

Co-location

Guidance for generators: Co-location of electricity storage and hydrogen production under the RO, FIT, REGO and SEG

Publication date: 23 May 2025

Version number: 6.2

This document provides guidance for participants of the Renewables Obligation (RO), Feed-in Tariffs (FIT), Renewable Electricity Guarantees of Origin (REGO) and Smart Export Guarantee (SEG) schemes who are considering co-locating electricity storage facilities. A co-located storage is one which is located with a renewable generating station or installation. This guidance has been developed to provide clarity to participants about the treatment of storage facilities within the framework of the schemes in anticipation of increased uptake of co-located storage. This guidance also provides guidance on the co-location of hydrogen production and storage with the RO and FIT schemes.

The guidance highlights the requirements of the RO, FIT, REGO and SEG schemes that are most relevant for co-located storage. It explains the key principles that will apply in assessing amendments to installations with co-located storage. It also provides some example scenarios to illustrate how the requirements of the schemes and these key principles may be met. However, this guidance is non-exhaustive, and the examples provided are not intended to cover every possible approach to co-locating storage. It is important to note that each application will be assessed case by case against the requirements of each scheme as set out in the respective legislative frameworks. This guidance includes an appendix with standard declarations for MCS-scale installations under the FIT scheme that can be used when installing co-located battery storage. This guidance also includes an appendix on hydrogen storage co-location and how it interacts with the RO and FIT schemes within existing guidance and legislation.

This guidance is limited to the requirements and our administration of the RO, FIT, REGO and SEG schemes, it does not cover issues relating to co-located storage beyond this. **This document is guidance only and is not intended to be a definitive legal guide. Generators should seek their own legal and technical advice before making any changes to their generating station or installation, or investment decisions.**

© Crown copyright 2025

The text of this document may be reproduced (excluding logos) under and in accordance with the terms of the [Open Government Licence](#).

Without prejudice to the generality of the terms of the Open Government Licence the material that is reproduced must be acknowledged as Crown copyright and the document title of this document must be specified in that acknowledgement.

This publication is available at www.ofgem.gov.uk. Any enquiries regarding the use and re-use of this information resource should be sent to: psi@nationalarchives.gsi.gov.uk

Context

The UK energy system is transitioning from a model of large centralised generation and transmission, to a smarter, more flexible and more decentralised system. This is changing the way that energy is generated, distributed, and consumed. As part of this, the sector is increasingly considering the role of energy storage in homes and businesses, on the distribution network, and importantly for our administration of the environmental schemes, co-located with generating stations or installations.

The Renewables Obligation (RO) is designed to support large scale renewable electricity projects in Great Britain (GB), and both large and small-scale renewable electricity projects in Northern Ireland. The scheme came into effect in England, Wales and Scotland in 2002 and in Northern Ireland in 2005. From 1 April 2017, the RO closed to new capacity (subject to certain grace periods). The Feed-in Tariffs (FIT) scheme was introduced on 1 April 2010 and is designed to support small scale renewable and low carbon technologies up to a total installed capacity of 5 MW in GB. The Smart Export Guarantee (SEG) scheme was introduced in 2020 and enables small-scale generators to be paid for their low carbon exported electricity. The Renewable Electricity Guarantees of Origin (REGO) scheme was introduced to provide transparency to consumers about the proportion of electricity that suppliers source from renewable generation.

The Department for Energy Security and Net Zero (DESNZ), the Scottish Government and the Department for the Economy in Northern Ireland (DfE) are responsible for developing the policy underpinning the RO scheme. DESNZ is responsible for developing the policy underpinning the FIT and SEG scheme. This includes setting support levels for FIT, establishing the legislative framework and making amendments to the legislation.

The RO and FIT schemes are administered by the Gas and Electricity Markets Authority ('the Authority') with its day-to-day functions performed by its office ('Ofgem'). We administer the Northern Ireland Renewables Obligation (NIRO) in accordance with the NIRO Order on behalf of the Northern Ireland Authority for Utility Regulation (NIAUR) under an Agency Services Agreement. SEG is a market led initiative where Ofgem has a small number of administrative functions which includes publication of guidance.

Contents

Context.....	3
Contents	4
Executive Summary	5
Relevant guidance	6
Relevant legislation.....	7
1. Introduction	7
Co-located storage does not change generators' obligations to comply with the RO and FIT scheme requirements.	11
Only eligible renewable electricity generated will receive support.....	11
Impact on the Total Installed Capacity	12
Scheme's eligibility requirements are not changed by the type of storage technology	13
2. Requirements for co-locating with RO accredited generating stations.....	13
Overview.....	13
Example scenarios: Renewables Obligation	18
Example scenarios: Renewable Energy Guarantees of Origin.....	26
3. Requirements for co-locating with FIT accredited installations	28
Overview.....	28
Example scenarios: Feed in Tariff	34
Appendices	45
Appendix 1 - Battery Storage Installation Declarations.....	45
Appendix 2 – Hydrogen Co-location	49
Appendix 3 – Co-locating Battery Storage with the SEG	60

Executive Summary

As the energy system transitions to become more decentralised and flexible, smart technologies like storage will play a greater role. As part of this, there is increasing interest from operators of renewable generating stations and installations who are seeking to co-locate storage facilities with renewable generation accredited under the RO and FIT schemes.

The legislation underpinning the RO and FIT schemes does not refer to or define storage or storage facilities. This means that the co-location of storage with accredited renewable generation is neither expressly prohibited nor expressly provided for under the schemes.

However, we consider that where the requirements of the schemes continue to be met, storage can be deployed and the accreditation of RO generating stations or FIT installations can remain valid under the existing legislative framework.

It is possible that co-locating storage may impact the eligibility of an accredited RO generating station or FIT installation to receive continued support under the schemes or may alter the amount of support received. **Generators should consider carefully the requirements of the scheme to ensure their proposed configuration does not adversely affect their ability to receive support under the schemes.**

There are four overarching principles that operators of RO generating stations or owners of FIT installations should consider when thinking about co-locating storage with generation accredited under the schemes. These are:

1. Co-located storage does not change generators' obligations to comply with the RO and FIT scheme requirements.
2. Generators can only receive support for eligible renewable electricity generated by an accredited RO generating station or FIT installation.
3. Installing storage will not alter the Total Installed Capacity of the RO generating station or FIT installation.
4. The schemes' eligibility requirements are not changed by the type of storage technology.

Annex 2 contains guidance around co-locating hydrogen generation and storage with RO generating stations and FIT installations.

Annex 3 contains guidance around co-location of battery storage with the SEG scheme.

This guidance considers storage only in so far as it is relevant to the RO, FIT and SEG schemes. It does not consider any matters outside of the treatment of storage under the schemes and is not intended to be a definitive technical or legal guide to the RO or FIT schemes. Generators should seek their own independent legal and technical advice before making any changes to their generating station or installation, or investment decisions. This document is not exhaustive and does not anticipate every scenario which may arise. If a scenario arises that is not addressed in this guidance, we will act in a way that is consistent with the relevant scheme's legislative requirements.

Updates to this document

This document replaces the 'Guidance for generators: Co-location of electricity storage and hydrogen production under the RO, FIT, REGO and SEG (Version 6.1)'.

This document will be referred to as 'Guidance for generators: Co-location of electricity storage and hydrogen production under the RO, FIT, REGO and SEG (Version 6.2)'. Minor changes have been made to replace references to the Renewables and Combined Heat and Power (R&CHP) Register with the Renewable Electricity Register (RER).

For further details on the updates contained in this version and previous versions of this publication, see the Summary of Updates. You can find this on the webpage hosting this document.

Relevant guidance

Readers should be aware of the following documents that support this guidance. These documents are available on our website at www.ofgem.gov.uk.

RO guidance: www.ofgem.gov.uk/ro

FIT guidance: www.ofgem.gov.uk/fit

REGO guidance: www.ofgem.gov.uk/publications/renewable-energy-guarantees-origin-guidance-generators-agents-and-suppliers

SEG guidance: www.ofgem.gov.uk/seg

Relevant legislation

All legislation can be found at www.legislation.gov.uk

- For the RO schemes:
 - The Renewables Obligation Order 2015 (as amended)
 - The Renewables Obligation (Scotland) Order 2009 (as amended)
 - The Renewables Obligation Order (Northern Ireland) 2009 (as amended)
 - The RO Closure Orders
- For the FIT scheme:
 - The Feed-in Tariffs Order 2012 (as amended)
 - Conditions 33 and 34 of the Standard Conditions of Electricity Supply Licences
- For the SEG scheme:
 - The Smart Export Guarantee Order 2019
 - Conditions 57 and 58 of the Standard Conditions of Electricity Supply Licences

1. Introduction

- 1.1. Storage is not defined within the legislation underpinning the RO or the FIT schemes. This means that the co-location of electricity storage facilities with accredited generating stations or installations, or those applying for accreditation, is neither expressly prohibited nor expressly provided for under the schemes. Therefore, where the requirements of the scheme continue to be met, storage can be deployed without impacting the accreditation of RO generating stations or FIT installations under the existing legislative framework.
- 1.2. This document has been published to provide guidance to operators of generating stations and owners of installations accredited under the RO or FIT schemes (or those applying for), who wish to co-locate battery storage or hydrogen production. In this document where we refer to a generating station or installation, we mean a generating station or installation that is, or is to be, an accredited RO generating

station or an accredited FIT installation. This guidance identifies some key principles which participants should follow when considering the co-location of storage with their renewable generation.

- 1.3. We have provided some example scenarios, which we consider either do or do not satisfy the requirements of the schemes. These scenarios have been informed by our engagement with participants to date and those scenarios we consider likely to be pursued. We may review this guidance from time to time and update it to add further scenarios. We will publish any additional guidance on our website. The scenarios included within this guidance consider fixed storage devices only. If a mobile storage device were to be co-located with a generating station or installation the same principles would apply, but we would need to assess this case by case once the change has been made and notified to us.
- 1.4. Accredited RO generating stations or FIT installations are required to give notice of co-located storage in the same way they are required to notify any changes to the generating station or installation, or the way in which support under the scheme is to be claimed (details of the process for notifying these changes are provided in chapters 3 and 4). This allows us, and where relevant the FIT licensee, to review the change and ensure that the station or installation continues to be eligible under the relevant scheme. When reviewing changes, our focus will be to establish whether the station or installation continues to meet all relevant eligibility requirements and whether the information provided is accurate and up to date. We will also check whether the electricity generated is still used or supplied in such a way that it remains eligible for support under the scheme and ensure that support is not issued for ineligible generation.
- 1.5. There is no process for generators to obtain prior assurance from us that intended changes to installations will not impact its accreditation. We will assess such changes case by case once the change has been made and notified to us.¹
- 1.6. It may be possible for a storage co-located with, or supplied by, a renewable generating station or installation accredited under the FIT or RO scheme to participate in the CM² without affecting scheme accreditation. However, this may depend upon the particular arrangements generators decide to pursue. Generators

¹ More detail on our processes for assessing amended applications and material changes to a generating station are provided in Chapter 2 of the [Renewable Obligation: Guidance for Generators](#) and Chapter 2 of the <https://www.ofgem.gov.uk/publications/feed-tariffs-guidance-fit-generators>.

² <https://www.gov.uk/government/collections/electricity-market-reform-capacity-market>

should seek independent technical and legal advice on any arrangements they are considering. When electric vehicles are added to a system with a pre-existing RO generating station or FIT installation, there are different places it must be installed dependent on if the vehicle can both draw and feed electricity into the system:

- If the vehicle can only draw electricity from the system, then it acts as a load. See the scenarios below for examples of where it can be placed for each scheme.
- If the vehicle can both draw electricity from the system and feed electricity into the system, then in this case the electric vehicle is acting as a type of co-located storage and a load. So that the electricity being fed into the system is not included in the installation's generation figures the vehicle needs to be placed between the export meter and the grid connection. If the vehicle is charged from a battery separately installed in the system, then that battery will also need to be between the export meter and the grid connection.

1.7. We may withdraw the accreditation for an RO generating station³ or FIT installation⁴ in a number of circumstances. These include:

For the RO scheme:

- where there has been a material change in circumstances since the accreditation was granted.
- where any condition of accreditation has not been complied with
- where we have reason to believe that the information that the decision to grant the accreditation was based on was incorrect in a way that makes the station ineligible
- where there has been a change in the applicable legislation since the preliminary accreditation was granted such that, had the application for preliminary accreditation been made after the change, it would not have been granted, and

³ Information on withdrawing a station's accreditation is set out on under 'Withdrawal of Accreditation' in chapter 2 of the RO: Guidance for Generators

<https://www.ofgem.gov.uk/publications-and-updates/renewables-obligation-guidance-generators>

⁴ Information on withdrawing an installation's accreditation is set out in Chapter 2 of the FIT: Guidance for Renewable Installations <https://www.ofgem.gov.uk/publications/feed-tariffs-guidance-fit-generators>

- where there has been a change in applicable legislation since the accreditation was granted such that, in our opinion, the station to which the accreditation relates is no longer likely to generate electricity that Renewables Obligation Certificates (ROCs) may be issued on.

For the FIT scheme:

- where the decision to grant accreditation or preliminary accreditation was based on incorrect information
- where any condition attached to an accreditation has not been complied with
- where the installation has been extended or modified in a way that stops it from being entitled to accreditation, and
- where we are notified by a relevant authority that the construction or operation of a FIT installation is in breach of legislation, a licence or a consent (for example a planning authority notifies us that an installation has not been granted planning permission).

1.8. Choosing to co-locate storage with an accredited RO generating station or FIT installation may impact the amount of support that the generator receives under the scheme. For example, if the amount of eligible renewable generation decreases or if the metering configuration used impacts eligibility to claim support under the scheme the amount of support received may decrease. For RO and FIT, if storage is installed in such a way that the accreditation of the generating station or installation is not affected, but the generating station or installation is not entitled to continue receiving support, there may be scope for the changes to be reversed and eligibility for support can resume. Any decision of this nature will be made case by case. Generators should consider this impact on the amount of support they can claim before taking investment decisions.

1.9. **This document is not exhaustive and does not anticipate every scenario which may arise. If a scenario arises that is not addressed in this guidance, we will act in a way that is consistent with the legislation.**

1.10. Though metering situations may become more complex where electricity storage is installed alongside an accredited installation, the same basic rule applies: for meter readings to be acceptable, the metering must be able to measure the amount of electricity exported by the installation separately from any other source (unless pro-rating is allowable in FIT).

- 1.11. We consider that where the requirements of the schemes continue to be met, storage can be deployed, and the accreditation of RO generating stations or FIT installations can remain valid under the existing legislative framework.
- 1.12. When an installation has storage co-located we expect each site to be assessed separately as each configuration will be slightly different which may impact their eligibility for export payments.
- 1.13. Despite the different requirements of the RO and FIT schemes (discussed in more detail in sections 3 and 4), we consider there are a number of overarching principles which apply when storage is co-located in the context of these schemes:
- Co-located storage does not change generators' obligations to comply with the scheme requirements.
 - Generators will only receive support for eligible renewable electricity generated by an accredited RO generating station or FIT installation.
 - Installing storage will not alter the Total Installed Capacity of the RO generating station or FIT installation.
 - The schemes' eligibility requirements are not changed by the type of storage technology.

Co-located storage does not change generators' obligations to comply with the RO and FIT scheme requirements.

- 1.14. For the duration of the support term, accredited generating stations and installations need to maintain compliance with all scheme eligibility requirements. The scheme requirements are not altered by the co-location of storage with an accredited generating station or installation. However, as RO and FIT generators apply to amend their accreditation they will need to provide additional evidence or answer further questions to enable us to be satisfied that ROCs may be issued, or FIT payments made, in respect of the electricity generated, used and/or exported. The evidence provided by the operator of a generating station or owner of an installation must satisfy us that the scheme requirements have been met, consequently we may ask for more details if necessary.

