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## Part 3: Implications for stacking and unbundling

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## Part 3: Implications for stacking and unbundling

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### ABSTRACT

The situation of overlapping offset crediting programs has not been well addressed or widely discussed in academic or policy dialogues. The policy question is whether a single activity can earn offset credits from more than one offset program. Further, how do we assess the additionality and baselines for proposed activities in a situation with overlapping offset crediting programs? If offset policies are successful and expand, then overlapping crediting policies will be increasingly common in the future. This issue is colloquially referred to as stacking. This article applies the definitions and framework regarding additionality and baselines from Parts 1 and 2 of this series to this issue of stacking. It presents specific options for how to apply the concept of additionality to activities that could potentially stack offset credits and outlines a practical way forward for policy makers. The overall reason to allow stacking is that incentives can be provided to actors (e.g., project developers) that better account for the recognized public benefits expected to be delivered by their proposed activity. Of the options that allow stacking, the primary tradeoff is between the aggregate administrative and coordination burden and overall cost-effectiveness.

### KEYWORDS

additionality, offsets, stacking, ecosystem services, bundling and unbundling, environmental markets

# 1 Introduction

The issue of how to address the situation of overlapping offset crediting programs has neither been widely discussed in the literature nor addressed by policy makers. If a single activity (e.g., proposal) produces one type of environmental or other public good benefit, then it seems possible, if not likely, that it will also produce other types of benefits. These benefits may then be potentially eligible by multiple offset crediting programs.

For example, a single proposed reforestation activity could both produce carbon sequestration benefits as well as enlarged habitat for an endangered species. Or, an industrial green chemistry project could both reduce greenhouse gas (GHG) emissions by improving energy efficiency as well as reduce nitrogen and phosphorous nutrient inputs to a watershed. Each of these benefits could be credited under existing or future offset programs. The policy question is then whether a single activity can earn offset credits from more than one of these programs. Further, how do we assess the additionality and baselines for proposed activities in a situation with overlapping offset crediting programs? If offset policies are successful and expand, then overlapping crediting programs will be increasingly common in the future. This issue is colloquially referred to as stacking.

This article applies the definitions and framework regarding additionality and baselines from Parts 1 and 2 of this series to this issue of stacking. It presents specific options for how to apply the concept of additionality to activities that could potentially stack offset credits. And then it suggests a practical way forward for policy makers.

The discussion of stacking has primarily occurred within the literature on payments for environmental or ecosystem services (PES)[1] and related environmental markets, covering issues such as land conservation, water quality, wetland destruction (i.e., wetland mitigation banking), and GHG emissions. Specifically, Bianco (2009), Bennett (2010), Fox, Gardner *et al*. (2011), and Achterman and Mauger (2010) have focused on the issue of stacking in ecosystem services markets. These authors have identified the importance of the concept of additionality to our ability to understand how to design offset policies that address the issue of stacking but have not presented detailed options or proposals.

There have also been few examples of approaches developed or applied for the stacking of credits in the field. One of these is the Willamette Partnership pilot project in Oregon, which is attempting to stack credits from multiple ecosystem services benefits (WP 2010). Their approach is to use a single activity to initially generate four types of offset credits, including: salmonid stream habitat (functional linear foot), wetlands (functional acre), upland prairie habitat (functional acre), and water quality in terms of temperature (kcal/day). They then plan to later expand this list to include offset credits for water quality in terms of nutrient inputs (lbs/yr of nitrogen and phosphorous), general stream habitat (functional linear foot), GHGs (metric tons of $CO_2$-equivalents), and generalized rare habitat (functional acre). A key challenge faced by this partnership and other initiatives where stacking is relevant is how the issue of additionality and baselines should be resolved.

