EirGrid Ex-Post Outturn Availability Connection Asset Maintenance Report for the 2021 Outage Season

Introduction and Background

The Single Electricity Market Committee (SEMC) decision SEM-15-071 “Process for the Calculation of Outturn Availability” was published on 29 September 2015. The decision applies to both transmission and distribution connected Centrally Dispatched Generating Units (CDGUs) and Controllable Wind Farm Power Stations (WFPS) which are disconnected as a direct result of a transmission outage scheduled by the TSO. Outages on the distribution system are not related to the decision paper.

This Ex-Post Outturn Availability Connection Asset (OACA) Maintenance Report contains details of the maintenance of OACAs for the 2021 outage season, in accordance with the SEMC decision.

The OACAs of a generation unit include any transmission equipment between and including the Connection Point and the busbar disconnects at the Transmission Station. Annual maintenance on connection assets associated with the relevant generation unit may disconnect a generation unit that is technically available at the connection point. This maintenance is scheduled by TSO and carried out by the TAO. A summary report of the outage schedule to facilitate this maintenance work is published annually at the start of each calendar year. A summary of the outage schedule at the end of each year is published. This is included in Appendix 3. Differences between the Ex-Ante and the Ex-Post summary are identified in the Overview of 2021 Outage Season.

Other documents to be considered when reviewing this report include

- SEM-15-071 Outturn Availability Decision Paper
- SEM-15-106 Outturn Availability addendum to SEM-15-071
- The EirGrid and SONI Implementation Approach to the SEM Committee Decision Paper SEM-15-071
- EirGrid Ex-Ante Outturn Availability Connection Asset Maintenance Plan for the 2021 Outage Season

Overview of the 2021 Outage Season

During the 2021 outage season:

- 101 OACA outages were processed. This figure was subject to in-season change as network configurations changed and as facilities moved to Controllable status in the market.
- 66 scheduled generator outages were planned in the Committed Outage Programme (COP) at the start of 2021. In season:
    - The TSO accommodated more than 49 changes to the generator outage dates as published in the COP.
    - The TSO accommodated more than 84 Short-Term Maintenance Outage requests (STMOs as described on the EirGrid website).

The results of the season are presented here, with descriptions and supporting information contained in the Appendices.

The figures below outline percentage changes under a number of different categories. Each category is described in detail in Appendix 2. Percentages are reported based on the Transmission Outage Programme Identification Number (TOP-IDs)[1] of TSO scheduled works. A TOP-ID is a unique identifier assigned for each outage and was linked to one specific connection asset.

As a generation unit's OACAs may contain several unique assets it may in turn have more than one TOP-ID for planned outages. For example, one TOP-ID may be linked to a generator transformer bay, while another TOP-ID may be linked to the cable from the meshed transmission station to that same generator transformer bay. As such, some TOP-IDs are intrinsically linked and a change of the works associated with one TOP-ID may also be linked to a change of the linked TOP-ID.

As noted above, Appendix 2 describes the categories for which changes are reported for each TOP-ID. For each reporting category for each TOP-ID, Appendix 3 reports whether there was a change to any work item. In the following pages, graphs are presented showing the percentage changes (i.e. Yes there was a change) for each of the reporting categories. The percentage change is divided into three groupings, "TSO Driven Change", "TAO Driven Change" and "Generator (Gen) Driven Change".

[1] The EirGrid Ex-Ante Outturn Availability Connection Asset Annual Maintenance Plan 2021 assigned an identifying number referred to as the TOP-ID to each outage. This TOP-ID started with the letters TO, for example the TOP-ID for the outage of a circuit between station1 and station2 may be TO-21-ST1-ST2-1-01.

The Transmission Outage Programme (TOP) process introduced in 2016, which issued indicative windows as opposed to specific outage dates at the start of the season, successfully accommodated the majority of generator outage changes without adversely impacting the programme. As shown in Figure 1, of all the indicative windows communicated in February 2021, approximately 64% remained unchanged at the end of the season. The largest drivers for changes to the indicative window was generator outages and aligning capital works.