Only eligible renewable electricity generated will receive support

- 1.15. Under the RO and FIT schemes, when storage is co-located there must be no risk that support is claimed for, and issued upon, electricity that was not generated by the accredited generating station or installation. Such electricity includes:

- electricity produced by a standby generator or auxiliary power supply;
- electricity imported from the grid, or
- electricity produced by other non-accredited renewable generation.

Impact on the Total Installed Capacity

- 1.16. For the purposes of the RO we consider that in most cases a co-located storage facility would not be considered part of the RO generating station. This is because storage is not directly referenced as an eligible generating technology under the RO scheme, and in most cases, the storage facility will not be essential to the operation of the generating station. Therefore, in most cases, the co-located storage will not affect the Total Installed Capacity (TIC) or Declared Net Capacity (DNC) of the generating station.
- 1.17. For FIT installations the co-located storage facility would be considered part of the installation as part of the geographical site. This would likely not affect capacity as TIC is defined as “maximum capacity at which an Eligible Installation could be operated for a sustained period without causing damage to it (assuming the Eligible Low-carbon Energy Source was available to it without interruption)”.
- 1.18. There may be some generating stations where a small-scale storage facility provides a key function to the operation of that station (for example, an off-grid generating station where a battery which is charged when the station is running to provide electricity for auxiliary loads and start up).⁵ For these stations, the DNC may be affected. However, we do not consider this will be the case for the majority of co-located storage.
- 1.19. The distinction we make between an accredited RO generating station or accredited FIT installation and a co-located storage facility in this guidance is specifically for the purposes of the RO and FIT schemes. This distinction may not be applicable or appropriate for other purposes or contexts, such as in planning.

⁵ Appendix 3 of the RO Guidance for Generators discusses eligibility and what constitutes a generating station in more detail. <https://www.ofgem.gov.uk/publications-and-updates/renewables-obligation-guidance-generators>

Scheme's eligibility requirements are not changed by the type of storage technology

- 1.20. We do not consider that the type of storage technology to be co-located with the renewable generating station or installation will affect our assessment on the availability of support for any eligible electricity generated. In effect, our assessment is "technology neutral" in relation to storage.
- 1.21. This guidance focuses on storage technologies which convert the stored energy back to an electrical energy output. This is because with these technologies it is important to be satisfied that the metering arrangements ensure that electricity from ineligible sources does not augment the meter readings for the generating station or installation.
- 1.22. Storage technologies which convert electrical energy into a form of energy which can be stored and used to produce a non-electrical output can be considered as on-site loads for the purposes for the RO and FIT schemes (unless the output is used for a purpose linked to the station).
- 1.23. Similarly, we do not consider there to be any limitation to the particular renewable or low-carbon generation technologies which storage could be co-located with as long as the generation technology is eligible for support under the schemes.

2. Requirements for co-locating with RO accredited generating stations

Overview

- 2.1. ROCs can be issued for the net renewable generation from an accredited RO generating station which is supplied to customers in Great Britain or Northern Ireland (GB or NI) or has been used in a permitted way as prescribed in the scheme legislation. RO generating stations with co-located storage will need to demonstrate that they continue to meet these requirements once the storage has been installed in order for ROCs to be issued.

Permitted ways

- 2.2. If the electricity generated by an accredited RO generating station is not supplied to customers in GB or NI, then the operator must demonstrate that it is used in a 'permitted way'.⁶ This requires that the electricity generated by an accredited station is either:⁷
- consumed by the operator of the generating station(s) that generated it
 - supplied to customers in GB or NI through a private wire network
 - exported to a distribution system or transmission system in circumstances in which its supply to customers cannot not be demonstrated
 - used in any combination of any of the above uses, or
 - used partly in any combination of any of the above uses with the remainder being supplied to customers in GB or NI.
- 2.3. For accredited generating stations with co-located storage facilities, where the electricity has ceased to be wholly supplied to customers in GB or NI as a result of the storage facility being installed, the operators of these stations will need to demonstrate which of the permitted ways requirements are met in order for ROCs to be issued.

Eligible on-site use

- 2.4. Where a co-located storage is used to meet any on-site demand that is not associated with the generating station, the electricity generated by the accredited RO generating station and supplied to the storage may be eligible for ROCs. This may be the case, for example, where the storage enables on-site demand to be met by electricity generated by the station when the peak demand occurs later than the generation.
- 2.5. To claim ROCs in respect of on-site use, the operator of the generating station will need to describe what the electricity is for and ensure they can show that they

⁶ Permitted ways are set out in Section 32B(10) of the Electricity Act 1989, article 54(8) of the Energy Order for Northern Ireland, and in article 17 of the Renewable Obligations Order 2015 for England and Wales and article 16 of the Renewables Obligation Scotland Order 2009 and the Renewables Obligation Northern Ireland Order 2009.

⁷ The [RO Guidance for Generators](#) sets out in detail the requirements RO accredited generating stations must satisfy to demonstrate the electricity is used in a way, which is eligible to receive ROCs and how they must do this.

have appropriate metering in place as part of the application. They will also need to sign a 'permitted ways' declaration and submit this to us each year. This is done through the Register.

- 2.6. On-site use in the context of a co-located storage facility is seen in example Scenarios 3.1, 3.2, 3.3, 3.5 and 3.6.

Private wire supply

- 2.7. The operator of the generating station may claim ROCs for renewable electricity supplied to a storage facility by a licence exempt distribution network or a 'private wire' arrangement. To do so, the operator of the generating station will need to describe what the electricity is used for and ensure they have appropriate metering in place as part of the application, they will also need to sign a 'permitted ways' declaration and submit this to us each year.
- 2.8. To claim ROCs for electricity generated and supplied to a storage facility via a private wire, the operator must also be able to demonstrate that this supply satisfies the criteria for private wire supply set out in scheme legislation.⁸ To assess whether these criteria have been met so ROCs can be issued, applicants will need to demonstrate:
- that a private wire is in place
 - a power purchase agreement (PPA) is in place
 - the electricity is supplied to premises, and
 - the generator is exempt from holding an electricity supply licence, and one of the licence exemptions can be identified.⁹
- 2.9. Private wire supply in the context of a co-located storage facility is seen in example Scenario 3.4 on page 24.

⁸ Section 32B(11) of the EA 1989; article 17 of the Renewable Obligations Order 2015 for England and Wales (ROO); article 16 of the Renewables Obligation Scotland Order 2009 (ROS); Article 54(8) of the Energy Order for Northern Ireland (NIRO); article 16 of the Renewables Obligation Scotland Order 2009 and the Renewables Obligation Northern Ireland Order 2009.

⁹ In GB <http://www.legislation.gov.uk/ukxi/2001/3270/schedule/4/made>,
In Northern Ireland <http://www.legislation.gov.uk/nisr/2013/93/schedule/3/made>

Net renewable generation

2.10. Under the RO, only the net renewable electricity generated by an accredited generating station and used in a way that is prescribed by the RO legislation is eligible to receive ROCs. Electricity used to operate the station, known as input electricity, (either imported, generated by the generating station or standby generation) must always be reported, and if greater than 0.5% of the station's total output will be deducted from the total generation before ROCs are issued.

2.11. The net renewable generation is defined in the RO Orders as:¹⁰

$$\text{Net renewable generation} = (\text{Gross output} - \text{Input electricity}) \times \text{Renewable qualifying percentage}$$

The metering set up must allow the operator of a generating station to accurately measure the output of the generating station as well as any input electricity. The gross output is the total electricity generated by a station, while the input electricity means the total amount of electricity used by the station for purposes directly related to its operation, whether or not that electricity is generated by the station or used while the station is generating electricity¹¹.

2.12. As co-located storage will generally not be considered to form a part of the RO accredited generating station, the metering arrangements will need to ensure that electricity from ineligible sources does not augment the meter readings for the station. This will ensure the net generation from the RO generating station can continue to be accurately measured. This is particularly important if the storage facility can also be charged by other sources of electricity which are not eligible for support under the RO (such as electricity imported from the grid or generated by excluded/unsupported capacity¹²).

¹⁰ Article 29 of the ROO, article 25 of the ROS, and article 23 of the NIRO.

¹¹ Article 2(1) of the ROO 2015 (as amended)

¹² In England, Scotland and Wales new capacity added to a RO generating station after the closure of the scheme is 'excluded or unsupported capacity'. Unlike the ROO and the ROS, NI legislation does not define 'NIRO capacity' or 'excluded capacity'. For clarity, we refer to all capacity that is not eligible for NIROCs as unsupported capacity.

- 2.13. Operators of generating stations should keep appropriate records of meter readings for audit purposes, to provide assurance of the number of ROCs claimed.¹³
- 2.14. Although the scheme requirements remain the same there may be some additional considerations, which generators planning to install co-located storage with their generation station or installation may need to consider. These may include, but may not be limited to, the following areas:

Dual scheme facility

- 2.15. A dual scheme facility is a RO generating station that receives support under more than one scheme. For example, a station where some capacity is accredited and supported by the RO and some is supported under a Contract for Difference (CfD).¹⁴
- 2.16. Generators should consider the requirements of both schemes when considering co-locating storage with their generating station and how the electricity generated by the station will be measured and used to supply the storage facility¹⁵.

Notifying Ofgem of changes to an accredited RO generating station

- 2.17. Once a generating station has been accredited under the RO, the operator is required to notify us of any changes made to the generating station, the way in which ROCs are to be claimed or the fuel used. Installing co-located storage is such a change. Any such changes must be notified to us within two weeks of the alteration occurring, in line with the conditions of accreditation and the information declaration signed annually. This can be done on the Register and the process for doing this is outlined in the 'RO Guidance for Generators'.
- 2.18. When notifying us of any changes made to the generating station as a result of installing co-located storage, the key information we will need to see to assess the

¹³ The [RO Guidance for Generators](#) sets out our approach to auditing, it states that operators of generating stations should keep appropriate records for at least six years so that they can provide a full audit trail at the time of audit.

¹⁴ <https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference>

¹⁵ Further information about dual scheme facilities accredited under the RO can be found in chapter 2 and appendix 4 of the Renewable Obligation: Guidance for Generators <https://www.ofgem.gov.uk/publications-and-updates/renewables-obligation-guidance-generators>

impact of that change on the generating station's eligibility to receive ROCs under the scheme include:

- an updated single line diagram (SLD) showing the storage facility and the metering arrangements
- updated information about the meters used for the calculation of net generation from the generating station
- evidence of the date the storage facility was installed and became operational, and
- an updated technical description of the generating station, the co-located storage and the way the electricity generated by the station will be used. This will include an updated and signed a 'permitted ways' declaration, if relevant, and any necessary evidence in respect of private wire arrangements.

2.19. We may request additional information from generators as appropriate in order to verify an installation's eligibility.

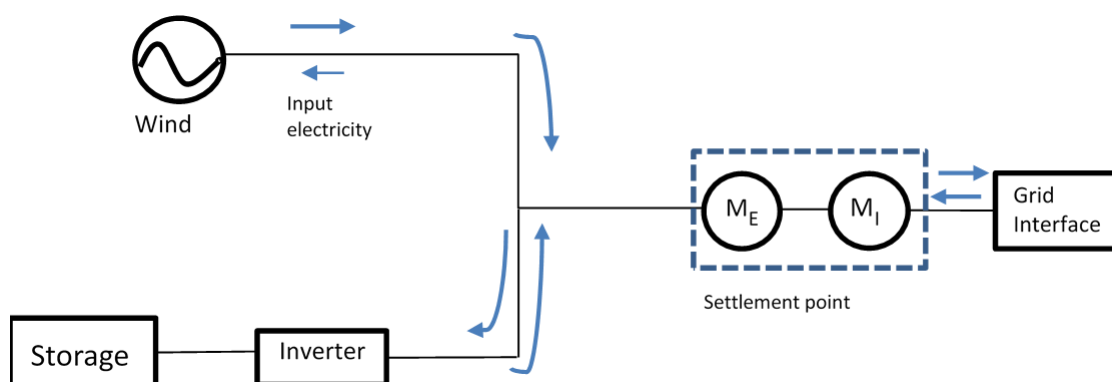
Example scenarios: Renewables Obligation

2.20. As the key requirements discussed in the previous section make clear, accredited RO generating stations with co-located storage may continue to claim ROCs if:

- the net generation from an accredited RO generating station can be accurately measured, **and**
- the electricity generated by the station is supplied to customers in GB or NI or has been used in a permitted way as prescribed in the scheme legislation.

2.21. In this section, we provide some example scenarios of accredited RO generating stations with co-located storage which illustrate how the requirements of the RO scheme may be met. We have used wind and solar photovoltaic (PV) generating stations as examples, but any eligible renewable technology under the scheme could be used. These examples are not exhaustive and scheme participants may wish to put forward variations on these approaches. We recognise that there are additional considerations for operators when developing system configuration, such as transformer losses etc, but these examples are designed to illustrate some of the main considerations for co-located storage. Applications will be assessed case by case against the requirements of the scheme legislation once a change has been made and notified to us.

Scenario 3.1: RO generating station with co-located storage, which maintains the existing metering points.



2.22. In this scenario, storage has been co-located with the existing RO generating station. There have been no changes to the metering point previously used, before the storage facility was installed. The storage facility can be charged by electricity produced by the generating station, as well as by electricity imported from the grid that passes through the import meter.

The electricity generated by the accredited RO generated station is used on-site, to supply the storage facility, and exported to the grid to be supplied to customers in GB or NI.

- The export meter, M_E , measures the total export of both the generating station and the storage facility.
- The import meter, M_I , measures the electricity imported from the grid, this will include any imported electricity supplied to the generating station, as input electricity, and any imported electricity used to charge the storage facility.

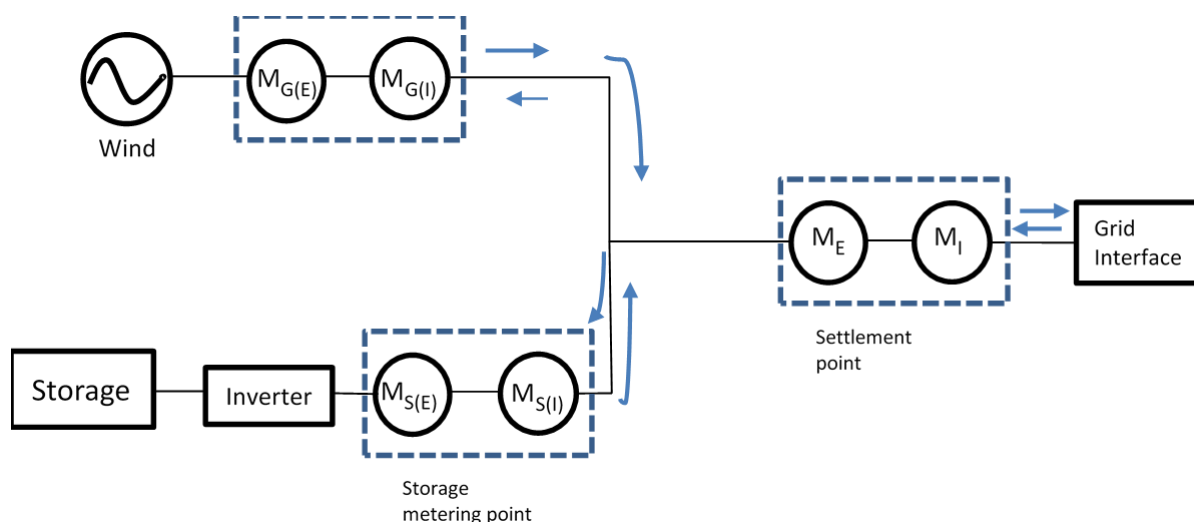
2.23. The net generation for the station can be calculated by the following formula:

$$\text{Net generation} = \text{Total output generation} - \text{Total imported electricity}$$

$$\text{Net generation} = M_E - M_I$$

2.24. **In summary:** Both of the key requirements of the RO scheme (summarised in paragraph 2.20) are satisfied in this storage co-location scenario. On this basis **ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

Scenario 3.2: RO generating station with co-located storage, with dedicated metering for storage and generation.



