



SONI Annual Performance Report 2023-24

Appendix 5
SONI Performance
Measures

Northern Ireland
December 2024

Key Performance Indicators

Overview of Key Performance Indicators in 2023/24 Plan

There are four SONI TSO Outcomes in relation to each role across the Forward Work Plan. These four roles are:

- Decarbonisation
- Grid Security
- System Wide Costs and
- Stakeholder Satisfaction.

We have categorised each performance measure against these four outcomes and provided a brief description below.

Decarbonisation



The decarbonisation of the electricity system is of great importance to customers and a vital component of the energy transition. The KPIs which fall within this SONI outcome are as follows:

| Decarbonisation | | | |
|---|---|----------------|----------------|
| PERFORMANCE INDICATOR | DESCRIPTION | 2023/24 TARGET | 2023/24 ACTUAL |
| System Non-Synchronous Penetration (SNSP) | To increase the maximum level of Synchronous Non-Synchronous Penetrations (SNSP) that SONI will allow on the system at any one point in time. | 80% | 75% |
| Renewable Dispatch Down | To increase the percentage of electricity from renewable sources in Northern Ireland | 10% | 18.6% |

Grid Security



A secure and reliable electricity network that is fit for the future of the electricity systems needs is critical to customers and market participants. The KPI which falls within this SONI outcome is as follows:

| Grid Security | | | |
|-----------------------|---|----------------|----------------|
| PERFORMANCE INDICATOR | DESCRIPTION | 2023/24 TARGET | 2023/24 ACTUAL |
| System Frequency (%) | To ensure that SONI manages the system frequency within Grid Code requirements which states that target frequency is that Frequency determined by the TSO, in its reasonable opinion, as the desired operating Frequency of the Total System. This will normally be 50.00Hz plus or minus 0.05Hz, except in exceptional circumstances as determined by the TSO, in its reasonable opinion when this may be 49.90 or 50.10Hz | 98% | 98.71% |

System Wide Costs

Ensuring customers get value for money and benefit from cost efficiency should be paramount. However, the costs for customers should be viewed holistically. The KPI which falls within this SONI outcome is as follows:

| System-Wide Costs | | | |
|--------------------------------|---|-----------------------------|----------------|
| PERFORMANCE INDICATOR | DESCRIPTION | 2023/24 TARGET | 2023/24 ACTUAL |
| Imperfections Cost Savings (€) | This performance measure is to minimise constraints costs | Determined Annually Ex-Post | €1.43 m * |

**Based on the use of the backcast model, there was a reduction in imperfection costs on €1.43 on an all island basis in the 2022/23 year.*

SONI Service Quality

Whilst delivering on decarbonisation, grid security and cost, SONI will also need to meet the expectations of its stakeholders. Creating a transparent information sharing environment accompanied by the timely completion of our tasks will create positive and efficient working relationships between the parties acting in the market. The KPIs which contribute to this SONI outcome are as follows:

| SONI Service Quality | |
|---------------------------------|---|
| PERFORMANCE INDICATOR | DESCRIPTION |
| Timely Delivery of Publications | All Publications and materials are published according to the timelines set throughout the Forward Work Plan, with dependencies detailed as, and when, appropriate. |
| Quality & Quantity of Feedback | Where appropriate, feedback will be reviewed in both qualitative and quantitative terms and then used to inform SONI on our performance for each relevant area as detailed throughout the Forward Work Plan |

Historical Background and Performance

Decarbonisation



SNSP (%)

Purpose of the metric

System Non-Synchronous Penetration (SNSP) is an important enabler for increasing the level of renewable sources of electricity generation on the power system. System Non-Synchronous Penetration is a real-time measure of the percentage of generation that comes from non-synchronous sources, such as wind and HVDC interconnector imports, relative to the system demand. New tools and processes are required by SONI to allow increases in the SNSP metric; therefore, this is determined to be a good measure for progress to enable decarbonisation of the electricity system to achieve net zero carbon emissions by 2050.

Approach to measurement

SNSP is a system security metric that has been established from the results of the DS3 programme. These studies initially identified 50% as the maximum permissible level. Due to works undertaken by SONI under the DS3 programme the SNSP level was reassessed, and the limit was raised over the years as per the table above.

In order to achieve the levels of SNSP that are required to achieve the 2030 targets, we will need to significantly evolve how we operate the power system

In the past we operated a power system based on conventional generation that could be sent an instruction (a dispatch instruction) to generate at a particular output, with no variability and with each generating unit synchronised with each other. Our future system will be at times utilising fully variable and non synchronised renewable sources of power.

The SNSP level is published on our website on a weekly basis in the Operational Constraints update document.