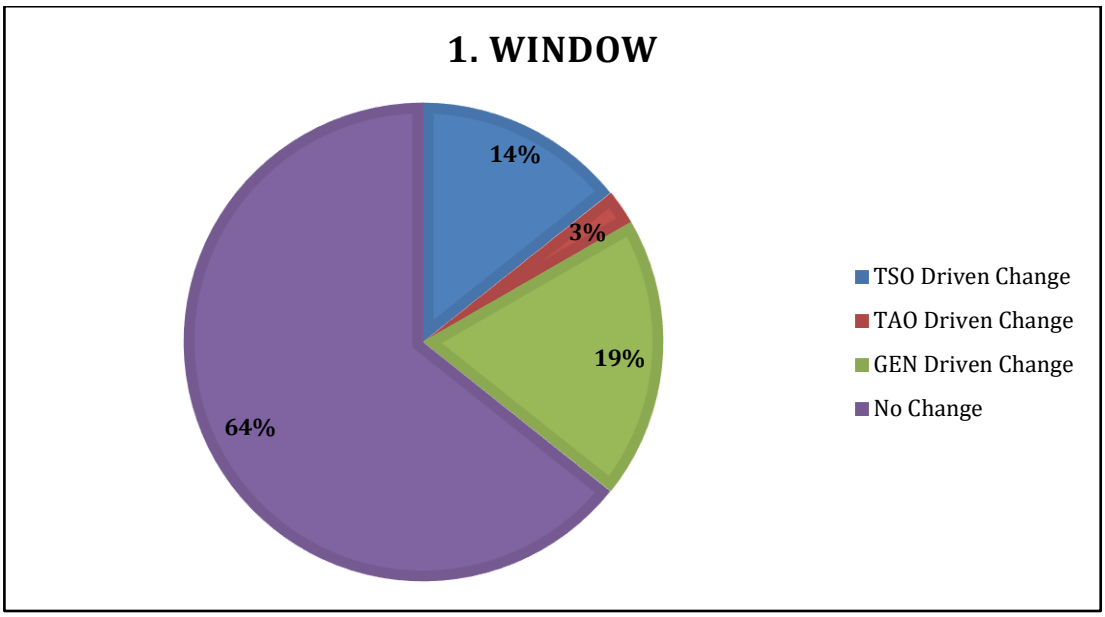

Figure 1: Category 1 - Indicative window communicated ex-ante

Figure 2 shows that 41% of the initial durations communicated ex-ante remained unchanged from the start of the season. Of the 59% of durations that did change, these were primarily related to TAO and generator change requests.