2.25. In this scenario, storage has been co-located with the existing RO generation station. Dedicated meters have been introduced for the generating station and storage, in addition to the metering already in place at the settlement point. The storage facility can be charged by electricity generated by the RO generating station, as well as electricity imported from the grid that passes through the import meter.

- The electricity generated by the accredited RO generated station is used on-site, to supply the storage facility, and also exported to the licensed network to be supplied to customers in GB or NI.
- The generation meter, $M_{G(E)}$, measures the total output of the RO generating station.
- The generation import meter, $M_{G(I)}$, measures the input electricity to the RO generating station. This may be imported from the grid or provided by the storage facility.
- The storage export meter, $M_{S(E)}$, measures the total output of the storage facility. The storage import meter, $M_{S(I)}$, measures the total imported electricity to the storage facility; this may be imported from the grid or supplied by the RO generating station. This meter is used to provide a check. The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.

- The export meter, M_E , measures the total export from both the RO generation station and the storage facility. This meter reading may also be used to provide a check to validate the ROCs claimed.
- The import meter, M_I , measures the electricity imported from the grid. This may be used to charge the storage facility or to provide input electricity to the RO generating station.

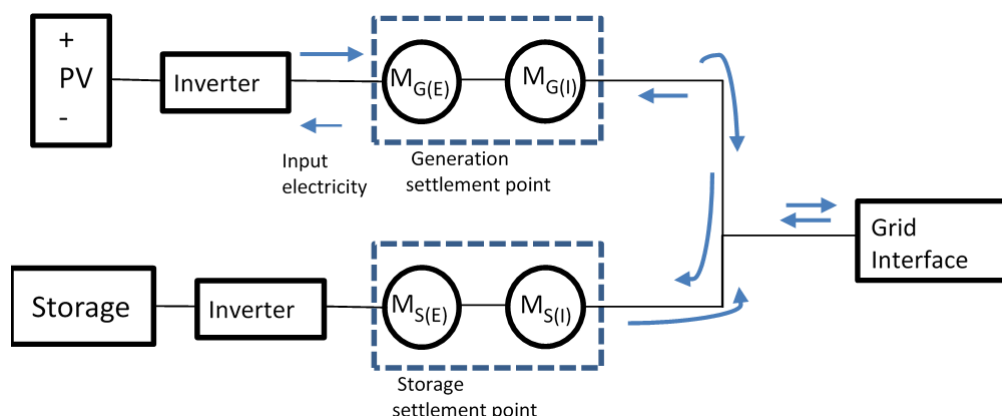
2.26. The net generation of the RO generating station can be calculated using the formula below:

Net generation = Total generation - Total input electricity to the generating station

$$\text{Net generation} = M_{G(E)} - M_{G(I)}$$

2.27. **In summary:** Both of the key requirements of the RO scheme (summarised in paragraph 2.20) are satisfied in this storage co-location scenario. On this basis **ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

Scenario 3.3: RO generating station with co-located storage with separate settlement metering units.



2.28. In this scenario, co-located storage has been installed with the RO generating station, the settlement metering point for the generating station has been relocated, so there are dedicated settlement meters for both the storage facility and the generating station. This may be accomplished by ensuring both the generation and the storage facility have separate meter point administration

numbers (MPANs) or separate balancing mechanism units (BMUs).¹⁶ The storage facility can be charged by electricity generated by the RO generating station, as well as electricity imported from the grid that passes through the storage import meter.

- The electricity exported by the generating station is either used on-site, to supply the storage facility or supplied to customers in GB or NI and purchased through a power purchase agreement (PPA).
- The generation meter, $M_{G(E)}$, measures the total output of the RO generating station.
- The import meter, $M_{G(I)}$, measures the input electricity to the RO generating station, this may be supplied by the storage facility or electricity imported from the grid.
- The storage meter, $M_{S(E)}$, measures the total output of the storage facility. The storage import meter, $M_{S(I)}$, measures the electricity imported to charge the storage facility from the RO generating station and the grid. These meters will be used by the storage facility for settlement purposes.

2.29. The net generation of the RO generating station can be calculated using the formula below:

Net generation = Total output generation – Total imported electricity

$$\text{Net generation} = M_{G(E)} - M_{G(I)}$$

2.30. **In summary:** Both of the key requirements of the RO scheme are satisfied in this storage co-location scenario. On this basis **ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

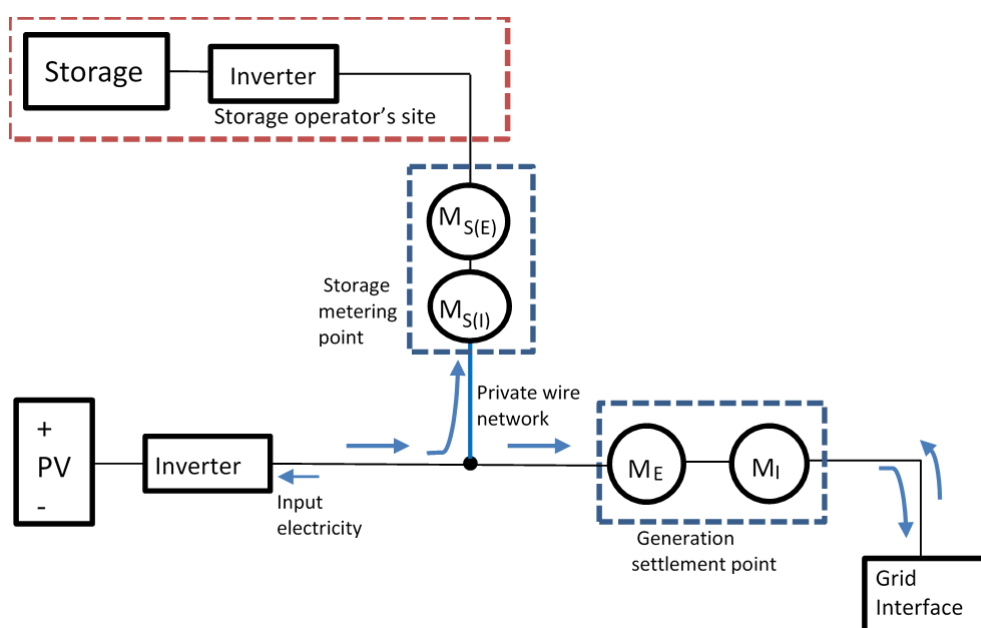
¹⁶ National Grid Electricity System Operator has published online an informal guidance note on the current treatment of co-located transmission connections, for industry consultation.

<https://www.nationalgrid.com/sites/default/files/documents/DRAFT%20Co-location%20Informal%20Guidance%20Note%20-%20Consultation.pdf>

The Energy Network Association has developed guidance on the treatment of co-located distribution connections through the ENA Open Networks Project.

<http://www.energynetworks.org/electricity/engineering/energy-storage/energy-storage-overview.html>

Scenario 3.4: RO generating station with co-located storage supplied by private wire.



2.31. In this scenario, co-located storage has been installed and is supplied by the generating station via a private wire network.

- The RO generating station supplies a portion of its generation to its customer's storage facility via the private wire, under the terms of a PPA. The remainder of the generating station's output is exported to the grid to supply customers in GB or NI.
- The export meter, M_E , measures the total output of the RO generating station exported to the grid.
- The generating station import meter, M_I , measures the electricity imported from the grid to provide input electricity to the RO generating station, or supplied to the storage facility.
- The storage import meter, $M_{S(I)}$, measures the electricity supplied to the storage facility from the RO generating station or from the grid.
- The storage export meter, $M_{S(E)}$, measures the output of the storage facility (if any) supplied to the RO generating station.

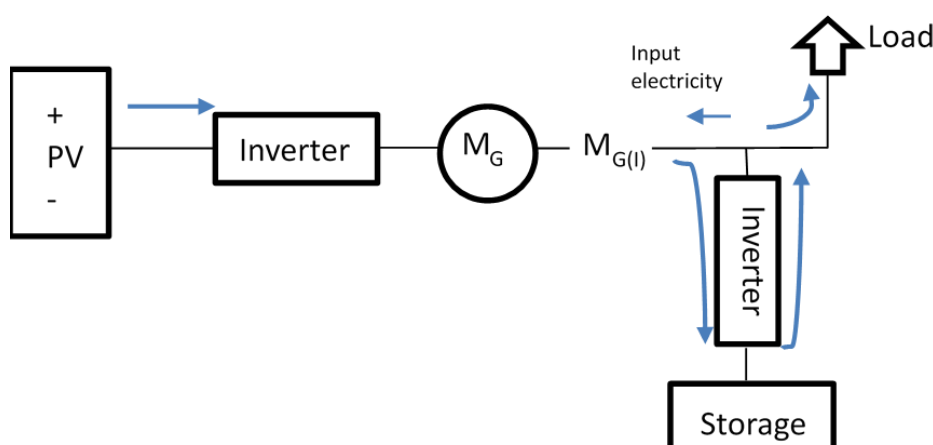
2.32. The net generation of the RO generating station can be calculated using the formula below:

$$\text{Net generation} = \text{Total output generation} - \text{Total imported electricity}$$

$$\text{Net generation} = (M_E + M_{S(I)}) - (M_I + M_{S(E)})$$

- 2.33. This scenario uses the electricity generated by the generating station in a combination of ways. The electricity exported to the grid from the RO generating station satisfies the requirement of supplying to customers within GB or NI. The proportion of electricity supplied to the storage facility via a private wire can be considered to be used in a permitted way, if the legislative requirements are satisfied, as demonstrated in the diagram above.
- 2.34. **In summary:** Both of the key requirements of the RO scheme are satisfied in this storage co-location scenario. On this basis **ROCs can be claimed** for the net generation (as calculated above at 2.32) provided other scheme requirements are met.

Scenario 3.5: Off-grid RO generating station with co-located storage.



- 2.35. In this scenario, co-located storage has been installed on the site of the RO generating station to help meet the on-site demand load. The storage facility can only be charged by the electricity produced by the generating station. There is no grid interface.
- As the electricity generated by the RO generating station is used to meet on-site demands, it is clear that the electricity is being used in a permitted way. In other words, this electricity is consumed by the operator of the generating station.
 - The generation meter, M_G , measures the total output of the RO generating station.
 - The import meter, $M_{G(I)}$, measures the input electricity to the RO generating station, this may be supplied by the storage facility.

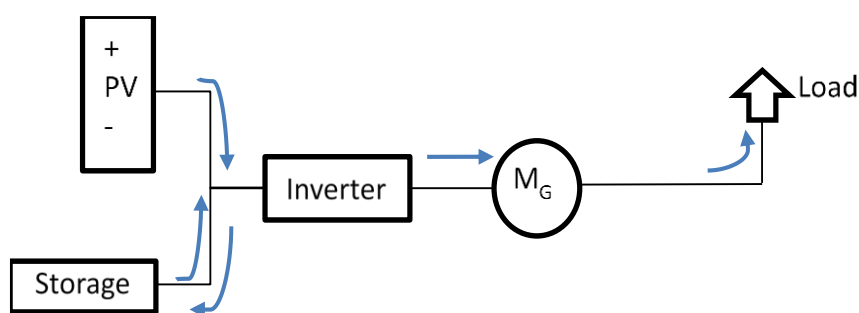
- 2.36. The net generation of the RO generating station can be calculated using the formula below:

$$\text{Net generation} = \text{Total generation export} - \text{Total input electricity}$$

$$\text{Net generation} = M_G - M_{G(I)}$$

- 2.37. **In summary:** Both of the key requirements of the RO scheme are satisfied in this storage co-location scenario. On this basis **ROCs can be claimed** for the net generation, (as calculated above at 2.36) provided other scheme requirements are met.

Scenario 3.6: Off-grid RO generating station, where storage is part of the generating station.



- 2.38. In this scenario a small-scale battery storage facility has been installed as part of the RO generating station, this provides input electricity to power the inverter in the early morning, before the station starts to generate. The storage may also be used to help meet the on-site demand load. The storage facility can only be charged by the electricity produced by the generating station. There is no grid interface.
- As the electricity generated by the RO generating station is used to meet on-site demands, it is clear that the electricity is being used in a permitted way. In other words, this electricity is consumed by the operator of the generating station.
 - The battery storage facility is used to supply the input electricity to the generating station; this will have been previously supplied by the generating station.

- The generation meter, M_G , measures the total output of the RO generating station, less the electricity used by the generating station. This is the net generation.
- 2.39. As the battery storage facility is installed before the generation meter and forms part of the generating station, the generation meter reading M_G provides the net generation of the RO generating station:

Net generation = Total generation export

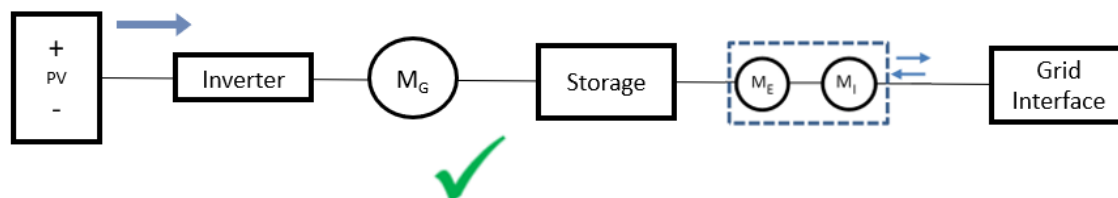
Net generation = M_G

- 2.40. In **summary:** Both of the key requirements of the RO scheme are satisfied in this scenario. On this basis **ROCs can be claimed** for the net generation, (as calculated above in paragraph 2.39) provided other scheme requirements are met.

Example scenarios: Renewable Energy Guarantees of Origin

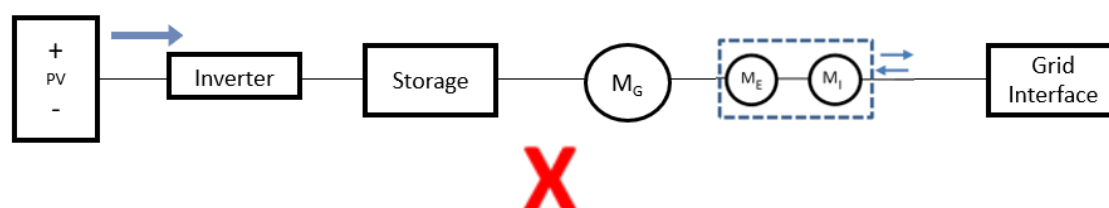
- 2.41. Generators accredited under the Renewable Energy Guarantees of Origin (REGO) scheme receive one REGO certificate for every MWh of eligible renewable electricity generated. We do not consider a generating station's REGO accreditation will be affected by the installation of co-located storage but the ability to claim REGOs may be affected. To successfully claim REGOs, the meter is required to measure the total renewable generation from an individual technology type and must be located after the renewable generation, but before any battery storage or another form of co-location. A REGO-only station measures gross renewable electrical generation to be eligible for REGO, whereas an RO station calculates net renewable electricity to be eligible for ROCs. We consider the four key principles for co-located storage will also apply to REGOs.
- 2.42. In this section, we provide some non-exhaustive scenarios of REGO installations with co-located storage that we consider may satisfy the requirements of the scheme. These examples are only for guidance around certain factors and each case is decided on a case-by-case basis. Import and export data is not counted when assessing the eligible REGOs.
- 2.43. Generators should consider scheme requirements when considering co-locating storage with their generating station and how the electricity generated by the station will be measured and used to supply the storage facility.

Scenario 3.7: REGO installation with one technology type with co-located storage installed after the generation meter.