Historical Figures

The actual permanent SNSP limit over the last several years is as follows:

| Year | SNSP Limit |
|------|---|
| 2013 | 50% |
| 2014 | 50% |
| 2015 | 55% Trial from Oct |
| 2016 | 55% Perm from Mar 60% Trial from Nov |
| 2017 | 60% Perm from Mar 65% Trial from Nov |
| 2018 | 65% Perm from Apr |
| 2019 | 65% |
| 2020 | 65% |
| 2021 | 70% Trial from Jan 70% Perm from Apr 75% Trial from Apr |
| 2022 | 75% Perm from Apr |
| 2023 | 75% |

SNSP (System Non-Synchronous Penetration) is the sum of non-synchronous generation (such as wind, solar and HDVC imports) as a percentage of total demand and exports.

When the SNSP limit is raised, a trial period takes place before it becomes permanent. During the trial period the system is operated at this increased SNSP limit except in times of extreme system events or during system testing

Target for year

In 2022 we successfully concluded our trial of operation with an increase in the SNSP limit from 70% to 75% and this increased limit became operational policy on 31st March 2022. Our target for 2023/24 was to achieve an 80% SNSP level. . However, we are currently operating at 75%, as we are actively conducting ongoing trials to safely and reliably integrate the increased levels of non-synchronous generation into the system. These trials are essential to ensure the robustness of our processes and systems at higher penetration levels, as we continue to prioritise system security and stability while progressing towards our target.

Renewable Dispatch Down (%)

Purpose of the metric

The aim of this metric is to minimise the dispatch down of renewable generation. Dispatch-down of renewable energy refers to the amount of renewable energy that is available but cannot be used by the system. This is because of broad power system limitations, known as curtailments, or local network limitations, known as constraints.

In Northern Ireland, renewable energy is predominantly sourced from wind, although solar energy has grown in size and significance in recent years. Other sources include hydroelectricity, biomass, biogas and waste.

Renewable generation receives priority dispatch within the scheduling and dispatch algorithms in the Castlereagh House Control Centre. However, there will be times when it is not possible to accommodate all priority dispatch generation while maintaining the safe, secure operation of the power system. Security-based limits have to be imposed due to both local network and system-wide security issues. Local network issues may arise due to lack of grid infrastructure to accommodate the renewable generation or due to transmission outages required to facilitate the delivery of new infrastructure.

Approach to measurement

Renewable Dispatch Down (%) is calculated on a Monthly basis and published one month in arrears. Annual figures are available one month following the end of the year. All controllable wind and solar farms are issued with detailed constraint and curtailment reports each month. The reports include clear categorisation between constraint and curtailment and clear reasons for why a curtailment or constraint was applied called a 'reason code'. All wind and solar farms also have access to dispatch instructions and wind and solar farm data with each dispatch instruction time-stamped with the instruction time.

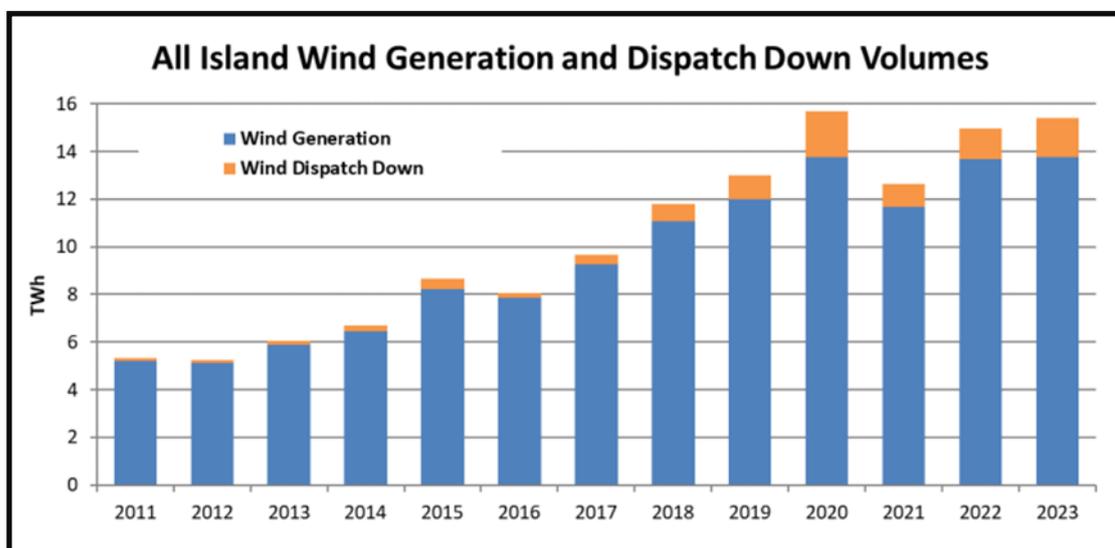
A detailed wind and solar aggregate constraint and curtailment report is also published online every month to coincide with the individual wind and solar farm reports. This report is accompanied by a separate user guide, which contains a detailed description of the methodology, worked examples and a Frequently Asked Questions (FAQs) section. Both the aggregate report and the user guide can be found at: <http://www.soni.ltd.uk/how-the-grid-works/renewables/>

