Scope 2 Market-Based Accounting Has Huge Potential Along With Data Challenges

Scope 5 provides a solution with its "market-indicative" approach

By Katie Tenneson & John Merrill

The Greenhouse Gas (GHG) Protocol's addition of the *market-based* method in its Scope 2 Guidance is intended to arm companies with highly accurate emissions data on the energy they buy. Previously, the Protocol relied on the location-based method which provides only average emissions data for the region-wide grid on which a company facility is located. Without *supplier-specific data*, companies are largely in the dark about the environmental impacts of the power they are buying. The granularity of supplier-specific information enables data-driven decisions which can help companies achieve their sustainability goals and demonstrate CSR leadership.

Supplier-specific data can help reduce Scope 2 emissions by informing company decisions about buying clean energy from sources other than conventional utilities, such as renewable power purchase agreements, the purchase of environmental attributes and/or self-generating clean energy. It can also guide cleaner choices regarding facility siting or expansion. Additionally, by contrasting market-based with location-based results, it becomes clear how individual suppliers compare to the average utility on their regional grid. Companies can use this information to pressure utilities to clean up their electricity mix and/or offer green tariffs, and to decide whether to opt into green tariffs if they exist.

Supplier-specific data holds great potential to help change electricity markets for the better. Rapidly rising demand from the private sector for low or emission-free electricity is an extremely important force moving utilities toward a clean energy future.

Unfortunately, the reality is that most utilities[1] know little about market-based reporting, and do not expend the resources needed to collect the complex information required to compile it in accordance with the Protocol. Scope 5 believes its market-indicative method – which approximates the results of the market-based method – is a timely and pragmatic way around this barrier, providing actionable information to inform companies' decisions about the energy they buy.

Fundamentals of Market-Based Reporting

The Scope 2 Guidance now requires dual reporting – or publishing both location- and market-based results – for any organization with operations where supplier-specific emissions factors are available. This includes all North American and Australian locations as well as most of Europe and parts of Asia.

The Challenge of Finding Quality Supplier-Specific Emissions Factors

To meet the GHG Protocol's strict requirements for market-based reporting, companies must report the most precise and accurate market-based emissions factors, in accordance with a hierarchy of contractual instruments, that meet eight rigorous Quality Criteria. Understanding the Quality Criteria and how to apply them is complex and the Protocol rejects any data for market-based use that is not rigorously complete and verifiable. This is designed to guard against abuse, such as understating emissions or double-counting of environmental benefits.

Acquiring supplier-specific emissions factors and verifying that they meet the Quality Criteria requires asking utilities complex questions about each of their sources of electricity to confirm that the emissions factors they provide (assuming they have them) accurately represent all delivered power, including both self-generated and imported power, with appropriate emissions factors applied to each power source.

Meeting the Quality Criteria also requires verification that any contractual instruments representing environmental attributes, such as renewable energy certificates (RECs) or guarantees of origin (GOs) are generated, tracked and retired in the same geographic market within a reasonable amount of time.

This process typically requires researching the utility and their sustainability or CSR reports and, importantly, identifying and cultivating a contact at the utility who has a deep understanding of the emissions profile of their entire power supply. It usually entails exchanging many emails and phone calls with a utility's environmental experts over a period of days or weeks. Unfortunately, the process most often fails to yield data that meets the Quality Criteria. The result is that the vast majority of companies are left with only grid average data, which is not very helpful in making decisions about how to reduce Scope 2 emissions.

Why Most Utilities Fail to Meet the Quality Criteria

Many utilities publish fuel mixes and emissions factors that reflect their self-generated power. While this normally satisfies local and state reporting requirements, it fails to meet the Quality Criteria in two areas:

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1 This paper primarily considers utilities (the major providers of electricity for most companies) but the methodology can also be applied to non-utility suppliers.