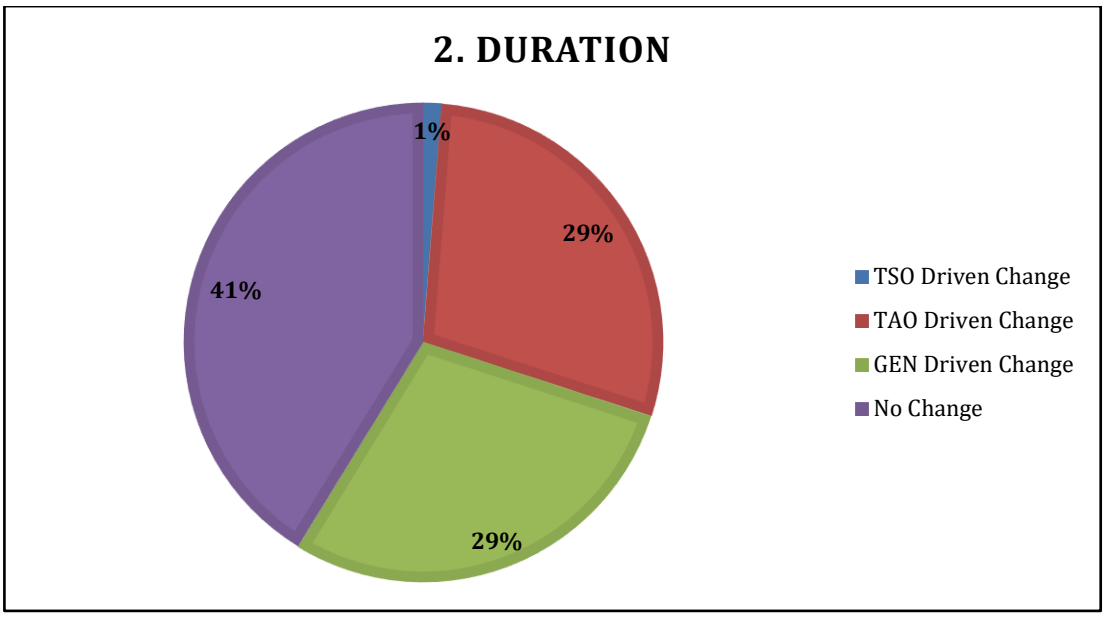

Figure 2: Category 2 - Initial duration communicated ex-ante

As shown in Figure 3, changes in the scheduled days communicated ex-ante largely originated from changes to generator outages. Additional changes were due TAO or TSO having to postpone or reschedule work.

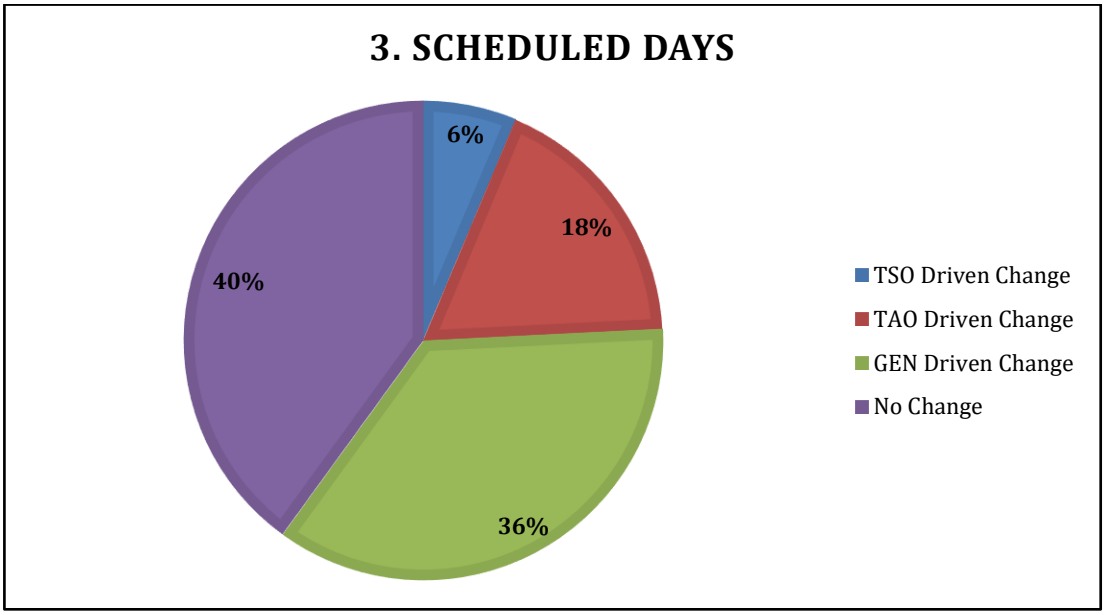

Figure 3: Category 3 - Scheduled days communicated ex-ante

Similarly, Figure 4 shows the designated days communicated ex-ante of which 53% remained unchanged. The high rate of change to generator outage dates making up the majority of changes.