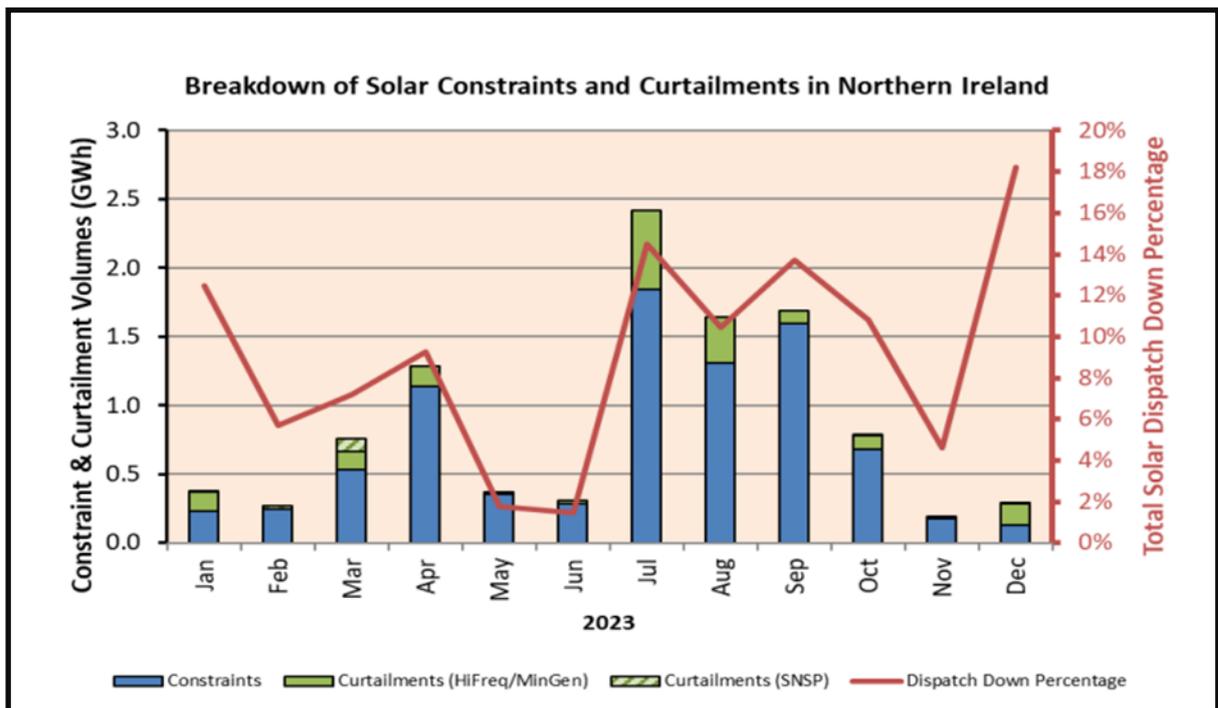
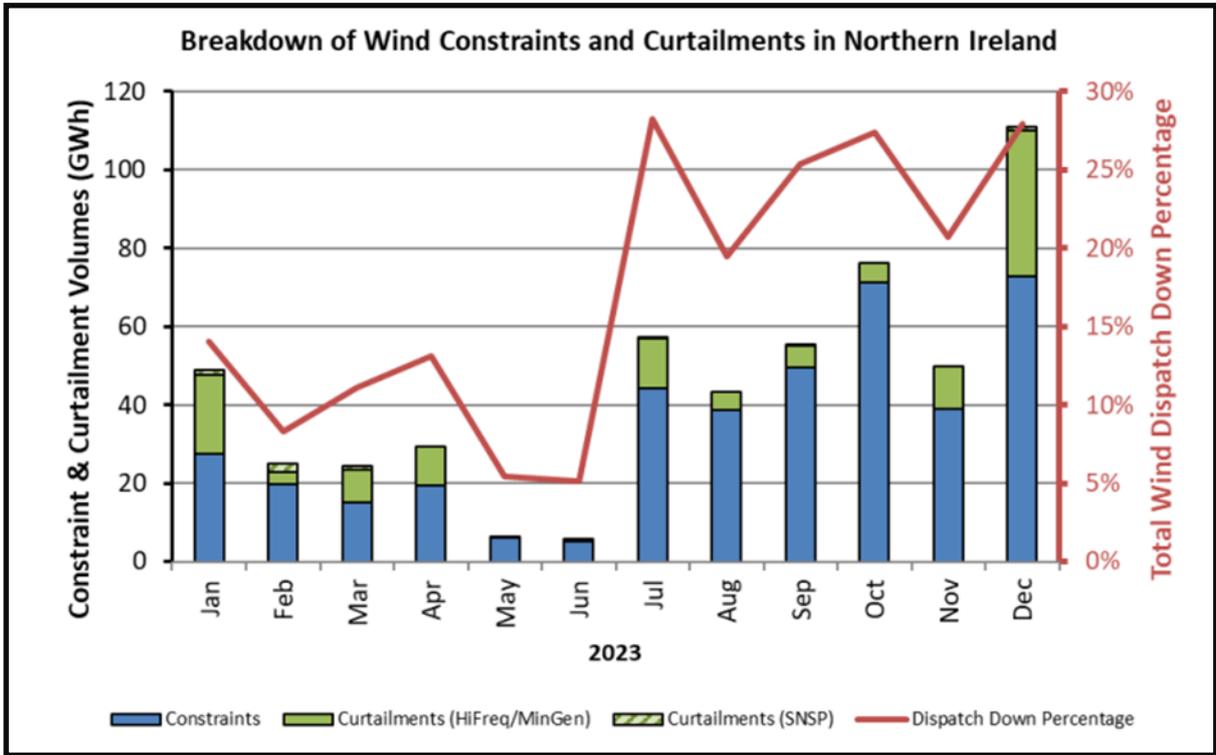
Historical Figures

| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|-------|------|-------|-------|------|------|-------|
| Wind | 9.4% | 10.7% | 14.8% | 7.8% | 9.4% | 18.6% |
| Solar | 0.0% | 0.0% | 0.0% | 0.0% | 4.6% | 7.9% |

In 2023, the total dispatch-down energy from wind generation in Northern Ireland was 539 GWh. This is equivalent to 18.6% of total available wind energy in that jurisdiction. In 2023, the total dispatch-down energy from solar generation in Northern Ireland was 10 GWh. This is equivalent to 7.9% of total available solar energy in that jurisdiction

When all renewable sources of electricity are taken into account, the dispatch down level of all renewables (wind) on the island in 2023 was 10.7%.





In general, wind constraints are trending upwards in Northern Ireland due to the amount of wind & solar on the Northern Ireland system relative to its size and the volume of interconnector imports from GB. At times there is no option but to constrain wind (and solar) if all the online conventional units are at minimum generation, while also managing the potential loss of the tie-line. The loss of the tie-line is flagged as a Northern Ireland constraint as opposed to curtailment, as it does not affect wind in Ireland, i.e. it's a local Northern Ireland issue.

Target for year

Our target for Renewable Dispatch Down for 2023/24 was 10% for wind generation, however, as highlighted above there are a number of factors at play and this target is very challenging.

The latest published figures available for Renewable Dispatch Down for calendar year 2024 (Jan to October), is 29.2% for wind and 17.0% for Solar.

The complete figures for 2024 will be available in SONI's Annual Renewable Constraint and Curtailment Report 2024, which will be published in April 2025.

Our target for Renewable Dispatch Down for 2023/24 remains at 10% for wind generation, however, as highlighted above there are a number of factors at play and this target is very challenging.

Grid Security



System Frequency (%)

Purpose of the metric

The Grid Code requires that the frequency is kept within the normal operating limits of 50 Hz \pm 0.1. This is to protect equipment and ensure a quality supply of electricity to end users.

Assessing the percentage of time that SONI operates within this window is considered a good measure of the performance against the Grid Code requirement. Certain events outside of the control of SONI, such as generator tripping, will result in the frequency falling outside of these normal operating limits. Management of frequency will also become more challenging due to increasing levels of non-synchronous generation on the system. It should also be noted that there needs to be a balance in relation to this metric as to not create a perverse incentive i.e. to maintain the frequency within the target range 100% of the time would require SONI to hold additional dynamic operating reserve at an additional cost to consumers.

The target percentage of time that the frequency should be in this window is outlined below. SONI believes that this strikes the best balance to ensure quality of supply, but which minimise costs.

