Best Practice Recommendation

For

Inspections of Production Devices and their certified EECS Production

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INDEX

1. Scope 3
2. Definitions 3
3. General instructions for inspections of Production Devices, Fuel Consumption and Production Declarations 3
3.1 The outcome of an inspection 3
3.2 Who should perform the inspection? 4
3.3 When should an inspection be performed? 5
3.4 Actions related to performing an Inspection 5
4. Sections in the Production Device Inspection Report 5
4.1 Title + Identification of the inspector 5
4.2 Introduction and scope 6
4.3 Description of the Production Device 6
4.4 Electricity measurement scheme and Energy flow diagram 6
4.5 Validation of Measurement equipment 7
4.6 Comments 8
4.7 Conclusion 8
4.8 Annexes 9
5. Inspections of Production Declarations and Consumption Declarations 9
6. Additions for Inspections of Production Devices that produce Cogenerated Heat and Power 9

1. Scope

This documents sets out a Best Practice Recommendation for Inspections of Production Devices and their certified Production under the EECS Standard. Such Inspections guarantee the quality of the measurement system and calculation of the amount of EECS certificates to be issued.

2. Definitions

All definitions provided in the EECS Rules apply in this document. In addition, following definitions are used for pragmatic reasons:

Application ..... the document that contains the relevant data for registration of a Production Device as mentioned in the EECS Rules section D4 and that serves as application to register the Production Device for the purposes of an EECS Product, with the aim to apply for EECS Certificates;

Inspection ..... onsite verification, at the site of the Production Device, of standing data relevant for the issuing of a correctly calculated amount of EECS certificates;

Inspection Report ..... the report reflecting the observations and conclusions of an Inspection;

Measurement Scheme ... Single-line diagram that sets out the electrical configuration and marks the positions of the production device and of all the meters for registering gross and net electricity production, electricity consumption, both of auxiliaries of the Production Device as other onsite consumption, grid injection, grid consumption, instrument transformers, …;

PD: ..... Production Device, as defined in the EECS Rules.

3. General instructions for inspections of Production Devices, Fuel Consumption and Production Declarations

3.1 The outcome of an inspection

An Inspection of a Production Device, Fuel production, Fuel consumption or a Production Declaration should result in an Inspection Report that allows the Production Registrar to assess the quality of the information in the Application for issuing EECS certificates. It also serves as a record for any future questions that may rise regarding the onsite situation of the Production Device and as a starting points for a future inspection. The below section “Sections in the Inspection Report” contains the required information such an Inspection Report should provide.

Mitigations

The requirement of an Inspection Report is specifically relevant in the cases where the Inspection is performed by another party than the Production Registrar. For those cases where the Production Registrar has a registration system in use where the key items of the Inspection are registered, this registration system could be assumed to hold the same value as an Inspection Report.

For technologies where the issuing of EECS certificates is not dependent of the type of fuel input (wind, solar, hydro, geothermal, wave & tidal power): When the Measurement Scheme and the meter equipment on which basis the amount of certificates is calculated, only involve meters owned and read by the grid operator, from which measuring quality the grid operator takes responsibility, the information registered after onsite visits in the follow up system of the grid operator regarding these meters, could be assumed to hold the same value as an Inspection Report.

Also for the cases in the above two paragraphs, the below chapter 4 “Sections in the Production Device Inspection Report”, can be considered a guidance on the items to be covered by an Inspection.

3.2 Who should perform the inspection?

Inspections should be conducted and the Inspection Report should be signed by a neutral organisation or person, accredited under national regulations, that has no benefit whatsoever on influencing the data in the Inspection Report. This should be an independent, impartial and objective party that does not take part in the Ownership of the Production Device in any way.

This can be, for example:

- The Production Registrar;
- An organization accredited under the ISO/IEC 17020 standard: “Conformity assessment -- Requirements for the operation of various types of bodies performing inspection”. The accreditation should be delivered by an organization that takes part in the Multi-Lateral Agreement of the European co-operation for Accreditation (http://www.european-accreditation.org/the-mla). The inspection body should be of Independence Type A, namely the Third Party principle, according to chapter 5.2 and annex A of the international Standard ISO/IEC 17020:2012. Inspection bodies accredited according to ISO/IEC 17020: 2004 who are in transition to ISO/IEC 17020:2012, also qualify. The need for an inspection in the scope of EECS certification, is not fulfilled by an inspection with the sole scope of electrical safety certification.
- Environmental verifiers accredited according to Regulation (EC) No 1221/2009 of 25 November 2009 on the voluntary participation by organisations in a Community eco-management(EMAS);
- The legally appointed grid operator, for as long as he is a neutral party not benefiting in any sense on the amount of certificates to be issued, and or as much as he takes responsibility in the correct placement, registration and accuracy of the metering. Especially for Production Devices where the net amount of RES-E is measured, and where no auxiliaries consume electricity and no fuel input measurements intervene in the calculation of EECS certificates, the grid operator can be allowed to make the necessary certifications needed for the inspection.