[1] Although there are no well-accepted definitions, for the purposes of this article, environmental services are seen as resulting from some human action while ecosystem services can be colloquially thought of as the "benefits of nature to households, communities, and economies" (Boyd and Banzhaf 2007). Further, for this article, the focus is on PES schemes that are relevant to the creation of tradable environmental commodities or financial instruments rather than custom bilateral payments, despite the latter being the form of PES more commonly discussed in the PES literature (Engel, Pagiola et al. 2008).

The issue of stacking is not only relevant to ecosystem services market contexts. It is also relevant to other types of environmental and non-environmental markets and offset policies.[2] For example, whether or not stacking should be allowed has been at the core of the debate over the relationship between the voluntary Renewable Energy Certificate (REC) and white tag (i.e., energy efficiency certificate) markets with GHG emission offset markets (Gillenwater 2008a; Gillenwater 2008b). Although this article focuses on environmental policy, stacking, like additionality, is a concept that is of general relevance to any type of offsetting policy.

## 2 Brief examination of the issues

Within the environmental markets community there has been an ongoing debate as to whether a single activity should be allowed to stack offset credits (Burnham 2009; Kenny 2009; Fox, Gardner et al. 2011). Opponents of the concept often refer to it as "double dipping," while proponents use the term stacking (Achterman and Mauger 2010; Kenny 2010). Opponents assert that there is an inherent problem with receiving more than one type of credit for a single activity, such as a change in land management practice on a given parcel of land. Whether called stacking or double dipping, the underlying issue is how additionality and ownership over environmental commodities are defined by offset policy makers.

First, it is necessary to define what is meant by additionality. As discussed in Parts 1 and 2 of this series, additionality is fundamental to the concept of an offset and a baseline is fundamental to the concept of additionality. Part 1 focused on definitional problems within existing GHG programs, standards, and climate change policy literature. It was shown that within the specific context of GHG emission offset programs, the language used to define additionality and baseline is, with few exceptions, imprecise, varied, and internally inconsistent. It concluded by proposing the following more precise definitions for additionality and baseline.

**Additionality** is the property of an activity being *additional*. A proposed activity is *additional* if the recognized policy interventions are deemed to be causing the activity to take place. The occurrence of additionality is determined by assessing whether a proposed activity is distinct from its baseline (see below).

A **baseline** is a prediction of the quantified amount of an input to or output from an activity resulting from the expected future behavior of the actors proposing, and affected by, the proposed activity in the absence of one or more policy interventions, holding all other factors constant (*ceteris paribus*). The conditions of a baseline are described in a baseline scenario.

Additionality assessments are intended to allow offset programs to discriminate between proposed behavior that is actually being altered by a recognized policy intervention from proposed behavior that is not altered. Typically, we think of the policy intervention from an offset or ecosystem services program as the issuance of tradable offset credits with an economic value or some other form of PES. But as discussed in Part 2 of this series, there are a variety of ways to conceptualize and define the policy interventions created by an offset program. Using the framework from Parts 1 and 2, stacking can be described as the question of how policy interventions from multiple offset programs influence a single proposed activity.

In the past, few PES programs have included explicit requirements that address additionality, with GHG offset programs being an exception (Bennett 2010). Yet, without a credible process for assessing

[2]For examples of non-environmental policy issues, see Pearce and Martin (1996).

additionality and baselines, then PES and other environmental market-based credits function more like a subsidy, with the inevitable free riders that come with it.[3]

The ownership issues with tradable environmental commodities and other credits[4] relevant to stacking are related to the concept of bundling or unbundling of ecosystem services (Salzman 2005) as well as the debate occurring in green power markets over the ownership and bundling of attributes associated with green power (Gillenwater 2008a). The bundling concept treats a single credit or certificate from an activity as functionally conveying ownership over all, or a broad collection, of environmental and/or public benefits or attributes associated with that activity. Such a tradable environmental instrument is then a form of meta-credit or certificate that—regardless of the unit of measure used (e.g., megawatt hours, tons of $CO_2$, acres)—represents most or all environmental and social benefits resulting from a given activity.[5]

In contrast, an unbundling approach to tradable environmental instruments regards the environmental attributes or benefits associated with an activity as divisible. Each can be separately represented by different types of credits or certificates.[6] It should be relatively obvious that unbundling is a prerequisite for stacking. There is nothing to stack if all benefits or attributes remain bundled in a single type of offset credit or certificate. Conversely, rejecting the concept of stacking is functionally equivalent to a rejection of unbundling, as there would be no purpose in unbundling if a given activity could never earn or use more than one type of credit.

