Contents

In all cases below, options are listed with considerations; **recommendations** in **bold**
All recommendations and decisions are prefixed with *must*, *should* or *could*.

AG1 meeting purpose and outcomes

To agree:

1. Definition of scope, detail, standards and methods used for the demonstrator for other AGs to work with.
2. The impact and business cases for stakeholders
   ('so what' questions for the banks - automated lending and de-risking, and track them. Address financed emissions.)
3. Initial scope for verification and assurance

Guiding Principles

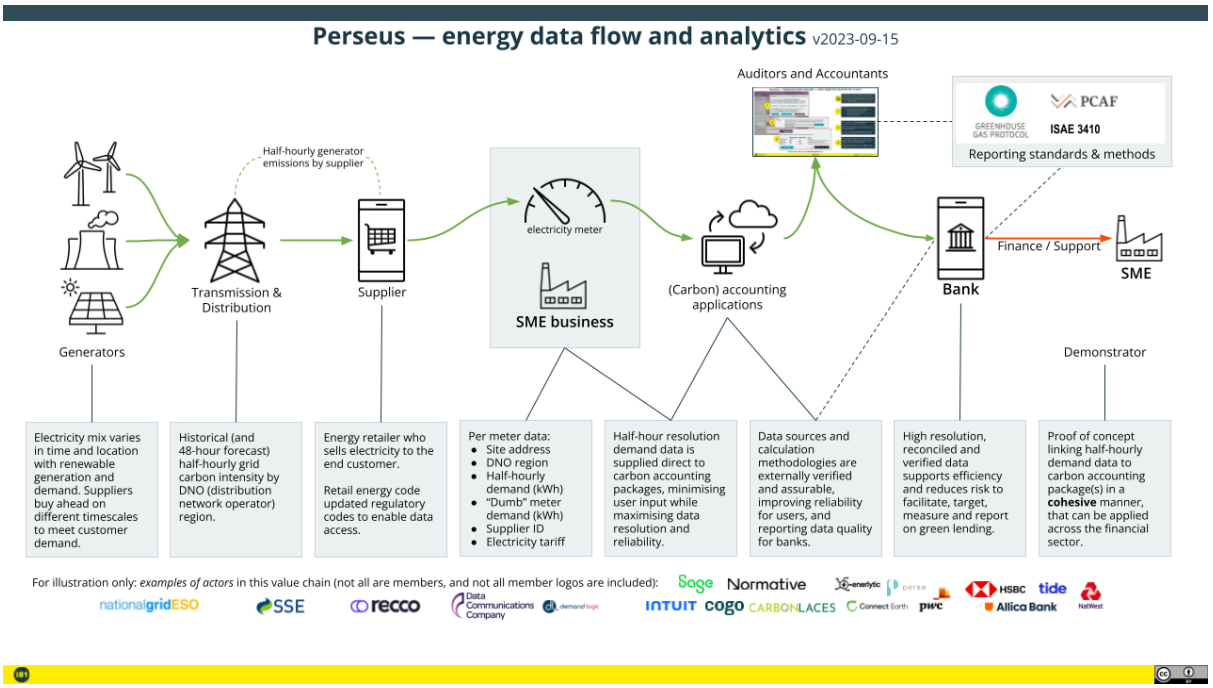
To be considered throughout:

1. Users
   - Primary Users (Banks, SMEs, Asset Managers, Third Parties)
   - Data providers
   - Related stakeholders
   - https://ib1.org/perseus/business-case/
2. Data needs
3. Reporting needs
4. Impact and decision-making needs

Definitions for 2023 scope (for a cohesive approach)

We define the scope of Perseus to include scientific, technical, legal, policy and communications areas. To create a cohesive and aligned approach across the market, a multistakeholder group has convened to discuss and align upon an *implementation* that is fit for purpose to enable the automation of GHG reporting in a meaningful and impactful manner.

Perseus members agree the 2023 scope is to align around a cohesive, comparable and interoperable implementation of footprinting electricity, for Scope 2 reporting, aligned with the PCAF standard and GHG Protocol Methodology.