Approach to measurement

The percentage of time that the frequency is within the range of 50 Hz \pm 0.1 Hz will be assessed at the start of each year for the previous year. The information will be made available as detailed in the Annual All Island Transmission System Performance Report.

Historical Figures

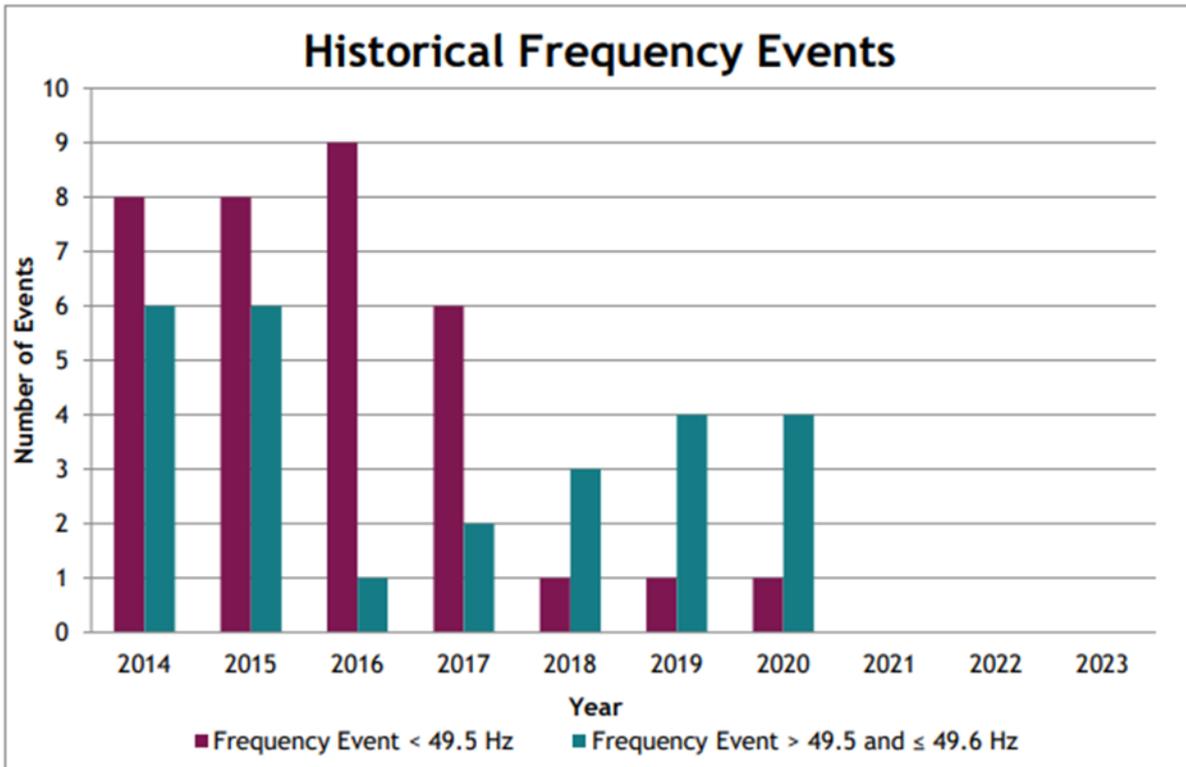
The actual performance over the past 5 years is detailed below:

| Year | % |
|------|--------|
| 2019 | 99.66% |
| 2020 | 99.67% |
| 2021 | 98.63% |
| 2022 | 98.52% |
| 2023 | 98.71% |

Frequency control will become increasingly challenging with the rapid decarbonisation of the electricity system, which will result in fewer conventional sources of frequency control and stability.

The nominal frequency of the all-island transmission system is 50 Hz and is normally controlled within the range of 49.95 Hz and 50.05 Hz. A frequency event is defined as when the frequency drops below 49.8Hz. A chargeable frequency event is when the frequency drops below 49.7Hz.

The below figure shows the historic frequency excursions over the period 2014– 2023.



Target for year

Our target for 2023/24 was to operate within the detailed parameters indicated above for 98% of the time. Our System Frequency percentage for this period was 98.71%

Frequency Excursions

There were no reportable frequency excursions in Northern Ireland in 2023.

System-Wide Costs



Imperfections Cost

Imperfections costs are levied through an all-island tariff; therefore modelling is performed on an all-island basis. This performance measure assesses our work to minimise constraints costs (which arise due to the difference between the ex-ante market schedule and the real-time dispatch). These costs are passed onto the end electricity consumer.

SONI intends to use the Plexos based backcast model, considering it to be the best model to use, when estimating the annual imperfections costs associated with constraints, as the backcast contains actual data, rather than using the forecast model which contains assumptions forecast more than six months before the beginning of the tariff year.