Individual activities typically have different characteristics and effects. For example, one land use project will not necessarily produce the same combination of benefits in the same proportion as another land use project from an adjoining parcel of land. Therefore, as pointed out by Gillenwater (2008b), prohibiting activities from unbundling credits then leads to the situation in which the credits from each activity effectively represent a custom combination of benefit and attribute types. In other words, requiring credits or certificates to be bundled, strictly speaking, violates the definition of a commodity, which specifies that all items classified as a specific commodity must have nearly identical characteristics. Consequently, decisions regarding bundling and unbundling have major implications for the fungibility of tradable environmental instruments and the potential efficiency of environmental markets.

Bundling also results in a tradable environmental instrument that is more likely to be a second best measure of most of the public goods it represents. It would be second best because it is based on a metric that does not directly measure the desired environmental benefit, although it will hopefully be somewhat correlated with it. "Ideally, environmental commodities should be homogeneous, first best measures of the relevant environmental good, and easily measured and verified." (Gillenwater 2008b). For example, if we were concerned with GHG emissions and endangered species, instead of crediting an activity for how many additional acres of forest land are preserved or created, it would be better to separately credit for the measured change in carbon storage and change in the population of endangered species, relative to a

[3] PES programs have also tended to assume that current or historical practices are the accepted baseline scenario (Fox 2008; Achterman and Mauger 2010; WP 2010).

[4] Many ecosystem services market transactions do not currently involve a widely traded environmental commodity but instead involve custom bilateral transactions for an aggregate collection of ecosystem services.