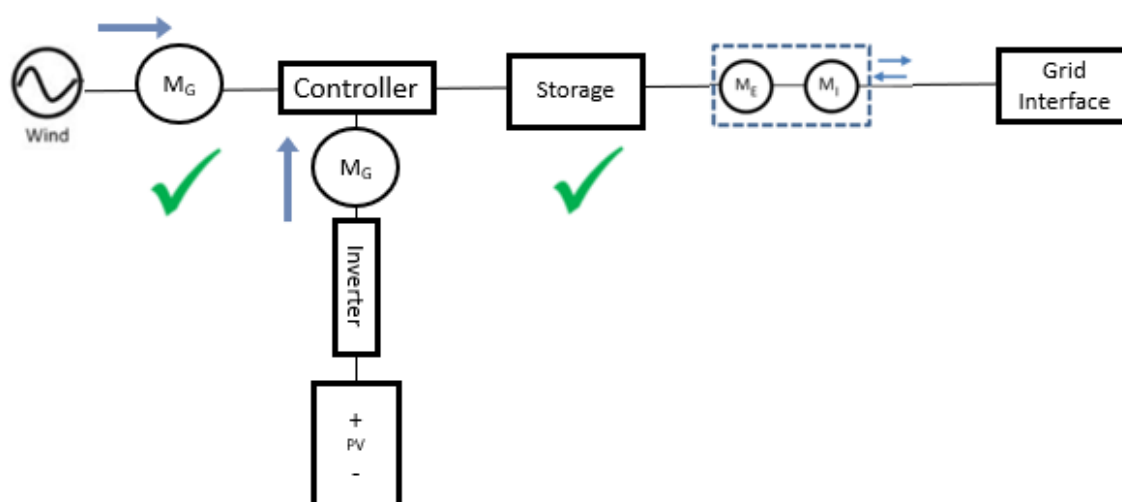
- 2.44. In this scenario, there is a generation meter installed after the solar panels and before the battery storage. This meter is capable of measuring gross renewable generation. On this basis, the requirements for generation payments are met.

Scenario 3.8: REGO installation with one technology type and co-located storage with the generation meter installed after the battery storage.



- 2.45. In this scenario, there is a generation meter installed after the solar panels and after the battery storage. This form of co-location would be ineligible because the generation meter is not capable of measuring gross renewable generation.

Scenario 3.9: REGO installation with two technology types with co-located storage installed after generation meters.



- 2.46. In this scenario, there is a generation meter after each separate type of renewable generation and before the battery storage. Different technology types on a co-located site would have separate accreditations. Each meter is capable of measuring gross renewable generation from individual technology types. On this basis, in this instance, the requirements for generation payments are met.

3. Requirements for co-locating with FIT accredited installations

Overview

- 3.1. Owners of FIT installations must satisfy ongoing metering requirements to be able to receive support payments. The FIT scheme does not permit using multiple meters to measure any electricity imported, to calculate net generation or export. In this chapter, we set out the requirements which are most relevant for co-located storage.

Types of FIT payments

- 3.2. There are two elements to the support payments the owner of an accredited FIT installation can receive: **generation payments** and **export payments**, if relevant for the installation.
- 3.3. FIT generation payments are made based on the total generation produced by an installation. A generation meter is normally located close to the point of generation and measures the electricity generated solely by the accredited FIT installation.

- 3.4. FIT export payments in respect of electricity exported from a FIT installation can be based on either:
- **Deemed Export** – For accredited FIT installations with a TIC of 30kW or less, the amount of electricity exported may be deemed as a percentage of the amount of electricity generated by the installation. For micro-CHP, AD, solar PV and wind, the percentage is 50%, for hydro it is 75%,¹⁷ or
 - **Metered Export** – Accredited FIT installations that are not entitled to claim deemed export may only receive metered export payments for electricity generated by their installation and exported to the grid based on an export meter reading. The export meter must be able to measure the amount of electricity exported solely by the accredited FIT installation.
- 3.5. Alternatively, FIT installation owners can decide to opt out of receiving FIT export payments and may seek to sell their exported electricity through a power purchase agreement (PPA) or similar commercial arrangements.

Metering Requirements

- 3.6. Any meter used to record generation or export for FIT payment purposes must be an approved meter and comply with specific metering legislation.¹⁸ The National Measurements Office (NMO) approves meters on Ofgem's behalf, where the maximum demand exceeds 100kW. It also approves any modifications to existing meters that were originally approved before the Measuring Instruments (Active Electrical Energy Meters) Regulations 2006 (the MI (AEEM) Regulations)¹⁹ were implemented.

Generation metering requirements

- 3.7. FIT licensees should only make FIT generation payments for the electricity generated by an Accredited FIT Installation, calculated by reference to the applicable generation tariff and generation meter readings – ie measurements

¹⁷ Deemed export is calculated based on the generation meter reading with reference to the methodology set out in a determination by the Secretary of State published at the beginning of each FIT year. <https://www.gov.uk/government/publications/feed-in-tariffs-fits-determinations>

¹⁸ The definition of "metering legislation" can be found in Schedule A to Standard Condition 33 of the Electricity Supply Licence.

¹⁹ These regulations implement part of the Measuring Instruments Directive (MID) into UK legislation.

taken by a generation meter of the gross amount of electricity generated by an accredited FIT installation.

- 3.8. Where storage is co-located with an accredited FIT installation, generation payments can be made if the FIT licensee can be satisfied that the generation meter only measures electricity generated by the FIT installation and not from other sources. This is particularly important for installations where the storage can also be charged by electricity imported from the grid and is installed before the generation meter. The generation meter reading cannot be calculated using separate input and output meters to calculate a net output value. Scenarios 4.1, 4.3, 4.4, 4.5, 4.6, 4.9, 4.10 and 4.11 in this chapter provide examples of generation meter arrangements that would satisfy this requirement.
- 3.9. Where storage is installed in such a way that it can also be charged from electricity imported from the grid, the above rule can be satisfied by installing a bi-directional meter which is capable of measuring input and output electricity and calculating and displaying a net value. Scenarios 4.3, 4.4, 4.5, 4.7 and 4.13 include bi-directional meters.
- 3.10. We consider that it is possible for FIT operators with co-located storage to satisfy the requirement for generation payments to be made in two different ways:

The configuration of the installation:

- 3.11. If the storage facility can only be charged by the FIT installation or the storage facility is installed after the generation meter, then it would be clear that the generation meter only measures generation from the accredited FIT installation.
- 3.12. Examples of this are illustrated in scenarios 4.1, 4.3, 4.4, 4.5, 4.6, 4.9 and 4.10, although we recognise there could be other approaches that meet this requirement.

The choice of generation meter:

- 3.13. The generation meter must be capable of measuring the electricity generated by the accredited FIT installation only. Payments cannot be made for electricity generated by an ineligible source.
- 3.14. However, this measurement must be undertaken by a single meter that can perform a net calculation. Using multiple meters to calculate a net output value is not permitted.
- 3.15. This approach is shown in scenarios 4.2 and 4.7.

- 3.16. If it is not possible to be satisfied that the generation meter produces a reading of the electricity generated only by the FIT installation, then the generator will not be entitled to receive generation payments. Scenario 4.3 provides an example of installing co-located storage with a FIT installation where this requirement is not met and payments may not be made.

Deemed export requirements

- 3.17. Accredited FIT installations with a TIC of 30kW or less, where it is not possible or practical for export to be measured via an export meter, may receive deemed export payments. Deemed export payments are calculated by multiplying the generation meter reading for the FIT installation, by a percentage, specific to the type of generating technology (for micro CHP, AD, solar PV and wind this factor is 50%, for hydro this is 75%).
- 3.18. As deemed export payments are calculated using the generation meter reading, where it is possible to be satisfied the generation meter measures only the generation from the accredited FIT installation, deemed export payments can be made. This remains the case for FIT installations with co-located storage. Scenarios 4.1, 4.4 and 4.6 provide examples of where deemed export can be claimed for a FIT installation with co-located storage.

Metered export requirements

- 3.19. FIT licensees should only make metered export payments against an export meter reading which measures electricity that is generated by an accredited FIT installation and flows onto the grid. Such payments must be calculated with reference to the export meter reading only and cannot be calculated using separate input and output meters to calculate a net output value.
- 3.20. Where storage is co-located with an accredited FIT installation, metered export payments can be made if the FIT licensee can be satisfied that the export meter only measures electricity exported by the FIT installation and not from other sources. This is particularly important for installations where the storage can also be charged by electricity imported from the grid. Scenarios 4.1, 4.3, 4.4, 4.5 and 4.13 in this chapter provide examples of installations that would satisfy this requirement.
- 3.21. We consider that it is possible for FIT operators with co-located storage to satisfy the requirement for metered export payments to be made in two ways;

The configuration of the installation

- 3.22. If the storage can only be charged by the FIT installation then it would be clear that the export meter only measures generation from the accredited installation.
- 3.23. This approach is shown in scenario 4.6 although we recognise there could be other approaches which can meet this requirement.

The choice of export meter:

- 3.24. The export meter must be capable of measuring the electricity exported by the accredited FIT installation only.
- 3.25. However, this measurement must be undertaken by a single meter that can perform a net calculation. Using multiple meters to calculate the net export is not permitted.

Bi-directional meters

- 3.26. If an installation set up can import from the grid it requires a meter that can separate the export and import flows of electricity. "Bi-directional meters" are meters which are capable of measuring input and output, and calculating a net value. In this chapter we have set out some scenarios which demonstrate in principle how bi-directional meters could be installed to meet the metering requirements. All meters used for FIT payment purposes will be considered independently and must satisfy the following criteria:
- The meter must be an approved meter²⁰ and comply with specific metering legislation, as described in paragraph 4.6, and
 - The meter must be capable of measuring input and output electricity, and calculating and displaying a net value, which is equivalent to the generation or export meter reading of the FIT installation only.
- 3.27. FIT installation owners considering installing a "bi-directional meter(s)" should note that FIT meter readings taken using such meters will be calculated by the meter on the difference between each month's import and export readings. This differs from the meter readings taken by standard meters, which measure and record the generation and/or export of the FIT installation on a cumulative basis.

²⁰ <https://www.gov.uk/guidance/electricity-meters-feed-in-tariff-fit-scheme#approved-meters>

If the difference between import and export in one month is negative, zero FITs payments could be claimed.

- 3.28. Set ups that meet the legislative requirements may also record a reduction in generation as batteries may incur losses through the charge and discharge cycle. In this instance FIT payments are likely to be reduced.
- 3.29. Where storage is co-located and it is not possible to identify whether the export meter measures export from the accredited FIT installation or another ineligible source, such as stored electricity imported from the grid or another generation source, the generator will not be entitled to export payments. However, generators of such installations may secure other revenue streams, such as a power purchase agreement (PPA) or similar commercial arrangements to continue receiving revenue from the electricity they are able to export.
- 3.30. Please note that most **smart meters** are not “bi-directional meters” under the definition we use here. This is because even though they are capable of measuring both import and export, they do not generate a net value.

Notifying changes to an accredited FIT installation

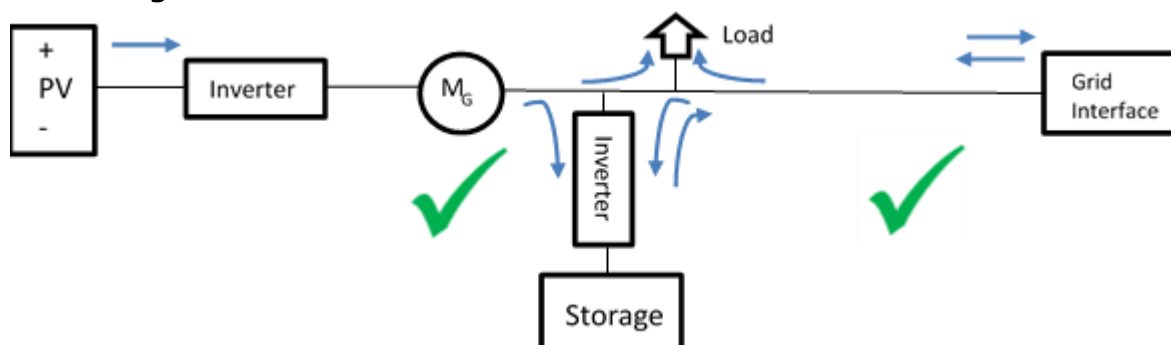
- 3.31. As with other changes to a FIT installation, co-locating storage with the FIT installation should be reported to the FIT Licensee, in accordance with the requirement within the Statement of FIT Terms. Appendix 1 contains example declarations for MCS-scale installations. ROO-FIT installations should also ensure this is reflected as an amendment to the ROO-FIT accreditation application on the Register.
- 3.32. This is important to ensure the information held about each FIT installation is accurate and up to date for assurance and audit purposes. This will include reviewing the installation’s accreditation conditions, assessing the eligibility of an installation to receive FIT payments and the level of payments claimed.
- 3.33. When notifying the change to co-locate storage, generators will need to provide the FIT Licensee, and where relevant Ofgem, with the following information:
- An updated single line or schematic diagram to identify how the electricity from the installation is provided to the storage facility and the metering arrangements in place.
 - In the case a bi-directional meter is installed:
 - Details of the meter, including meter make, model and operators manual.

- Confirmation of how the meter operates.
 - Confirmation, including photographic evidence, that the meter displays the net renewable generation without the need to manually subtract the imported/exported energy.
 - Copy of MID compliance certification.
 - Confirmation of whether the bi-directional functionality is set by the manufacturer or if the meter requires reprogramming by the installer.
 - Confirm whether the storage device can be charged by electricity supplied from the grid
 - Confirm whether the meter currently installed can be reprogrammed to measure net the generation output, which corresponds to the amount of electricity generated by the FIT installation only.
 - Details of the meter readings used to claim the FIT payments.
 - Details of the storage facility installed, including the date the storage facility was installed and became operational, and supporting evidence.
- 3.34. We may request additional information from generators or FIT licensees as appropriate in order to verify an installation's eligibility.

Example scenarios: Feed in Tariff

- 3.35. In this section, we provide some example scenarios of accredited FIT installations with co-located storage that we consider satisfy the requirements of the scheme. If claiming REGOs for a station that is REGO and FIT accredited, the scenarios below demonstrate both FIT and REGO eligibility. These examples are non-exhaustive and are for guidance only around certain factors and each case is decided on a case-by-case basis.

Scenario 4.1: Deemed export FIT installation with co-located storage installed after the generation meter.

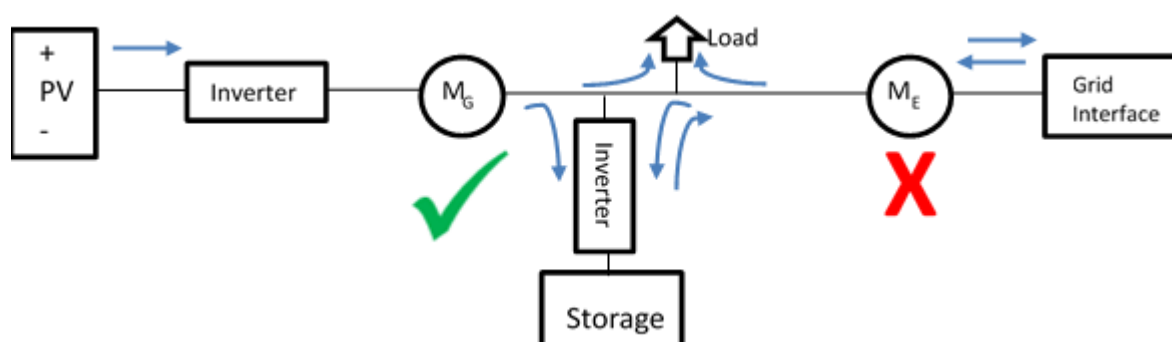


In this scenario the co-located storage is installed after the generation meter. It is assumed that the requirements to qualify for deemed export are met.²¹ The storage can be charged by both electricity generated by the FIT installation and electricity imported from the grid. The storage facility is able to supply any on-site demand and can export to the grid.

The generation meter can only measure the generation output of the FIT installation. On this basis, generation payments can be made. The generation metering requirements are met. Deemed export payments are unaffected.

In summary: both generation payments and deemed export payments **could be made**.

Scenario 4.2: Metered export FIT installation with co-located storage installed after the generation meter.