Some of these assumptions, such as fuel, are very volatile and have a significant impact on the imperfections costs associated with constraints. No method of estimating the annual imperfections costs associated with constraints is perfect but it is SONI's opinion that using the Plexos based backcast model to determine these costs is as robust as possible, as we are using actual inputs rather than assumptions.

SONI produces 4 Quarterly Imperfections Cost Reports which are published on the SEM-O website (TSO Responsibilities), which will provide clear evidence of the imperfections reductions actions, progress on the plan and the future improvements that SONI will make to remove or reduce the cost of each constraint in the next period. In addition, for the first time in 2023, the TSOs published a Mid-Year Imperfections report. This mid year report was continued in 2024 at the request of both Regulators.

Based on the use of the backcast model, there was a reduction in imperfection costs on €1.43 on an all island basis in the 2022/23 year.



Timely Delivery of Publications

Across the four SONI roles, 13 project milestones were detailed to have the performance measured by Timely Delivery.

10 of these **13** milestones were completed. 1 milestone related to 2 publications (1 was completed and 1 is partially completed), 2 did not progress in the year.

Out of the 10 completed:

- ❑ 4 were delivered on time (in the month specified or earlier)
- ❑ 6 were delayed, however they were delivered within the Quarter (3 months of the specified delivery date),
- ❑ 2 were SONI-related delays.