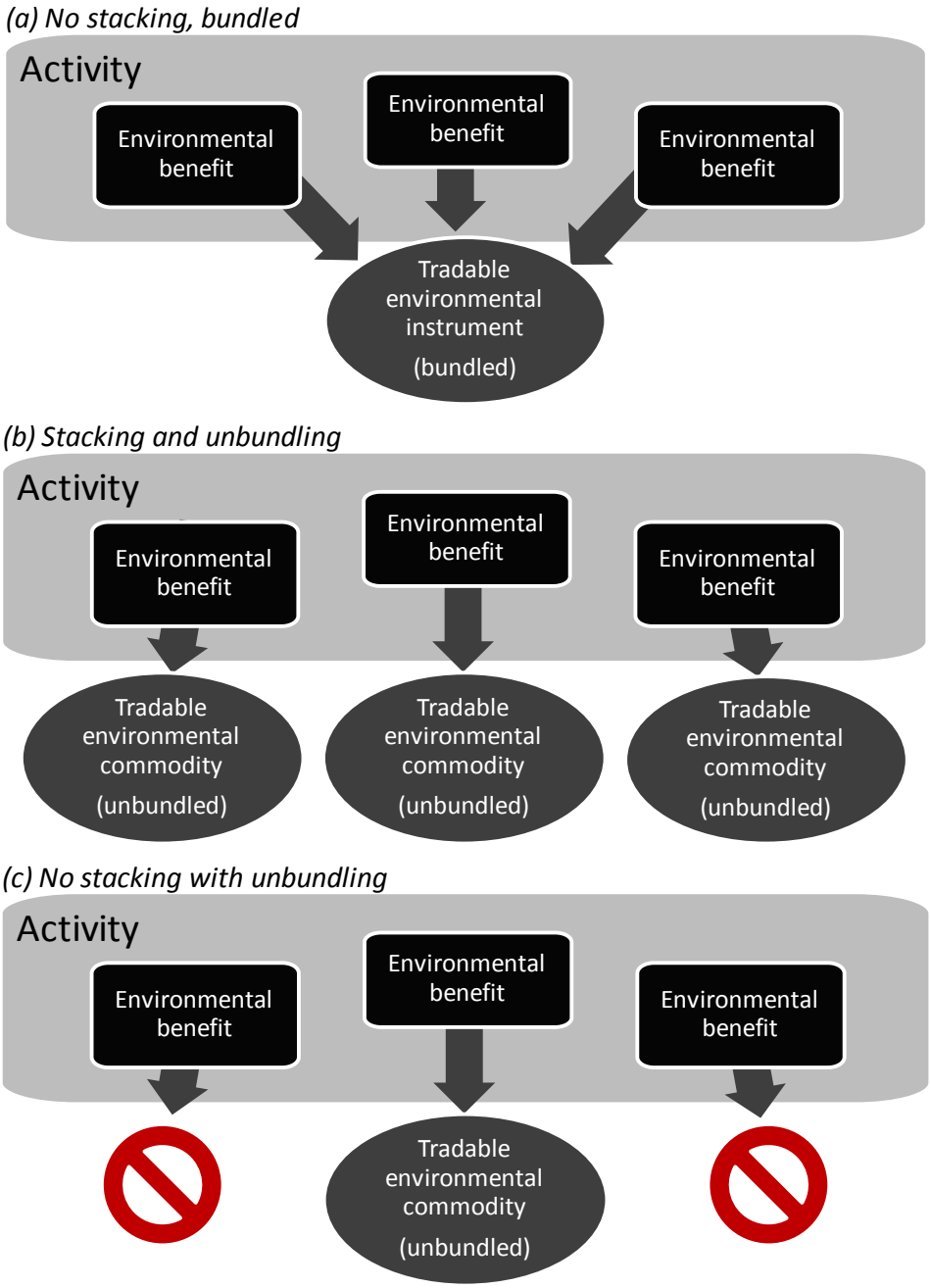
[5] Advocates of bundling, though, do not claim that their meta-credits or certificates should also include ownership over attributes associated with any harm or damages associated with an activity.

[6] Engel, Pagiola et al. (2008) distinguishes the term "bundling" from "layering." The former they define as selling multiple services to one buyer, while the latter they define as combining payment from multiple buyers. Without any intended bias regarding the number of buyers or sellers, I use the term bundling because it is more commonly used in the environmental policy community at this time. The fundamental issue for this article relates to whether environmental attributes or benefits are aggregated via financial instruments, not how buyers or sellers are aggregated.

credible baseline. Only if overall habitat preservation is the objective, might acres be a reasonable first best measure, assuming a minimum quality of this habitat is confirmed. Unbundling allows offsets to more directly measure the specific environmental or public good desired.

Figure 1 illustrates the various ways to combine stacking and bundling for a single project along with the tradable environmental instruments or commodities that would result from each configuration. There are two configurations in which there is no stacking: with a bundled tradable environmental instrument that is viewed as representing all benefits resulting from the project (Figure 1a) or with a tradable environmental commodity viewed as representing only one environmental benefit even if other benefits result from the project (Figure 1b). As will be shown in the following section, which of these two configurations is chosen has no implications for how additionality or baselines are assessed. The third configuration (Figure 1c) allows stacking and therefore illustrates a project that can sell separate environmental commodity for each environmental benefit it produces. Again, the primary implication of requiring bundling is that the activities can no longer conceptually be viewed as producing a homogeneous environmental commodity.

**Figure 1.** Stacking and bundling configurations for a single activity




If unbundling is allowed, why would policy makers and those wishing to earn offset credits want to be able to stack offset programs and their credits? The first reason is that proposed activities with multiple environmental or other pubic good benefits may require the policy intervention of more than one offset program. Even if a proposed activity is additional, this fact does not mean that the policy intervention from a single offset program will be sufficient to enable its implementation. Without stacking, some cost-effective activities that provide more than one type of public good benefit would not get implemented, even if those benefits are addressed and valued under separate environmental markets. For example, a proposed agricultural project may produce additional GHG emission reductions as well as reduce the

amount of nitrogen and phosphorus pollution to a watershed. Neither GHG offset credits nor water quality credits, alone, may be enough to enable the proposed project to be implemented. But if combined, they may enable the project's implementation.