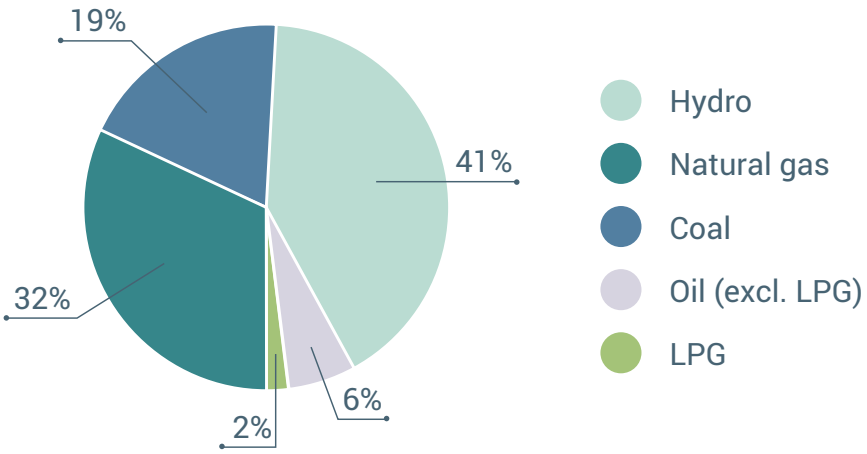
- Most have not correctly accounted for renewable energy production or purchases.
- Many sell a mix of self-generated and imported power but do not consider the emissions attributable to the imported power in calculating their overall emissions factors.

The Protocol precludes the use of supplier-specific emissions factors with either of these failings (and many others) in the market-based method. Unfortunately, there are no government mandates or financial incentives on the horizon that would motivate electric utilities to put systems in place to accurately collect, record and communicate data to their customers that meet the Quality Criteria.

Most Utilities Have Useful if Imperfect Data

However, most utilities can provide enough data for customers to reasonably *estimate* a utility's supplier-specific emissions factor using Scope 5's market-indicative method. This data includes:

- The quantities of power sales in the period of interest that are self-generated and imported for resale.
- The fuel mix - the quantities and types of fuels - used in the utility's own generators during this period, such as the one below.
- The fuel mix of electricity imported for resale (from suppliers other than the grid-wide wholesale markets).



The Market-Indicative Method

At Scope 5 we have developed a third methodology – the market-indicative method – which is reasonably accurate and much better than the void of utility-specific data that would otherwise exist for the foreseeable future. Our approach emulates the market-based methodology and uses reasonable, conservative estimates to fill information gaps. In many cases, the failure of available data to meet the Quality Criteria impacts only a small portion of the utility's total supply, or can be mitigated with additional analysis. If we cannot produce reasonable estimates for missing data, we do not apply the market-indicative method.

We want to emphasize that the Guidance clearly states that reporters should not calculate supplier-specific emissions factors – or recalculate existing ones – on behalf of a supplier for

use in the market-based method. Modifying or deriving emissions factors obtained from a supplier disqualifies them from use in market-based reports.

Although each utility is unique and must be evaluated individually, our general methodology in applying the market-indicative approach follows the steps below and is represented in Figure 1:

1. Obtain an accurate emissions factor for the portion of a utility's total sales that it generated itself.

First, we review all data and information provided by the utility. We scrutinize any emissions factors it published or gave us to understand exactly how they were calculated. Most of the time, utilities do an accurate job for power which they produce in their own generators[2]. In the rare instance when a utility has not done this correctly, we look for reliable fuel mix and electricity production data. If this data is available and we are convinced it is accurate, we can use it to calculate an emissions factor for self-generated power.

2. Properly account for any renewables portion of total sales.

Next, if renewable electricity and/or environmental attributes constitute part of the utility's sales, we evaluate how the contractual instruments conveying the environmental attributes for the renewable power were handled. If the utility can demonstrate that contractual instruments were properly created, tracked and retired on behalf of its customers, we use an emissions factor of zero for the renewable portion. If the utility is unable to provide information on how contractual instruments were handled, we, consistent with the market-based method, apply the regional grid-average emissions factor to the renewable portion. We follow this approach whether the utility generated the renewable power itself, imported it, or purchased environmental attributes not bundled with electricity.