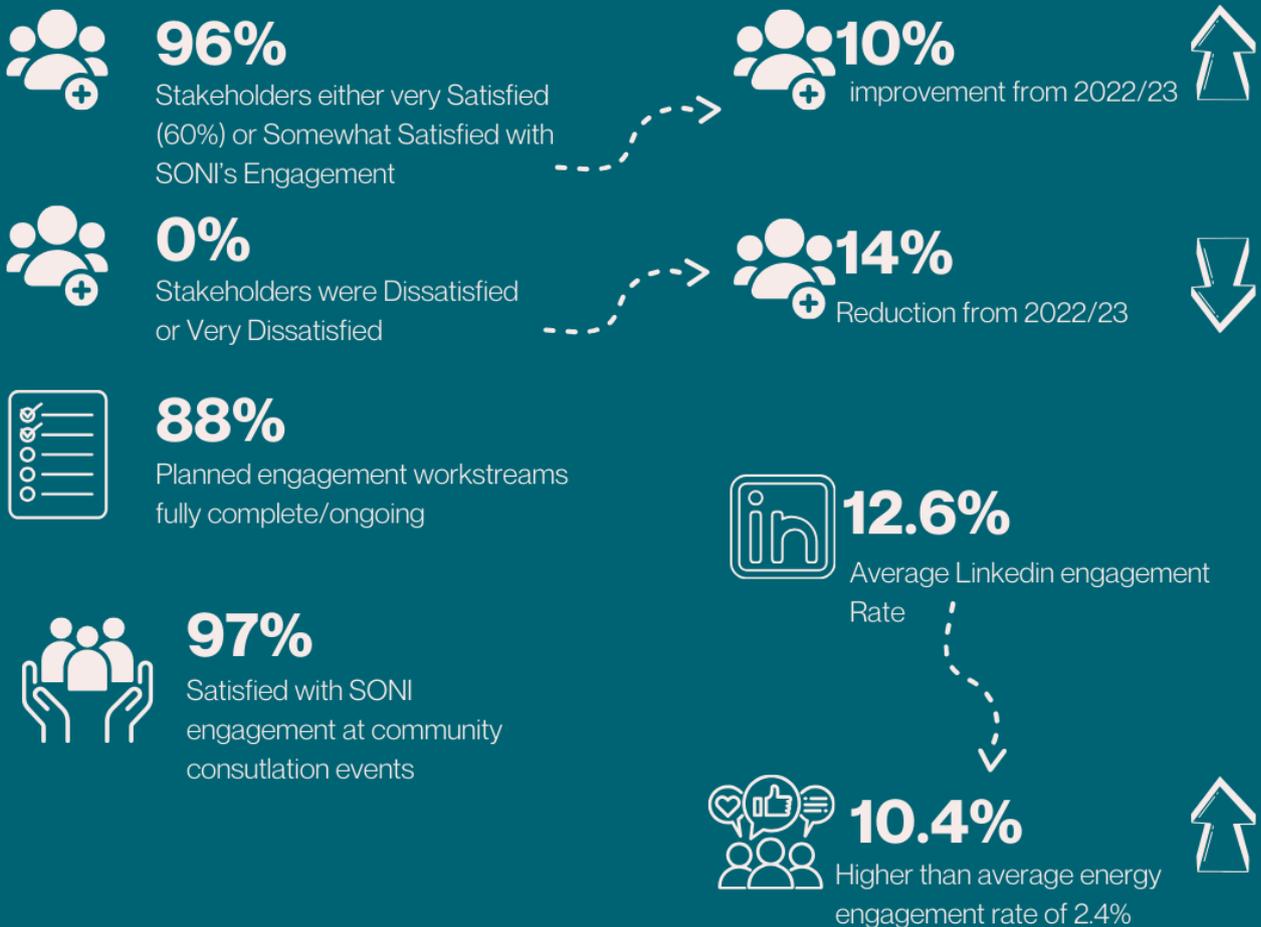
Quality and Quantity of Feedback

We have included in the following few pages a summary of the qualitative and quantitative feedback gathered throughout the year, aligned with our 2023/24 Stakeholder Engagement Action plan. This includes insights from our annual Stakeholder Engagement pulse findings 2023/24, alongside more targeted feedback from our Eden Carnmoney public engagement initiatives. These findings reflect our ongoing efforts to expand engagement activities while prioritising the quality and depth of the feedback we receive. By doing so, we aim to continuously enhance our understanding of stakeholder priorities and ensure our approach remains robust and inclusive.

ENGAGEMENT EVALUATION FRAMEWORK SUMMARY

This Engagement Evaluation Framework summary provides highlights of the evaluation assessment of SONI's Stakeholder Engagement Action Plan 2023/24

Summary



SONI ANNUAL STAKEHOLDER ENGAGEMENT PULSE SURVEY 2023/24 FINDINGS

SONI ENGAGEMENT

96%

Stakeholders were either **Very Satisfied (60%)** or **Somewhat Satisfied (36%)**

0%

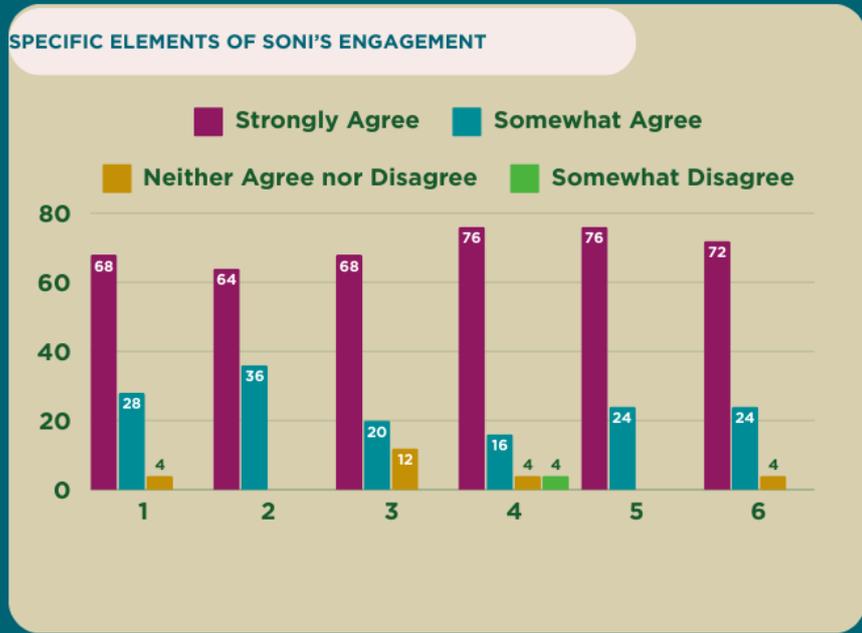
Stakeholders were either **Dissatisfied** or **Very Dissatisfied**

10%

Improvement from 2022/23 where **86%** were **Very Satisfied (36%)** or **Somewhat Satisfied (50%)**

14%

Reduction in stakeholders who were **Somewhat Dissatisfied** in



- SPECIFIC ELEMENTS OF SONI'S ENGAGEMENT**
- The engagement(s) met expectations and added value to roles (**68% Strongly Agree**, 28% Somewhat Agree, 4% Neither Agree nor Disagree)
 - The information provided was accessible and proportionate to my needs (**64% Strongly Agree**, 36% Somewhat Agree)
 - Better understanding of SONI's role & relevant subject matter (**68% Strongly Agree**, 20% Somewhat Agree, 12% Neither Agree nor Disagree)
 - Sufficient opportunity to engage and ask questions (**76% Strongly Agree**, 16% Somewhat Agree, 4% Neither Agree nor Disagree, 4% Somewhat Disagree)
 - SONI team knowledgeable on the area of engagement (**76% Strongly Agree**, 24% Somewhat Agree)
 - Frequency of my engagement with SONI is about right for my needs (**72% Strongly Agree**, 24% Somewhat Agree, 4% Neither Agree nor Disagree)

