector Monthly Unavailability

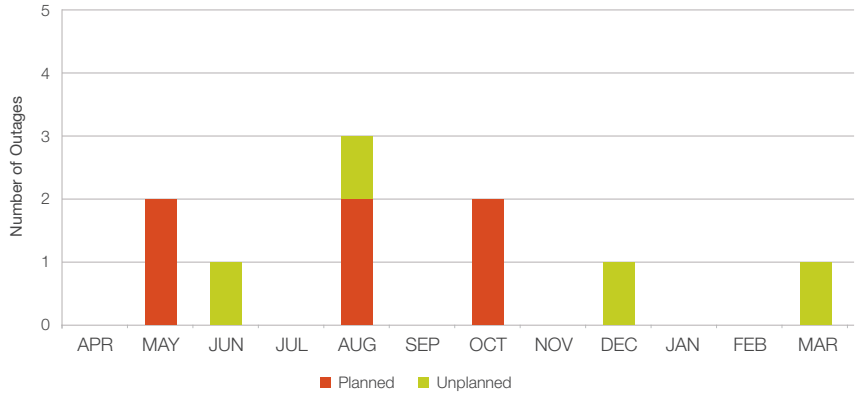


England - Norway Interconnector % Monthly Unavailability	
	NSL
April	50.00
May	57.59
June	29.30
July	0.00
August	19.56
September	0.00
October	2.15
November	0.00
December	0.32
January	0.00
February	0.00
March	0.54
Average	13.33

Outages 2022-23 (April – March)

The chart refers to Planned and Unplanned Outages. In this context Planned are notified prior to Day Ahead and Unplanned are notified at Day Ahead or within the Contract Day.

The chart below shows the number of Interconnector Planned and Unplanned Outages on a per month basis.



Interconnector Planned and Unplanned Outages		
	Planned	Unplanned
April	0	0
May	2	0
June	0	1
July	0	0
August	2	1
September	0	0
October	2	0
November	0	0
December	0	1
January	0	0
February	0	0
March	0	1
Total	6	4

Offshore Systems

System Description

The following section contains details of the currently connected offshore networks; Robin Rigg OFTO (TC), Gunfleet Sands OFTO (TC), Barrow OFTO (TC), Ormonde OFTO (TC), Lincs OFTO (TC), Westermost Rough OFTO (TC), Dudgeon OFTO (TC), Beatrice OFTO (TC), Rampion OFTO (TC), East Anglia 1 OFTO (TC), Walney 1 OFTO (BT), Walney 2 OFTO (BT), Sheringham Shoal OFTO (BT), London Array OFTO (BT), Greater Gabbard OFTO (EQ), Gwynt-Y-Mor OFTO (BBE), Thanet OFTO (BBE), Humber Gateway OFTO (BBE), West of Duddon Sands OFTO (WoDS), Burbo Bank Extension OFTO (DTP), Race Bank OFTO (DTP), Galloper OFTO (DTP), Walney Extension OFTO (DTP) and Hornsea One OFTO (DTP). The offshore network consists of 2922 kilometres of circuit, connecting to 24 offshore substations totalling over 9.3GW of generating capacity.