In this scenario the co-located storage is installed after the generation meter. The generation meter and export meter are meters which are not capable of measuring a net value. The storage can be charged by both electricity generated by the FIT installation

²¹ These requirements to receive deemed export are discussed in more detail in Chapter 3 of the <https://www.ofgem.gov.uk/publications/feed-tariffs-guidance-licensed-electricity-suppliers>.

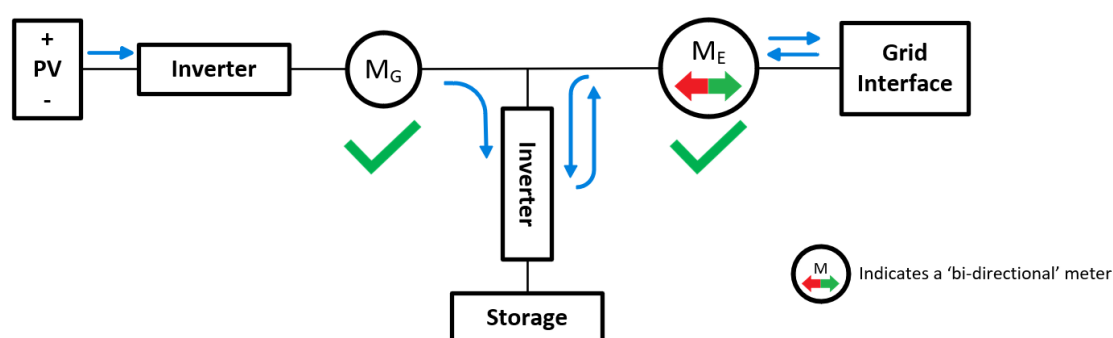
and electricity imported from the grid. The storage facility is able to supply any on-site demand and can export to the grid.

The generation meter only measures the generation output of the FIT installation. On this basis, the requirements for generation payments are met.

However, the requirements for export metering would not be met as the export meter cannot isolate the amount of electricity that is exported by the FIT installation. Here, the export meter will measure the total export, comprising both export from the FIT installation and export from the storage facility. As the storage can be charged from electricity imported from the grid, not all of the total export will be eligible to receive support. On this basis, no metered export payments can be made.

In summary: generation payments could be made, but no metered export payments could be made. Deemed export payments could be made, assuming that the requirements to qualify for deemed export are met.

Scenario 4.3: Metered export, stand-alone FIT installation with co-located storage.



In this scenario the co-located storage is installed after the generation meter, the site is a stand-alone installation and does not have an on-site load (beyond the auxiliary load of the installation). The export meter is a “bi-directional meter”, which is capable of measuring a net value. The storage can be charged by both electricity generated by the FIT installation and electricity imported from grid, and can export to the grid.

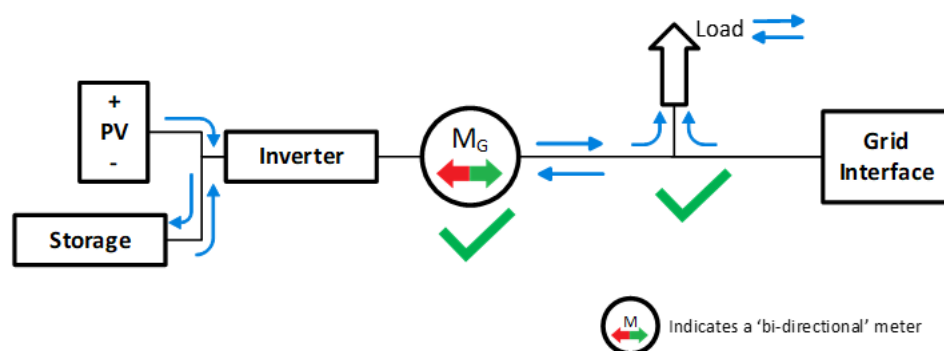
The requirements for generation metering can be met where the generation meter would measure only the generation output of the FIT installation. Here, the meter clearly does that. On this basis, generation payments can be made.

The requirements for export metering can be met where the export meter can isolate the amount of electricity exported by the FIT installation. Here, the export meter would

measure the total export, comprising the combined export from the FIT installation and from the storage facility as well as measuring the total imported electricity from the grid. As there is no on-site load in this scenario, the export meter calculates a net output which corresponds to the amount of electricity exported by the FIT installation. On this basis, metered export payments can be made.

In summary: both generation payments and metered export payments can be made.

Scenario 4.4: Deemed export FIT installation with co-located storage installed before the generation meter, with bi-directional meter.



In this scenario, the co-located storage is installed before the generation meter and shares an inverter with the solar PV FIT installation. It is assumed that the requirements to qualify for deemed export are met.²² The generation meter is a “bi-directional meter”, which is capable of measuring input and output, and calculating and displaying a net value. The storage can be charged by both electricity generated by the FIT installation and electricity imported from grid. The storage facility is able to supply the on-site demand load and can also export to the grid.

The requirements for generation payments would be met where the generation meter is an approved bi-directional meter and can isolate the amount of renewable electricity which has been generated by the FIT installation only. Here, the generation meter would measure generation output from both the FIT installation and the storage facility and any imported electricity used to charge the storage. In this scenario, the meter can measure the net generation output which corresponds to the amount of electricity generated by the FIT installation. This means even though the storage can be charged by a mix of

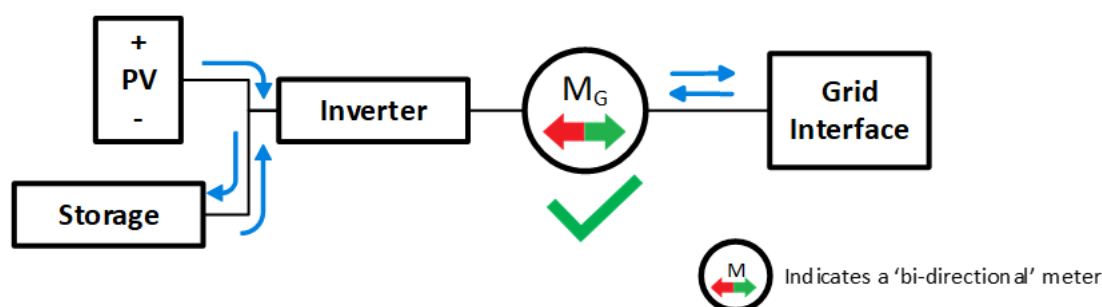
²² These requirements to receive deemed export are discussed in more detail in Chapter 3 of the <https://www.ofgem.gov.uk/publications/feed-tariffs-guidance-licensed-electricity-suppliers>

eligible and ineligible electricity, the meter can isolate the portion eligible to receive FIT support. On this basis, generation payments could be made.

Deemed export payments can be made as generation meter requirements are met.

In summary: both generation payments and deemed export payments could be made.

Scenario 4.5: Metered export FIT installation with co-located storage installed before the generation meter and with “bi-directional” meters without load.

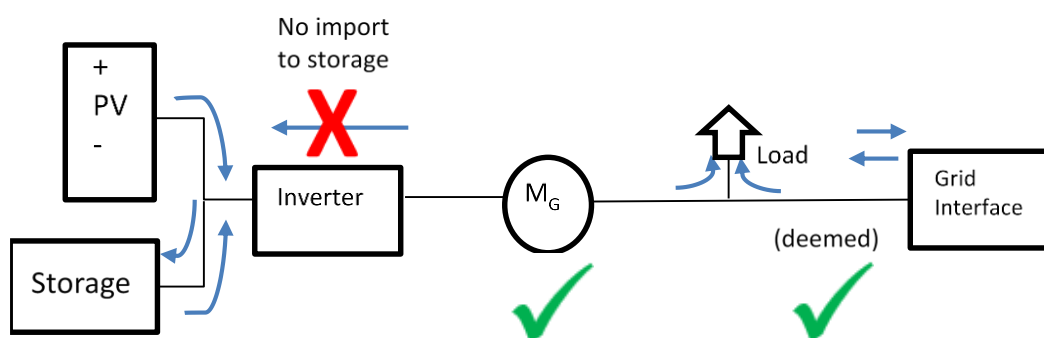


This scenario is the same as 4.4. but it does not have a load output. In this scenario, the co-located storage is installed before the generation meter and shares an inverter with the PV FIT installation. The generation meter is a “bi-directional meter”, which is capable of measuring input and output, and calculating and displaying a net value. The storage facility can only be charged by electricity imported from the grid.

The requirements for generation metering can be met where the generation meter can isolate the amount of electricity generated by the FIT installation. Here, the meter clearly does that. On this basis, generation payments can be made.

In summary: generation and export payments can be made.

Scenario 4.6: Deemed export FIT installation with co-located storage installed before the generation meter, charged only by the FIT installation.



In this scenario, the co-located storage is installed before the generation meter and shares an inverter with the solar PV FIT installation. It is assumed that the requirements to qualify for deemed export are met.²⁴ Here, the generation meter is capable of measuring output from both the FIT installation and the storage facility.

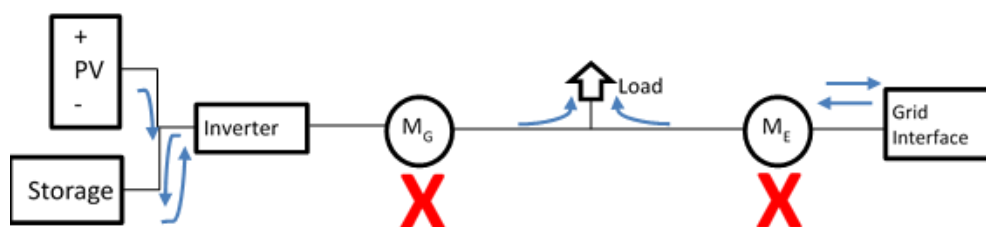
In this scenario, the co-located storage can only be charged by electricity generated by the FIT installation. Inverter settings are used to prevent importing from the grid. There may be other ways a generator could configure an installation to achieve the same effect.

Even though the generation meter is not capable of measuring a net value, as the storage device cannot be charged by grid supplied electricity, the generation meter only measures generation output from the FIT installation. Therefore, the requirements for generation payments are met.

Deemed export payments can be made as generation meter requirements are met.

In summary: both generation payments and deemed export payments can be made.

Scenario 4.7: Metered export FIT installation with co-located storage installed before the generation meter.



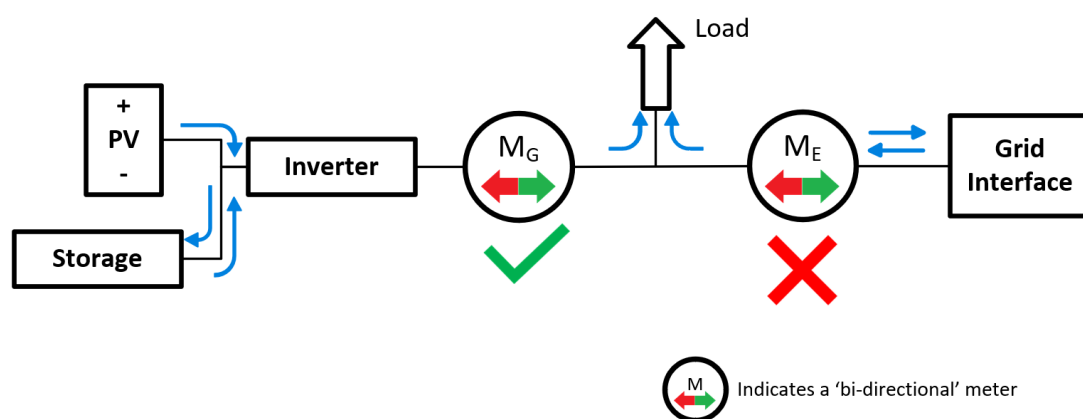
In this scenario the co-located storage is installed before the generation meter and shares an inverter with the solar PV FIT installation. Both the generation meter and export meter are meters which are not capable of measuring a net value. The storage can be charged by both electricity generated by the FIT installation and electricity imported from grid. The storage facility is able to supply the on-site demand and can also export to the grid.

The requirements for generation metering would not be met as the generation meter cannot isolate the amount of electricity generated by the FIT installation. Here, the generation meter measures output from both the FIT installation and the storage facility. As the storage can be charged from electricity imported from the grid, not all of this total output will be eligible to receive support. On this basis, no generation payments can be made.

Similarly, the requirements for export metering would not be met as the export meter cannot isolate the amount of electricity exported only from the FIT installation. Here, the export meter measures the total export, comprised of export from the FIT installation and export from the storage facility. As the storage facility can be charged from electricity supplied from the grid, not all of this total export will be eligible to receive FIT support. Therefore, no metered export payments can be made.

In summary: neither generation payments nor metered export payments could be made.

Scenario 4.8: Metered export FIT installation with co-located storage installed before the generation meter and with “bi-directional” meters.



In this scenario, the co-located storage is installed before the generation meter and shares an inverter with the PV FIT installation. Both the generation meter and export meter are “bi-directional meters”, which are capable of measuring input and output, and calculating and displaying a net value. The storage facility can be charged by both electricity generated by the FIT installation and electricity imported from the grid. The storage facility is able to supply the on-site demand load and can also export to the grid.

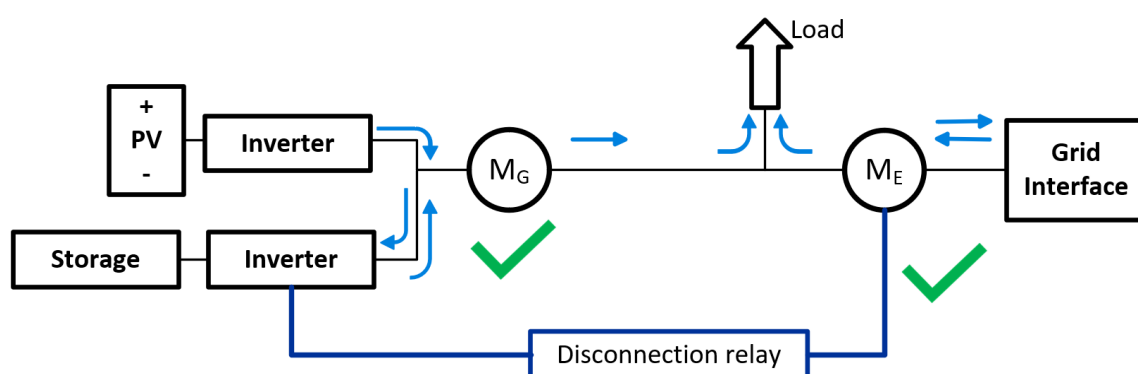
The requirements for generation metering can be met where the generation meter can isolate the amount of electricity generated by the FIT installation. Here, the generation meter would measure generation output from both the FIT installation and the storage facility, and the imported electricity used to charge the storage. In this scenario, as the meter is a “bi-directional meter”, it can measure the net generation output which corresponds to the amount of electricity generated by the FIT installation. This means even though the storage can be charged by a mix of eligible and ineligible electricity, the meter here can isolate the portion eligible to receive FIT support. On this basis, generation payments could be made.

The requirements for export metering would not be met where the export meter cannot isolate the amount of electricity exported by the FIT installation. Here, the export meter can measure the net export, comprising the combined export from the FIT installation and from the storage facility, and the total imported electricity from the grid.

However, in this scenario, the presence of the on-site load (which would draw electricity from the grid, the FIT installation and the storage facility) means that the export meter alone cannot distinguish the amount of imported electricity that is used to meet the on-site demand and the amount used to charge the storage. This means that although the export meter is capable of calculating a net export value, this net value would not correspond to the export solely from the FIT installation, but to a mix of electricity exported from eligible and ineligible sources. A single export meter could not isolate the export from the FIT installation. On this basis metered export payments cannot be made.

In summary: generation payments could be made, but no metered export payments can be made. Deemed export payments could be made, assuming that the requirements to qualify for deemed export are met.

Scenario 4.9: Metered export FIT installation with co-located storage, charged only by the FIT installation.