POST ENGAGEMENT SURVEYS 2023/24

95%

Respondents **Strongly Agreed** or **Agreed** that the engagement met expectations & added value to their role

88%

Respondents **Strongly Agreed** or **Agreed** that they have a better understanding of SONI's role & the relevant subject matter

88%

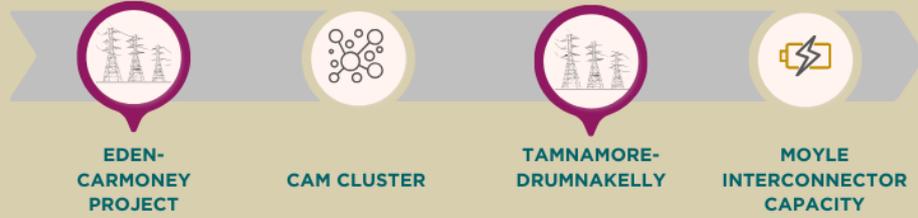
Respondents **Strongly Agreed** or **Agreed** that the information provided was accessible and proportionate to their needs

88%

Respondents **Strongly Agreed** or **Agreed** that their engagement was sufficient opportunity to engage and ask questions

**SONI
ENGAGEMENT
WITH LOCAL
COMMUNITIES**

Given the challenges of reaching the general public for feedback through traditional channels, SONI also seeks views when engaging about local infrastructure projects. In line with our Public Engagement Model, this included the following key projects in 2023/24:



Engagements across all public drop-in sessions



Elected representatives and other stakeholders

97%

Respondents **Strongly Agreed or Agree** that they were satisfied with their engagement with SONI

94%

Respondents **Strongly Agreed or Agree** they have a better understanding of SONI's role due to the public event they attended

100%

Respondents **Strongly Agreed or Agree** that the information was accessible and easy to understand

97%

Respondents **Strongly Agreed or Agree** that they understand why the project is needed

48%

Respondents found out about the events through family/friends and social media.

97%

Respondents **Strongly Agreed or Agree** that they understood what the project involves

94%

Respondents **Strongly Agreed or Agree** that the projects will benefit local communities



**DIGITAL AND MEDIA
ENGAGEMENT**

3,608

engagements on infrastructure project social media posts



Average LinkedIn engagement rate of 12.6%, **10.2% higher** than energy industry averages

According to SONI's independent media monitoring, Prime Positive coverage media coverage increased from 17% to 45% and recorded 0% Prime Negative coverage for the second year in a row.

Media Score

a holistic score which combines coverage sentiment, key message penetration, volume etc

2023/24

89/100

2022/23

80/100





case

studies & testimonials

“Having customer engagements clinics to discuss early stages of potential connection methods have been very beneficial and helpful.”
Customer

“Before commenting further we want to focus on SONI’s significant effort and work in their Engagement Model and specifically their commitment to work with those who may be affected by any future grid development plans, ensuring affected local communities, including land owners, are at the heart of the energy transition. SONI have engaged with the UFU on their 3-Part Process for Grid Development process. What this means is a commitment to engage with local communities years before the submission of a planning application and thereby provide opportunities for their input.”
Organisation representing rural communities

“Regular engagement at working level on security of supply and system operations. Short notice requests to meet and provide system updates are met by SONI colleagues.”
Statutory partner

“SONI do a fantastic job in engaging with the wider business community and ensuring we can send relevant messaging to our members. They are also key partners who actively encourage sustainable growth in Northern Ireland.”
Business representative body

“The team’s willingness to work together to tackle research challenges, along with their collaborative spirit in addressing complex issues is invaluable.”
Academia

“We believe that SONI has gone above and beyond their remit to support the development of offshore wind. They have provided information in a timely manner and have been extremely professional and courteous in all of our engagements.”
Developer



Eden-Carrmoney Project public engagement

The Eden – Carrmoney project is an upgrade to the electricity transmission system between Eden 110 kV Substation, near Carrickfergus, and Carrmoney 110 kV Substation in Newtownabbey.

To meet the growing needs of residents and businesses in the local area, a significant upgrade of electricity infrastructure is necessary which will involve the refurbishment of parts of the existing overhead line and the placement of new high-capacity underground cable.

As part of SONI's Public Engagement Model, SONI Engagement Team delivered a package of external engagement and communications to ensure local communities had an opportunity to feed into our plans.

The outcomes of the engagement are outlined in the graphics below.