This **Must**

- For a specific, variable time period selected by the user, and for a defined Meter Point Administration Number (MPAN), to return:
    - **Half-hourly** (HH) **demand/consumption data** from smart meters. (e.g. data from SmartDCC and/or other commercial solutions);
    - **Tariff** information. Data from a trusted Source;
    - **HH grid carbon intensity** data, for the relevant DNO. Data from National Grid ESO[1];
- For non-DCC metered information (e.g. from commercial third parties which enable disaggregated submetering from managed offices)
    - **HH demand data** via an assurable third-party service
    - **HH grid intensity** as above
    - Link(s) to legal identifiers that represent the end customer (e.g. SME sublet of a managed office)
- In all cases, the provision of data must be able to be made on a **bulk-request** call by a data user from a data supplier, on a weekly, monthly, quarterly or annual basis. Such bulk requests must contain all data at HH resolution in a **technically efficient** manner (AG2).
- Such requests must be covered by **legal** terms that enable the usage of the data for the purpose(s) defined herein, and restrict usage of the data for any other purpose (AG3)
- The **purpose** of such usage, including **rights** and **restrictions**, must be made clear and transparent to all users in the value chain (AG4)
- Where applicable, **policies** and **regulatory** changes must be made to enable the usage of the data for the **purpose**(s) herein at a national scale and aligned with the national data strategy (AG5)

[1] Carbon Intensity API (carbon-intensity.github.io)

This **Should** return:

- MPAN from company name and address data. Data from SmartDCC;
- Supplier ID from MPAN. Data from SmartDCC;
- Dumb meter data from MPAN. Data from SmartDCC.

Considerations for 2024 scope

Perseus members agree that the scope for 2024 should include:

Must

- Future scope considerations must be considered for inclusion:
    - Areas beyond electricity (e.g. other energy types, water, agriculture)
    - Utilisation of the same framework internationally (under the NZBA umbrella)

Should

- Future scope considerations should be considered for inclusion:
    - Utilisation of the same framework to enable reporting data to be shared across the market (as part of Scope 3 reporting)
- For a specific time period and Meter Point Administration Number (MPAN), to return:
    - HH generation data per tariff, per supplier (to allow calculation of true carbon-free energy, CFE%).

Could

- Include onsite generation data
- Future scope that could be considered for inclusion:
    - Utilisation of the same framework to extend downstream (domestic)
    - Utilisation of the same framework to extend upstream (enterprise)
    - Utilisation of the same framework for other sectors (e.g. other forms of finance, insurance, asset management, etc)
    - Such considerations may be beyond the scope of Perseus and its relationship with the NZBA umbrella.

Impact question considered during discussion and approval

Does Perseus increase lending & incentives targeted at achieving Net Zero?

- **Reducing risk**
- Meeting regulatory requirements
- Increasing efficiency, improved accuracy and quality
- Permit development of new financial instruments, or other opportunities?
- [Are these the right questions? If not, what are?]

Framing considered during discussion and approval

Reporting & data

- What compliance is necessary (and sufficient)?
    - **GHG Protocol** (location-based, market-based calculation methodology);
        - (Protocol consultation currently under review)
    - **PCAF** (financed emissions);
- What is the public sector perspective?
    - Members are prioritising SBTi commitments and Carbon Reduction Plans (CRPs) under UK Procurement Policy Note 06/21 (PPN 06/21[2])

Context

We're not building a carbon calculator or a new standard, we're building a Trust Framework for data exchange that will enable carbon calculators to access and use assurable data from the real economy. This will be supportive to the implementation of carbon footprinting against existing standards.

SBTi, PPN 06/21 Carbon Reduction Plans and all other GHG Reporting standards are based on the GHG Protocol. In this *initial* context, we are concerned with Scope 2 emissions, which the GHG Protocol allows to be calculated using two methodologies: location-based and market-based. (Note: if market-based is used, location-based must also be reported.)

With the addition of good quality, publicly-available data, the demonstrator has enough information to calculate emissions using the location-based methodology to a higher resolution than current standard practice. With the addition of currently available data, market-based calculations can also be performed, although not yet to a similar resolution (until half-hourly generation data is included), and subject to the current flaws in the UK electricity market (specifically unbundled REGOs).

It was proposed in discussion that a market-based approach requires additional data which is difficult to access and may be a barrier to SMEs reporting (e.g. Renewable Energy Certificates purchased, Power Purchase Agreements, etc.); that consideration should be given to whether market-based calculations are necessary for the pilot and if so how the additional data will be gathered to make these calculations possible. One suggestion would be to provide energy supplier names so that carbon calculators can generate and apply supplier-specific emissions factors, or alternatively provide a set of open source supplier-specific emissions factors.

Based on this, additional research was undertaken into data requirements and availability. A subgroup comprising metering, supplier and DNO representatives was convened and these issues have been progressed.

Half-hourly demand data per MPAN is readily available, as is tariff data. Half-hourly generation data may be more problematic, but will be critical for decarbonisation. It is proposed that this goes on the roadmap, with the demonstrator focussing on half-hourly demand.

[2] Procurement Policy Note 06/21: Taking account of Carbon Reduction Plans in the procurement of major government contracts - GOV.UK (www.gov.uk)

SmartDCC have said that they can return address data, given an MPAN. It is not yet clear whether they can do the reverse, so that MPANs can be looked up, using only address data. This can be done in a piecemeal fashion already, using individual electricity supplier websites (and of course the MPAN is printed on every electricity bill) but it is not clear whether it can be done automatically. If this functionality is required, this will need to be resolved, but for the POC, and the 2023 scope, the unique identifier will be the MPAN.