3. Properly account for the portion of the utility's total sales that it imported and resold.

Finally, we consider the non-self-generated portion of power sold by the utility. Utilities usually know their total sales and their self-generated quantities for a given period. If they have not tracked it separately, they can subtract self-generated amounts from total sales to arrive at a reasonably accurate net import amount. For any imports from a specific supplier, the utility should apply an emissions factor based on the most precise contractual instrument available from that supplier (see Table 6.3 of the Scope 2 Guidance). Most often, however, utilities buy power on the wholesale market where the many and varied sources are not identifiable. In this case, if the utility does not do so itself, we apply, consistent with the market-based method, a grid-average emissions factor to the imported wholesale power.

Market-Indicative Example

Let's consider an example of applying the market-indicative approach:

During the previous year, "Acme Electric" generated 80% of the power it sold to its customers from a well-documented mix of company-owned coal and natural gas-fired generators and another 5% from its own solar facilities. It released multiple sustainability reports and briefings that included emissions intensities, fuel mixes, resource consumption for power generation and other information on sustainability. The publications included

2 In much of the United States and Europe, many regulatory agencies mandate that utilities publicly disclose this information.

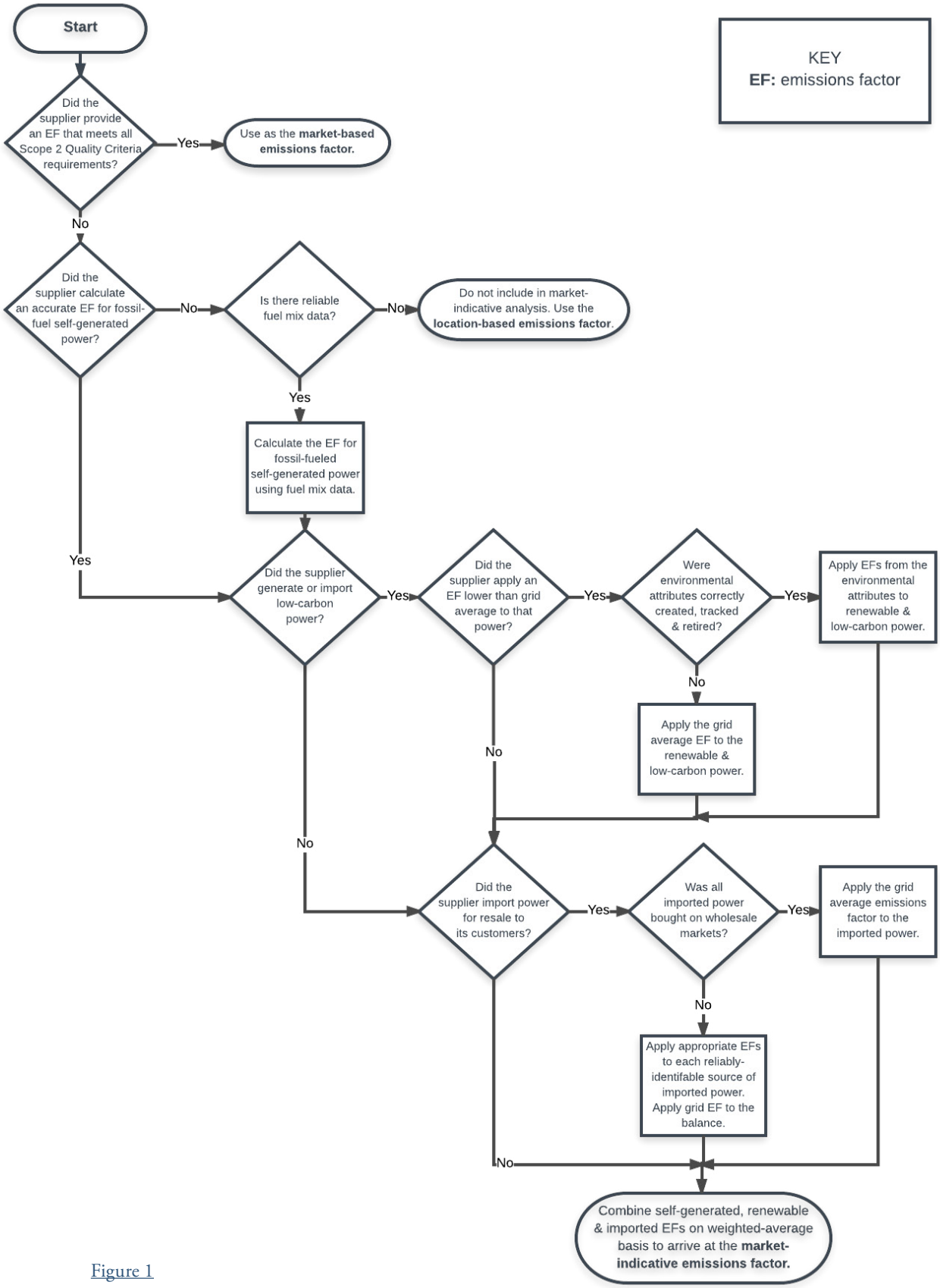

Start
KEY
EF: emissions factor
Did the supplier provide an EF that meets all Scope 2 Quality Criteria requirements?
Yes
Use as the market-based emissions factor.
No
Did the supplier calculate an accurate EF for fossil-fuel self-generated power?
No
Is there reliable fuel mix data?
No
Do not include in market-indicative analysis. Use the location-based emissions factor.
Yes
Calculate the EF for fossil-fueled self-generated power using fuel mix data.
Yes
Did the supplier generate or import low-carbon power?
Yes
Did the supplier apply an EF lower than grid average to that power?
Yes
Were environmental attributes correctly created, tracked & retired?
Yes
Apply EFs from the environmental attributes to renewable & low-carbon power.
No
Apply the grid average EF to the renewable & low-carbon power.
No
No
Did the supplier import power for resale to its customers?
Yes
Was all imported power bought on wholesale markets?
Yes
Apply the grid average emissions factor to the imported power.
No
Apply appropriate EFs to each reliably-identifable source of imported power. Apply grid EF to the balance.
No