Offshore Transmission Networks

Offshore Transmission Networks						
	Go Live	Number of Circuits	Circuit Length km	Generating Capacity MW	Connection Voltage	Interfacing Party
TC Robin Rigg	02/03/2011	2	28.8	178	132kV	DNO
TC Gunfleet Sands	19/07/2011	1	12.76	163.9	132kV	DNO
TC Barrow	27/09/2011	1	30.1	90	132kV	DNO
TC Ormonde	10/07/2012	1	44.3	150	132kV	DNO
TC Lincs	11/11/2014	2	122.6	256	400kV	Transmission
TC Westermost Rough	11/02/2016	1	26.16	206.5	275kV	Transmission
TC Dudgeon	13/11/2018	2	178	400	400kV	Transmission
TC Beatrice	04/08/2021	2	181	588	400kV	Transmission
TC Rampion	17/11/2021	2	86	400	400kV	Transmission
TC East Anglia 1	20/12/2022	2	367.5	680	400kV	Transmission
BT Walney 1	31/10/2011	1	48	182	132kV	Transmission
BT Walney 2	04/10/2012	1	49	182	132kV	DNO
BT Sheringham Shoal	05/07/2013	2	88	315	132kV	DNO
BT London Array	18/09/2013	4	216	630	400kV	Transmission
EQ Greater Gabbard	29/11/2013	3	135	500	132kV	Transmission
BBE Gwynt Y Mor	17/02/2015	4	126.8	576	400kV	Transmission
BBE Thanet	17/12/2014	2	58.8	300	132kV	DNO
BBE Humber Gateway	15/09/2016	2	78	219	275kV	Transmission
West of Duddon Sands	25/08/2015	2	84.6	382	400kV	Transmission
DTP Burbo Bank Extension	27/04/2018	1	35.3	258	400kV	Transmission
DTP Race Bank	10/11/2019	2	164.7	573	400kV	Transmission
DTP Galloper	27/02/2020	2	88.3	353	132kV	Transmission
DTP Walney Extension	04/06/2020	2	139	659	400kV	Transmission
DTP Hornsea One	12/03/2021	2	533	1134	400kV	Transmission

TC: Transmission Capital
BT: Blue Transmission Investments Limited
EQ: Equitix
BBE: Balfour Beatty & Equitix Consortium
DTP: Diamond Transmission Partners

Availability

Offshore Transmission Systems are radial and only connect offshore generation to the wider NETS. The regulatory incentivisation of OFTO performance is different to that of onshore TOs and is based on their system availability rather than loss of supply. The OFTOs provide information for outages that originate on their system or outages that have impacted their system, for example, a generator, DNO or TO system. The system availability performance for each OFTO is then calculated after categorising the outages as either OFTO or Non-OFTO.

System performance is monitored by reporting variations in Annual System Availability, Winter Peak System Availability and Monthly System Availability. There is also a breakdown of Planned and Unplanned System Unavailability. The Annual System Availability of Offshore Networks for 2022-23 was **99.42%**

% Annual System Availability

Offshore Transmission Networks % Annual System Availability

	2018-19	2019-20	2020-21	2021-22	2022-23
TC Robin Rigg	100	99.87	99.95	100	100
TC Gunfleet Sands	99.97	100	99.66	100	100
TC Barrow	100	100	100	100	100
TC Ormonde	100	100	100	99.93	99.38
TC Lincs	100	99.56	99.44	99.98	96.63
TC Westermost Rough	99.73	100	100	99.93	100
TC Dudgeon	100	99.31	99.83	99.92	99.95
TC Beatrice	N/A	N/A	N/A	99.16	99.32
TC Rampion	N/A	N/A	N/A	100	99.56
TC East Anglia 1	N/A	N/A	N/A	N/A	100
BT Walney 1	100	99.95	100	98.90	100
BT Walney 2	91.42	100	100	100	100
BT Sheringham Shoal	99.40	100	100	99.69	99.61
BT London Array	99.94	99.95*	99.77	99.82	99.92
EQ Greater Gabbard	99.82	99.78	99.78	99.98	94.74
BBE Gwynt Y Mor	99.93*	96.10	86.31	99.21*	99.90
BBE Thanet	100	100	99.84	100	99.72
BBE Humber Gateway	100	99.83	99.76	98.73	99.72
West of Duddon Sands	100	100*	99.50	99.19	99.09
DTP Burbo Bank Extension	98.15	99.67	99.99	100	100
DTP Race Bank	N/A	100	99.26	100	99.93
DTP Galloper	N/A	100	99.95	100	99.97
DTP Walney Extension	N/A	N/A	99.97	100	100
DTP Hornsea One	N/A	N/A	100	99.93	99.57

* Figure has been updated as an exceptional event with agreement from Ofgem.