- What data is necessary? (Current position in **bold**)
    - Electricity consumption:
        - Time resolution (**half hourly**, hourly, less?)
        - Spatial resolution (Group, company, **MPAN**, circuit?)
    - Grid carbon intensity
        - Spatial resolution (country, region, **DNO**, primary station?)
        - Forecast, or **historical** only?
    - Generation:
        - **Single DNO regional grid "bucket?"**
        - Pass through (green tariff)?
        - Adjustment of grid carbon intensity to compensate for demand taken out by green tariffs;
        - Generation data source:
            - Is data from large generators sufficient?
            - Is settlement data lag a problem?
    - **Tariff (pricing) information**
        - Useful for Return on Investment (ROI) calculation
        - Useful for ROI on decarb solutions, can be provided by DCC
        - Useful for avoiding calculation errors when discounting spend from an SMEs' transaction/accounting data.
        - Helps build the business case for reduction actions which is the primary adoption driver for SME

For the demonstrator, communication of MPAN and half-hourly (HH) demand is sufficient (with date/time from and to). SmartDCC has confirmed that the following additional data is also available:

- Site address;
- Tariff;
- Dumb meter demand;
- Supplier ID;
- Generator carbon intensity from mandatory Fuel Mix Disclosure (this is an averaged annual figure, including unbundled REGOs).

Other data sets researched include:

- Additionally, HH resolution grid carbon intensity is available from National Grid ESO (Carbon Intensity);

- Historical and 48H forecast.

Value to stakeholders

Value to banks and carbon accounting vendors (e.g. https://ib1.org/perseus-faq/). Data must result in a product which provides models for sustainable lending.

- Automated analysis of demand profile unlocks targeted recommendations for decarbonisation actions (confirming the suitability of interventions already in lending taxonomy, and supporting those that are not);
- Detailed data facilitates the ability to **coordinate with energy efficiency experts, unblocking the extension of decarbonisation services to small businesses;**
- **The use of automated data allows automated assurance and de-risking on the regulation of reporting requirements (e.g. PCAF);**
- **Demand and tariff data together allow automated calculation of:**
  - Return On Investment
  - GHG emissions reduction (location-based)
  - **Inputs into automated reporting (e.g. SBTi)**
- Driving decarbonisation through market-based calculation (green tariffs) requires the matching of generation and demand data at half-hourly resolution (on the road map).
- **Verification and Assurance**
  - **Define 'verifiable' and/or 'assurable' in the context of this application**
  - **Process for data sharing can be independently verified by a third-party**
  - Can be machine-verified as coming from a trusted source that is part of the Trust Framework
  - **Raw data can be independently verified by a third-party**

Automated tracking of GHG emissions reduction.

Value to SMEs (primary message)

- High-quality, assured data capture with minimal effort facilitates improved carbon footprinting and reporting;
- Automated analysis of demand facilitates targeted recommendations for decarbonisation and cost savings;
- Greater detail and assurance improve efficiency and reduce risk for banks, improving access to green finance

For the roadmap

- Tariff data
- MPAN address
- Supplier ID
- Supplier annual fuel mix
- TBC:14 geographical regions, based on DNOs
  - [Can be cross-referenced with already available emissions data];
  - Each DNO region is treated as a single "bucket."

- Matching of generation with demand per supplier (CFE green tariffs);
- RECCo sandbox
- Link to denominator data (e.g. floor area, employee numbers, turnover).

For future discussion, scoping and development

On electricity:

- Calculation methodologies:
    - Spatial resolution of location-based calculation: does it make sense to resolve to the DNO level?;
    - Temporal resolution of generation emissions for market-based calculation: can half-hourly generation data be obtained from suppliers?;
    - Credibility of unbundled REGO system
    - Feedback to inform grid carbon intensity of remaining generation - is it better to do the national average? Could do both regional and UK easily enough, but would that be more confusing?

Scope: to consider, plan and address in the roadmap

- Banks to flag what represents material data used in decision-making (e.g. other energy types, agriculture, water, transport, materials, etc.)
- Can the same rails be used to enable sharing of the reporting data (eg. Scope 1,2,3)?
- How will this enhance national benchmarking?
- How might this scale internationally?
- How might this scale 'down' (e.g. to domestic) or 'up' (the value chain)?
- How might this scale across the financial sector (e.g. insurance, asset management, trade finance, etc.)?
- Data misuse and protection, legal data rights - what data is shared and how?

