



Research that matters.

Inquiry into environmental offsets

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Rod Campbell

The Australia Institute

Research that matters.

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Level 5, City Walk Centre
131 City Walk
Canberra City, ACT 2601
Tel +61 2 6130 0530
Email: mail@tai.org.au
Website: www.tai.org.au

Introduction

The Australia Institute welcomes the opportunity to make a submission to the Standing Committee on Environment and Communications, References Committee Inquiry into environmental offsets. Our experience with environmental offsets is mainly related to their treatment by economists and particularly in the economic assessment of major projects.

This submission first discusses offsets in economic theory, particularly in light of some recent reports by the Productivity Commission, which contain confused and at times misguided ideas on the economics of environmental valuation and use of offsets.

The second section of our submission discusses how environmental offsets have been treated by economists in relation to major projects in Queensland, particularly Waratah Coal's Galilee Coal Project, and NSW, particularly Maules Creek Coal Project, Wallarah 2 Coal Project and Warkworth Coal Project.

Offsets in economic theory

From an economic perspective, the need for an environmental offset arises when an environmental asset is to be damaged or destroyed, resulting in a loss that is borne by the environment and therefore the wider community. To ensure community welfare is not reduced, the developer needs to compensate the community.

How should this compensation be provided? Options include the payment of a tax, the purchase of a permit, or the creation or purchase of an offset in the form of some environmental enhancement elsewhere.

While taxes, permits, etc are commonly used for environmental assets such as water, or pollution discharge, most discussion around environmental offsetting relates to native vegetation and species habitat. Most commonly an area of native vegetation being destroyed for a building or mining project is offset by the developer undertaking to restore or create an area of vegetation elsewhere.

Of key concern to policy makers should be the question of whether the offset or other compensation is appropriate to the damage done to the environmental asset, ie does the offset actually work or is the compensation adequate? Purchases of credits in well-established schemes such as salinity credit or water markets suggest that these prices do compensate the community for use of environmental resources, particularly when well defined caps on total use are in place.

Vegetation, species and ecosystems are more difficult to convert into financial terms particularly when they are in danger of local or complete extinction. An early economist to address this question was Richard Bishop, who advocated the use of a "Safe Minimum Standard" approach to ensure against species and ecosystem loss. This approach:¹

calls for avoidance of extinction unless the social costs are unacceptably large.

Bishop's example is of a hydro electric dam proposed to flood an area containing the last known habitat for an endangered species. He advocates "*sufficient population and habitat to ensure survival*", which would need to be ascertained not by economists, but by ecologists and other natural scientists. He also addresses the issue of "*How much is 'unacceptably*

¹ (Bishop, 1978). Note that Bishop draws heavily on the work of (Krutilla, 1967) and other economists such as Ciriacy-Wantrup.

large”, an issue which “must necessarily involve more than economic analysis, because endangered species involve issues of intergenerational equity”.

The key point to take from Bishop’s work is that when dealing with the uncertainty and irreversibility of environmental damage, valuation in economic terms may not be particularly meaningful. He advocates taking scientifically derived estimates of what is required and then using economic tools to drive efficient development around this requirement.

Environmental offsets should be seen as an extension of this idea. While Bishop discusses a situation where *“there is no alternative method of preventing extinction”*, offsets are an alternative if the situation is not so dire. The parallel is that environmental scientists should be advising as to the required conservation standards to protect environmental assets in offsets. Once scientists have established these standards or offsets, then economists can assist with finding efficient ways to achieve them.

There is a strong parallel here with earlier examples of successful trading schemes of water or salinity credits – caps on water use or saline discharge rights are set by scientists to ensure sustainable use, then economists assist with designing an efficient system. Similarly, discussion of climate change by economists such as the Garnaut or Stern reviews generally conclude that emissions reduction targets should be set with reference to climate science and a policy response guided by economics.

Offsets and environmental valuation

A clear advantage of using offsets is that they limit the need for putting a dollar figure on the environment. By providing compensation for environmental damage through environmental offsets, judged as equivalent by environmental scientists, the need to put a dollar figure on environmental assets is eliminated. The Productivity Commission recently noted:²

environmental benefits are difficult to value, particularly those that are not reflected in market prices (so called ‘non-market’ values).... There are several non-market valuation methods that can be used to evaluate such trade-offs, but they are not widely used for environmental policy analysis in Australia.

How well such measures perform:³

can depend on how familiar [survey] respondents are with the environmental assets in question. For example, people surveyed at a recreation site about their willingness to pay to visit are likely to be able to provide well-informed answers based on their knowledge and feelings about the site, and possibly also knowledge about substitute sites they might prefer if the cost of visiting changed. By contrast, when people are asked about environmental assets that are relatively unfamiliar to them (and which they may never visit) they rely more on the information presented to them and may have to construct their preferences during the survey.