% Winter Peak System Availability

Offshore Transmission Networks % Winter Peak System Availability					
	2018-19	2019-20	2020-21	2021-22	2022-23
TC Robin Rigg	100	100	100	100	100
TC Gunfleet Sands	100	100	100	100	100
TC Barrow	100	100	100	100	100
TC Ormonde	100	100	100	100	100
TC Lincs	100	100	100	100	100
TC Westermost Rough	100	100	100	100	100
TC Dudgeon	100	100	100	99.88	100
TC Beatrice	N/A	N/A	N/A	100	100
TC Rampion	N/A	N/A	N/A	100	100
TC East Anglia 1	N/A	N/A	N/A	N/A	100
BT Walney 1	100	100	100	99.07	100
BT Walney 2	100	100	100	100	100
BT Sheringham Shoal	100	100	100	100	100
BT London Array	99.99	99.89	100	99.64	100
EQ Greater Gabbard	99.68	100	100	100	90.50
BBE Gwynt Y Mor	99.61	100	72.84	99.82*	99.90
BBE Thanet	100	100	100	100	99.51
BBE Humber Gateway	100	99.82	100	99.17	99.41
West of Duddon Sands	100	100	100	100	100
DTP Burbo Bank Extension	100	100	100	100	100
DTP Race Bank	N/A	100	100	100	100
DTP Galloper	N/A	100	100	100	100
DTP Walney Extension	N/A	N/A	99.91	100	100
DTP Hornsea One	N/A	N/A	100	99.92	100

* Figure has been updated as an exceptional event with agreement from Ofgem.

% Monthly System Availability

Offshore Transmission Networks % Monthly System Availability												
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
TC Robin Rigg	100	100	100	100	100	100	100	100	100	100	100	100
TC Gunfleet Sands	100	100	100	100	100	100	100	100	100	100	100	100
TC Barrow	100	100	100	100	100	100	100	100	100	100	100	100
TC Ormonde	100	100	100	100	92.74	100	100	100	100	100	100	100
TC Lincs	100	100	100	60.49	99.85	100	100	100	100	100	100	100
TC Westermost Rough	100	100	100	100	100	100	100	100	100	100	100	100
TC Dudgeon	99.40	100	100	100	100	100	100	100	100	100	100	100
TC Beatrice	100	100	100	100	100	98.14	100	93.57	100	100	100	100
TC Rampion	100	100	100	100	98.62	96.11	100	100	100	100	100	100
TC East Anglia 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	100	100	100
BT Walney 1	100	100	100	100	100	100	100	100	100	100	100	100
BT Walney 2	100	100	100	100	100	100	100	100	100	100	100	100
BT Sheringham Shoal	100	100	100	100	95.42	100	100	100	100	100	100	100
BT London Array	100	99.76	99.44	100	100	99.87	100	100	100	100	100	100
EQ Greater Gabbard	100	100	100	99.14	99.38	100	99.95	100	100	94.12	77.37	66.88
BBE Gwynt Y Mor	100	100	100	99.66	100	100	99.43	100	99.71	100	100	100
BBE Thanet	100	100	100	100	98.16	100	100	100	100	98.53	100	100
BBE Humber Gateway	98.40	100	100	100	100	100	100	100	100	98.24	100	100
West of Duddon Sands	96.67	100	95.54	100	100	96.71	100	100	100	100	100	100
DTP Burbo Bank Extension	100	100	100	100	100	100	100	100	100	100	100	100
DTP Race Bank	100	100	99.15	100	100	100	100	100	100	100	100	100
DTP Galloper	100	100	100	100	99.67	100	100	100	100	100	100	100
DTP Walney Extension	100	100	100	100	100	100	100	100	100	100	100	100
DTP Hornsea One	100	100	94.85	100	100	100	100	100	100	100	100	100

% Monthly Planned and Unplanned Unavailability

The table shows the % monthly variation in Planned and Unplanned System Unavailability for the Offshore Transmission Networks. The unavailability has been classified by network responsibility i.e. OFTO or Non-OFTO (e.g. Generator).