In this scenario, the co-located storage is installed before the generation meter. The configuration of the site means that the storage can only be charged by electricity generated by the FIT installation. In this example, a disconnection relay is used. The disconnection relay prevents the storage from charging whenever there is import from the grid; this allows the storage facility to supply the on-site demand load and also export to the grid (but not import and store electricity from the grid). The generation meter and export meter are meters which are not capable of calculating a net value.

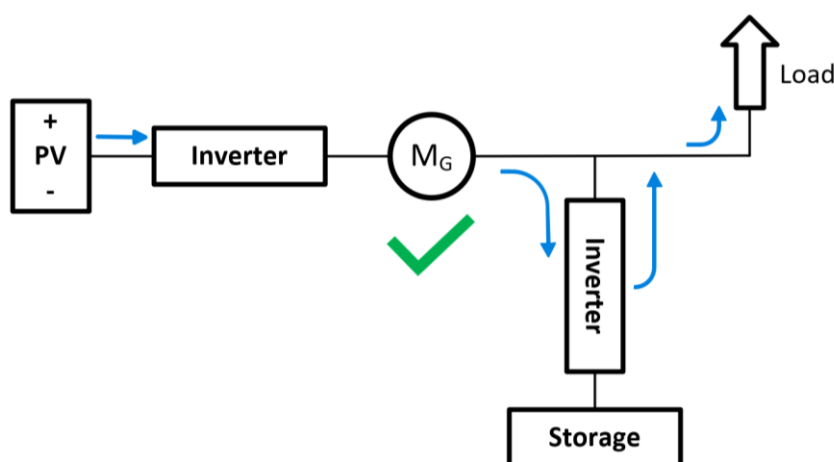
The requirements for generation metering can be met where the generation meter can isolate the amount of electricity generated by the FIT installation. Here, the generation meter would measure generation output from both the FIT installation and the storage facility, but as the storage facility can only be charged by the installation, all generation measured is electricity that is generated by the installation. On this basis, generation payments can be made.

The requirements for export metering can be met where the export meter can isolate the amount of electricity exported by the FIT installation. Here, the export meter would measure the total export, all of which is export from the FIT installation. On this basis, metered export payments can be made.

There may be other ways a generator could configure an installation to achieve the same effect. We encourage FIT licensees to bring cases where a software solution is utilised to our attention.

In summary: both generation payments and metered export payments can be made.

Scenario 4.10: Off-grid FIT installation with co-located storage.

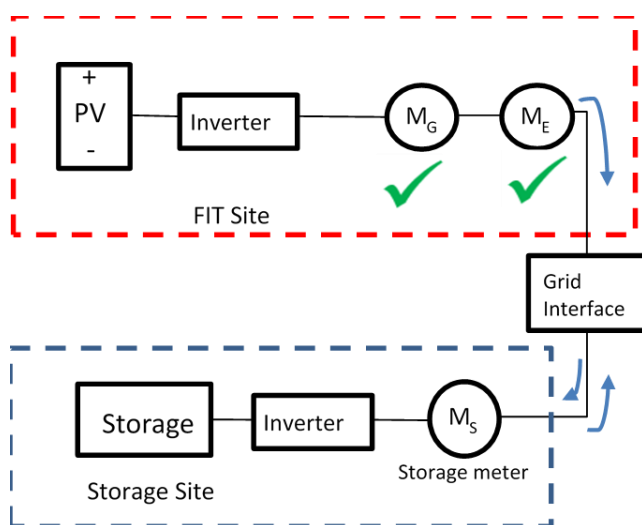


In this off-grid scenario the co-located storage is installed after the generation meter, the generation meter is a meter which is not capable of measuring a net value. The storage can be charged only by electricity generated by the FIT installation. The storage facility is able to help supply the on-site demand.

The requirements for generation metering can be met where the generation meter would measure only the generation output of the FIT installation. Here, the generation meter clearly does that. On this basis, generation payments can be made.

In summary: only generation payments can be made.

Scenario 4.11: Metered export, stand-alone FIT installation with co-located storage with separate settlement metering units.



In this scenario the co-located storage has been installed in close proximity to the FIT installation (for example at the same address and Ordnance Survey (OS) grid reference). The FIT installation and the storage have independent grid connection points and independent import/export metering (with associated MPANs). There are no electrical or mechanical interactions between the FIT installation and the storage. For the purposes of the FIT scheme the installation and the storage would be considered to be on separate Sites.²³ All the electricity generated by the FIT installation is exported. The storage facility can be charged by electricity imported from the grid.

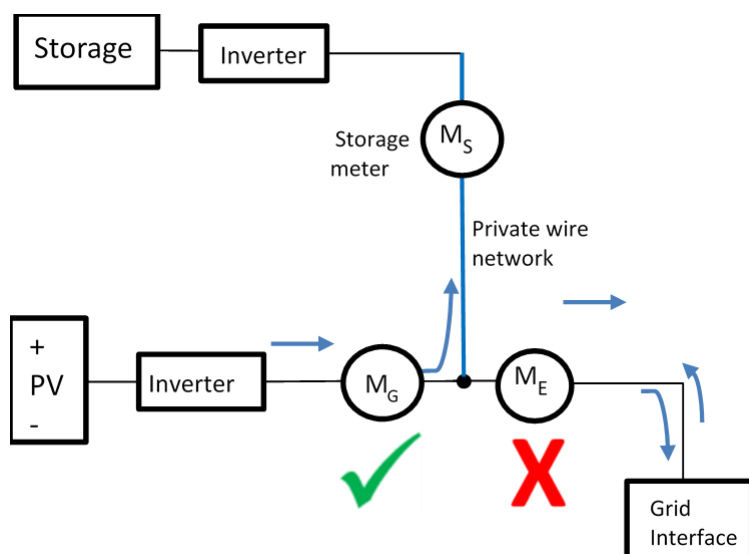
The requirements for generation metering can be met where the generation meter would measure only the generation output of the FIT installation. Here, the generation meter clearly does that. On this basis, generation payments can be made.

The requirements for export metering can be met where the export meter can isolate the amount of electricity exported by the FIT installation. Here, the export meter clearly does that. On this basis, metered export payments can be made.

In summary: both generation payments and metered export payments can be made.

Scenario 4.12: Metered export, stand-alone FIT installation with co-located storage supplied by private wire.

²³ More information on the definition of a FIT Site is provided in chapter 8 of our 'Feed-in Tariffs: Guidance for Renewable Installations'. <https://www.ofgem.gov.uk/publications/feed-tariffs-guidance-fit-generators>



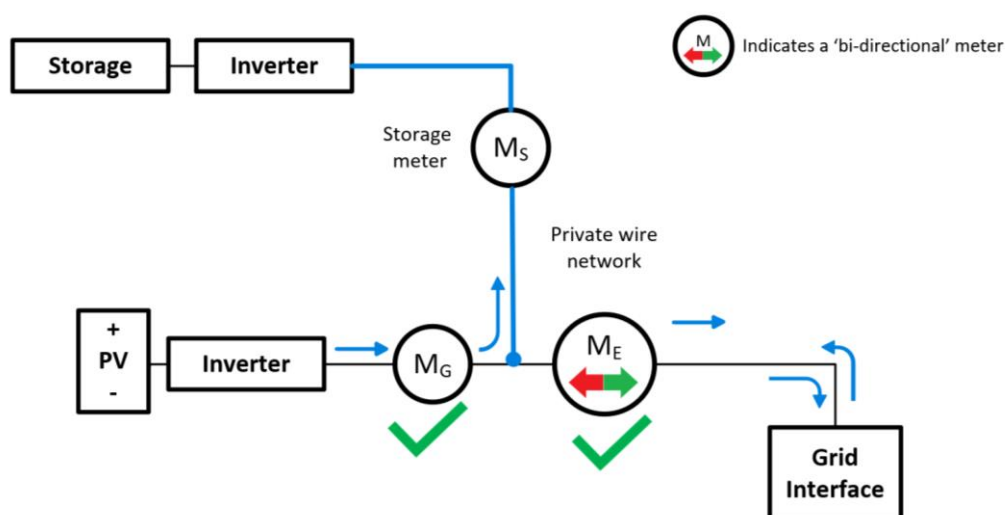
In this scenario, co-located storage has been installed and is supplied by the generating station via a private wire network. The FIT installation and the storage share an export meter. The electricity generated by the FIT installation is either supplied to the storage facility or exported to the grid. The storage facility is also able to import electricity from the grid.

The requirements for generation metering can be met where the generation meter would measure only the generation output of the FIT installation. Here, the generation meter clearly does that. On this basis, generation payments can be made.

However, the requirements for export metering would not be met where the export meter cannot isolate the amount of electricity that is exported by the FIT installation. Here, the export meter will measure the total export, comprising export from the FIT installation and export from the storage facility, but as the storage can be charged from grid supplied electricity, not all of the total export will be eligible to receive support. On this basis, no metered export payments can be made.

In summary: generation payments could be made, but no metered export payments could be made. Deemed export payments could be made, assuming that the requirements to qualify for deemed export are met.

Scenario 4.13: Metered export, stand-alone FIT installation with co-located storage supplied by private wire with bi-directional meter.



In this scenario, co-located storage has been installed and is supplied by the generating station via a private wire network. The FIT installation and the storage share a bi-directional export meter. The electricity generated by the FIT installation is either supplied to the storage facility or exported to the grid. The storage facility is also able to import electricity from the grid.

The requirements for generation metering can be met where the generation meter would measure only the generation output of the FIT installation. Here, the generation meter clearly does that. On this basis, generation payments can be made.

Unlike in scenario 4.12, the requirements for export metering are met as the export meter is bi-directional and able to measure a net value of electricity that is exported to the grid by the FIT installation.

In summary: generation and metered export payments could be made.

Appendices

1.1.1 Appendix 1 - Battery Storage Installation Declarations

The following scenarios and declarations are designed for MCS-FIT installations, to assist generators and FIT licensees in assessing the eligibility of installations with co-located storage for generation and export payments. These two scenarios are the most common setups under which MCS installations are eligible for generation and deemed export payments.

Under Scenario 4.6 the storage installation cannot charge from the grid. The installation is therefore eligible for generation payments, and export payments (metered or deemed)

are unaffected. The generator and installer should provide Declarations 1a and 1b to their FIT licensee.

Declaration 1a

I _____ ("the FIT Generator") certify in respect of this application for accreditation/accredited FIT installation [*delete as appropriate*] that the co-located storage system **cannot** charge from the grid.

Signed FIT Generator: _____

Dated: _____

Declaration 1b

I _____ ("the Installer") declare that the _____ ("model and manufacturer") battery storage system was installed on _____ ("date") at _____ ("address") on request of _____ ("the FIT Generator").

I certify that this battery system **cannot** charge from the grid, and attach a single line or schematic diagram showing how the electricity from the installation is provided to the storage facility and the metering arrangements in place.

Signed Installer: _____

Dated: _____

Under Scenario 4.1, the storage installation can charge from the grid. However, the generation meter is capable of measuring only the generation from of the FIT installation. This is either because the generation meter is located between the renewable installation and storage system, or because it is a bidirectional meter, as defined in guidance. Therefore, the installation is eligible for generation payments and deemed export payments are unaffected. The generator and installer should provide Declarations 2a and 2b to their FIT licensee, along with additional evidence described in the declarations.

Declaration 2a

I _____ ("the FIT Generator") certify in respect of this application for accreditation/accredited FIT installation [*delete as appropriate*] that the co-located storage system **can** charge from the grid.

Please tick the relevant box to confirm where the generation meter is located.

☐ Between the renewable installation and the storage system, meaning it only measures the output from the installation.

☐ After both the renewable installation and the storage system, but is a bi-directional meter capable of measuring input and output electricity, and calculating and displaying a net value, which is equivalent to the generation or export meter reading of the FIT installation only.

Signed FIT Generator: _____

Dated: _____

Declaration 2b

I _____ ("the Installer") declare that the _____ ("model and manufacturer") battery storage system was installed on _____ ("date") at _____ ("address") on request of _____ ("the FIT Generator").

I certify that this battery system **can** charge from the grid and that the generation meter is located:

☐ Between the renewable installation and the storage system, meaning it only measures the output from the installation.

☐ After both the renewable installation and the storage system, but is a bi-directional meter capable of measuring input and output electricity, and calculating and displaying a net value, which is equivalent to the generation or export meter reading of the FIT installation only.

I attach the following evidence that this is the case:

- Single line or schematic diagram showing how the electricity from the installation is provided to the storage facility and the metering arrangements in place.

As well as the following additional evidence where the meter is bi-directional.

- Details of the generation meter, including meter make, model and operators manual
 - Confirmation of how the meter operates
 - Confirmation, including photographic evidence, that the meter displays the net renewable generation without the need to manually subtract the imported/ exported energy
 - Copy of MID compliance certification
 - Confirmation of whether the bi-directional functionality is set by the manufacturer

Signed Installer: _____

Dated: _____

1.1.2 Appendix 2 – Hydrogen Co-location

- A2.1 The following content is not intended to be exhaustive, nor are they our preferred models. The content is designed to show generators how hydrogen co-location could work in practise, and to provide guidance on how hydrogen interacts with the RO and FIT schemes within existing guidance and legislation.
- A2.2 Application amendments will be reviewed on a case-by-case basis. Generators should have regard to their wider legislative responsibilities and other charges that they may be liable for including network charges and policy costs.

Hydrogen storage co-location

- A2.3 'Hydrogen storage' is when electricity is used to produce hydrogen which is then stored in liquid form, gas form or in materials such as metal hydrides. This hydrogen is then used to produce electricity at a later time. Here it is referring to the entire hydrogen storage covering all equipment for the power-to-hydrogen-to-power equipment, including any ancillary equipment.
- A2.4 Accredited generating stations or installations with co-location of any storage technology can still claim ROCs or retain FIT payments as long as:
- The installation or generating station complies with the scheme rules
 - The net generation of electricity from the accredited generating station or installation can be accurately measured (or deemed under FIT).
 - Under the RO the electricity is supplied to customers in GB or NI or used in permitted ways.
- A2.5 See sections 3 and 4 above for further detail on co-location under the FIT and RO schemes.

Hydrogen Production

- A2.6 The key consideration for any use of electricity generated by an accredited RO generation station or FIT installation is to ensure that it can be correctly metered. The simplest way to ensure this is to place a meter between the accredited generating station or installation and the hydrogen production and/or energy storage equipment that is storing the generated electricity. See below for example scenarios.

A2.7 Under the RO scheme, all electricity generated must be exported to customers in GB or NI or used in 'permitted ways'. Electricity that is generated and used on site by the generator may be a permitted way and so eligible for ROCs e.g. hydrogen production. For more information on 'permitted ways' see section two of the [RO Guidance for Generators](#).

Hydrogen use as feedstock in accredited generating stations or installations

A2.8 If an RO generating station includes hydrogen in the fuel mix the generator must notify us in the normal way and include the hydrogen production methods. We would need to agree new Fuel Measurement and Sampling (FMS) procedures with the generator to allow them to report fuel information and get information about the hydrogen production process, as well as the electricity used to produce it. For more information see section 3 of the [RO Fuel Measurement and Sampling Guidance](#).

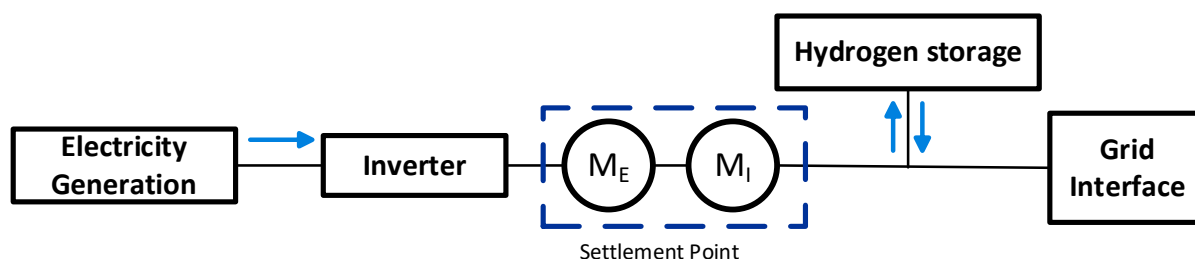
A2.9 Under the RO, when electricity is produced using green hydrogen (hydrogen produced from renewable sources) we must be able to account for the electricity used in its production.²⁴ The electricity used to generate the hydrogen will need to be reported as input electricity by the Generator who is claiming the ROCs. For more information on how to submit data see section 4 of the [RO Fuel Measurement and Sampling Guidance](#).