Matrix of use cases and data requirements

	Banks	Data Providers	Carbon accounting	
MPAN		✔	✔	
Address	✔	✔		
Supplier ID	✔	✔	✔	
Annual Fuel Mix	✔	✔		
Tariff	✔	✔	✔	
DNO grid carbon intensity	✔	✔	✔	
HH demand kWh	✔	✔	✔	
Dumb meter data	✔	✔	✔	
Half-hourly generation kWh		✔	✔	

Endorsements & attendance

Specify the group members who endorse the approach and record their endorsement.

Endorsed
Gavin Starks (Icebreaker One - AG1 co-chair)
Duncan Oswald (Sage - AG1 co-chair)
Ian Sutherland (Tide)

Pending

Attendance

Name	2023-07-13	2023-09-06	YYYY-MM-DD	YYYY-MM-DD	YYYY-MM-DD	YYYY-MM-DD
Gavin Starks	●	●				
Duncan Oswald	●	●				
Andrew Griffiths	●	◉				
Andrew Smithson	◉	◉				
Ben Cotton	◉	●				
Callum Campbell	◉	◉				
Cerys Leff	●	●				
Conrad Ford	◉	◉				
David Beer	●	◉				
Dr Yildiz Tugba Kara	●	◉				
Dr. Kesavan Gopalan	●	◉				
Hannah Gilbert	●	●				
Ian Sutherland	●	●				
James Wark	○	●				
James Armstrong	◉	◉				
Jaya Chakrabarti	●	●				
Jonathan Ward	◉	◉				
Josh Couchman	●	◉				
Julia Langley	◉	◉				
Lee Freeman	●	◉				
Leon Jayasinghe	◉	●				
Luiza Margulis	◉	◉				
Madhuban Kumar	◉	●				
Matt Bullivant	◉	◉				
Nick Carmont Zaragoza	●	◉				
Paul Clark	●	◉				
Peter Allan	●	●				

Rebecca Harding	●	⦿				
Roman Poivet	●	●				
Sean Hanafin	⦿	⦿				
Tracie Callaghan	●	●				
Vicky Sins	●	⦿				
Yentl Staelens	⦿	⦿				
Phillip Schauer	●	●				
Cara Merusi	●	⦿				
Jonathan Geldart	⦿	⦿				
Nicoleta Ciobanu	⦿	⦿				
Martin McTague	⦿	⦿				
David Marriage	●	⦿				
Ian O'Donnell	●	⦿				
Hannah Cool	⦿	●				
Nika Safonova	○	●				
Adam Bastock	○	●				
Mankaran Ahluwalia	○	⦿				
Simon Heppner	○	●				
Aneysha Minocha	○	⦿				
Molly Webb	○	●				
Andrew Dakers	○	⦿				
Elliott Brown	○	●				
Elliot Cyriax	●	⦿				

● = in attendance ⦿ = absent/ apologies ○ = Not scheduled to attend

Appendix

Impact: overview of risk and efficiencies

Banks have stated that high risk is hampering their efforts to lend to green projects. This risk includes financial risk (common to any loan) and impact risk (the risk of their loan not having the environmental benefits they want).

Specifically, the credibility of GHG reporting means that the risk profile of green lending is high. Provision of better, verifiable and assurable data will decrease that risk, leading to a decrease in the cost of capital (how much needs to be put aside in reserves) and enable banks to increase credible green lending to the SME community.

Financial risk

Perseus can help banks to reduce financial risk by providing more accurate data in a loan application on:

- energy use,
- energy cost,
- the effectiveness of the intervention to be financed, and
- return on investment (ROI).

After the application, data can be used to demonstrate the actual, delivered benefits in terms of:

- climate impact, and
- financial benefit to customers.

Impact risk

Banks currently assess the "greenness" of loans by reference to a taxonomy. If a project is on the list (e.g. EV charging infrastructure, heat recovery equipment, photovoltaics etc.), it is deemed "green" and attracts whatever preferential rate the bank offers. There are two ways in which this system can be improved:

- The effectiveness of different interventions varies between applicants;
- The list is closed, preventing applications for other interventions which may be effective (particularly in the specific context of individual applicants) but which are not included in the generic taxonomy.

Perseus will automate the provision of highly accurate impact and cost information, allowing banks to open applicants to any intervention which can be demonstrated to deliver a positive climate impact while yielding a sufficient return to support the loan.

Efficiency

There is consensus that even the demonstrator will increase efficiency and begin the process of allowing the development of new financial instruments and other opportunities (e.g. lower friction, higher resolution automated carbon accounting) and that this will only be increased as the post-demonstrator roadmap progresses, bringing in additional data sources (e.g. tariff data, dumb meter readings, Site address and Supplier ID, annual carbon intensity inc. REGOs; all from MPAN).

