

EEOS Quality Workshop

25th Aug 2021

Joe Durkan



Rialtas na hÉireann
Government of Ireland

Agenda

Introduction



QMS Thematic Review Summary



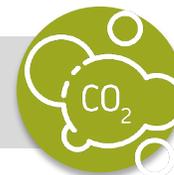
Domestic Site Inspections - Summary Report



Quality Auditing & Sampling – Best Practice Review



Quality Assurance 2022 to 2030 – Proposed SEAI approach



Questions



QMS Audit Outbrief

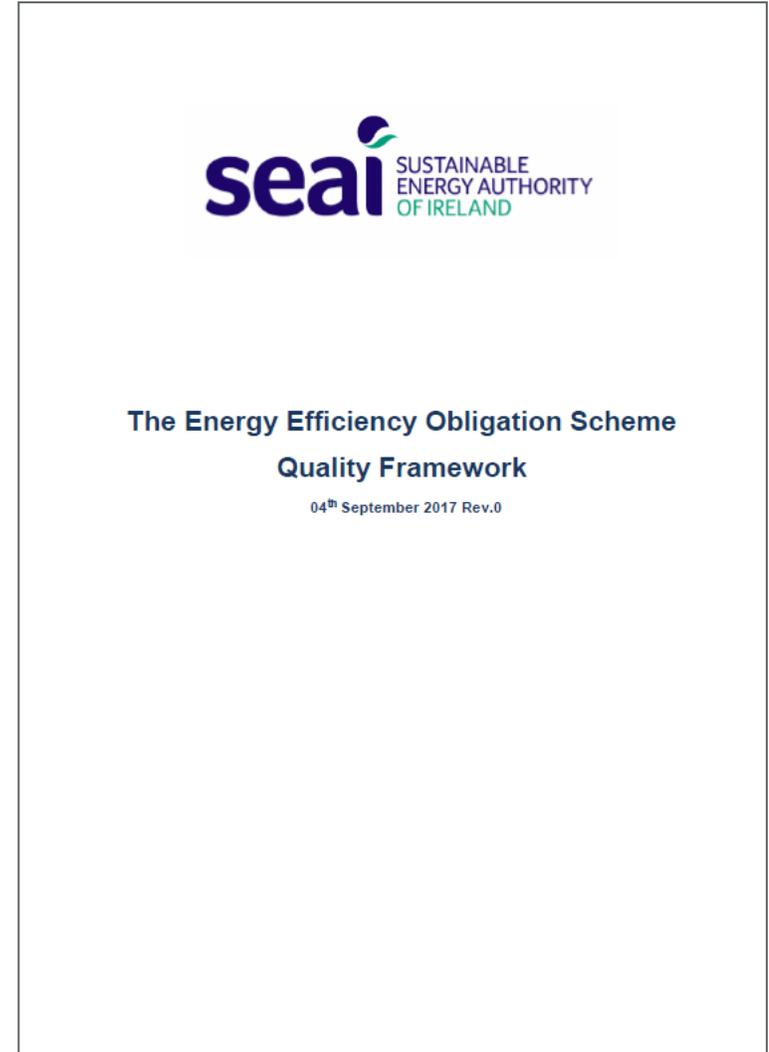


25th August 2021

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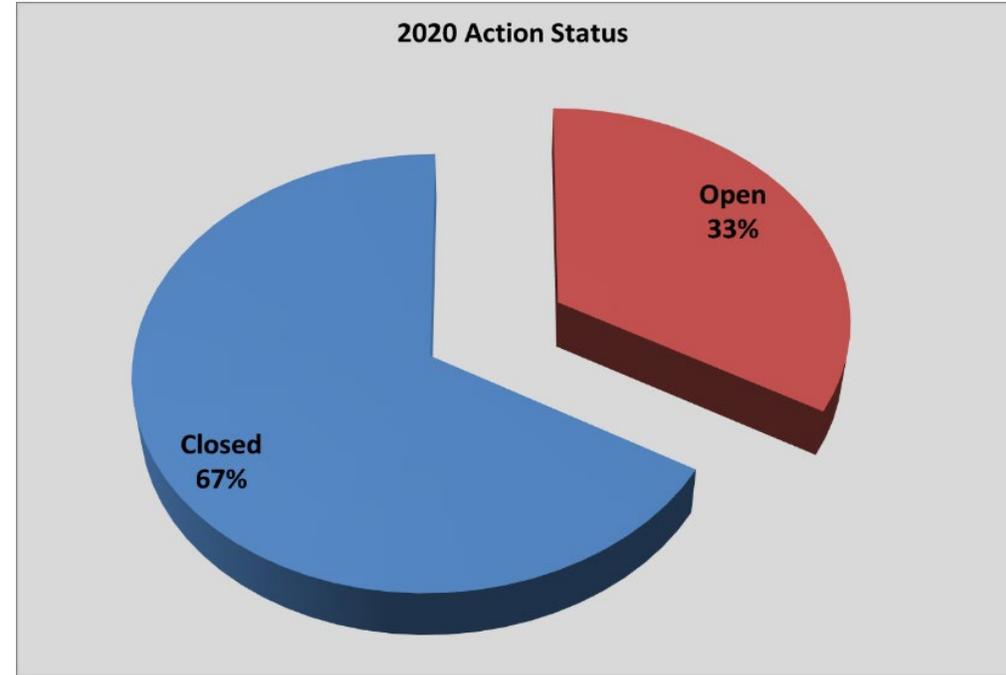
Main Purpose of the QMS Audits

- Compare existing quality practices to those of the EEOS Quality Framework
- Ensure any issues identified by SEAI prior to the QMS Audit are reviewed
- Identify areas of good practice
- Highlight areas of improvement or risk in the quality management system
- Identify if any updates are required to calculation methodologies for the programme
- Auditing the quality of a sample of reported energy efficiency improvement measures
- Review the calculations of a percentage of reported energy credits which must be independently audited by the obligated party prior to submission to SEAI



2020 Improvement Actions

- 46 improvement actions or recommendations observations made over the course of the audits in 2020
- Some good improvements made with evidence of continuous improvement observed in most cases
- 67% of actions satisfactorily closed out
- Recommendation for two Obligated Parties to submit remediation plans as required by SI:634 of 2016
- Action tracker below used on previous responses

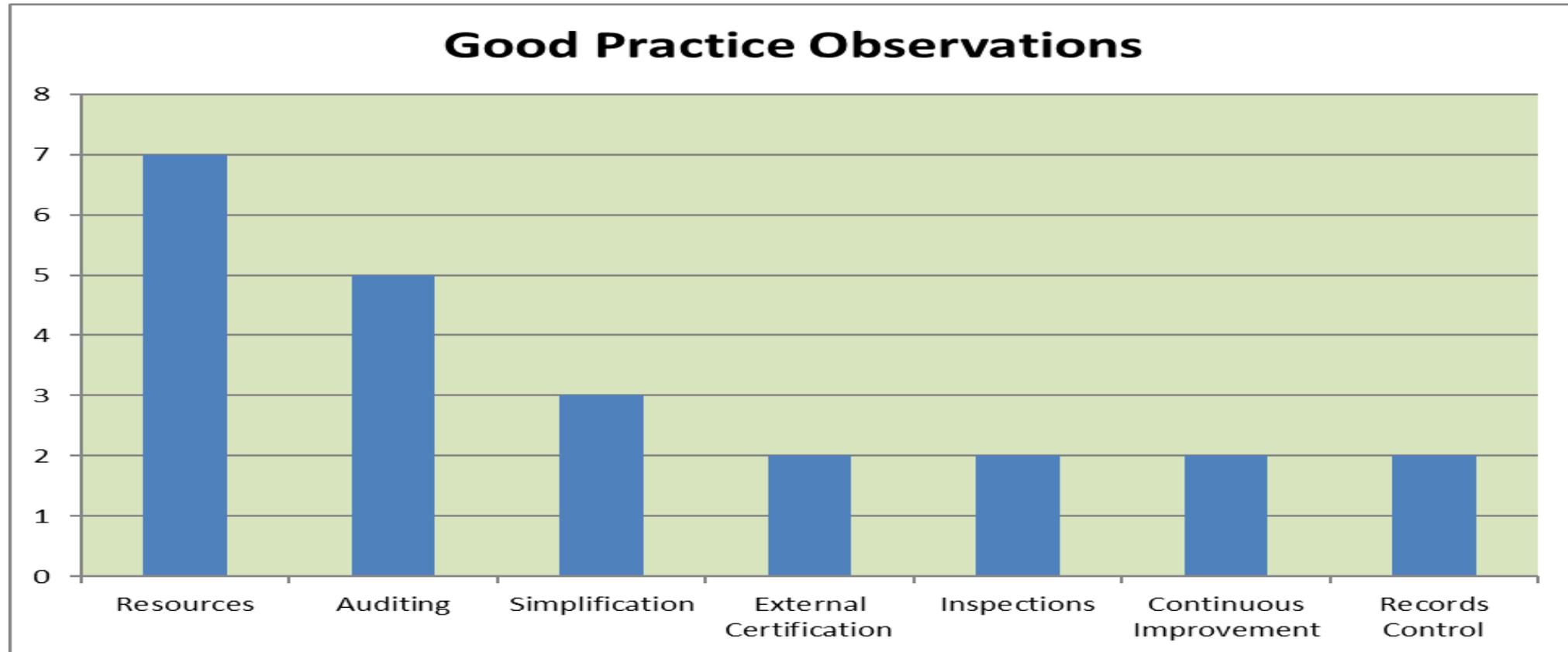


Please complete the table below for each improvement action identified in Section 4 of the EEOS External Audit report. ¶