		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
TC Robin Rigg	**OFTO Planned**	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	2.08	0.82	0.08	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Gunfleet Sands	**OFTO Planned**	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	1.13	0	0	0	0	0.21
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Barrow	**OFTO Planned**	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	6.45	0	0	0	0	0	0	1.37	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Ormonde	**OFTO Planned**	0	0	0	0	7.26	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	7.56	0	0	0	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Lincs	**OFTO Planned**	0	0	0	39.51	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0.15	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0.11	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Westermost Rough	**OFTO Planned**	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Dudgeon	**OFTO Planned**	0.60	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Beatrice	**OFTO Planned**	0	0	0	0	0	1.86	0	6.43	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	1.52	0.04	0	0	0	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC Rampion	**OFTO Planned**	0	0	0	0	1.38	3.89	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
TC East Anglia 1	**OFTO Planned**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0
	OFTO Unplanned	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0
	Non-OFTO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
BT Walney 1	**OFTO Planned**	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0.24	0	0	0	0	0	0	0	0	0	0	0
		Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
BT Walney 2	**OFTO Planned**	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0.23	0	0	0	0	0	0	0	0	0	0	0

% Monthly Planned and Unplanned Unavailability

		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
BT Sheringham Shoal	OFTO Planned	0	0	0	0	4.58	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
BT London Array	OFTO Planned	0	0	0.56	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0.24	0	0	0	0.13	0	0	0	0	0	0
	Non-OFTO	0	0	0	9.19	20.36	6.25	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
EQ Greater Gabbard	OFTO Planned	0	0	0	0.86	0.62	0	0.05	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	5.88	22.63	33.12
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
BBE Gwynt Y Mor	OFTO Planned	0	0	0	0	0	0	0.57	0	0.29	0	0	0
	OFTO Unplanned	0	0	0	0.34	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
BBE Thanet	OFTO Planned	0	0	0	0	1.84	0	0	0	0	1.47	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
BBE Humber Gateway	OFTO Planned	1.60	0	0	0	0	0	0	0	0	1.76	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
West of Duddon Sands	OFTO Planned	3.33	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	4.46	0	0	3.29	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
DTP Burbo Bank Extension	OFTO Planned	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
DTP Race Bank	OFTO Planned	0	0	0.85	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
DTP Galloper	OFTO Planned	0	0	0	0	0.33	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
DTP Walney Extension	OFTO Planned	0	0	0	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
DTP Hornsea One	OFTO Planned	0	0	5.15	0	0	0	0	0	0	0	0	0
	OFTO Unplanned	0	0	0	0	0	0	0	0	0	0	0	0
	Non-OFTO	0	0	0	0	0	0	0	0	0	0	0	0

Outage Details

Offshore system outages are calculated using MW of offshore transmission capacity unavailable not generation lost.

TC Robin Rigg

Outage Date and Time	Reason	Days, Hours and Mins	MWh
06 June 2022 09:11 Robin Rigg East Windfarm restricted to 90MW. ENW planned works on Harker - Robin Rigg West - Sellafield - Stainburn 2 132kV circuit.	Non-OFTO	1d 6h 19m	2668
05 July 2022 09:51 Robin Rigg East Windfarm restricted to 0MW/0MVA due to ENW outage to reconfigure the network for tower works on Harker – Robin Rigg East – Sellafield – Siddick 1 132kV circuit.	Non-OFTO	2h 56m	258
06 July 2022 10:45 Robin Rigg East Windfarm restricted to 0MW/0MVA due to ENW outage to reconfigure the network for tower works on Harker – Robin Rigg East – Sellafield – Siddick 1 132kV circuit.	Non-OFTO	9h 27m	832
02 August 2022 08:48 Robin Rigg East wind farm restricted to 0MW/0MVA due to ENW outage to open Isolator on Harker – Robin Rigg East – Sellafield – Siddick 1 132kV circuit.	Non-OFTO	46m	67
02 August 2022 15:54 Robin Rigg East wind farm restricted to 0MW/0MVA due to ENW outage to close Isolator on Harker – Robin Rigg East – Sellafield – Siddick 1 132kV circuit.	Non-OFTO	28m	41
Total			**3866**