The demonstrator will be as simple as possible while demonstrating potential and delivering immediate value. Additional functionality will be described in Appendix, but not included in the demonstrator. Although the demonstrator is a minimal demonstration of functionality, the ultimate aim of the project is maximum functionality: a race to the top.

Emissions calculation methodologies

The Greenhouse Gas Protocol recognises two calculation methodologies to estimate emissions from the use of electricity (Scope 2): location-based and market-based. If the market-based methodology is used, the Protocol requires that the location-based methodology is supplied as well. (The Protocol is currently under revision, with most of the consultation responses being concerned with Scope 2 calculations, so this may well change soon, but whatever changes are implemented, it is likely that these methodologies will be retained for consistency with historical reporting.)

Use of the market-based methodology in the UK is undermined by the ability of renewable energy generators to "unbundle" Renewable Energy Guarantees of Origin (REGOs) from generated electricity. This allows suppliers to purchase enough unbundled REGOs at the end of the year to make the electricity they have supplied to their customers appear renewable, when in fact any matching of renewable generation to customers' demand is coincidental. In other words, suppliers can purchase whatever wholesale electricity is available on the market, to match demand when their customers need it, then buy unrelated REGOs at the end of the year, which relate to renewable electricity that may have been generated at any time.

The implication for emissions calculation methodologies is that the location-based method is sound, but the market-based method is not. Businesses which pay for a green tariff, then report zero emissions from electricity use, are misrepresenting their climate impact and preventing opportunities to reduce it. This is exactly the type of institutional greenwashing that reputable organisations such as banks must take great care to avoid.

Given that the core use case for this platform is the calculation and communication of accurate carbon emissions estimates, it is critical that this issue be addressed and resolved by AG1.

The following paragraphs expand on this issue and propose a route forward to be debated.

Location-based methodologies

Half-hourly (HH) resolution carbon intensity data is available[3] from National Grid for each DNO (historical, and two-day forecast). This can be aggregated to the whole of the UK, or used at this resolution. There are arguments for both approaches:

- UK resolution data is commonly used, so this would be consistent with current practice (however, we are in a position to improve on current practice);
- DNO resolution data makes visible the huge differences in carbon intensity within DNO regions. This is caused because most renewable generation capacity is in Scotland, but most demand is in England, specifically in the South-East. As the transmission infrastructure is currently inadequate, generation is constrained even when demand in the South is high. This means that Scope 2

[3] Carbon Intensity API v2.0.0 – Carbon Intensity API (carbon-intensity.github.io)

emissions from businesses in the North really are lower than those in the South, as additional demand results in reduced renewable generation constraint in the North, while in the South it results in additional fossil generation capacity coming online. The argument is that it would be an odd decision to discard good and useful data by averaging out these differences.

- It may be that the best approach is to do both: maintain current practice at a UK level, but also calculate location-based emissions at a regional level.

Perseus will provide HH demand data for each MPAN, allowing calculation of HH resolution location-based emissions at DNO-level, or at any lower temporal and spatial resolution.

Business case(s) for each user (draft for discussion in next meeting)
Question to each member. https://ib1.org/perseus/business-case/

- Internal business case
- Efficiencies
- Innovation
-

Market-based methodologies

To generate market-based emissions that are accurate enough to be useful for decarbonisation, we need to know HH fuel mix attributed to each tariff provided by each supplier (because suppliers may sell both green and brown tariffs out of the same purchased wholesale electricity). HH fuel mix per supplier would be acceptable, but would result in only one calculation being possible per supplier, which would undermine suppliers' ability to sell green tariffs, or indeed more than one tariff of any sort.

We currently have annual fuel mix per supplier, but this averages out time of demand across the year, making it of limited use for calculating the emissions associated with electricity use, and no use for driving behaviour to reduce emissions. (It is also reported inclusive of the purchase of unbundled REGOs, so does not reflect actual emissions associated with electricity use.) HH fuel mix data per tariff is therefore considered a "must have" for the Perseus roadmap. Without it, the market-based calculation methodology is unsound.

This is illustrated below. For November 2022, the following plots show:

(1) half-hourly data for one of Sage's electricity meters,

(2) UK grid carbon intensity as a proxy for HH generation data from a supplier with a poor-quality, but entirely legal, green tariff;

(3) Calculated GHG emissions associated with electricity demand on this meter, and

(4) Emissions reported using the market-based emissions calculation methodology, with a green tariff using unbundled REGOs.

This illustrates the variability in electricity demand and grid carbon intensity over a month, resulting in highly variable emissions. Averaging this variability out over an entire year loses all this detail, preventing businesses from targeting actions to decarbonise their electricity use, and reducing the accuracy of emissions calculations for banks and other users.