Item No. ¶	Improvement Action Identified ¶	Proposed Action ¶	Responsibility ¶	Target Completion Date ¶
a) ¶	Include the improvement action as identified during the EEOS External Audit ¶	Outline the proposed actions to take place to address the improvement action ¶	Outline the person responsible for completing the action ¶	When will it be completed ¶
b) ¶	¶	¶	¶	¶
c) ¶	¶	¶	¶	¶
d) ¶	¶	¶	¶	¶

2021 Obligated Party Good Practices

- 23 good practice observations made categorised as follows:

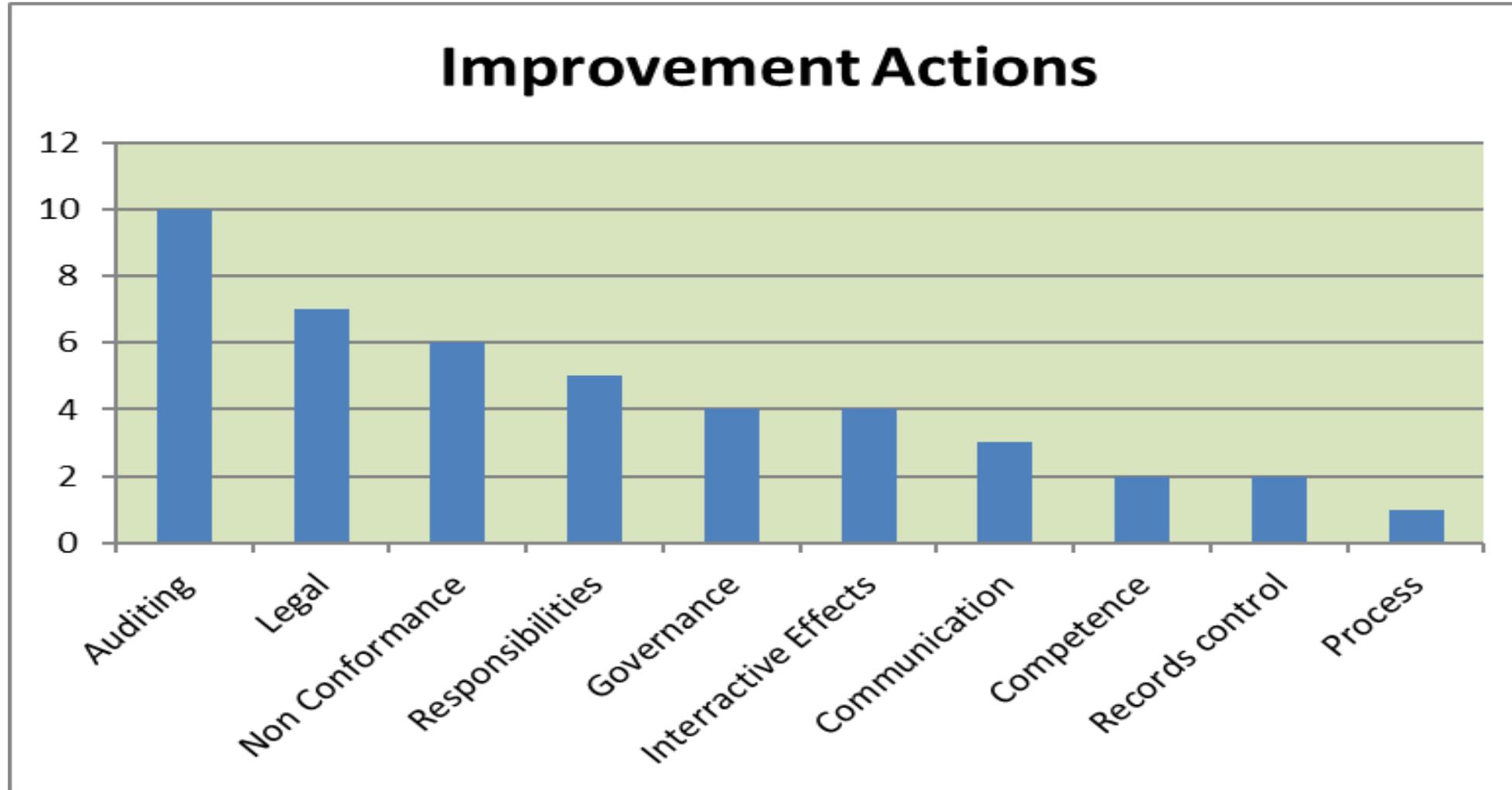


Obligated Party Good Practices

- ✓ There have been significant improvements made in the quality management systems since the audits in 2020 in the majority of cases.
- ✓ The management systems from seven obligated parties are being maintained and used to drive a consistent quality of credits.
- ✓ In the seven obligated parties, there are good processes in place for monitoring the various credit streams with numerous issues identified and corrected prior to being submitted to SEAI which illustrates that the internal QA processes are highlighting issues as opposed to the SEAI checks.
- ✓ There are three obligated parties with ISO:9001 in place which increases confidence in the quality of the credits being delivered through the scheme and one additional company planning ISO9001 certification by the end of the year.
- ✓ In general, resource allocation is quite good with the QMS demonstrating robust processes, through resource changes.
- ✓ There are some good practice processes emerging in the area of auditing and checking of credit streams through the monitoring of audit rates of various schemes. This should be supported and improved through the next scheme in order to improve credit stream partner audits and ensure that quality is embedded in all stakeholder works completed.
- ✓ There is a reliance on SEAI quality control of measures in both the grant supported measures and in the non-residential checks. The focus of the QMS should be on **the delivery of Quality Assured credits** to SEAI.

2021 Obligated Party Improvement Actions

- 44 improvement actions or recommendations observations made over the course of the audits



Obligated Party Improvement Actions

- One Obligated Party had had recurring major failure to the quality of the credits being submitted and are required to submit a remediation plan approved by their senior management team to SEAI.
- One Obligated Party was not been in a position to facilitate the QMS audit.
- The residential auditing process is primarily focused on the measures installed in the residential sector. A shift towards contractor HQ auditing with a focus on the checks carried out by the contractor is a recurring theme which will improve the function of the QMS.
- Development of robust QMS audit schedules has been recommended with sufficient detail on the audits taking place such as HQ audit of contractor A, B, C etc. Desktop audits of X% of measures, site inspections of X%.... This should be shared with SEAI during bilateral meetings.
- Some OP's were unable to complete site inspections during the Covid-19 restrictions. While this is understandable, other measures could have been put in place such as photographs, external checks, etc to mitigate quality risks.
- Alignment as much as possible, the site inspection, contractor checks etc. with the SEAI QADP checklist.
- There is a legal requirement to audit at least 20% of the measures through SI No.634 of 2016. Three Obligated Parties were not in a position to demonstrate compliance with this requirement during the audit. This is a fundamental element of the QMS and should be demonstrable through the governance structure of the QMS and associated evaluation of legal compliance.
- The legal compliance review should be more comprehensive than a statement that audit rates are >20% Statutory requirements.