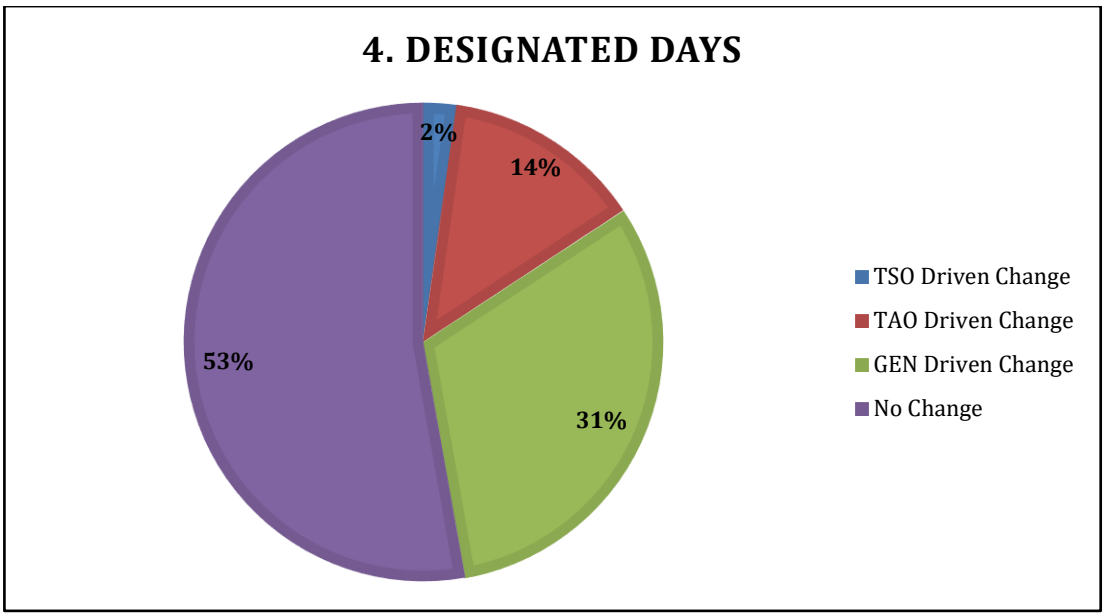

Figure 4: Category 4 - Designated days communicated ex-ante

Changes to works description communicated ex-ante in Figure 5 covers the situation where the corrective and preventative maintenance tasks were added in season or work items were incorrectly in the plan as they had been completed in a previous outage season. This was primarily due to lag in the closure of completion reports from the previous season leading to work items remaining open.

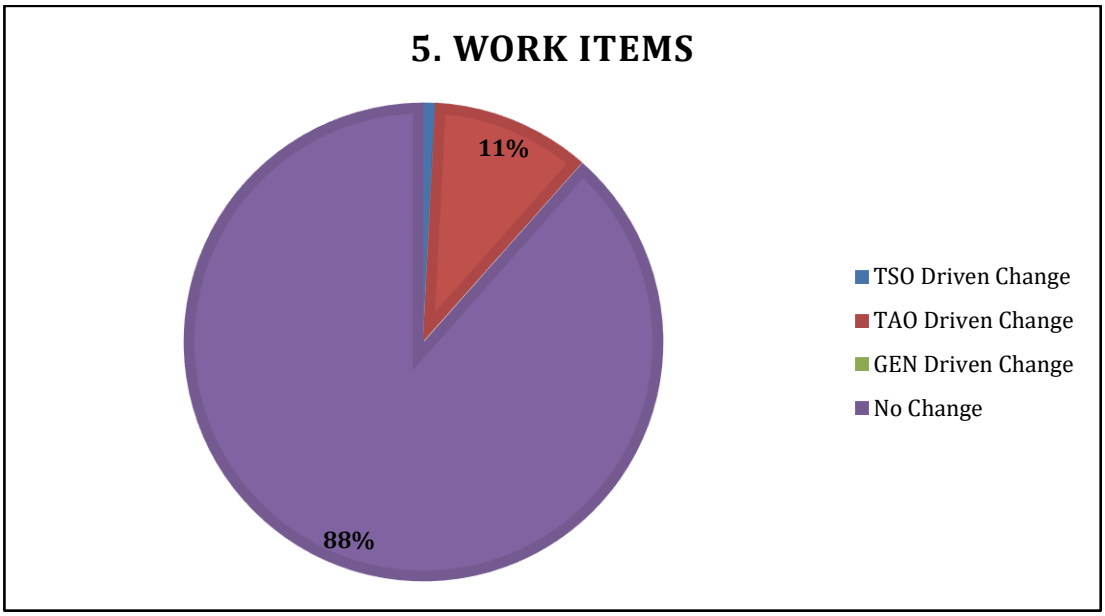

Figure 5: Category 5 - Works description communicated ex-ante

Figure 6 shows the percentage of TOP-IDs (each of which contained several individual work items) where the associated plant (both wind and conventional) had changed outage dates.

