Renewable energy clearly has a critical role to play in addressing the challenge of climate change. However, with current cost structures, many renewable energy projects need additional incentives to compete with conventional sources of power – whether from governments or from voluntary contributions.

Voluntary green power markets have grown rapidly in some countries, as companies, governments, individuals and other organisations enroll in green power pricing programmes. Rather than attempting to buy renewable power directly from suppliers, buyers often purchase renewable energy certificates (RECs – otherwise known as green tags, renewable energy credits, etc) that provide proof that, somewhere on the grid, a certain quantity of green power has been generated.

One reason that organisations and individuals voluntarily pay a premium to participate in green power markets is to make public claims about their own environmental bona fides. What claims these organisations and individuals are justified in making, however, is a strongly debated issue. Misinformation and miscommunication are rife in voluntary green power markets, especially regarding the relationship between these markets and greenhouse gas (GHG) emissions.

Specifically, there are two questions that have confused and/or troubled many market participants who wish to make green marketing claims:

- What is the relationship between green power programmes and GHG emission offset credits?
- How should organisations account for participation in green pricing programmes or REC purchases in their corporate GHG emissions inventory?

**Question 1: Offset quality**

A GHG emissions offset is the reduction, removal or avoidance of GHG emissions from a specific project that is used to compensate for emissions occurring elsewhere. The promise of a GHG offset is that GHG concentrations in the atmosphere will be the same whether the offset purchaser retires an offset or reduces its own emissions.

Offsets can provide access to emission reduction opportunities that are lower cost than the internal abatement options that might be available. Offset projects should not cause environmental or social harm to achieve lower GHG emissions, and ideally they should produce multiple environmental or social benefits.

It is important to recognise that, in jurisdictions where the electric power industry is subject to a cap on its emissions, such as via an emissions trading scheme, grid-connected renewable energy (or energy efficiency) projects within the capped jurisdiction should not be permitted to generate offset credits. The reasoning here can best be described with a simplified example.

A renewable energy project is developed that produces zero-emission electricity. The project causes a coal-fired power plant to generate and emit less than it would have otherwise. Emissions caps determine the total amount of GHGs released into the atmosphere by that sector. Because emissions from power plants are capped, the displaced emissions at the coal plant caused by the renewable energy project simply free up emission allowances (i.e., permits to emit) that the coal plant then sells to other entities which can then emit more. The actions of the renewable energy project only shift emissions to other entities.

So, the imposition of an emissions cap on the elec-
tricity sector means that renewable energy projects cannot be awarded offset credits. Although some may find this result unfair, the price placed on GHG emissions created by the emissions cap still incentivises renewable energy projects by reducing the cost of the electricity they produce compared with that from fossil fuel-fired generators. Any desire by society to promote renewable energy further can then be achieved using other policies (eg, renewable portfolio standards or feed-in tariffs).

In jurisdictions without a GHG emissions cap-and-trade scheme including the electricity sector, renewable energy projects can be a legitimate source of offset credits. For example, this situation occurs under the Clean Development Mechanism, where renewable energy projects in developing countries are regularly approved to earn offset credits, because there are not emission caps in place in these countries.

Our question, though, is whether participation in green pricing programmes or purchasing RECs is the same as purchasing (and retiring) GHG emission offset credits from a renewable energy project. The short answer is no.

The reason they are not the same has to do with the definition of an offset project. An essential part of that definition is that a project’s eligibility must be contingent on it being additional, meaning that the project would not have occurred without the incentive provided by the opportunity to sell offset credits. If the project would have occurred anyway, it does not result in additional emission reductions and the essential promise that defines an offset credit is broken. Projects that fail to meet a credible additivity determination should not be eligible to sell GHG offset credits.

There is much angst among GHG emission market participants regarding the issue of additionality. It is a challenging concept, yet essential to the legitimacy of any offset credit instrument. Do away with additionality and you also do away with the very concept of an offset.

Testing for additionality does not have to be perfect. But it should provide a high level of assurance that false positive and false negative determinations have been minimised through the use of tests that approximate an ideal measure of project developer behaviour.

Although revenue from the voluntary green power market is an increasingly important part of renewable energy project finance in some parts of the world, much of the renewable energy generated under the umbrella of voluntary green power markets would have been generated without the incentive provided by green pricing programmes or REC markets.