A2.10 Hydrogen cannot be used as a fuel in an accredited FIT installation.

RO Hydrogen Scenarios

Scenario 1: RO generating station with meter before hydrogen storage.

²⁴ [Renewable Obligations Order 2015](#) 2(1) 'total input electricity'.



A2.11 In this scenario, hydrogen storage has been installed on the same site as the RO generating station with the metering point located before the storage. This is not technically a co-location scenario as the generated electricity will pass through the meter before reaching the storage. The metering in place at the settlement point measures the electricity generated.

- The electricity generated by the accredited RO generating station passes through the meter before it is stored and/or exported to the licensed network to be supplied to customers in GB or NI.
- The export meter, M_E , measures the total export from the RO generating station. This meter reading may also be used to provide a check to validate the ROCs claimed.
- The import meter, M_I , measures the input electricity to the RO generating station from the grid and hydrogen storage.
- The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.

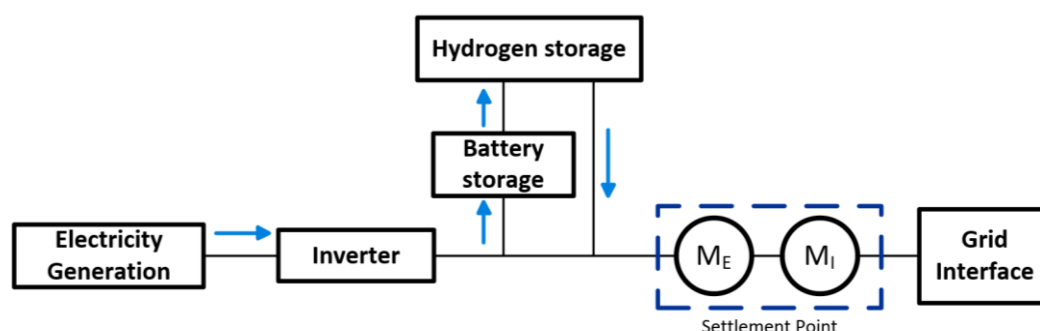
A2.12 The net generation of the RO generating station can be calculated using the formula below:

$$\text{Net generation} = \text{Total export electricity} - \text{Total input electricity}$$

$$\text{Net generation} = M_E - M_I$$

A2.13 **In summary: ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

Scenario 2: RO generating station with meter after co-located hydrogen storage with battery storage.



A2.14 In this scenario, hydrogen storage has been co-located with the RO generating station. The hydrogen storage is connected to a battery. The metering in place at the settlement point measures the electricity generated by the accredited generation station minus any electricity lost due to storage inefficiencies in the battery storage and hydrogen storage. There is no other electricity input into the hydrogen storage installation from any other source.

- The electricity generated by the accredited RO generating station can be stored in the hydrogen storage, battery storage and exported to the licensed network to be supplied to customers in GB or NI.
- The generation meter, M_E , measures the total output of the RO generating station minus electricity lost through storage.
- The generation import meter, M_I , measures the input electricity to the RO generating station, hydrogen storage and battery storage from the grid.
- The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.

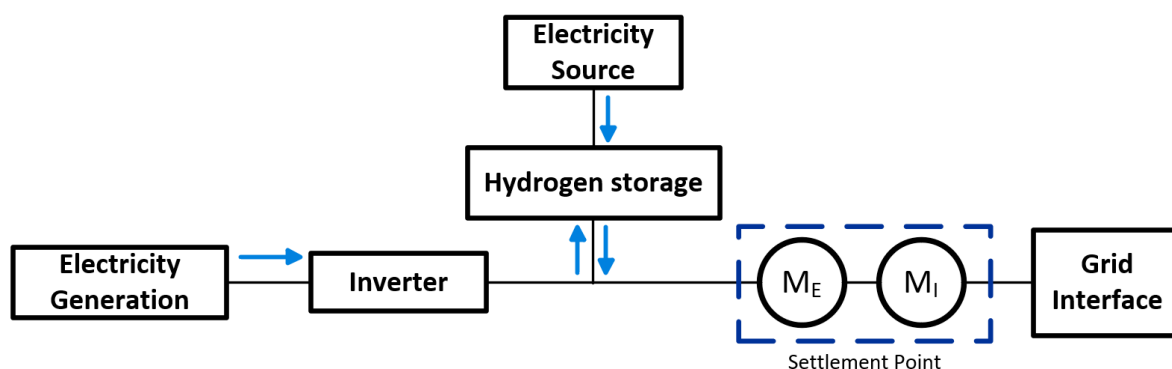
A2.15 The accredited generation of the RO generating station can be calculated using the formula below:

$$\text{Net generation} = \text{Total export electricity} - \text{Total input electricity}$$

$$\text{Net generation} = M_E - M_I$$

A2.16 **In summary: ROCs can be claimed** for the accredited generation, as calculated above, provided other scheme requirements are met.

Scenario 3: RO generating station with meter after co-located hydrogen storage with additional electricity source.

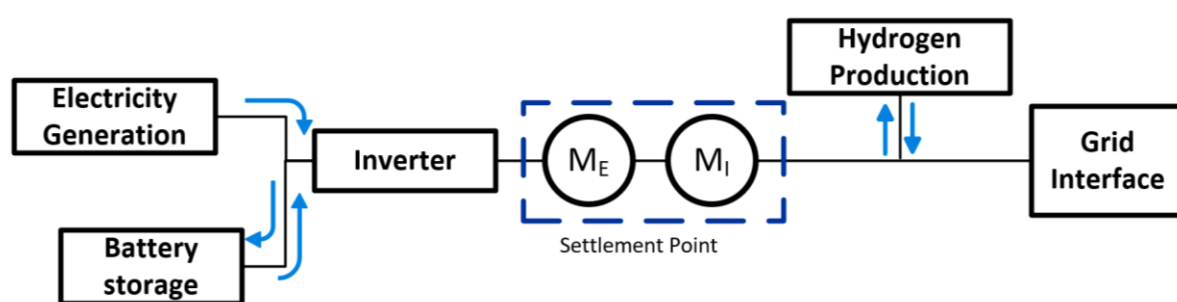


A2.17 In this scenario, hydrogen storage has been co-located with the RO generating station and has another source of electricity to the hydrogen storage. The metering in place at the settlement point measures the electricity generated and any electricity from the additional electricity source minus any electricity lost due to storage inefficiencies.

- It is not possible to calculate the electricity generated by the accredited generating station due to additional electricity input.

A2.18 **In summary: ROCs cannot be claimed** for the accredited generation as accurate metering is not possible.

Scenario 4: RO generating station with co-located storage and hydrogen production.



A2.19 In this scenario, electricity battery storage has been co-located with the RO generating station with hydrogen production equipment installed after the metering point. This is not technically a co-location scenario as the generated electricity will pass through the meter before reaching the storage. The metering in place at the settlement point measures the electricity generated.

- The electricity generated by the accredited RO generating station is used on-site to supply the storage facility, produce hydrogen and also exported to the licensed network to be supplied to customers in GB or NI.
- The export meter, ME, measures the total output of the RO generating station and battery storage.
- The import meter, MI, measures the input electricity to the RO generating station and battery storage from the grid.
- The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.

A2.20 The net generation of the RO generating station can be calculated using the formula below:

Net generation = Total export electricity - Total input electricity

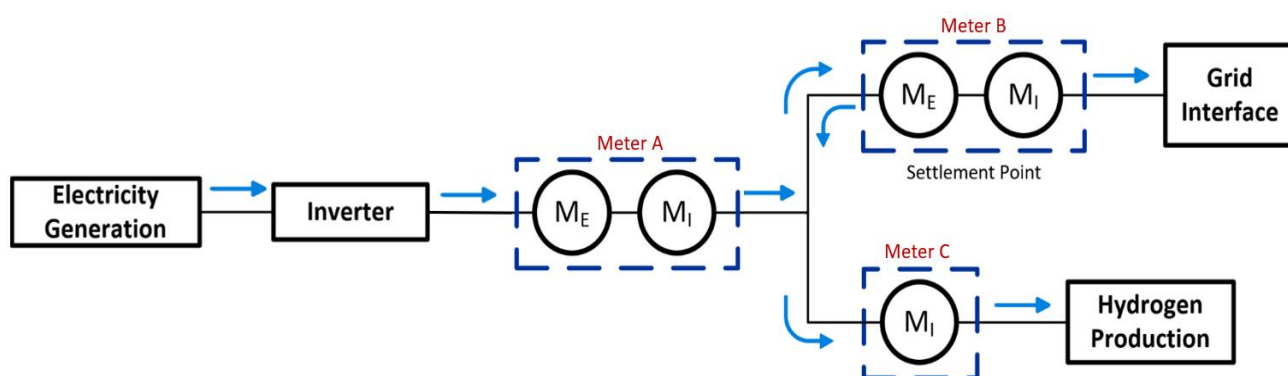
$$\text{Net generation} = M_E - M_I$$

A2.21 **In summary: ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met

A2.22 Below are two variations of the RO generating station co-located with hydrogen production, Scenario 5a and Scenario 5b.

A2.23 This is to demonstrate how a small change to the station's setup can impact its accreditation.

scenario 5a: RO generating station with co-located hydrogen production and dedicated metering



A2.24 In Scenario 5a, three meters allow for the input electricity to be accurately deducted so that ROCs are only issued for eligible electricity generation.

- The electricity generated is at least partially used on-site to produce hydrogen as a permitted way, and also exported to the grid.
- The generation export meter in meter A, ME, measures the total electricity production from the RO generating station.
- The generation import meter in meter A, MI, measures electricity imported to the generating station from the grid.
- The generation export meter in meter B, ME, measures the electricity exported from the RO electricity generating station.
- The generation import meter in meter B, MI, measures the input electricity to the RO generating station from the grid which may be used to provide input electricity to the RO generating station and hydrogen production installation.
- The generation import meter in Meter C, MI, measures the input electricity to the Hydrogen Production facility from the RO accredited generation as a permitted way and the grid.
- The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.
- All the electricity generated by the accredited RO generating station passes through any of the meters before being exported or used to generate hydrogen.

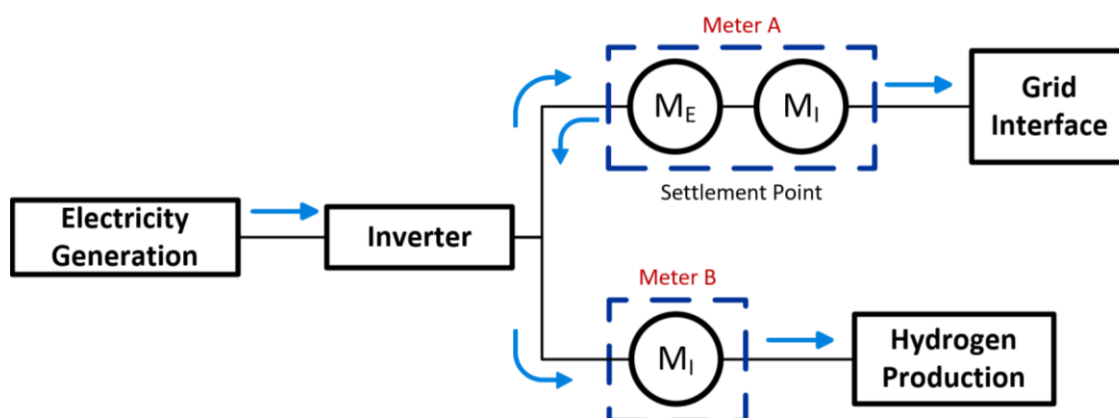
A2.25 The net generation of the RO generating station can be calculated using the formula below:

Net generation = Meter A electricity export – Meter A electricity input

$$\text{Net generation} = (\text{AM}_E - \text{AM}_I)$$

A2.26 **In summary: ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

Scenario 5b: RO generating station with co-located hydrogen production



A2.27 In Scenario 5b, the set-up is identical to Scenario 5a above, except for the absence of an export and import meter after the inverter.

A2.28 Two meters allow for the electricity exported to the grid to be correctly measured so that ROCs are only issued for eligible electricity generation.

A2.29 The input electricity would be removed from net generation calculations and so the eligible electricity would be reduced.

- The electricity generated is at least partially used on-site to produce hydrogen as a permitted way, and also exported to the grid.
- The generation export meter, M_E , measures the electricity exported from the RO electricity generating station.
- The generation import meter in meter A, M_I , measures the input electricity to the RO generating station from the grid which may be used to provide input electricity to the RO generating station and hydrogen production installation.
- The generation import meter in Meter B, M_I , measures the input electricity to the Hydrogen Production facility from the RO accredited generation and the grid as a permitted way.
- Two meters are necessary as, under the RO, electricity exported to the grid must be metered separately to electricity used in permitted ways.
- The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.
- All the electricity generated by the accredited RO generating station passes through either of the meters before being exported or used to generate hydrogen.

A2.30 The net generation of the RO generating station can be calculated using the formula below:

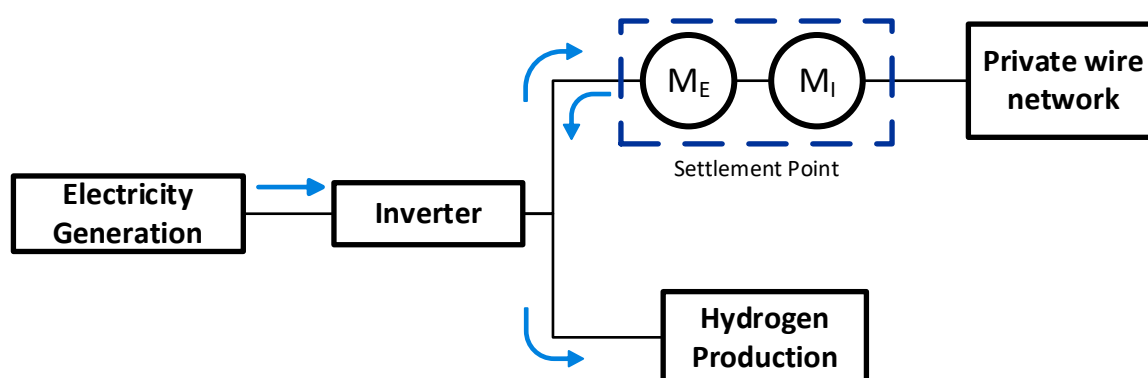
Net generation = Meter A net electricity export + Meter B electricity import to hydrogen facility

$$\text{Net generation} = (\text{A}M_E - \text{A}M_I) + (\text{B}M_I)$$

A2.31 The absence of a meter after the inverter means that the calculation for determining net generation requires conservative deductions. This means that less ROC's may be issued to the generator for an equivalent amount of electricity production when compared with scenario 5a.

A2.32 **In summary: ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

Scenario 6: RO generating station with private wire network, hydrogen production and insufficient metering.



A2.33 In this scenario, hydrogen production has been co-located with the existing RO generating station which is supplied by the private wire network.

- The electricity generated is at least partially used on-site to produce hydrogen, and also exported through a private wire network.
- The meters only measure the export and import of electricity through the private wire network.
- There is no meter before the hydrogen production installation.
- The operator should retain records of these meter readings for audit purposes, and to provide assurance of the number of ROCs claimed.