Even though demand is relatively stable throughout the month, the variation in grid carbon intensity results in a highly variable emissions profile. With this information, businesses can modulate and time-shift demand; without it they cannot.

Finally, the difference between emissions calculated in (3) and (4) illustrates the effect of pretending that green tariffs using unbundled REGOs result in no emissions. This is one example of why this system is no longer fit for purpose. Another is that the calculation of residual grid carbon intensity is unaffected, when it should go up to compensate for retired REGOs.

Accurate calculation of emissions using the market-based methodology will require the emissions from generation (i.e. fuel mix) to be matched to demand at high resolution (e.g. half-hourly). To do this, half-hourly generation emissions data is required.

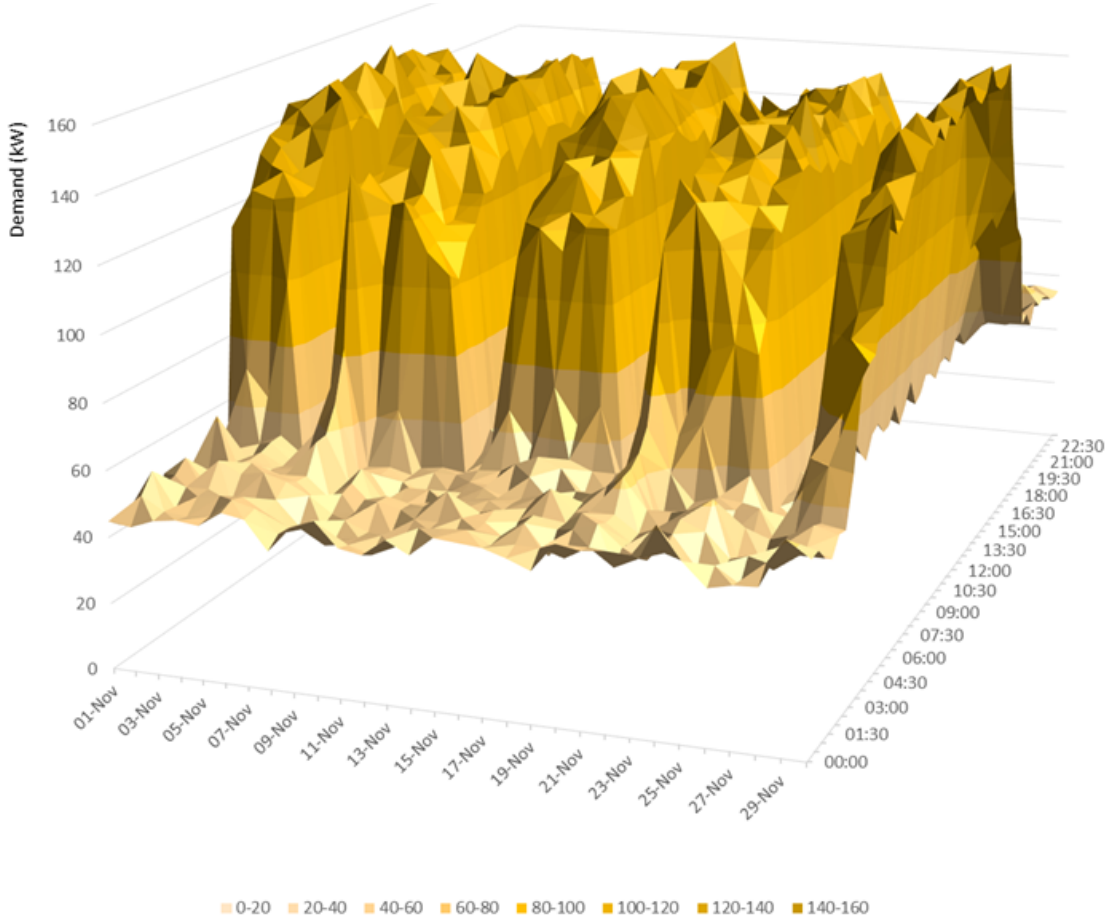


Figure 1: half-hourly data for one of Sage's electricity meters.