Obligated Party Improvement Actions

- The Non-conformance log could be more robustly used to log issues that are identified internally prior to submission to SEAI in order to demonstrate the function of the QMS at identifying issues and ensure that all SEAI identified issues are also included in the log.
- Responsibilities throughout the scheme, with a specific focus on the quality checks being carried out by the installers should be reviewed to ensure that QA is both a top down and a bottom up approach.
- Obligated Party scheme governance is lacking with two obligated parties. Had sufficient senior management oversight been in place, systemic failure of the QA system would not have occurred.
- The interactive effects with other projects and credits which were previously claimed for, should be more comprehensively addressed in all M&V reports in order to ensure that each M&V practitioner considers interactive effects with other NREC's.
- There were five obligated parties where some of the 2020 improvement actions (some minor actions) had not been fully addressed.

Scheme Recommended Improvements

- Review and approve the Remediation Plans once submitted.
- Follow-up with the Obligated Parties within the 60 days to ensure that actions are adequately addressed
- Clearly outline the consequences of not completing audit actions adequately (consider reviewing the validity of the credits uploaded).
- Update the risk register to reflect the outcome of the 2021 QA audits.
- Confirm if Obligated Parties with externally certified management systems will be subjected to less frequent auditing.
- Organisations which have ISO50001 certification should be included in the risk assessment process for assessing claims.
- Desktop checks completed by SEAI should reject NREC submissions that do not have an adequate discussion in the report surrounding previous credits claimed for at that location, similarly if the site energy is not completed on an NREC, the application should be rejected.
- All of the guidance documents used in the scheme including the “Guidance on authenticating claims” should be simplified and updated.
- Publish the guidance document on what constitutes an audit in the context of SI:634 of 2016.
- SEAI should publish decisions related to M&V approaches as they are made to ensure consistency of approach across the sector and provide training to M&V practitioners on EEOS M&V requirements.
- Site inspections should be carried out prior to upload and OP should stand over the credits as opposed to awaiting SEAI approval.
- SEAI should consider moving away from individual inspections of measures in the residential and non-residential schemes and place more of a focus on the audits being conducted by the Obligated Party on their credit suppliers.

Summary

- Improving QMS in place in most cases (vast improvement over the 2014-2020 period).
- Good improvements made since 2020 for most OP's even through the pandemic.
- Two OP's are not using the QMS adequately (Legal compliance auditing closeout of actions).
- Good records control in place throughout (although photographs are inconsistently required).
- Some areas of the quality system need clarity (auditing, residential competency etc.)
- Some more work needed on M&V reports for non residential credits in area of interactive effects.
- Updates to documents outlining SEAI scheme rules and publish decisions made for fairness and quality improvements.
- Update the risk register and apply inspections and audits based on 2021 risks.

Questions?



The importance of a QMS

Quality Management Requirements for Obligated Parties

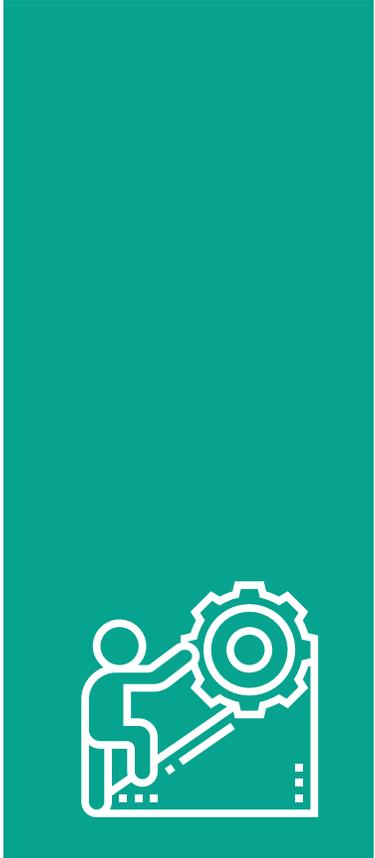
- Obligated Parties have a statutory requirement to have a “*quality assurance scheme that measures and verifies the cumulative energy savings achieved by an energy supplier or a particular class of energy supplier, or the activities of an agent acting on its behalf.*” (S.I. 634:2016)
- Obligated Parties have a statutory requirement to “*audit a statistically significant proportion of energy efficiency improvement measures undertaken to comply with an Energy Efficiency Notice*” (S.I. 634:2016)
- The expectation that an OP operates a properly functional QMS is one of the foundations underpinning SEAI’s own assurance responsibilities
- **SEAI will not be able to assure credits in 2021 submitted by OPs who have outstanding improvement actions or who are required to submit and fullfill a remediation plan arising from the 2021 Audit.**

Domestic Site Inspections - Summary

Seán O'Connor

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Site Inspection Process



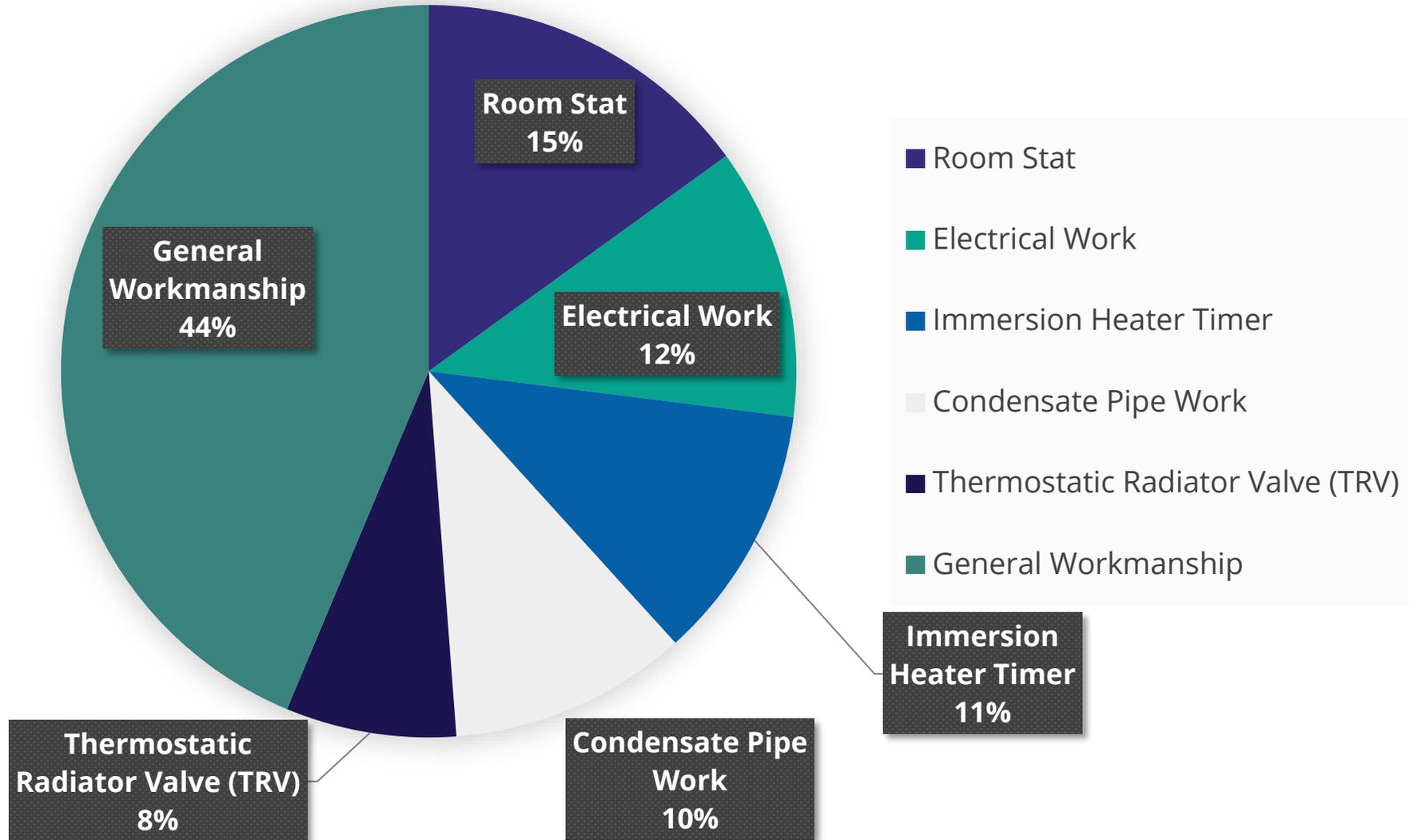
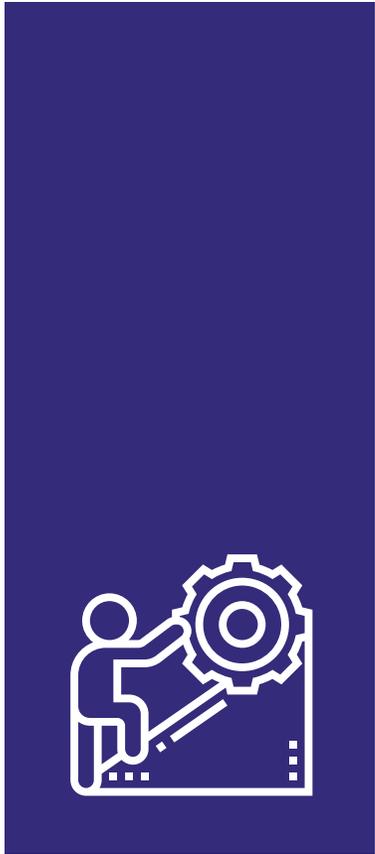
- Domestic site inspections are carried out As part of the EEOS schemes quality assurance activities
- This process involves a Quality Agent (QA) going on-site to ensure the measure has been installed to scheme standards.
- This assessment can result in the following outcomes:
 - Pass
 - Significant Non-Compliance (SNC)
 - Severity 1
 - Severity 2
 - Severity 3
 - No works