The second reason is that stacking has the potential to provide a more economically optimal combination of incentives by separately accounting and paying for more of the public good benefits a single activity delivers. Stacking, when based on first best measure metrics for each offset program, can promote more efficient tradeoffs between the full range of private and public benefits and costs. For example, managing forests solely to maximize carbon sequestration could do harm to biodiversity or a threatened species. If stacking is prohibited, then land managers are forced to choose only one environmental benefit to incorporate into their land management decision making. However, if both carbon sequestration and species protection benefits are accounted for and credited under separate offset programs, then land managers are given incentives to make decisions that consider both benefits. For stacking to be considered by policy makers, though, they must be presented with implementation options and an analysis of trade-offs.

## 3 Options for resolution

Policy makers have a number of options for how they can address the issue of additionality and stacking when designing future offset programs and reforming existing programs that account for the presence of other offset programs.[7] Table 1 describes a range of options and identifies some of the key advantages and disadvantages of each. The options presented address: 1) whether stacking is allowed; and 2) if allowed, how additionality and baselines could be assessed when a single activity is subject to multiple offset program policy interventions. The terminology and framework for understanding this table is taken from Parts 1 and 2 of this three part series. Specifically, the fundamental approach for assessing additionality and baselines for each option is described in Part 2 of this series. Readers are encouraged to refer to these preceding articles for background.

[7] Fox (2008) suggests that if ecosystem services markets have a process for assessing additionality then the resulting credits could not be unbundled and that stacking would not be needed. It is not obvious how she reached this conclusion, which is inconsistent with the findings presented in this article.

**Table 1.** Programmatic design options for assessing additionality and baselines under different assumptions regarding bundling and stacking

| Option | Configuration | Disadvantages | Advantages |
|---|---|---|---|
| (1) Limit the eligibility of proposed activities to only one offset program. Additionality and baseline assessed based on intervention of the single offset program. | No stacking, with or without bundling. Figure 1(a) or 1(c) | A weaker incentive is created for activities that provide a wider range of public benefits. Activities with more than one type of benefits may not be implemented. Potential problems with "offset program shopping." | Avoids some duplication of effort and need for coordination across offset programs. |
| (2) Each offset program assumes the presence of other programs' policy interventions in their assessment (e.g., baseline scenario assumes activity receives credits from all other offset programs). | Stacking and unbundling. Figure 1(b) | Each program will have to independently assess each proposal, and actors will have to submit separate proposals to each program, leading to duplication. Assessment processes will produce more false negatives. | Reduced need for coordination across programs relative to option 4. |
| (3) Each offset program assumes the absence of other programs' policy interventions in their assessment (e.g., baseline scenario presumes other offset programs do not exist). | Stacking and unbundling. Figure 1(b) | Each program will have to independently assess each proposal, and actors will have to submit separate proposals to each program, leading to duplication. Can create a financial windfall for some activities that did not require the policy intervention of more than one program to be additional (more false positives). | Reduced need for coordination across programs relative to option 4. |
| (4) A single merged assessment process for all offset programs is used where the policy intervention is modeled as the combination of all individual offset program policy interventions a class of activities is eligible to apply for. | Stacking and unbundling. Figure 1(b) | Requires coordinated assessments and model development across offset programs. Proposals can only be deemed additional for all programs or none. Can create a financial windfall for some activities that did not require the policy intervention of all programs to be additional. | Stronger incentives provided for activities that provide a wider range of public benefits. Single application process for activity proposals. |
| (5) A single merged assessment process for all offset programs in which the overall policy intervention is modeled as the combination of $x$ single program policy interventions, where $x = \{1…n\}$, and $n$ is the total number of programs a proposal is eligible to apply for. Assessment is optimized to identify the minimum cost combination of programs necessary to achieve additionality. | Stacking and unbundling. Figure 1(b) | Complicates assessment process, as up to $n^2$-1 models are needed for each class of activities to account for all the possible combinations of offset programs relevant to a proposed activity. Requires coordinated assessments and model development across programs. | Theoretically, more economically efficient than option 4 because it avoids financial windfall of credits being awarded to an activity that needed the policy intervention of fewer than $n$ programs. Single application process for activity proposals. |
| (6) Identical to option 5, except that there is a | Stacking and | Complicates assessment process, as up to $n$ | Theoretically, less |