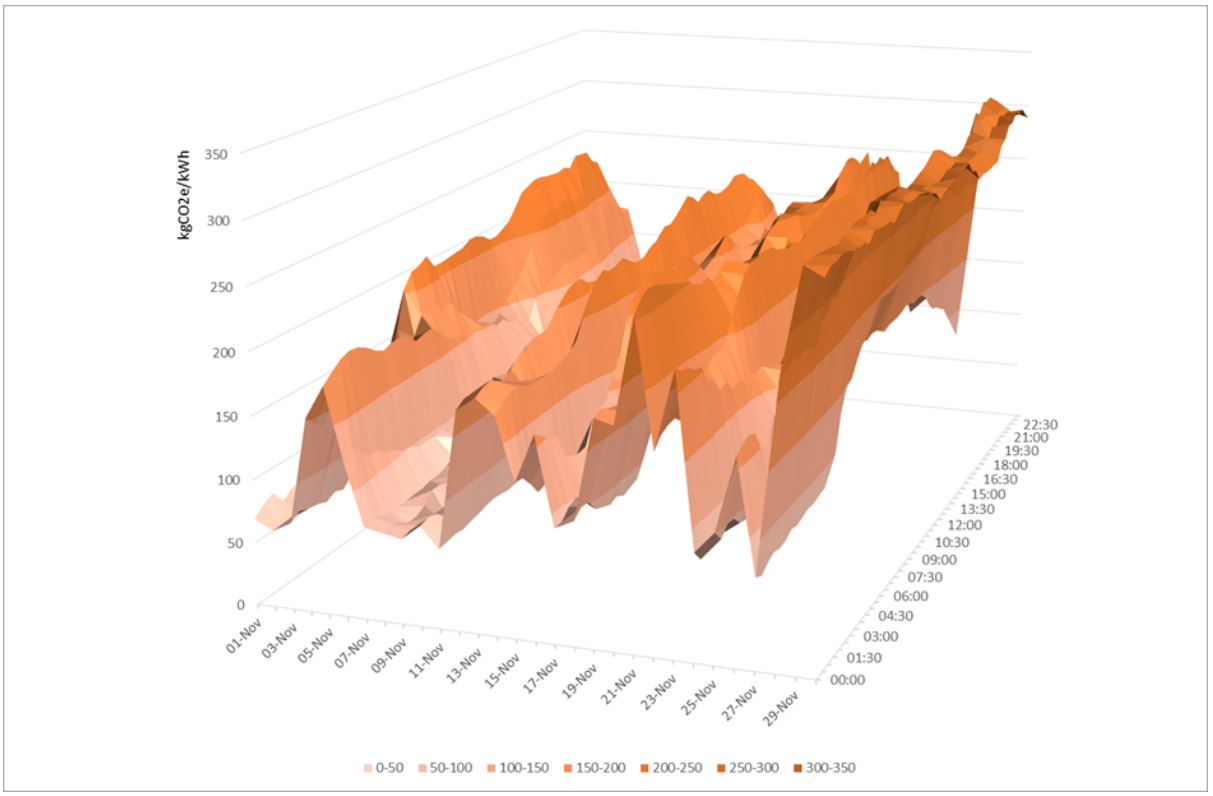


Figure 2: UK grid carbon intensity as a proxy for HH generation data from a supplier with a poor-quality, but entirely legal, green tariff.