Overview of Severities issued

Boiler and/or Controls	61%
High Efficiency Gas Boiler with Fully integrated HC	
High Efficiency Oil Boiler with Fully integrated HC	
Entry Level Heating Controls Upgrade only with remote access	
Fully integrated Heating Controls Upgrade	
High Efficiency Gas Boiler with Entry Level Heating Controls	
Fabric	21%
Attic Insulation	
Internal Wall Insulation	
Windows	
External Wall Insulation	
Cavity wall insulation	
Heat	15%
Solid Fuel Stove	
Air to Water Heat Pump	
Solar (thermal)	
High heat retention cylinder	
Renewable Electricity	3%
Solar PV	

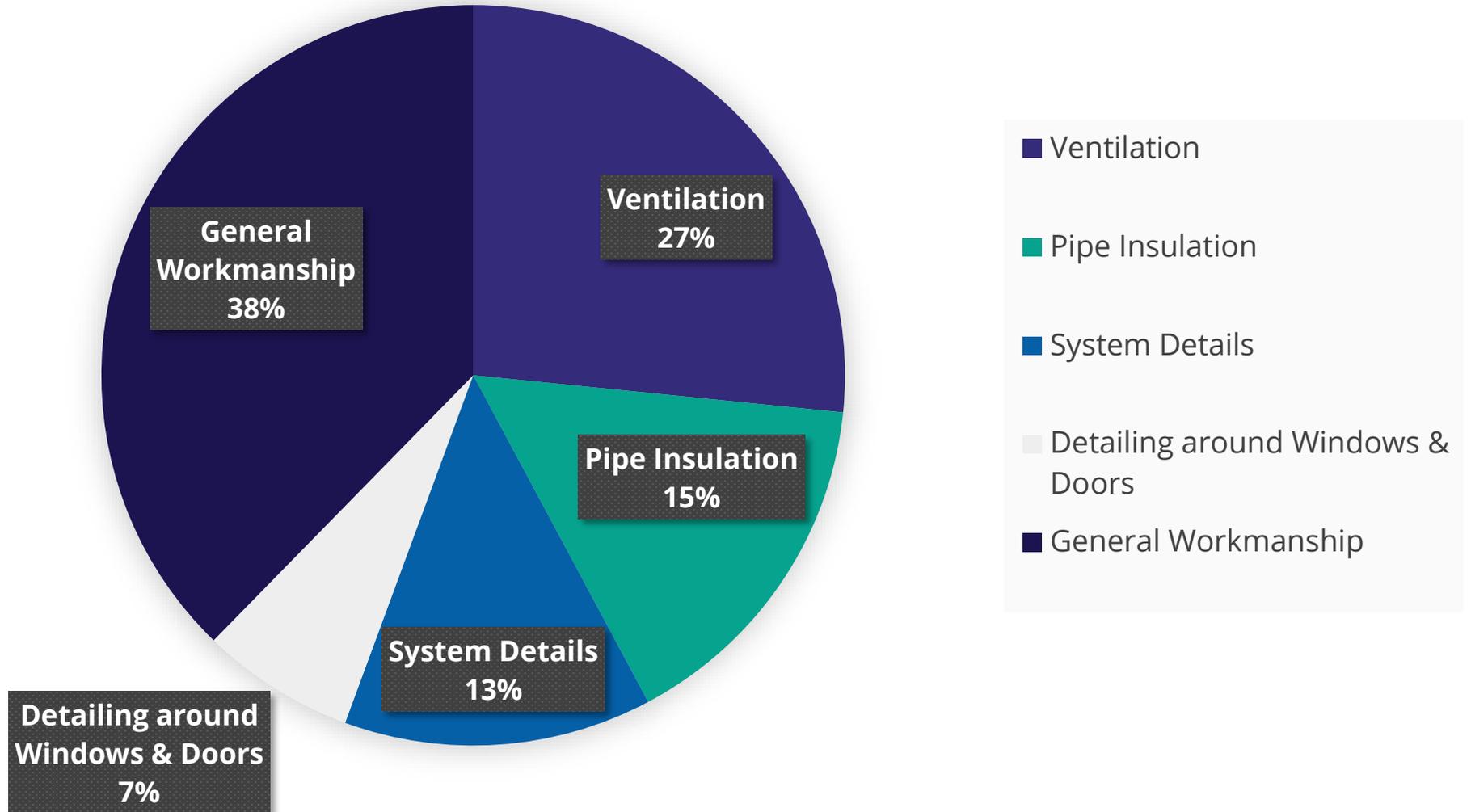
Boiler and/or control measures

- Accounted for 61% of all Sev's issued



Fabric measures

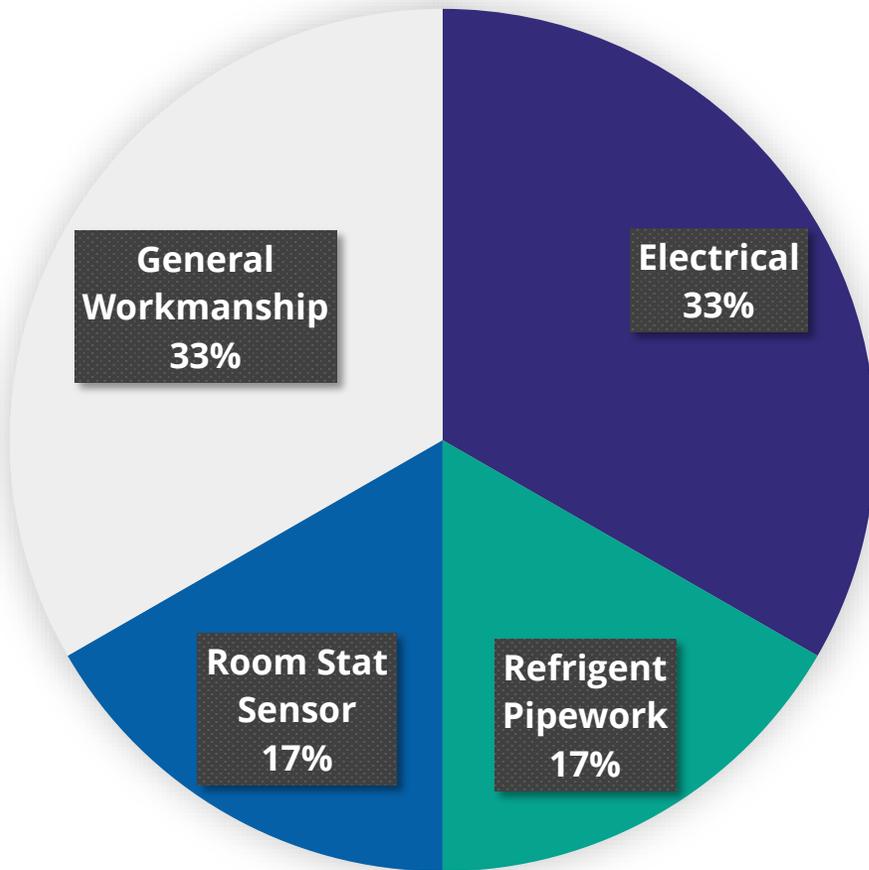
- Accounted for 21% of all Sev's issued



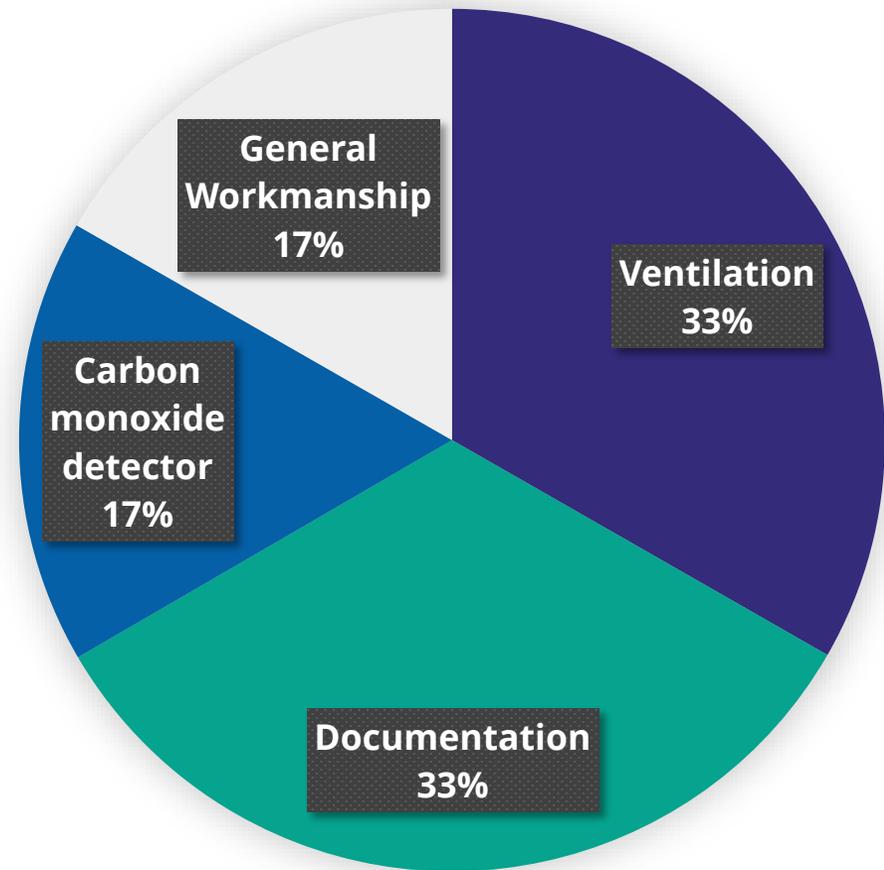
Heating measures

- Accounted for 15.5% of all Sev's issued

Air to Water Heat Pump



Solid Fuel Stove



Concluding Comments



Quality Auditing & Sampling – Best Practice Review

Maeve Morrissey



Obligated Party audits versus SEAI audits

- SEAI audits
 - Thematic review of OP Quality Management System (QMS)
 - Check QMS of individual obligated parties are in place and functioning
 - Not set up your Quality Assurance (QA) or do your Quality Control (QC)
 - does reality match processes outlined in the QMS
 - does QMS reflect requirements of EEOS Quality Framework
 - Weekly audit a portion of domestic and non-domestic units
- Obligated Party audits
 - OPs are required to have a QMS in place for EEOS as per S.I.131/2014, amended by S.I.634/2016
 - QMS is where OPs outline their QA & QC
 - QA & QC should be performed on the energy credits before being submitted to SEAI
- Results impact the risk associated with the quality of credits and can impact on the frequency of inspections

EEOS & OP audits