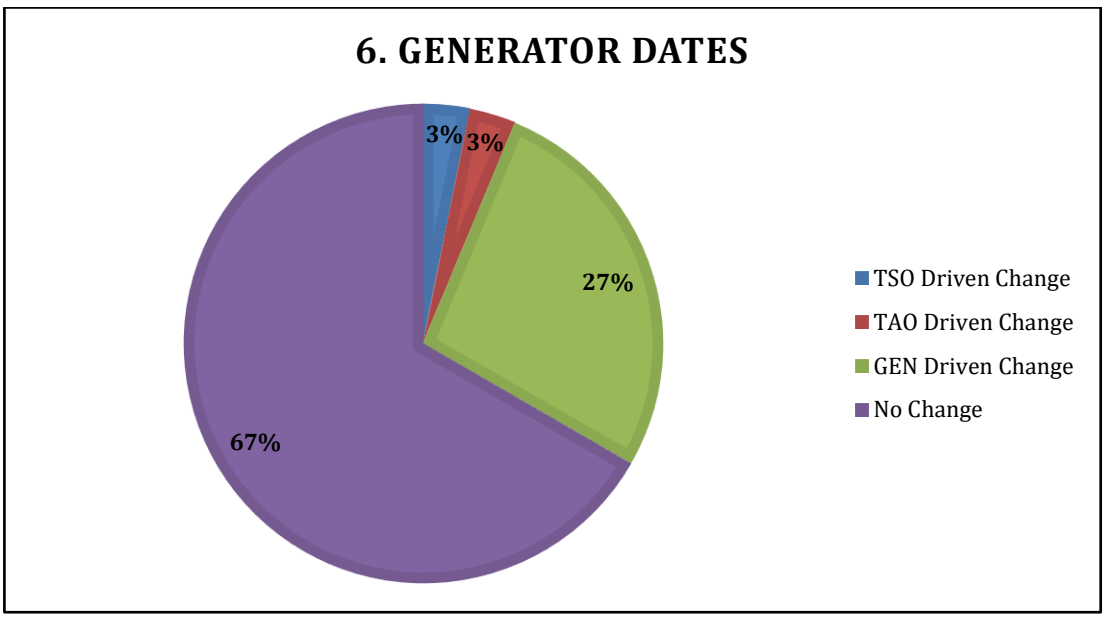

Figure 6: Category 6 - Generator outage dates

Figure 7 shows the breakdown of scheduled works that were not completed in 2021. 71% of works went ahead as planned with much of the remainder not being done due to several reasons determined primarily by the TAO followed by generators. This compares with a completion figure of 69% in 2020 which shows a minor improvement.