The individual person performing the inspection needs all the necessary competence to perform verifications in the specific fields. He at least needs competences, knowledge and understanding:

- of the technical aspects of the production of electricity (regarding the evaluation of electrical one-line diagrams, measurement systems, physical energy flows and their reflection on diagrams),
- of legislative, regulatory and administrative requirements relevant in the specific domain,
- in issues of production of electricity by using renewable energy (e.g. the renewable energy content of waste, when auditing a PD with an Input from waste),
- of the general functioning of the activity of producing electricity from renewable energy (e.g. to decide whether the documentation of the plant operator is in line with the specific requirements for the field of activity).

It could be a bachelor in electrical engineering, electricity, electro-technics, electro-mechanics, with some years of experience in process industry, energy flow follow up … However this description is not limited and the experience and personal profile of the inspector could be convincing to perform the required tasks.

The Inspection Body should ensure that the organisation and its staff is free of any commercial, financial or other pressures which might influence their judgment or endanger trust in their independence of judgment and integrity in relation to their inspection activities.

3.3 When should an inspection be performed?

An Inspection should be performed:

1. At the first registration of the Production Device;
2. At the time of re-registration of the Production Device (when applicable for this category of Production Devices);
3. Whenever changes occur that have influence to the amount of certificates to be issued for the PD Output. These changes involve:
    a. Changes that might result in no longer meeting the Qualification Criteria;
    b. Changes that have influence on the amount of certificates to be issued for the PD Output:
        i. Changes to the meters or the measurement scheme;
        ii. Changes in capacity of the PD;
        iii. Changes in basic components of the PD;
        iv. Replacing meters (if not under the control of the Grid Operator independent of the PD owner);
        v. Changes in the Energy Input to the PD.
4. When the findings of a previous Inspection result in the need for checking data that needed to be fixed by a deadline set at the previous Inspection;
5. At suspicion of fraud or when the Issuing body receives a complaint that questions the amount of certificates issued, the quality of the Production Device, the measurement scheme, the fuel inputs, …

3.4 Actions related to performing an Inspection

The Inspection should involve a.o. examination of documentation, an on-site visit of the Production Device, arranging safety allowances to reach all meters involved, interviews with personnel, preparation of the Inspection Report.

4. Sections in the Production Device Inspection Report

The Inspection Report consist of at least the following sections:

1. Title + Identification of the Inspector
2. Introduction and scope
3. Description of the Production Device
4. Measurement scheme + energy flow diagram
5. Validation of measurement equipment related to the Production Device
6. Comments
7. Conclusion
8. Annexes

To the extent the sections 3, 4 and 5 are already part of the Application, the Inspector can leave out this information from his Inspection Report on condition that he puts his stamp and signature on every relevant page of the Application and confirms in the Inspection Report the accuracy of this data in the Application.

4.1 Title + Identification of the inspector

The identification of the inspector comprises:

- the name and contact data of the individual that performs the inspection;
- the name and contact data of the company that performs the inspection;

- a reference to the standard under which the company is accredited to perform such inspection.

4.2 Introduction and scope

The introduction of the Inspection Report mentions:

- the address and contact details of the Production Device and its owner;
- geographical coordinates of the Production Device;
- date of the onsite visit;
- the unique identification of the Inspection Report;
- subject of the inspection;
- the scope of the inspection.

4.3 Description of the Production Device

All technical characteristics of the Production Device are described, including at least:

- Description of all Energy Input and Output flows of the Production Device;
- (if applicable) Confirmation that the Production Device produces electricity from Renewable Resources;
- Confirmation of the detailed Fuel type of all the Input flows of the Production Device(according to EECS Fact Sheet "Types of Energy Inputs and Technologies");
- Confirmation of the Technology type (according to EECS Fact Sheet "Types of Energy Inputs and Technologies");
- Nominal Capacity of the Production Device;
- Commissioning date of the Production Device;
- The name commonly used to identify the Production Device, as is (to be) used on the EECS certificates (to be)issued for this PD;
- If applicable: changes to the Production Device or the measurement equipment that have occurred since the previous Inspection;
- Confirmation that the Production Device is operational on the date of the inspection. With "operational" is meant that the system can be operated in normal operation, and it is not "under construction". Whether or not the power plant is in operation of on the day of the inspection is not a condition for a positive advice by the inspection report.
- Description of all substantial components of the production. This description contains at least the engine or turbine, generator, transformer of the Production Device, the transformer of the auxiliaries, incinerator, boiler …. The inspection report mentions for each component at least the following information, if applicable:
- Brand;
- Type;
- Serial number;
- Capacity;
- Construction year, as shown on the device.
- Modifications to the Production Device compared to the previous Inspection.
- The construction year of the Production Device should be compared with the PD commissioning date reported in the Application and this commissioning date should be checked for plausibility;

4.4 Electricity measurement scheme and Energy flow diagram

The electricity measurement scheme as provided to the Production Registrar is validated and checked on correctness. This scheme is to be supplied in the shape of a single-line diagram and displays the positions of: power generator(s), auxiliaries of all types, measurement equipment, instrument transformers, power transformers, grid connection, onsite electricity consumption, etc.

For thermal plants, an energy flow diagram needs to be included in the inspection report. Alternatively, the energy flow scheme as provided to the Production Registrar is validated and checked on correctness. The energy flow diagram indicates all inputs and outputs of the Production Device in terms of fuel and energy in whatever state.

The inspector validates the formula for the calculation of the net Output for which EECS Certificates are to be issued, based on both the electricity measurement scheme and the energy flow diagram (when the latter is applicable). Therefore he confirms whether all meters are correctly located to measure the net/gross electricity/auxiliaries/…, whether meter numbers on the provided diagram are compliant with the information supplied to the Issuing Body, energy consumption for auxiliaries and fuel pre-treatment is correctly measured and integrated in the calculation formula.

In determining the net amount of electricity from renewable resources, the inspector keeps in mind the attention points per technology:

- **Hydropower**: Pumped storage units: The inspector checks whether the formula for calculating the amount of EECS certificates refers to the net amount of electricity coming from natural feeds;
- **Biogas & biomass**: the auxiliaries for fuel pre-treatment and the non-renewable fuel input should be deducted from gross electricity production;
- **Energy production from waste/mixed fuel input**: validation of the methodology for determination of the organic part of the waste/fuel input that qualifies for EECS certificates for RES-E;
- National regulations on the definition of net RES-E apply.

4.5 Validation of Measurement equipment

The inspection report contains a list with all meters involved in the calculation of the net amount of energy that qualifies for EECS certificates. It contains at least a description of the following properties of every meter:

- the measured quantity and reference to the name of the meter on the measurement scheme (for example, gross electricity production (kWh), auxiliary consumption of cooling circuit (kWh), electricity consumption of pumping (kWh), natural gas consumption for biomass preheating (Nm^3/h), wood pellets input (kg/h), lower calorific value determination (MJ/kg) , …);
- measuring unit (for example m^3, kWh, kg,%, T, ...);
- brand;
- type;
- serial number;
- precision or accuracy class;
- confirmation of existence of an official calibration certificate no older than 5 years, that contains
    - serial number of the measurement instrument;
    - date of calibration: reference to that date as shown on the calibration certificate (not necessarily the same as the date of the calibration certificate was issued);
    - signature of the individual responsible for the calibration;
    - results of the calibration or confirmation of conformity of test results with the applicable standard or procedure;
- Mitigations:
    - In case the transmission grid operator or the distribution grid operator of the grid in which the Production Device injects its electricity Output, reviews the quality of the measurement equipment, the report of such review can be accepted instead of an official calibration certificate.
    - For electricity meters measuring a production or consumption that never exceeds 10kVA, and for temperature meters, the need for an individual calibration certificate can be replaced by the existence of a certificate of conformity of the meter type with the Measurement Instruments Directive (2004/22/EC)
    - Current and voltage transformers: the age of the allowed calibration certificate is not limited [1]

[1] **Instrument transformers:**

- seal: an indication of whether, and by whom the measuring device is sealed (operator or inspection body), including the date of the seal, if available; meter reading: the index of the measurement device on the date of inspection, indicating the multiplier (where applicable). A comma is used to indicate decimals;
- confirmation of correct programming: in the case of electronic registration of measurements in a central monitoring software system, the inspector revises the programming of the measurement and confirms its proper functioning in the inspection report. This applies for additional measurement equipment needed to calculate the net Output for which EECS Certificates are to be issued, for example, operating hours, recording of open position of flue gas valve, calculation of useful heat based on flow and temperature measurements in a central system, … ;
- the standards and regulations the measurement device complies with (if applicable).