- SEAI weekly checks form part of the monitoring and verification of energy credits as required under the SI 634. These can be considered our quality control checks.
 - Quality control is checking that a product meets the quality requirements. Quality control could also be called a quality inspection.
- An audit is conducted as part of quality assurance and is process related
 - It prevents quality defects and leads to improvements.
- SEAI conduct audits on the processes of all OPs once a year (thematic reviews) to meet the SI.
- The monitoring and verification combined with the audits is how we can stand over the quality of the credits delivered to DECC & subsequently the EU.
- The same applies to the obligated parties:
 - Must perform quality control checks on their products (i.e. the energy savings) before submitting them to SEAI.
 - Must audit their suppliers to check the suppliers' processes are satisfactory.
 - Should be audited annually independently of the SEAI audit
 - some are due to their ISO accreditation.

Research into Audits

Article 7 of the EED 2018 states:

- *Member States shall put in place **measurement, control and verification systems** under which documented verification is carried out on at least a **statistically significant proportion and representative sample** of the energy efficiency improvement measures put in place by the obligated parties. The measurement, control and verification shall be carried out independently of the obligated parties.*

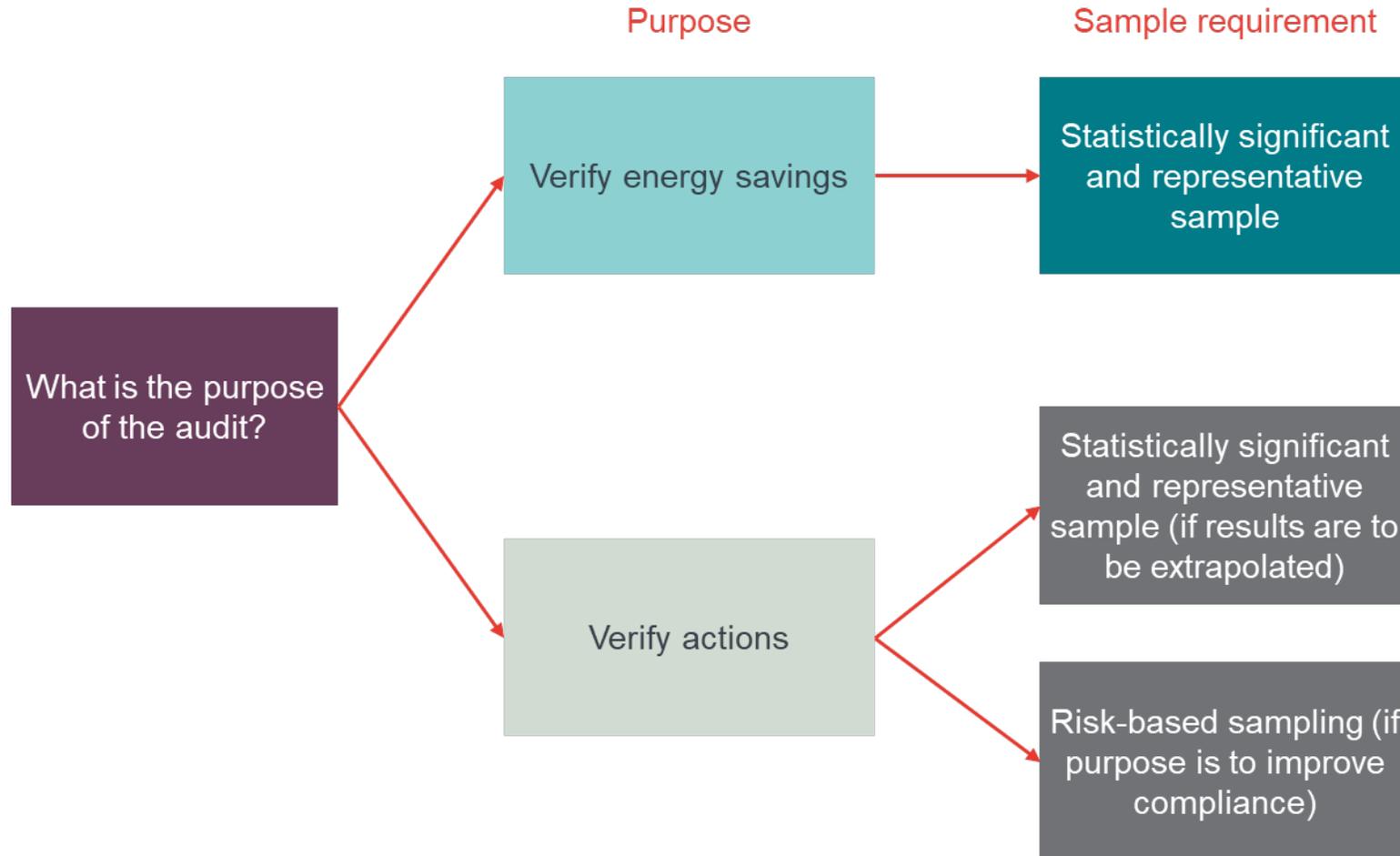
Frontier Economics

- Research into audits to ensure compliance with Article 7 of EED 2018
 - How should the audit be defined?
 - What does a statistically significant and representative sample need to consider?
- Reviewing EU guidance, actions by other member states and international best practice
- OPs should complete their own audits, before submitting credits to SEAI, while this research is ongoing

Frontier Economics: What is an audit?