Combine self-generated, renewable & imported EFs on weighted-average basis to arrive at the market-indicative emissions factor.

Figure 1

an emissions factor, stated that it represented self-generated power only and that the utility imported 15% of the power it supplied to customers. Therefore, since Acme Electric's emissions factor did not represent 100% of power sold, it failed to meet the Quality Criteria.

Although the emissions factor Acme published could not be used in market-based reporting, with additional research and analysis, we could derive a market-indicative emissions factor that closely represented the power supplied by Acme, resulting in a significantly more accurate and informative result than a location-based emissions factor by itself.

We followed the three-step methodology described previously:

1. Obtain an accurate emissions factor for the portion of a utility's total sales that it generated itself.

Acme Electric reported a net emissions factor of 1.799 lbs./kWh, for self-generated power only. To learn how it was calculated, we exchanged emails and phone calls with the utility's Director of Sustainability over the course of several weeks. She gave us Acme's quantities of self-generated power, the fuel mix and quantities of fuel used to produce it. We learned that its 1.799 lbs./kWh value was calculated by dividing emissions by all self-generated power, which included a small portion of solar power. Significantly, we learned that Acme used zero emissions for the solar portion.

2. Properly account for any renewables portion of total sales.

As mentioned above, we learned that an emissions factor of zero was applied to Acme's solar-generated power, but Acme provided no evidence that environmental attributes were formally created, tracked and retired in accordance with the Quality Criteria.

Consistent with the Protocol, we recalculated Acme's self-generated emissions factor and applied the regional grid average emissions factor to the renewable portion of the energy supplied to customers (see Recaluclating Acme's Self-generation Emissions Factor on the following page). Acme's corrected emissions factor for self-generated power was 1.867 lbs./kWh.

3. Properly account for the portion of the utility's total sales that it imported and resold.

We had learned that Acme purchased all its imported electricity on the wholesale markets on its regional grid and did not account for emissions from this portion of its sales. Consistent with what Acme should have done for the market-based method, we applied the grid average emissions factor of 1.151 lbs./kWh to Acme's imported power. Note that in this case, the grid average was much cleaner than Acme's self-generation.