Reference to meter in measurement scheme	Reference Measured quantity	Measuring unit	Meter brand	Meter Type	Serial number	Accuracy class	Date of calibration	Sealed by [name party] + date of seal	Meter reading on inspection date	Other	Reference to standards and regulations the measurement device complies with

4.6 Comments

The inspector lists his comments on the correctness of the data in the Application, the reliability of the measurement equipment, the validity of the calculation formula to determine the amount of certificates to be issued, and potential other relevant observations.

4.7 Conclusion

As a conclusion the inspection report confirms the correctness of all the data that has been provided to the Production Registrar in the process of the application for EECS certificates. The

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Electrical Measurements for larger capacities are usually equipped with current and / or voltage transformers (CT and VT). These are static elements that have a great influence on the measurement result, but which do not loose quality over time. The failure of an instrument transformer is easy to detect. For this reason the quality of the instrument transformers is considered very important, but their recalibration is not considered necessary. Therefore calibration certificates for instrument transformers are to be submitted, but the date of the calibration may be more than five years in the past. Given the specific test procedure, these calibration certificates do not need to be signed.

data that hasn't yet earlier been provided to the Production Registrar and validated by the inspection body, will be provided in or attached to the Inspection Report.

The signature of the responsible individual of the inspection body is a crucial element to complete the Inspection Report. By signing the Inspection Report the inspection body takes the responsibility for the correctness of the content of the report.

4.8 Annexes

Calibration certificates of the measurement equipment are attached to the Inspection Report.

5. Inspections of Production Declarations and Consumption Declarations

In case of the existence of a valid Inspection Report as set out in section 7, where the validity of the measurement scheme can be taken for granted, for an inspection of Production Declarations and Consumption Declarations, the inspector confirms the correctness of the monitoring system that registers measurement values relevant for the calculation of the amount of EECS certificates to be issued. This includes:

- Compare generation capacity with the issued number of certificates and other relevant data (e.g. wind speeds, annual solar hours, input registries of fuel/waste/biomass/… ,) to identify potential abnormalities;
- Check the full overview of input flows over the period of time to be checked;
- Check the amount of PD operating hours reported fits the data registered onsite;
- Weighing notes: check the correct functioning of the weighing machine:
    - Is a calibration certificate available, less than 5 years old?
    - Are the weighing principles of this weighing machine applied correctly?
    - Is the right quantity measured? For example, net input in the Production Device: if measured by weighing a truck containing biomass input before and after delivery (net weight = gross weight – tare weight) , check if no other flows of this biomass are taking place onsite then the amount of biomass input to the Production Device. Or verify the correctness of the registration method if the latter would be the case.
- Check the registration system: are all net input flows registered correctly?
- Check the calculation system: are the measured values correctly transposed into the calculation formula of the amount of EECS certificates to be issued?
- Waste – analysis of proportion of organic material in the waste (in terms of energy content, based on the lower calorific value of the waste components): validation of methodology.
    - when available and applicable: national analysis data can be used. In that case, the inspector checks whether these national analysis data are indeed applicable on the fuel type used in the Production Device.
- Laboratory analysis of fuel input (determination of Lower Calorific Value, proportions …): validation of the frequency of the analysis, judgment whether the sample is representative for the sampled matter, validation of the analysing method.

6. Additions for Inspections of Production Devices that produce Cogenerated Heat and Power

For inspections of Production Devices who receive GOs for High Efficient Cogeneration, the inspector additionally confirms:

- The heat production does not exceed the useful heat demand, nor on annual basis, nor in business continuity;

- The heat is transported in the most efficient manner to the location of useful heat consumption (heat pipes and buffers are perfectly insulated);
- Further information regarding useful heat consumption:
    - type of useful heat consumption (specify heat applications);
    - Measurement of useful heat consumption (Is there an emergency cooler present in the circuit? Is the meter of useful heat consumption located after the emergency cooler?);
- Useful heat consumption should be measured after the produced heat passed the emergency cooler, and as close as possible to the location of useful consumption;
- Calculation of the amount of primary energy saved: formula check with location of devices and measurement equipment of the fuel input, useful heat production and net electrical or mechanical power Output;
- Determination of Lower Calorific Value: validation of method to determine the LCV, quality of the numbers used.
- Verification on methodology for determining CO2 emissions and CO2 emissions savings.