- Audit definition:
 - audit purpose
 - sampling requirements
- To align with the Directive the audit must monitor and verify that:
 - **energy savings** are correctly calculated in a manner that allows the results to be extrapolated across the whole scheme
 - **actions** are undertaken in line with quality and other standards, with the aim of improving compliance and protecting consumers
- Two types of sampling required

Types of audit sampling



Sample Size & Frequency of Audits

- For a smaller sample size, a larger proportion of the underlying population needs to be sampled for the results to be statistically representative
 - Less than 20 units – 100% should be surveyed
 - 200-1000 units – a sample of 10% should be appropriate
 - Over 1000 units – a sample of ~100 should be appropriate
- An increase in the population size will reduce the total number of units to be sampled in order to reach a specific significance level.
- An increase in the time interval between selections could reduce the number of units audited while retaining a statistically representative sample.

Sample Size & Frequency of Audits

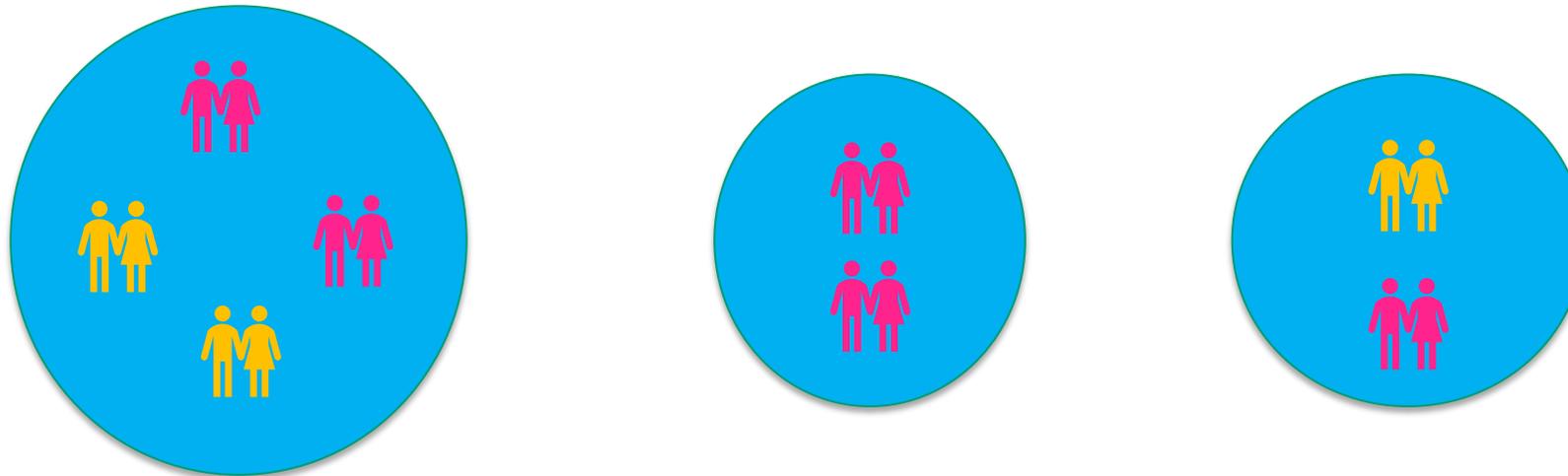
Time Scale	Population size (units)	Estimated sample size in period (units)	Estimated total units sampled per year
Weekly	20	20	1,040
Monthly	86	20	240
Quarterly	260	26	104
Bi-annually	520	52	104
Yearly	1,040	100	100

Recommended EEOS audit definition

- Dual purpose audit to:
 - Monitor & verify energy savings are correctly calculated
 - Monitor & verify actions are undertaken in line with quality & other standards
- Expand the use of audit results
- Improve the representativeness of samples by:
 - Ensuring sample size is sufficiently large
 - Changing the methodology for NRECs from a risk based to statistically significant and representative sample

What is a 'statistically significant & representative sample'?

- Large enough that the estimates produced from sampling are expected to be close to the underlying population being measured
 - e.g. the sample average is expected to be close to the population average
- Characteristics in the sample accurately reflect the different characteristics found in the underlying population.



What is a 'statistically significant & representative sample'?

Need to consider:

- Estimators:
 - An estimator is an estimate of the population sample
 - A sample of statistically significant size is more likely to result in an estimator that comes close to the true population estimator
 - Non-statistically significant samples are less likely to reflect the underlying population
 - Result in estimators that are not sufficiently robust.
- Accuracy
 - The closeness of the sample-based estimator to the true population value.
 - An estimate that is accurate at the 1% level means: if we sample the same population a very large number of times and estimate our desired parameter each time we took a sample, the resulting estimates are expected to lie no more than 1% away from the true population parameter.
- Confidence level
 - The confidence level of an estimator indicates how confident we are that the same result would be reproduced in repeated sampling.

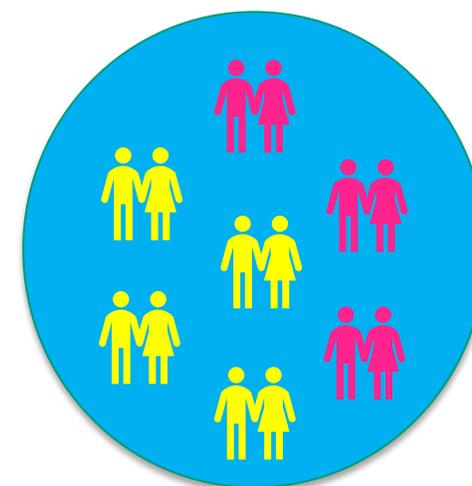
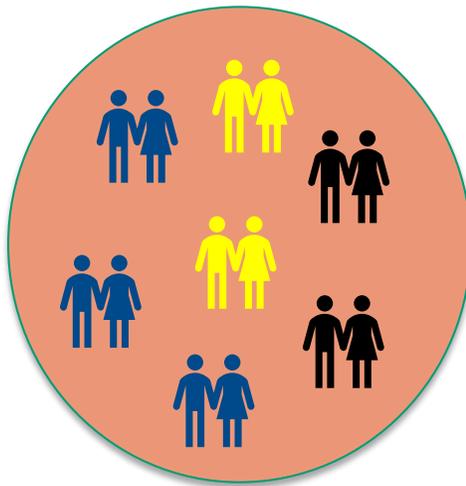
What is a 'statistically significant & representative sample'?

Also need to consider:

- Variability
 - Variability refers to a lack of consistency or a spread of data
 - Accuracy is inversely related to variability.
 - The more variable the population, the larger the sample size required to be representative
- Variance
 - Variance is the measure of variability
 - It tells you the degree of spread in the data set
 - It's directly related to the variability of the sample and the underlying population
 - Provides information on the spread of estimates that would be obtained through repeated sampling of the underlying population
 - Used to assess whether the sampled populations differ from one another

Variability & Variance

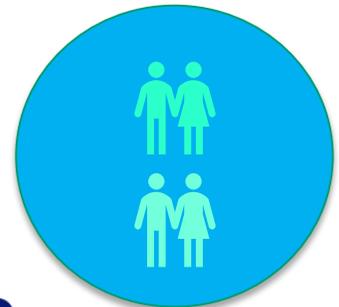
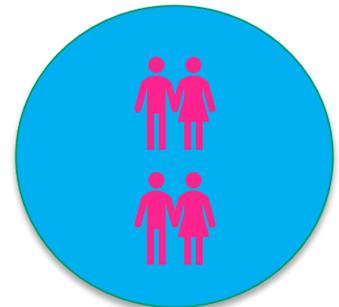
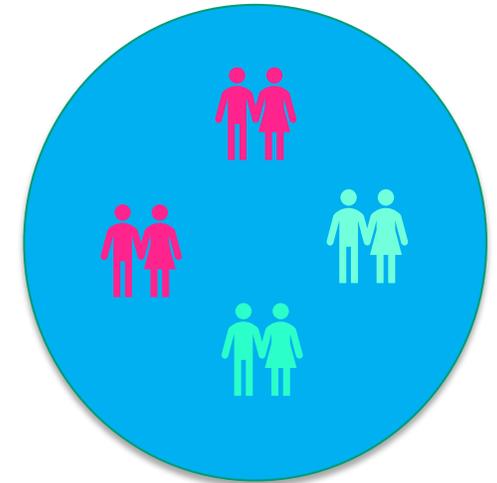
- For example in a clinical trial you test the impact different treatments have.
- Each treatment option is trialled on a sample of patients – Placebo, P (1 dose), P (2 doses).