TC Gunfleet Sands

Outage Date and Time	Reason	Days, Hours and Mins	MWh
12 October 2022 08:46 Planned DNO outage to maintain their onshore circuit breaker 305 at Clacton Grid.	Non-OFTO	8h 24m	1377
11 March 2023 08:36 GT outage requested by generator.	Non-OFTO	5h 53m	260
Total			**1637**

TC Barrow

Outage Date and Time	Reason	Days, Hours and Mins	MWh
25 May 2022 14:17 ENW outage on Trimpell No1 / BOW circuit for maintenance on Heysham disconnector 106.	Non-OFTO	1d 23h 58m	4317
15 December 2022 00:45 CB 190 opened due to ENW issue at Trimpell.	Non-OFTO	1h 43m	155
15 December 2022 16:13 CB 190 opened for restoration switching by ENW at Trimpell.	Non-OFTO	8h 27m	761
Total			**5232**

TC Ormonde

Outage Date and Time	Reason	Days, Hours and Mins	MWh
30 May 2022 11:49 ENW outage on Trimpell No2 / OEL cct for maintenance on Heysham disconnector 406.	Non-OFTO	2d 8h 13m	8433
23 August 2022 08:09 OFTO planned full site outage for SCADA upgrade and GT1 OLTC maintenance.	OFTO	1d 10h 02m	5105
24 August 2022 18:11 OFTO planned outage for GT1 OLTC maintenance.	OFTO	16h 15m	1056
25 August 2022 10:30 OFTO Planned Outage for GT2 OLTC maintenance	OFTO	1d 5h 55m	1945
Total			**16538**

TC Lincs

Outage Date and Time	Reason	Days, Hours and Mins	MWh
18 July 2022 08:36 Full outage for 400kV outdoor sealing end repair. Waiting for determination of exceptional event request.	OFTO	12d 5h 59m	77906
16 August 2022 08:27 Bird strike on the Harmonic Filter 3 capacitor bank. Filter trip results in an intertrip to CCT1 export circuit.	OFTO	2h 22m	286
16 August 2022 10:49 Bird strike on the Harmonic Filter 3 capacitor bank resulting in an intertrip to CCT1 export circuit at 08:27h. Export circuit was made available at 10:49. Generator technical issue delayed full restoration until 12:41h.	Non-OFTO	1h 52m	226
Total			**78417**

TC Westermost Rough

Outage Date and Time	Reason	Days, Hours and Mins	MWh
None			
Total			**None**

TC Dudgeon

Outage Date and Time	Reason	Days, Hours and Mins	MWh
05 April 2022 07:06 Removal of shunt reactor of circuit 2 for warranty repair. Outage of CCT 2. Waiting for determination of exceptional event request.	OFTO	8h 40m	1733
Total			**1733**

TC Beatrice

Outage Date and Time	Reason	Days, Hours and Mins	MWh
01 April 2022 00:00 GT2 Transformer restriction at generator request as under generator managed warranty. OFTO assessment had no restriction.	Non-OFTO	10d 17h 39m	6439
14 May 2022 12:59 GT1 Stuck tap-changer. De-energised to comply with ESQCR, thus excluded.	Non-OFTO	24m	118
19 May 2022 09:48 GT1 Stuck tap-changer. De-energised to comply with ESQCR, thus excluded.	Non-OFTO	13m	64
21 September 2022 08:33 GT1 oil top up - transfer agreement snagging works.	OFTO	1d 2h 44m	7860
27 November 2022 18:41 GT2 radiator replacement - transfer agreement snagging works.	OFTO	3d 20h 35m	27220
Total			**41699**