| | | | |
|---|---|---|---|
| predetermined rank ordering of which offset programs are added to assessment. First, a proposal's additionality is assessed for $x = 1$. If not additional, then assessed for $x = 2$ and repeated until determined additional or $x = n + 1$. | unbundling. Figure 1(b) | models are needed for each class of activities to account for accumulation of program policy interventions. The first program in the assessment rank ordering will be subject to a greater supply of credits than the last program. Requires coordinated assessments and model development across programs. | economically efficient than option 5 but more efficient than option 4. Fewer combinations of offset programs to stack than option 5. Single application process for activity proposals. |

Option 1 rejects stacking. A single activity under this option can only earn one type of credit (which can be viewed as being bundled or unbundled), even if other offset crediting programs existed.[8] As discussed in the previous section, proposed activities that require the policy intervention of multiple offset programs will not be implemented under this option. Unless rules to prevent it are in place, this option encourages actors to apply to the one offset program that provides the strongest incentive. The advantage of this option is that it is one of easiest for policy makers to implement.

Options 2 and 3 both permit stacking, and therefore necessitate unbundling. These two options allow offset programs to operate with little or no need for coordination among them. Each offset program separately assesses the additionality and baseline of a proposed activity. But then, what does each program assume about the presence or absence of the other program's policy interventions? Because their assessments are conducted independently, each offset program must make assumptions about the effect of other programs on a proposed activity. Even ignoring the presence of other programs is effectively making an assumption about what effect they have (i.e., none). Option 2 uses the simplifying assumption that the proposed activity will be approved by all other offset programs. A given program will then only determine a proposal to be additional if it requires the policy intervention of all applicable offset programs. Option 3, in contrast, effectively disregards other offset programs. The result is that a proposed activity may be issued credits from more offset programs than it needs to be implemented.

Option 4 addresses many of the disadvantages of options 2 and 3 by integrating the assessment of additionality and baselines across offset programs. Under this option, a proposed activity would apply to a single consolidated assessment process instead of separate processes for each program. As a prerequisite, though, all offset programs will need to develop a single consensus additionality and baseline model for each class of proposed activities (e.g., project type). The policy intervention included in these models would be an aggregate of the individual policy interventions created by each program. Through this collective assessment process, a proposed activity would then be deemed either additional for the entire set of applicable offset programs or non-additional for the entire set.

Options 5 and 6 go a step further by attempting to optimize the collective cost-effectiveness of offset programs. Similar to option 4, programs are required to integrate their assessment of additionality and baselines into a consolidated process. Under option 4, the policy interventions of all offset programs were merged into one consolidated policy intervention for the purpose of the assessment process. Both options 5 and 6 attempt to more precisely determine the minimum overall policy intervention (e.g., credit types to be issued) needed to enable the implementation of a proposed activity. Option 6 is a slight simplification of option 5 as it uses a predetermined order for which types of credits a proposed activity is allowed to earn. Options 5 and 6 are akin to an incremental cost funding approach in which program administrators attempt to determine the additional cost of an activity, relative to a baseline, and then provide only the amount of funding necessary to support the activity.