More importantly, there is no mechanism used within voluntary green power markets for differentiating between non-additional and additional projects. This failure to differentiate violates an essential requirement that defines an offset credit. Additionality ensures that an offset credit is distinct from a production subsidy. With a production subsidy, any producer receives the subsidy (ie, credit). With an offset, only additional projects (ie, producers that meet certain criteria) receive an offset credit.

There will almost always be free riders with a production subsidy scheme. In the case of renewable energy markets, the enabling incentive for most projects is government support programmes, such as the Production Tax Credit in the US and various feed-in tariff mechanisms in Europe. It is probably safe to say that most renewable energy projects are dependent on such support programmes. However, in voluntary green power markets, much of the renewable energy supplied is not dependent on the extra financial support provided by these markets. In other words, there are many free riders. As a consequence, participation in voluntary green power pricing and REC markets is not the same as buying a GHG emission offset.

**Question 2: Buying or subsidising green power?**

So, if organisations are not buying emission offsets when they participate in voluntary green power markets, what are they buying? When an organisation participates in a green pricing programme or purchases RECs, they typically assume that they are purchasing zero-emitting electricity. But are they actually buying electricity produced by renewable energy generators?

Most assume that the answer to this question is yes. Unfortunately, they are basing their answer on an erroneous assumption.

Emissions from an organisation’s consumption of purchased electricity are indirect emissions (ie, Scope 2 emissions) because they actually occur at a power plant owned and operated by another organisation. These indirect emissions are calculated by multiplying electricity consumption by an emissions factor representing tonnes of carbon dioxide (CO₂) per megawatt-hour (MWh). This factor typically represents an average emissions intensity of the generation supplying the relevant transmission grid.

There has been much attention given to double counting of indirect emissions. However, rarely does this attention properly identify which of the three types of double counting is at issue:

- double counting of MWh or RECs;
- double counting of avoided emissions between a displaced fossil generator and a renewable power generator; or
- double counting of avoided emissions between the voluntary green power market consumer and other electricity consumers on the grid.

Dealing with the first type of double counting is rarely an issue. Basic tracking of MWh from renewable generators and the use of REC certification and registries addresses it.

The second type of double counting involves ownership of emission rights and generally remains ambiguous until emissions from the electric power industry are capped and emission rights (technically, permits) are assigned.

It is the third type of double counting that invalidates the common assumption that participation in voluntary green power markets is the same as directly consuming electricity produced by zero-emitting resources. In the language of economics, green power markets do not offer a ‘good’ that is subject to private ownership because it is non-exclusive.

Again, when organisations calculate their indirect GHG emissions from electricity consumption, they typically use an average emissions factor for all generation supplied to the grid. This factor includes electricity from renewable generators that green power market consumers claim as their zero-emitting electricity. The
absence of a mechanism to exclude everyone else on the grid from claiming this zero-emitting power as part of their average mix causes the basic definition of ownership to be violated. Under these conditions, green power market consumers cannot claim to be purchasing zero-emitting electricity.

Some will argue that the error in Scope 2 emissions accounting caused by type 3 double counting is small because renewable energy makes up a small fraction of generation on their grid. Why, in a market struggling to establish its credibility, should we establish it using an approximate emissions accounting framework? The approximation is justified only so long as the market fails to achieve its goal, which is significantly increasing the share of renewable energy on the grid.

However, before despair sets in, there is a mechanism available to overcome this third type of double counting. A comprehensive and closed accounting system that tracks all MWh using generation attribute certificates would allow organisations to claim ownership of indirect GHG emissions from grid-connected energy generators. Each organisation’s emission intensity for its electricity consumption would be determined by certificate purchases. Infrastructure is being put in place for generation attribute tracking systems in Europe and the US (ie, Guarantees of Origin and certificates, respectively). These systems can both prevent the double counting of RECs (ie, type 1 double counting) and establish excludable ownership over generation emission attributes.

In the absence of a comprehensive tracking system, a credible and consistent average Scope 2 emissions approximation is justified only so long as the market fails to achieve its goal, which is significantly increasing the share of renewable energy on the grid.

In the absence of mechanisms to address add-onality or double counting, participation in voluntary green power markets cannot be the basis of emission offset claims or claims of purchasing zero emission electricity. However, participation is not pointless. There is nothing dishonourable in subsidising a public good. For now, participating in green power markets is a charitable act that can provide an incentive for investments in renewable energy, which is the ultimate objective.

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