- The patients in each group will have different results – this is the variability.
- The variance is then the amount that they differ.
- To check if the results of the trials are due to the different treatment options or the individuals in the trial you should check the variance.
- If the variance between the groups is higher than the variance within the groups then the results are likely due to the different treatments not the individuals being treated.

Accuracy & confidence level

- As per the Directive, audit results should be extrapolated
- Statistical Significance need high levels of accuracy & confidence levels
 - 1% or 5% accuracy
 - 95% confidence level
 - Need to manage variability
- Variability can be managed by creating strata
 - Heterogenous strata i.e. the strata should be different from each other
 - Obligated party, sector etc.
 - Homogenous samples i.e. the strata characteristics should be similar
 - Each stratum is treated as a separate population from which a random sample is chosen
- Sampling by strata:
 - Help ensure all segments of the underlying population are represented
 - Smaller sample size needed for representative sample
 - Increase accuracy and reduce variance



Strata & risk

- Strata allow for more careful investigation of higher risk parts of the population
 - could be based on an OP's historical accuracy of claims and/or compliance
 - could potentially be triggered if the accuracy of claims and/or compliance falls below a pre-determined threshold
- Strata allow us to oversample certain populations to any desired extent.
- Sub-populations that have **greater variability** or that are of a **particular concern** may be **sampled more frequently**, without the need to oversample other parts of the population.

Next Steps

- Identifying potential strata
- Testing the variance within strata
- Testing the variance across the population

- Then estimate the required sample size for a statistically significant sample considering:
 - The different populations and estimators (e.g. energy savings) to be measured
 - Appropriate strata to enable improved accuracy for a given level of sampling
 - Different options for levels of accuracy

- OPs should still complete their own audits before submitting credits to SEAI



Thank you.

Any questions?