Now that we have a corrected emissions factor for Acme's self-generated power, we combine it (on a weighted-average basis) with the grid average emissions factor for its imported power to arrive at an overall market-indicative supplier-specific emissions factor:

$$\left(\frac{85}{100} x\ 1.867\right) + \left(\frac{15}{100} x\ 1.151\right) = \ 1.7596 \frac{lbs.}{kWh}$$

This is the market-indicative result for Acme.

RECALCULATING ACME'S SELF-GENERATION EMISSIONS FACTOR

In calculating the emissions factor of 1.799 for their self-generated power, Acme calculated their emissions (due to burning fossil fuels to generate power) and divided them by the total amount of power that they generated:

$$EF_{gen} = \frac{CO_{2act}}{P_{gen}} = \frac{CO_{2act}}{P_{solar} + P_{ff}} = 1.799\ lbs./kWh$$

Equation 1

where:

EF_{gen} - Acme's stated emissions factor for self-generated power

CO_{2act} - Acme's actual CO2 emissions from power generation activities

P_{gen} - Acme's total self-generated power

P_{solar} - self-generated solar power

P_{ff} - self-generated fossil fuel power

But – in doing so, Acme understates what would be the appropriate emissions factor for self-generated energy because they include solar power generated in the denominator but include no emissions for it in the numerator. The reason that including no emissions for solar is erroneous is that the Scope 2 Guidance requires that environmental attributes for renewable energy be properly created, tracked and retired to be used in the market-based method and Scope 5 has designed the market-indicative methodology to be consistent with the market-based method.

To resolve this, we'll separate the emissions factor for self-generated electricity into two components:

EF_{ff} - emissions factor for fossil fuel self-generated power

EF_{solar} - emissions factor for solar self-generated power

First, we will calculate the correct value for EF_{ff}. We can derive this from Equation 1 by removing the solar component of generated power from the denominator. To do so, we simply prorate by 85/80 (the ratio of total generated power to fossil fuel generated power):

$$EF_{ff} = \frac{CO_{2act}}{P_{ff}} = \frac{85}{80} x \frac{CO_{2act}}{P_{sol}+P_{ff}} = \frac{85}{80}\ x\ 1.799\ \text{lbs./kWh} = 1.9114\ \text{lbs./kWh}$$

To get the correct emissions factor for all self-generated power, EF'_{gen}, we combine E_{ff} with EF_{sol}, weighting to account for the relative portion of each:

$$EF'_{gen} = \frac{80}{85} x\ EF_{ff} + \frac{5}{85} x\ EF_{sol}$$

Because we are unable to verify the environmental attributes for the solar portion, we use the grid average value of 1.151 lbs./kWh for EF_{sol}. Substituting:

$$EF'_{gen} = \frac{80}{85} x\ 1.9114 + \frac{5}{85} x\ 1.151 = 1.867\ \text{lbs./kWh}$$

This is the corrected emissions factor for Acme's self-generation.

Conclusion

The granularity of supplier-specific information enables data-driven decisions which can help companies achieve their sustainability goals and demonstrate CSR leadership. Scope 5's *market-indicative* method of estimating supplier-specific emissions provides timely and actionable information to inform decisions about buying energy from utilities. It is a pragmatic solution to the lack of information which qualifies for use in the GHG Protocol's market-based methodology.

Market-indicative, like market-based, results:

- Enable companies to more effectively pressure their utilities to clean up the electricity they sell.
- Inform company decisions to explore and purchase clean energy from sources other than their utilities. Options include renewable power purchase agreements, buying environmental attributes and self-generating clean energy.
- Empower companies to make better-informed decisions about where to expand or site new facilities.

With market-indicative supplier-specific data, companies are no longer in the dark about the environmental impacts of the power they are buying.

ABOUT SCOPE 5

Scope 5 turns sustainability data into action and delivers outcomes that matter, from reporting basics to operations excellence. Scope 5's cloud-based data management solution automates dual-reporting and can be used for 'triple' reporting, producing emissions totals for market-based, location-based and market-indicative categories.

Contact Scope 5 to learn more.