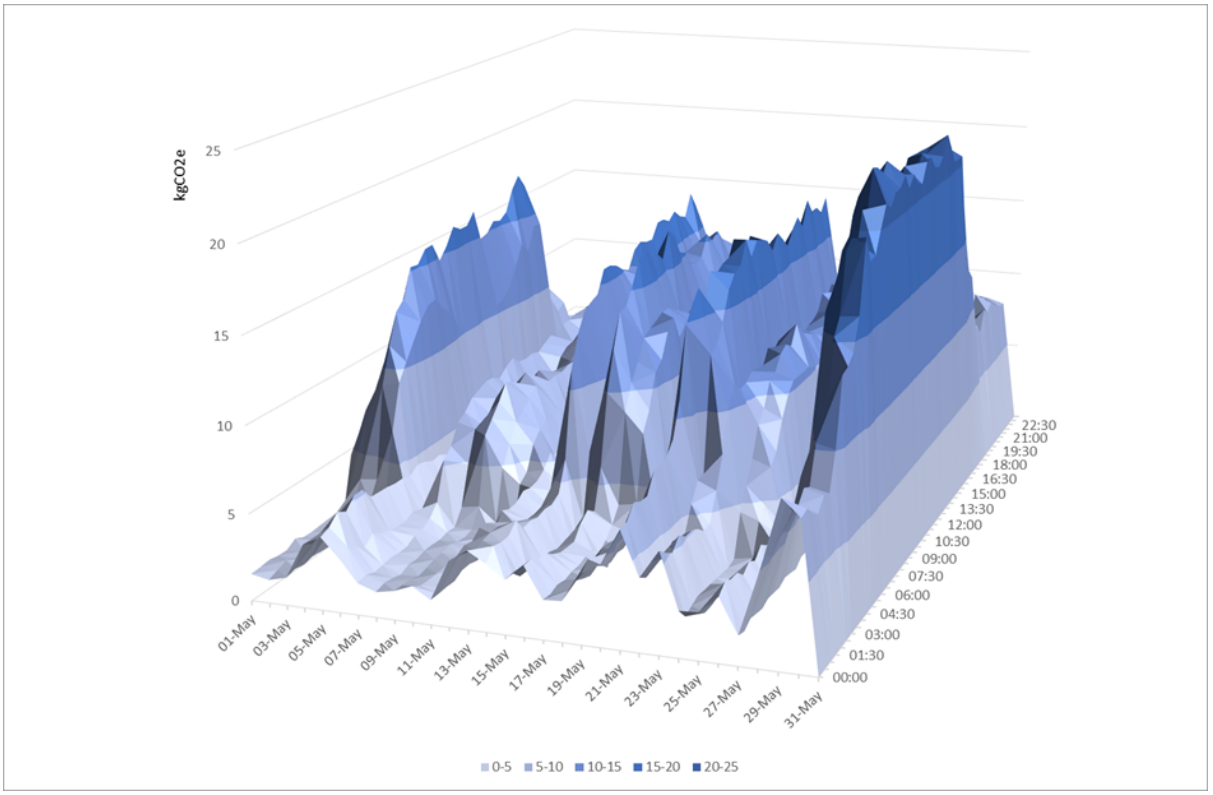


Figure 3: Calculated GHG emissions associated with electricity demand on this meter.

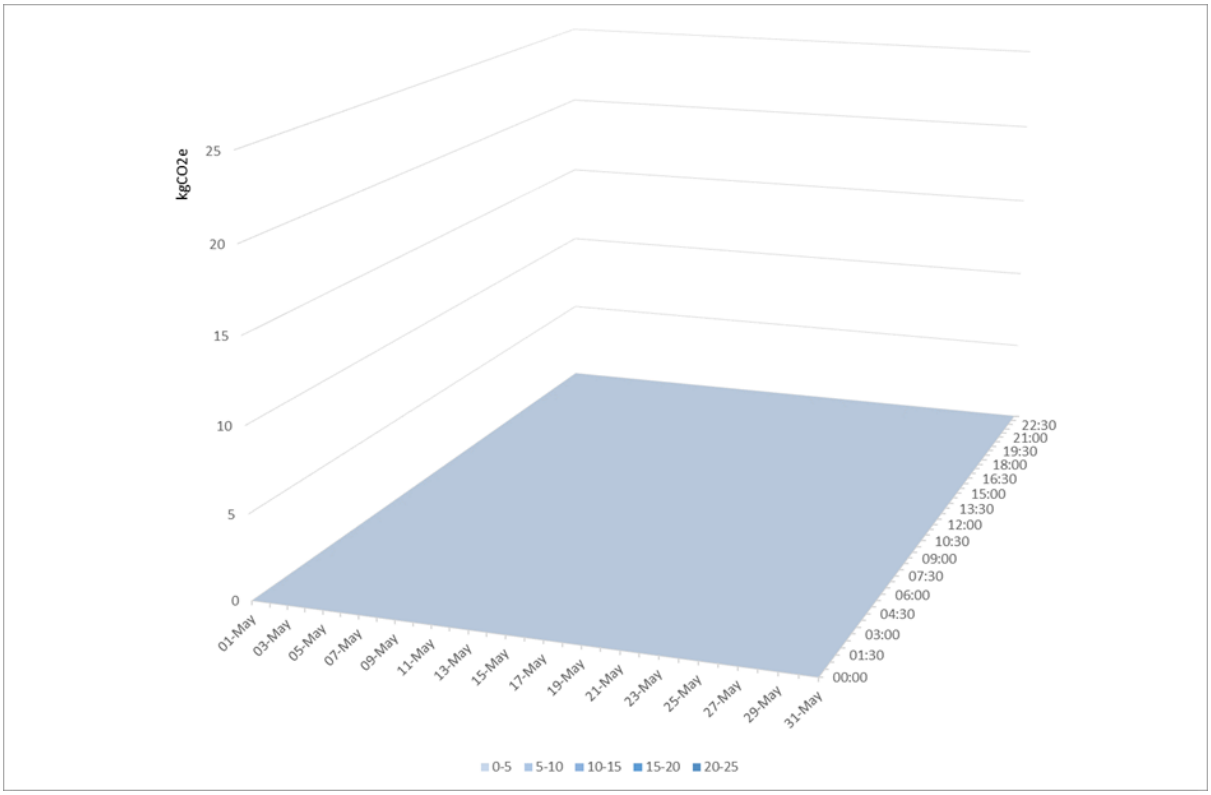


Figure 4: Emissions reported using the market-based emissions calculation methodology, with a green tariff using unbundled REGOs. It shows the difference between the actual emissions (Fig.3) and those "calculated" using the market-based methodology and REGOs (Fig.4, i.e. zero) to illustrate the challenge with current calculation methodology.