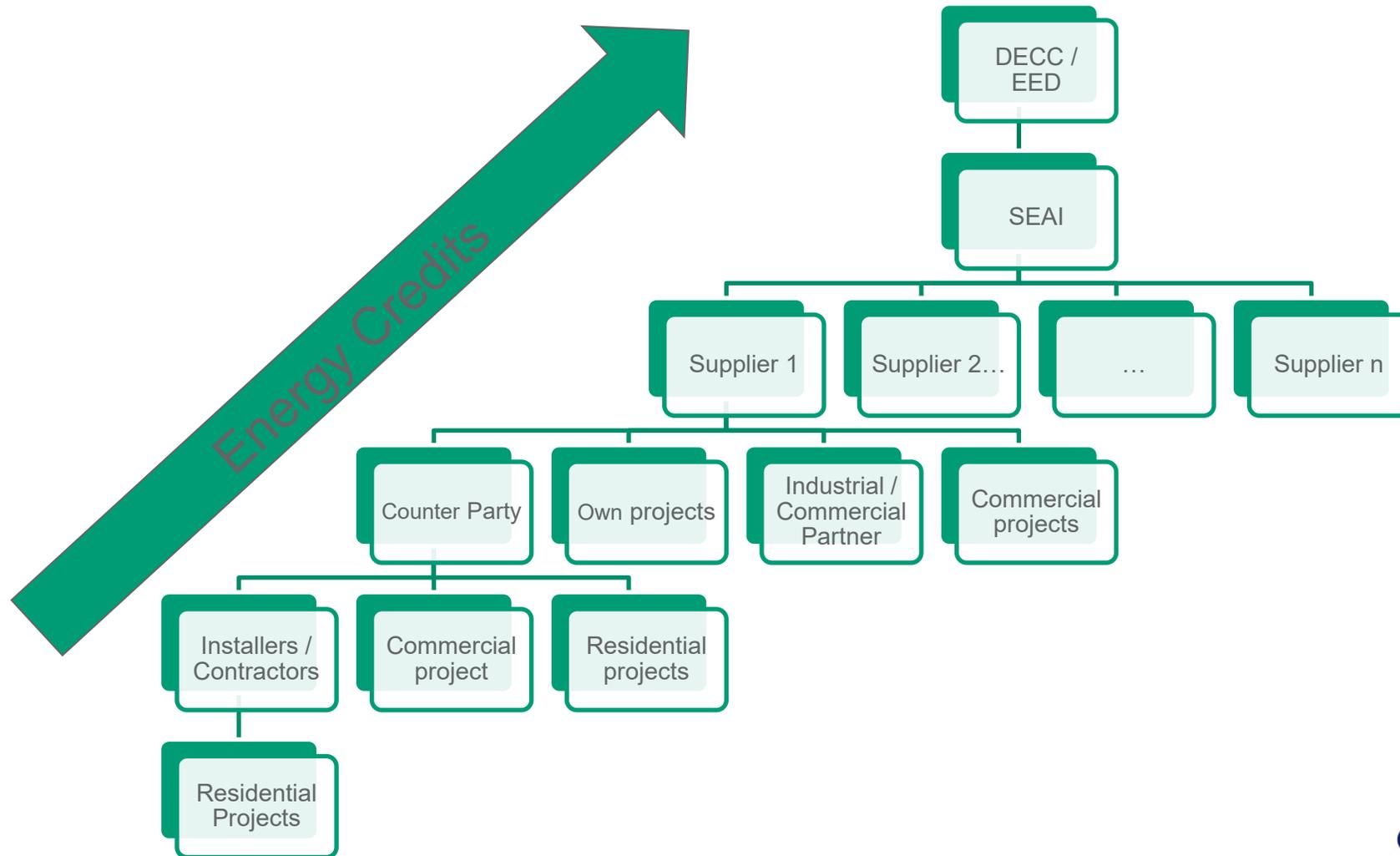


EEOS Quality Control

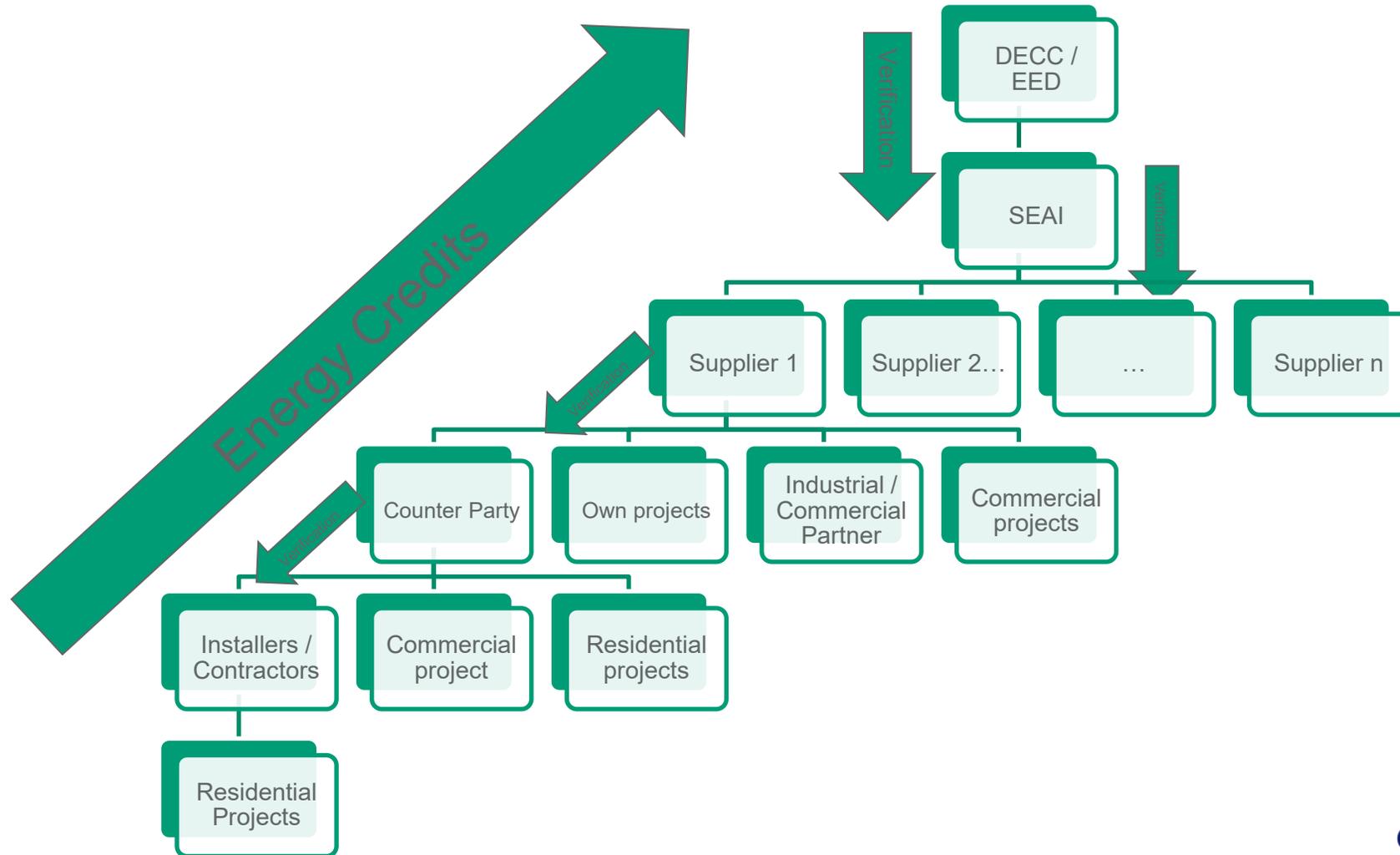
EEOS and Quality Management - Recap

- Treat supply of Energy Credits as a product
- Obligated Parties are a supplier of this product to SEAI
- In turn an OP's contractors, partners, own projects etc. are suppliers of energy credits to the OP
- Quality management schemes (e.g. ISO 9001) provide a template for ensuring robustness of the processes involved in product delivery

EEOS simplified overview



EEOS simplified overview



2021 Operation

QMS - 2021 SEAI Approach

- Move away from evaluation role towards audit and assurance

EED Art 7a(5)

- Member States shall put in place measurement, control and verification systems under which documented verification is carried out on at least a statistically significant proportion and representative sample of the energy efficiency improvement measures put in place by the obligated parties. The measurement, control and verification shall be carried out independently of the obligated parties.

QMS - 2021 SEAI Approach

- Move away from evaluation role towards audit and assurance

EED Art 7a(5)

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QMS - 2021 SEAI Approach

- Verification of both actions (energy efficiency improvements) and energy savings (arising from the actions).

EED Art 7 Annex - Appendix XII(1)

- Actions are verified to ensure that they were installed or implemented in compliance with quality, performance or other requirements under the policy measure.
- Reported energy savings are verified to ensure that they comply with the calculation rules or methodology of the policy measure.

	Implementing public authorities (SEAI)	Participating or entrusted parties / contractors / obligated parties
Actions or projects to be approved / rejected	<p>Aim: ensuring quality of actions and projects (compliance with predefined requirements)</p> <p>+ providing key data for policy management and evaluation</p>	
	<p>Roles:</p> <ol style="list-style-type: none"> 1. establishing requirements and reporting/documentation rules; 2. approving/rejecting submitted actions or projects; 3. carrying out or commissioning <i>ex post</i> verifications (documentation and/or on-site) and imposing penalties/sanctions 	

	Implementing public authorities (SEAI)	Participating or entrusted parties / contractors / obligated parties
Actions or projects to be approved / rejected	<p>Aim: ensuring quality of actions and projects (compliance with predefined requirements)</p> <p>+ providing key data for policy management and evaluation</p>	<p>Aim: ensuring that actions/projects will qualify for the scheme (e.g. to secure a financial incentive or energy savings credits)</p> <p>+ ensuring customer satisfaction (for contractors or obligated parties) or energy savings (for end-users)</p>
	<p>Roles:</p> <ol style="list-style-type: none"> 1. establishing requirements and reporting/documentation rules; 2. approving/rejecting submitted actions or projects; 3. carrying out or commissioning <i>ex post</i> verifications (documentation and/or on-site) and imposing penalties/sanctions 	<p>Roles:</p> <ol style="list-style-type: none"> 1. submitting information required by the public authorities; 2. storing documentation needed for <i>ex post</i> verification; 3. implementing quality processes

	Implementing public authorities	Participating or entrusted parties / contractors / obligated parties
Energy savings to be accounted for (or credited) / cancelled	<p>Aim: ensuring quality of energy savings evaluation and reporting (compliance with predefined calculation rules and/or evaluation requirements), so that the monitored energy savings reflect policy impacts in line with the policy objectives and EED requirements</p> <p>+ providing key data for policy management and evaluation</p>	
	<p>Roles:</p> <ol style="list-style-type: none"> 1. establishing calculation rules and/or evaluation requirements; 2. approving/rejecting reported energy savings (or calculating energy savings, depending on the type of policy measures and its rules); 3. carrying out <i>ex post</i> verifications (documentation and/or on-site) and imposing penalties/sanctions 	

	Implementing public authorities	Participating or entrusted parties / contractors / obligated parties
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QMS Process - General Outline (1)

- SEAI focus on measurement, control and verification
- SEAI Audits should be seen as a commentary on the effectiveness of an OP's process and not be relied on as part of their process

Before uploading savings to SEAI (NREC or ECMS):

- All materiality requirements to have been met (e.g., client fully recompensed, all supports provided, documentary evidence collected, etc)
- OP to have full quality assurance in place and must be able to stand over all information provided to SEAI.
- OP quality control to include document review, evaluations of calculations, site inspections, and independent assurance.

future
workshops
on these
items

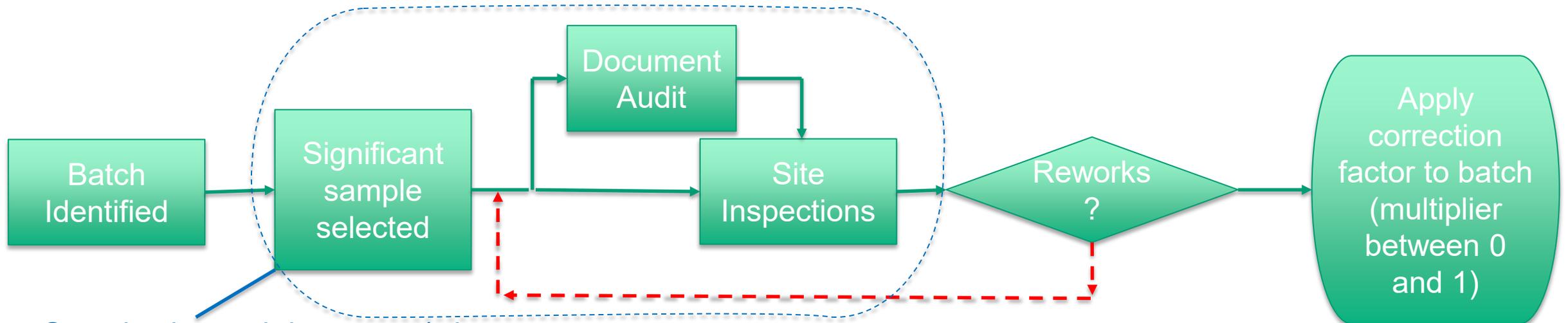
QMS Process - General Outline (2)

- SEAI will audit batches of savings.
(e.g. for domestic savings, batch size will be related to the number of actions submitted, for non-residential it will be a combination of the number of projects and total of kWh uploaded).
- A significant sample will be selected from the batch.
- This will be seen as representative of the whole batch.
- A combination of desktop (document based) and physical (site inspections) will be carried out on the selected sample.

future
workshops on
these items –
definition of
“batch”, batch
size, sample
size,

QMS Process - General Outline (3)

- If non-conformances are found, the impact of these on energy savings of the sample will be assessed.
- If corrective actions are not carried out (i.e. reworks) and verified for the whole batch, then a discount will be applied to the entire batch.
- The “risk” level of the OP will be adjusted and will influence future audits.



Sample size and document / site audit ratio influenced by OP Risk

2021 QMS – Next steps

Workshops to be scheduled on:

- QMS audit requirements (SEAI to OPs, and OPS to their supply chain)
 - Independent assurance vs day to day quality control
 - Determining batch and sample sizes
- SEAI assurance process
- Establishing inspection requirements and non-conformity (failure) classifications
- Establishing consequences of unsuccessful audits.
- Establishing requirements and rules for reporting/documentation and calculation and/or evaluation requirements

Next workshop on Additionality and Materiality – 01 September

Questions & AOB



Thank you