TC Rampion

Outage Date and Time	Reason	Days, Hours and Mins	MWh
09 August 2022 08:03 Export cable testing, transfer agreement snagging works. Circuit1 outage.	OFTO	10h 50m	2058
10 August 2022 07:06 Export cable testing, transfer agreement snagging works. Circuit2 outage.	OFTO	10h 43m	2036
12 September 2022 09:21 Outage requested by NGET due to proximity works to OFTO circuits. Bolney – Twineham CCT1 Outage. Exceptional event request submitted as licence does not consider this an excluded event. Waiting for confirmation.	OFTO	1d 9h 45m	6075
14 September 2022 08:18 Outage requested by NGET due to proximity works to OFTO circuits. Bolney – Twineham CCT2 Outage. Exceptional event request submitted as licence does not consider this an excluded event. Waiting for confirmation.	OFTO	1d 4h 33m	5139
Total			**15309**

TC East Anglia 1

Outage Date and Time	Reason	Days, Hours and Mins	MWh
None			0
Total			**0**

BT Walney 1

Outage Date and Time	Reason	Days, Hours and Mins	MWh
03 April 2022 18:09 Trip caused by Orsted voltage set point change.	OFTO	1h 42m	286
Total			**286**

BT Walney 2

Outage Date and Time	Reason	Days, Hours and Mins	MWh
19 April 2021 08:45 Planned outage by DNO for maintenance of their equipment.	Non-OFTO	1h 03m	176
27 July 2021 09:26 Planned outage by DNO for asset investigation.	Non-OFTO	38m	106
Total			**282**

BT Sheringham Shoal

Outage Date and Time	Reason	Days, Hours and Mins	MWh
15 August 2022 05:25 Maintenance of Salle onshore 1 and OS1 offshore circuits.	OFTO	2d 20h 13m	10744
Total			**10744**

BT London Array

Outage Date and Time	Reason	Days, Hours and Mins	MWh
04 May 2022 10:33 SGT2A protection relay replacement.	OFTO	6h 58m	1003
04 May 2022 10:36 SGT2A protection relay replacement (SGT2B switching time).	OFTO	24m	58
04 May 2022 16:58 SGT2A protection relay replacement (SGT2B switching time).	OFTO	33m	79
06 June 2022 06:17 SGT1A tap changer maintenance and GT1 maintenance.	OFTO	15h 08m	2179
06 June 2022 06:51 SGT1A tap changer maintenance and GT1 maintenance (SGT1B switching time).	OFTO	59m	142
06 June 2022 19:56 SGT1A tap changer maintenance and GT1 maintenance (SGT1B switching time).	OFTO	1h 28m	211
19 July 2022 12:57 GT4 33kV busduct replacement.	Non-OFTO	12d 11h 02m	43063
01 August 2022 00:00 GT4 33kV busduct replacement.	Non-OFTO	2d 11h 53m	9007
05 August 2022 09:14 GT3 33kV busduct replacement.	Non-OFTO	14d 2h 43m	48775
19 August 2022 14:28 GT1 33kV busduct replacement.	Non-OFTO	10d 21h 25m	37644
01 September 2022 11:01 GT2 33kV busduct replacement.	Non-OFTO	8d 4h 51m	28346
11 September 2022 17:55 Birdstrike in filter 1A, tripping circuit 1 offshore.	OFTO	4h 12m	605
Total			**171112**

Equitix Greater Gabbard

Outage Date and Time	Reason	Days, Hours and Mins	MWh
26 July 2022 6 Yearly maintenance.	OFTO	9h 40m	3201.60
22 August 2022 6 Yearly maintenance.	OFTO	15h 30m	2289.60
27 October 2022 Fault investigation.	OFTO	4h 03m	175.20
26 January 2023 Busduct fault.	OFTO	18d 1h 12m	71737.92
22 February 2023 Unplanned OFTO.	OFTO	40d 6h 58m	160143.48
Total			**237547.80**

BBE Gwynt-Y-Mor

Outage Date and Time	Reason	Days, Hours and Mins	MWh
01 April 2021 00:01 52.8% Export cap on SSEC3.	OFTO	71d 6h 20m	114259
10 June 2022 06:21 SSEC3 cable repair.	OFTO	42d 12h 31m	115448
20 July 2022 13:33 SGT2 - due to SVC2 trip.	OFTO	3h	861
01 October 2022 04:38 SGT1 - due to SVC1 trip.	OFTO	8h 27m	2425
12 December 2022 13:15 SGT2 low oil trip.	OFTO	4h 14m	928
Total			**233921**