A2.34 This does not meet the requirement for suitable ROC metering as it does not measure all output from the RO generating station. **No ROCs can be claimed for the unmetered generation unless a suitable estimate agreement can be made.**

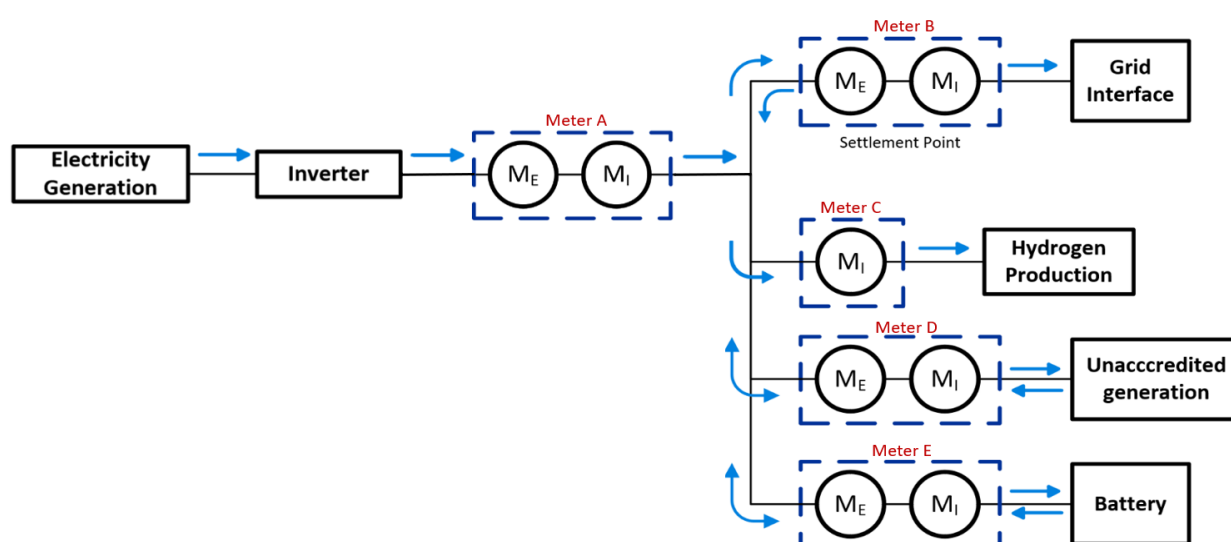
A2.35 Below are two variations of the same case, Potential Example 1a and Potential Example 1b. This is to demonstrate how a small change to the station's setup can impact its accreditation.

A2.36 These are potential applications of scenarios 5a and 5b above where hydrogen production has been located with the RO accredited generating station which is exporting to the grid.

A2.37 Alongside the hydrogen production plant, the accredited generating equipment has been co-located with unsupported capacity and battery storage.

A2.38 Multiple meters are needed so that electricity exported to the grid can be correctly metered so that ROCs are only issued for eligible electricity generation. The input electricity would be removed from net generation calculations.

Potential Example 1a: Multiple system exports and imports with dedicated metering



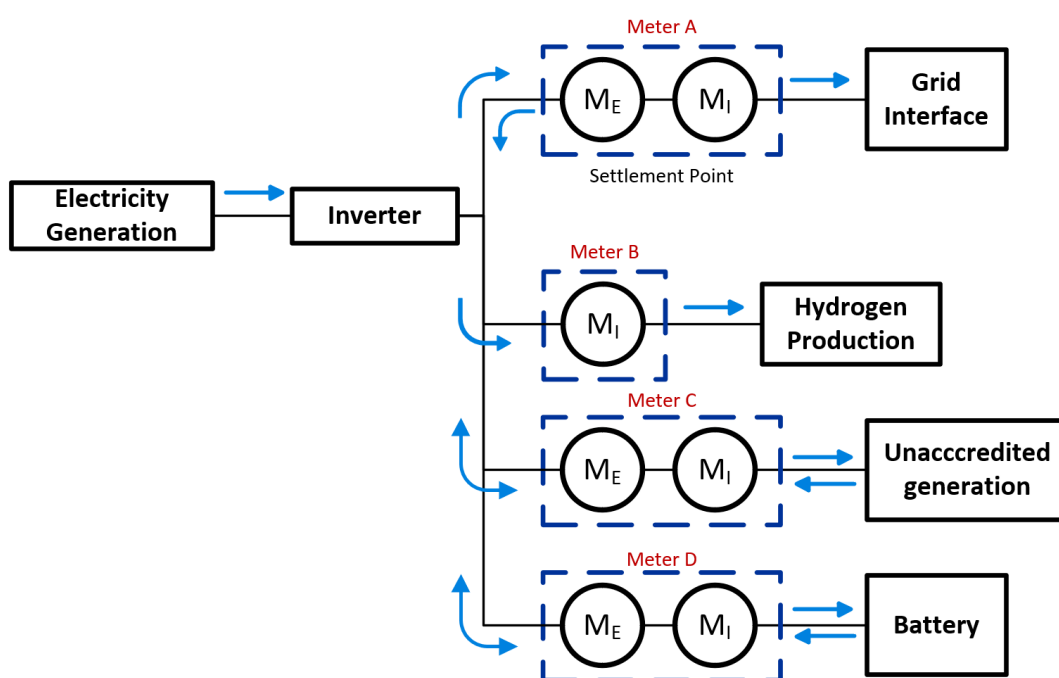
A2.39 In Potential Example 1a, the presence of an import and export meter after the inverter means that eligible generation can be accurately calculated for the accredited station.

A2.40 Net generation = Meter A electricity export – Meter A electricity import

$$\text{Net generation} = (\text{AM}_E - \text{AM}_I)$$

A2.41 **In summary: ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

Potential Example 1b: Multiple system exports and imports



A2.42 Similarly to Scenario 5b, the absence of the additional measures means a more conservative approach to calculating net generation is necessary.

A2.43 This means that less ROC's may be issued to the generator for an equivalent amount of electricity production when compared with Potential Example 1a.

A2.44 Net generation = Meter A net electricity export + Meter B electricity import to hydrogen facility - Meter C net electricity export - Meter D net electricity export

$$\text{Net generation} = (\text{AM}_E - \text{AM}_I) + (\text{BM}_I) - (\text{CM}_E - \text{CM}_I) - (\text{DM}_E - \text{DM}_I)$$

A2.45 **In summary: ROCs can be claimed** for the net generation, as calculated above, provided other scheme requirements are met.

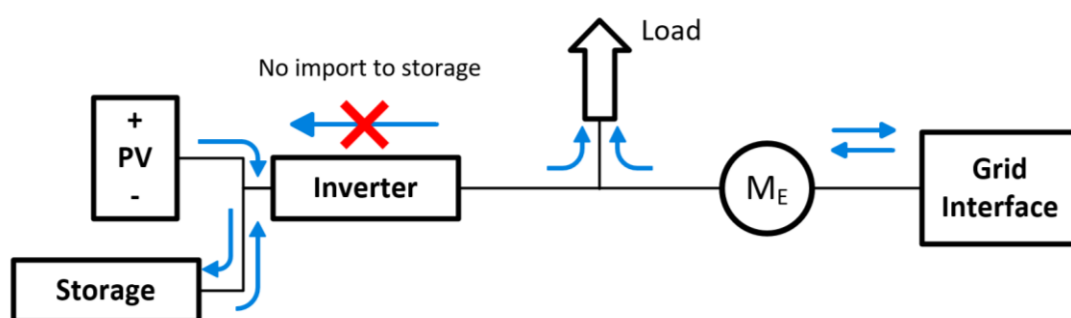
1.1.3 Appendix 3 – Co-locating Battery Storage with the SEG

- A3.1 Generators are able to add battery storage to their installation that is receiving SEG payments as long as the export meter is still able to measure the amount of electricity generated/exported from the installation separately from any other source.
- A3.2 SEG Licensees are only obliged to make SEG payments where a SEG installations meets the eligibility requirements. SEG Licensees will make an assessment on whether an installation meets the SEG requirements following receipt of a prospective SEG Generator's application to receive export payments.
- A3.3 SEG Licensees are obligated to make SEG payments when the electricity stored in co-located storage and subsequently exported can be guaranteed to only have come from the SEG installation (green export).
- A3.4 Where the export meter for an eligible installation also records, but cannot determine the amount of, electricity exported from another source ("Brown Export"), a SEG licensee is not obliged to make SEG payments. SEG Generators should check with their SEG Licensee as to how the Licensee will view any intended changes to the co-located storage.

Example scenarios: Smart Export Guarantee

- A3.5 In this section, we provide some example scenarios of SEG installations with co-located storage that we consider satisfy the requirements of the scheme. These examples are non-exhaustive and we consider that participants could implement variations on these approaches.

Scenario 1: Inverter settings are used to prevent the storage device from importing electricity from sources other than the accredited SEG installation.



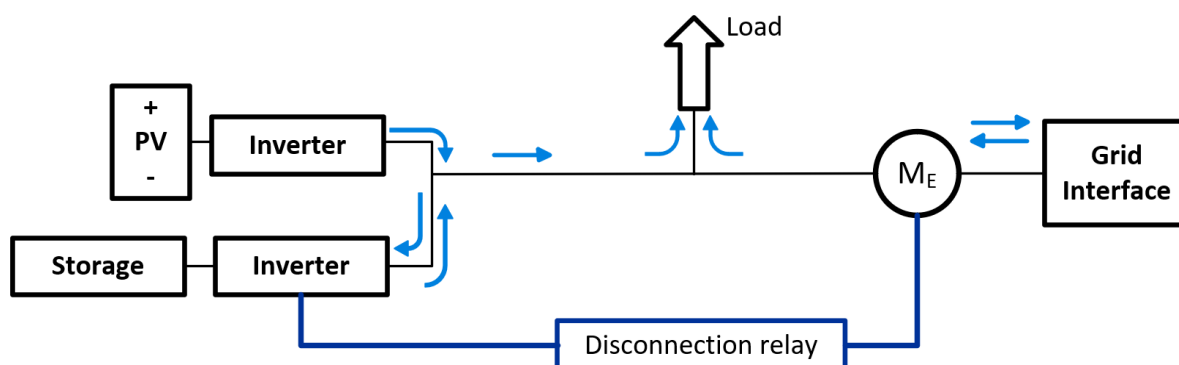
A3.6 In this scenario, the co-located storage is installed before the inverter, which is shared with the SEG installation.

A3.7 The co-located storage can only be charged by electricity generated by the SEG installation; inverter settings are used to prevent importing from the grid. There may be other ways a generator could configure an installation to achieve the same effect.

A3.8 The storage device cannot be charged by electricity from any source other than the installation; only export from the SEG installation is measured. There is no risk of any brown export. Suppliers can be satisfied that payments are made on green export only.

A3.9 **In summary:** licensee is obligated to make SEG payments on the basis of green export.

Scenario 2: The disconnection relay prevents the storage from charging whenever there is import from the grid. Any export is green export only.



A3.10 The configuration of the site means that the storage can only be charged by electricity generated by the SEG installation. In this example, a disconnection relay

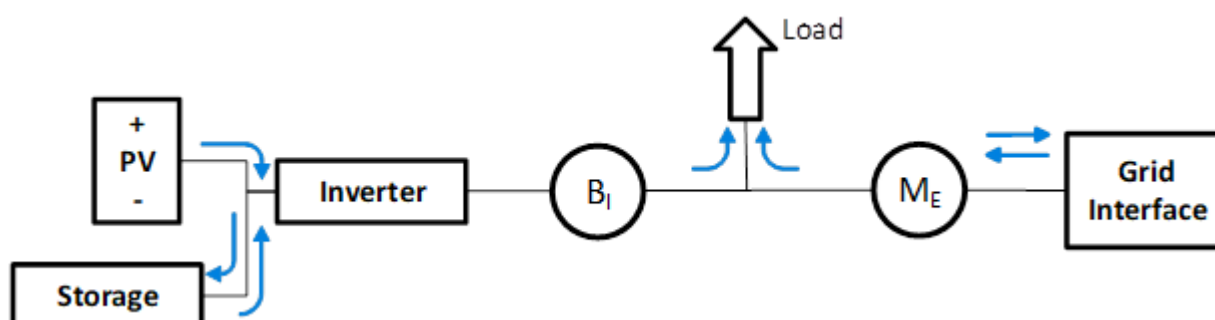
is used. The disconnection relay prevents the storage from charging whenever there is import from the grid; this allows the storage facility to supply the on-site demand load and also export to the grid (but not import and store electricity from the grid).

A3.11 The export meter can isolate the amount of electricity exported by the SEG installation. Here, the export meter would measure the total export, all of which is export from the SEG installation.

A3.12 There may be other ways a generator could configure an installation to achieve the same effect. We encourage SEG licensees to bring cases where a software solution is utilised to our attention.

A3.13 **In summary:** licensee is obligated to make SEG payments on the basis of green export.

Scenario 3: Electricity imported from the grid for storage in the storage device.



A3.14 In this scenario, the co-located storage shares an inverter with the SEG installation. The storage facility can be charged by both the SEG installation and electricity imported from the grid. The storage facility can supply the on-site demand load and can also export to the grid.

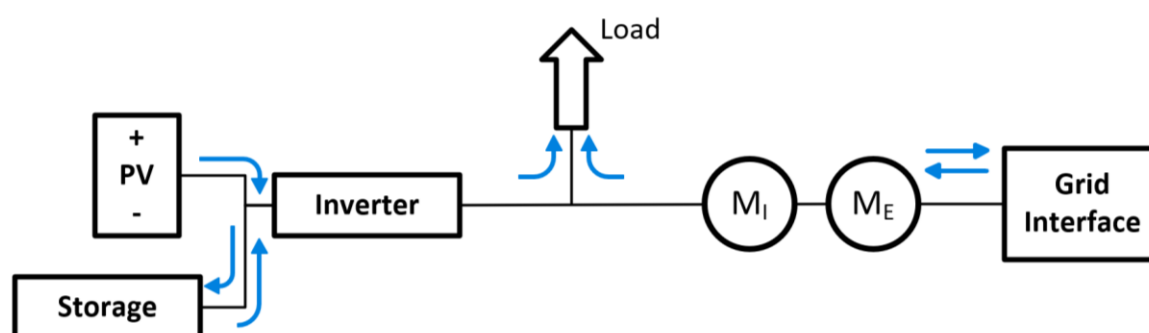
A3.15 The import meter readings taken using meter B_I (which records import to the storage device only) are deducted from export meter readings taken using meter M_E to calculate green export. If the difference between import and export in one month is negative, no SEG payments can be claimed.

A3.16 In this scenario, the co-located storage can import both green and brown electricity and so the export meter reading may include electricity generated by the SEG

installation and exported as well as electricity imported from the grid, stored and then exported. Given a calculation would be needed to determine the green export, a SEG Licensee would not be obliged to make SEG payments.

A3.17 **In summary:** licensee is not obligated to make SEG payments on the basis that a calculation would be required to determine the green export. A Licensee might accept the principle that green export can be calculated in this scenario and make payments on that calculated green export.

Scenario 4: SEG supplier deducts the import meter from the export meter to calculate the overall electricity exported.



A3.18 In this scenario, the co-located storage shares an inverter with the SEG installation. The storage facility can be charged by both the SEG installation and electricity imported from the grid. The storage facility can supply the on-site demand load and can also export to the grid.

A3.19 The meter M_E can measure the export, comprising the combined export from the SEG installation and from the storage facility. The meter M_I can measure the total imported electricity from the grid both for use onsite and for storage in the storage device. The co-located storage can import both green and brown electricity and so the export meter reading may include electricity generated by the SEG installation and exported as well as electricity imported from the grid, stored and then exported. Given a calculation would be needed to determine the green export, a SEG Licensee would not be obliged to make SEG payments.

A3.20 Also, the import for the onsite loads may exceed any export recorded by the export meter M_E . When the calculation is completed, this may result in a negative export value and no SEG payments being made.

A3.21 **In summary:** licensee is not obligated to make SEG payments on the basis that a calculation would be required to determine the green export. A Licensee might accept the principle that green export can be calculated in this scenario by subtracting the electricity recorded on the import meter from the electricity recorded on the export meter and make payments on that calculated green export.