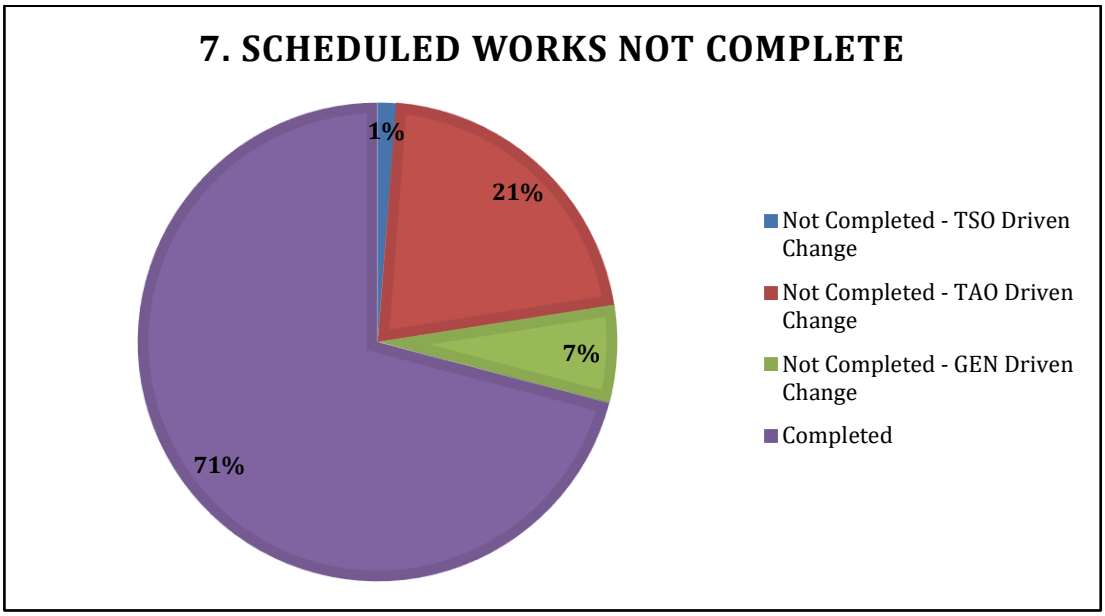

Figure 7: Category 7 – Scheduled Works Not Complete

Figure 8 shows the number of conventional Centrally Dispatched Generation Units (CDGUs) and the number of changes to the COP processed by the TSO in 2021. It is noted that several generation units have changed their COP dates more than once and this is included in the graph. For each change, system studies to assess the impact of the proposed change on system security and the transmission outage programme are carried out by the TSO. The TSO must also assess system capacity margins.

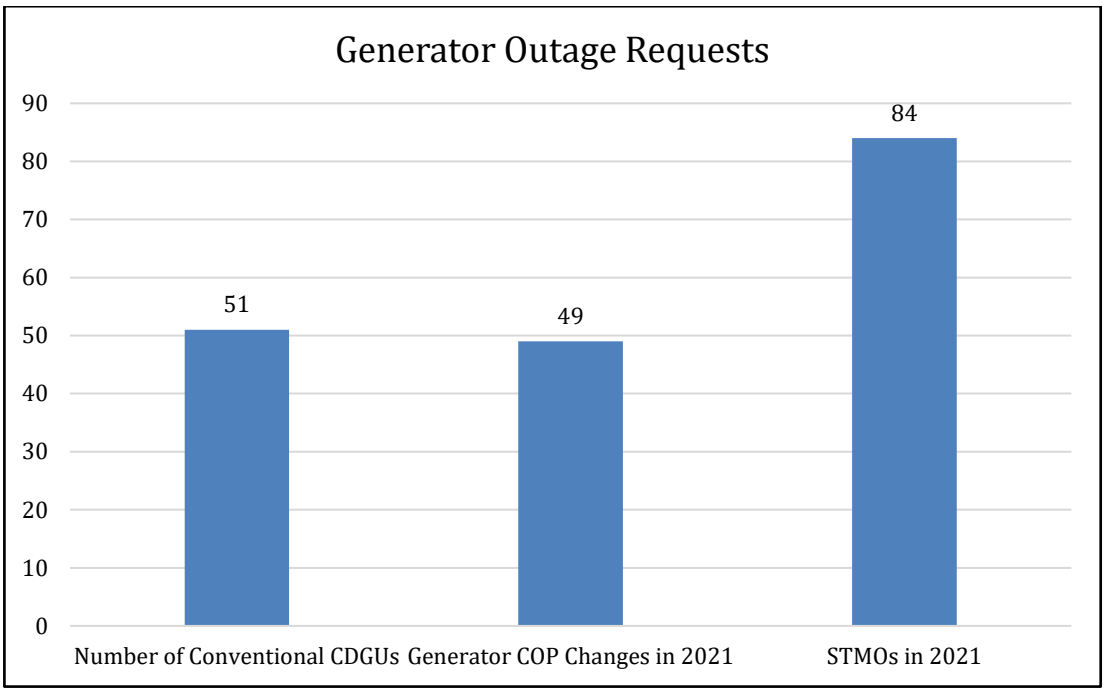

Figure 8: Generator Change Requests Processed in 2021

In season, the TSO accommodated 49 changes to the generator outage dates as published in the COP. STMOs are short, opportunistic maintenance outages, typically carried out at low load periods - overnight or at the weekend and which generally last for less than 48 hours i.e. short-term. 84 of these requests were accommodated in 2021.

Initiatives for improvement

This is the sixth Ex-Post Outturn Availability (OA) report published by the TSO in cooperation with the TAO, in fulfilment of the requirements of SEM-15-071. As the sixth such report, feedback from the 2021 Ex-Post forum will be factored into the 2022 season's tracking and reporting and subsequently the ex-post report to improve transparency and quality of service to energy producers on the grid.

Appendix 1: Transmission Outage Programme Timelines

A full programme of work for the year ahead was developed in February 2021; this had work items classified as Scheduled, Planned or Unscheduled. Outages several months in the future were initially classified as Planned. As the outage window approached, the outage moved to a proposed/scheduled state. These outage classifications are described in Table 1.