BBE Thanet

Outage Date and Time	Reason	Days, Hours and Mins	MWh
16 August 2022 07:40 OFTO 6 yearly maintenance EC1.	OFTO	15h 14m	2285
18 August 2022 07:07 OFTO 6 yearly maintenance EC2.	OFTO	9h 58m	1822
17 January 2023 08:08 Cable sheath testing EC1.	OFTO	11h 51m	1777
19 January 2023 07:19 Cable sheath testing EC2.	OFTO	9h 58m	1495
Total			**7379**

BBE Humber Gateway

Outage Date and Time	Reason	Days, Hours and Mins	MWh
28 April 2022 09:07 Circuit 2, CSE temporary repair.	OFTO	22h 58m	2503
10 January 2023 07:20 Circuit 2, CSE temporary repair.	OFTO	1d 4h 05m	2869
Total			**5372**

West of Duddon Sands

Outage Date and Time	Reason	Days, Hours and Mins	MWh
19 April 2022 08:46 Maintenance of SGT1 and return of harmonic filter 1.	OFTO	2d 7h 24m	9152
08 June 2022 10:19 Circuit 2 taken out of service to investigate filter imbalance.	OFTO	1h 57m	322
26 June 2022 20:20 Circuit 2 tripped following offshore pressure release device operation.	OFTO	3d 0h 17m	11941
15 September 2022 07:16 REF injection testing as part of root cause analysis following July 2021 outage.	OFTO	2d 6h 49m	9056
Total			**30471**

DTP Burbo Bank Extension

Outage Date and Time	Reason	Days, Hours and Mins	MWh
None			0
Total			**0**

DTP Race Bank

Outage Date and Time	Reason	Days, Hours and Mins	MWh
28 June 2022 11:23 Protection Testing.	OFTO	8h 24m	1910.42
29 June 2022 13:18 Protection Testing.	OFTO	6h 35m	1497.25
Total			**3407.67**

DTP Galloper

Outage Date and Time	Reason	Days, Hours and Mins	MWh
09 August 2022 10:54 Protection Testing.	OFTO	1h 40m	627
10 August 2022 10:14 Protection Testing.	OFTO	4h 26m	236
Total			**863**

DTP Walney Extension

Outage Date and Time	Reason	Days, Hours and Mins	MWh
None			0
Total			**0**

DTP Hornsea One

Outage Date and Time	Reason	Days, Hours and Mins	MWh
15 June 2022 10:24 Transfer Agreement Orsted snagging works.	OFTO	1d 3h 50m	6269
16 June 2022 14:14 Transfer Agreement Orsted snagging works.	OFTO	8d 18h 17m	9903
25 June 2022 08:31 Protection relay replacement.	OFTO	3d 11h	18694
Total			**34866**

This glossary provides explanations and definitions for common terms used throughout this report.

System Availability

System availability is reduced whenever a circuit is taken out of operation for either planned purposes or following a fault.

Planned outages are required for system construction and new user connections in addition to the maintenance necessary to retain a high level of system reliability to ensure that licence standards of security are met.

System Availability is calculated by the formula:

$$\left(\frac{\text{The sum for all circuits of hours available}}{\text{(No. of circuits) x (No. of hours in period)}}\right) \text{x } 100\%$$

A circuit is defined as equipment on the transmission system, e.g. overhead line, transformer or cable which either connects two bussing points or connects two or more circuit breakers/disconnectors, excluding busbars.

Winter Peak Availability is defined as the average System Availability over the three months of December, January and February.

System Unavailability

System Unavailability is calculated by the formula:

(100 – Availability) %

Unavailability falls into 4 categories, 3 of which are planned and the other unplanned:

Maintenance Outages are planned outages required for maintenance;

System Construction Outages are planned outages required to construct or modify assets which are not provided for the exclusive benefit of specific users;

User Connection Outages are planned outages required to construct or modify assets which are provided to facilitate connection for the exclusive benefit of specific system users; and

Unplanned Unavailability is due to outages occurring as a result of plant or equipment failure, i.e. outages required and taken at less than 24 hours' notice.