Bianco (2009) implicitly endorsed option 5 by stating that a ecosystem services project should only be allowed to stack the minimum number of credit types necessary for it to be deemed additional. "A project should not be eligible for stacking unless both payments are necessary to drive development" (Bianco 2009). Unfortunately, he does not address how offset program administrators will realistically be able to coordinate and optimize their additionality assessment process across multiple offset programs, given that those proposing a project will have a clear incentive to request eligibility to earn all types of credits relevant to their proposed activity.

[8] This requirement, technically, requires a minimum level of coordination among offset programs to prevent a single activity from registering with multiple offset programs.

To illustrate some of the implications of each option, imagine a simplistic proposed activity that delivers a variety of environmental benefits relative to its recognized baseline. Assume that the incremental cost of this proposed activity is $3 more than its actual baseline. Non-financial factors are assumed to be negligible with respect to the project developer's decision making. The duration of the activity is only one year. The nature of the proposed activity makes it relevant to five existing offset programs that provide credits for five different ecosystem services metrics. Credit buyers treat each tradable environmental instrument as being fungible and representing only one environmental benefit (i.e., unbundled). The expected value of each type of credit from each offset program is $1. And the activity is expected to be able to earn one credit of each type in its first and only year of operation. Transaction costs are assumed to be zero, and the additionality assessment process is assumed to be accurate.

Under option 1, this proposed activity would be allowed to earn only 1 credit, worth $1, from one of the five offset programs. As a result, it would not be implemented and would constitute lost opportunity relative to a situation in which stacking was allowed.

Under option 2, after applying for each offset program separately, the proposed activity would be deemed non-additional and rejected by all programs because they would each assume the other programs were supporting it.

Under option 3, after applying to each offset program separately, the proposed activity would be deemed additional by all programs. The activity would be implemented and would receive one credit from each offset program, totaling $5 (net windfall = $2).

Under option 4, the proposal would be deemed additional under a single combined assessment process following a single application. The activity would be implemented and would receive credits from all offset programs, totaling $5 (net windfall = $2).

Under options 5 or 6, the additionality assessment process becomes more complex. Using a single application and after multiple rounds of modeling, the proposed activity would be found additional under either option. The activity would be implemented, but would receive a total of only $3 in credits, one from three different offset programs. A process would be needed to decide which three of the five offset programs would issue credits to the activity and which two would not. Option 5 would attempt to find the optimal combination of credit types to achieve maximum economic efficiency (through a cost/benefit analysis), while option 6 would have a predetermined order of which credit types got issued first.

This example highlights some of the elementary trade-offs among the various options as well as why it is important to systematically examine stacking design options. Focusing on single factors, such as economic efficiency, in an analysis of stacking can lead to potentially impractical approaches.[9]

## 4 Discussion and conclusion

How to assess the additionality and baseline for a proposed activity when it is eligible to apply to multiple offset programs has no simple answer. Given the disadvantages and advantages presented in Table 1, policy makers have multiple options for how to allow stacking of offset credits. The overall reason to allow stacking is that incentives can be provided to actors (e.g., project developers) that better account for the recognized public benefits expected to be delivered by their proposed activity.

Of the options that allow stacking (i.e., options 2 through 6), the primary tradeoffs appears to be between the aggregate administrative and coordination burden and overall cost-effectiveness. Of these, option 3,

[9] See Woodward (2011) for a detailed theoretical analysis of the implications of stacking on economic efficiency.

which involves independent additionality and baseline assessments for each program, and option 4, which involves a single collective assessment that does not attempt to achieve perfect optimization, are likely to be a pragmatic way forward for the development of successful offset polices in the future. Option 4 will require offset programs to coordinate to a vastly greater degree than in the past. Option 3 produces similar results without the need for coordination, but at greater costs to both program administrators and participants.

Following this conceptual analysis of stacking design options, the next step is for researchers and policy makers to explore the application of various options within the context of existing or planned PES and offset crediting programs to identify the conditions in which one option is favored over another.

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