Table 1: Outage states throughout the season.

Outage Classification	**Outage Description**
Planned	A viable outage window (date range) identified in which a fixed duration of work is to be carried out. Works were not assigned specific dates until later in the outage season, for example works which are not expected to take place until several months in the future.
Proposed	An outage slot for the work to be completed in, with specific proposed start and end dates. These dates were proposed approximately 6 weeks before the start of the relevant month and were subject to further refinement in discussion with the TAO.
Scheduled	Outages scheduled with specified start and end dates, where these dates are unlikely to change. The outage dates are scheduled approximately 4 weeks before the start of the relevant month.
Unscheduled	Outages with could not be accommodated in the first release of the Transmission Outage Programme but would be scheduled later in the programme.

Table 2 shows an example of how the works were communicated to generators at the start of the season.

Table 2: Example of works communicated to generator in February 2021

GENERATOR TRANSFORMER – XXXX

TO-18-XX-T103-01 Window: **Jun** Status: **Indicative**

WORK	LOCATION		WORK ID	STATUS	DAYS	DESCRIPTION/COMMENTS
					X	Total Maintenance Outage Duration Requested
XXX	CD			DO	X	Works Description

Details of designated days for Outturn Availability purposes were assigned when the outage was scheduled (i.e. when the outage moved to the scheduled state which typically happened 4 weeks in advance of the relevant month).

Appendix 2: Ex-Post Reporting Format

This appendix lists how changes in the 2021 scheduled OACAs maintenance works are reported in this document. Changes to the seven distinct categories listed in Table 3 are reported in Excel spreadsheet format in Appendix 3 for each TOP-ID. Each of these categories is described in detail in Table 4 below. Where a change occurred to any category during the year for a TOP-ID, this is indicated with a Yes in the relevant spreadsheet column under each category heading. Reasons for change are also then recorded in a subsequent column under the same category heading.

Table 3: Reporting categories in the Ex-Post report

#	**Category**	**Change**	**Reason For Change**
1	*Indicative window communicated ex-ante*	Yes/No	
2	*Initial duration communicated ex-ante*	Yes/No	
3	*Scheduled days communicated ex-ante*	Yes/No	
4	*Designated days communicated ex-ante*	Yes/No	
5	*Works description communicated ex-ante*	Yes/No	
6	*Generator outage dates*	Yes/No	
7	*Scheduled works not completed*	Yes/No	

The categories 1 to 7 are explained as follows in Table 4 below.

Table 4: Description of the reporting categories

#	**Category**	**Category Description**
1	*Indicative window communicated ex-ante*	This category highlights if the outage occurred in the indicative outage window communicated to the generator at the start of the outage season.
2	*Initial duration communicated ex-ante*	This indicates if the outage took the number of days communicated to the generator at the start of the outage season.
3	*Scheduled days communicated ex-ante*	This category indicates if the outage occurred on the days communicated to the generation unit when the outage became scheduled (i.e. 4 weeks before the start of the month in which the works took place).
4	*Designated days communicated ex-ante*	This category indicates if the designated days (i.e. one of the five days where the generator is not outturn available for maintenance) were changed from those communicated to the generator when the outage became scheduled.

5	*Works description communicated ex-ante*	A change to this category indicates that the works description changed from those communicated to the generator at the start of the outage season.
6	*Generator outage dates*	A change to this category indicates that the generator applied to the TSO to change their generator outage date as published in the Committed Outage Programme (COP).
7	*Scheduled works not completed*	This category indicates if any one of the work items scheduled under the TOP-ID prior to the outage was not completed.

Please note:

- Where a work item incorrectly appeared in the EirGrid Ex-Ante Outturn Availability Connection Asset Maintenance Report, e.g. the work item had been completed in a previous outage season, this was logged as a change under 5. *Works description communicated ex-ante* rather than as a change under 7. *Scheduled works not completed*.

Appendix 3: Ex-Post Reporting Format

In this appendix, the OACA maintenance report lists changes as per points 1 to 7 from Table 3. The link below points to the report in Excel format on the EirGrid website.

The Ex-Post Outturn Available Connection Asset Report 2021 spreadsheet can be located on the EirGrid website here.