Offshore System Availability

OFTO availability is calculated using the formula:

$$\left(\frac{\text{Total MWh system is capable of delivering – MWh unavailable}}{\text{Total MWh system is capable of delivering}}\right) \text{x } 100\%$$

NETS Grid Code and NETS Security and Quality of Supply Standard

The NETS Grid Code and NETS Security and Quality of Supply Standard (NETS SQSS) define the required security level to which the system is planned. The required security level at a substation increases with the amount of demand connected to the substation and so the planned level of demand security is normally higher for 400kV and 275kV transmission voltages than for 132kV. Additionally, the 132kV network is, in parts, less interconnected than the higher voltage systems and so losses of 132kV transmission circuits (for example due to weather related transient faults) are more likely to lead to temporary losses of supply.

Loss of Supply Incidents

A loss of supply incident is defined as any incident on the transmission system that results in an actual unsupplied energy incident to a customer or customers including pumped storage units operating in pump mode.

All transmission system incidents that resulted in a loss of supplies are reported individually giving the date, time and location of the event, duration, demand lost, an estimate of unsupplied energy and relevant factual information relating to the event.

Since 1st April 2013, loss of supply incidents is governed by the Energy Not Supplied (ENS) scheme. The scheme aims to incentivise the Transmission Licensees to minimise the impact of any loss of supply to their customers, that is, to restore supplies as soon as possible after an incident.

Loss of Supply Incidents – Incentivised

An Incentivised loss of supply event is an event on the Licensee's Transmission System that causes electricity not to be supplied to a customer, subject to the exclusions defined in the Special Conditions of the Transmission Licence.

Loss of Supply Incidents – Non Incentivised

The Non-Incentivised category covers loss of supply incidents that are less than 3 minutes in duration, the energy not supplied is calculated and recorded but not included in the incentivised energy not supplied figure and is reported separately. The Non-Incentivised category also applies to connection arrangements that are chosen by the customer and often have a level of design and operational security below that normally required to satisfy the NETS SQSS. This may be reflected in a reduced cost of the connection. In some cases, customers have also chosen to secure their supplies using their own generation to compensate for this reduced level of transmission security. Loss of supply initiated on a DNO network are not included within this category.

Overall Reliability of Supply

The Overall Reliability of Supply for a transmission system is calculated using the formula:

$$\left[1 - \left(\frac{\text{Estimated Unsupplied Energy}}{\text{Total energy that would have been supplied by the transmission system)}}\right)\right] \times 100\%$$

Voltage Excursions

The Electricity Safety, Quality and Continuity Regulations 2002 permit variations of voltage not exceeding 10% above and below the nominal at voltages of 132kV and above and not exceeding 6% at lower voltages. Any voltage excursions in excess of 15 minutes will be reported.

The NETS Grid Code reflects these limits and imposes a further constraint for the 400kV system in that voltages can only exceed +5% for a maximum of 15 minutes.

Consumers may expect the voltage to remain within these limits, except under abnormal conditions e.g. a system fault outside of the limits specified in the NETS SQSS.

Normal operational limits are agreed and monitored individually at connection points with customers to ensure that voltage limits are not exceeded following the specified credible fault events described in NETS SQSS.

Frequency Excursions

The Electricity Safety, Quality and Continuity Regulations 2002 permit variations in frequency not exceeding 1% above and below 50Hz: a range of 49.5 to 50.5Hz. Any frequency excursions outside these limits for 60 seconds or more will be reported.

The system is normally managed such that frequency is maintained within operational limits of 49.8 and 50.2Hz.

Frequency may, however, move outside these limits under fault conditions or when abnormal changes to operating conditions occur. Losses of generation between 1320 and 1800MW are considered abnormal and a maximum frequency change of 0.8Hz may occur, although operation is managed so that the frequency should return within the lower statutory limit of 49.5Hz within 60 seconds.

ESO