In other words, people who know a lot about an environmental asset have a better understanding of its value than people who don’t. This is particularly the case for assets which provide benefits that may not be immediately obvious such as habitat for animals which pollinate crops, vegetated areas which improve water quality or coastal vegetation which reduces storm surge damage or other “indirect use values”.⁴

² (Baker & Ruting, 2014) p2

³ (Baker & Ruting, 2014) p6

⁴ (Baker & Ruting, 2014) p12

Indirect use values are the values people hold for the services provided by species and ecosystems. Examples include pest control, pollination and water cycling.

In fact, people may not realise they place a value on such assets as they are unaware of the benefit they are receiving. Estimating the total economic value of an environmental asset is difficult, time consuming and costly, making offsets an attractive option for compensation for environmental damage.

Furthermore, provision of an offset may be preferable to paying a fee for equity reasons – the members of the community (present and future) who will be most impacted by the damage to the original environmental asset are likely to receive the most benefit from a well designed offset.

The Productivity Commission in another recent paper urges decision makers to evaluate offsets through exactly these sorts of measures:⁵

regulators must adopt scientifically rigorous, consistent and predictable methodologies to quantitatively measure and value the expected environmental losses caused by development (and equally, to measure and value the expected environmental gains from available offset measures).

It is unclear if the Commission is referring to non-market valuation exercises or valuations based on other non-economic metrics, however they make clear that they prefer use of non-market valuation to assess whether values the community places on benefits are similar to the cost of offsets provided by project developers.⁶

For example, if a project is expected to damage threatened species habitat, the proponent may be required to provide comparable areas of habitat in some contiguous region. The compliance cost associated with the offset policy is therefore determined by the cost of delivering ‘equivalent environmental gains’, not by the external cost of the development activity on the community. It is unlikely, therefore, that current offset policies and practices efficiently internalise the external costs associated with development activity.

It is unclear why the Commission places so much faith in methods of evaluating costs to the community in this passage, while in quotes above emphasis is placed on the difficulties of these methods. If the species in question becomes extinct, external costs are difficult to evaluate in economic terms, to say nothing of ecological, moral and philosophical issues. The Commission believes that:⁷

One way to achieve [efficient compensation to the community] is to impose a tax (often referred to as a ‘pigouvian tax’) on activities that generate negative externalities, such as environmental pollution. Appropriately set, a pigouvian tax on the polluting activity ensures producers face the total social cost of their production decisions, and the socially optimal amount of development activity (and environmental pollution) is achieved.

The important words here are “appropriately set” which raises a series of questions. How to set an appropriate tax for different ecosystems and species in different locations, used/not used by different people under different jurisdictions? How will this tax price in uncertainty around extinction risk and its irreversibility? Will the costs involved in estimating all these

⁵ (Productivity Commission, 2013) p241, emphasis in original.

⁶ (Productivity Commission, 2013) p239

⁷ (Productivity Commission, 2013) p239

appropriate tax levels and administering them be greater than provision of environmental offsets? These questions serve to illustrate the complexity of calculating environmental values for policy use which the Commission has not adequately addressed.

The use of environmental offsets is designed to ensure that species and ecosystems are able to survive and perform to levels deemed necessary by experts in these fields. Decision makers must take advice on environmental requirements from environmental scientists. If a development is likely to have irreversible impacts on species and ecosystems, safe minimum standards to ensure species survival and ecosystem function must be maintained. Similarly, where developments can proceed, but serious environmental impacts are being felt by the community, particularly on difficult to evaluate environmental assets such as native vegetation, environmental offsets designed by independent experts are likely to be the best policy option as they avoid problematic environmental valuation and equity considerations.

The following sections discuss projects The Australia Institute has had involvement with, which illustrate some of the challenges around environmental offsets and environmental valuation.

Offsets and economics in practice

Queensland - Waratah Coal Galilee Coal Project

The economic assessment of the Waratah Coal Galilee Coal Project, also known as the China First project, includes no mention of environmental costs or of any offsets. In fact, it fails to consider any costs or benefits of the project at all, instead focusing entirely on the potential impacts on indicators of economic activity such as gross state product. In other words, it never asks if the benefits of the project outweigh its costs, environmental, economic or social. It never asks if the project will make Queensland or Australia better off.

This lack of cost benefit analysis is a common failing of project assessment in Queensland and is contrary to Queensland Treasury guidelines. The Queensland and Federal governments seem unconcerned however, and routinely approve major projects without any understanding of the implications for government finances, let alone environmental offsets.

New South Wales – Maules Creek and Wallarah 2

In New South Wales decision makers are provided with cost benefit analysis, however the approach to environmental offsets is simplistic. Offsets are assumed to perfectly compensate the community for loss of habitat. The assessment of the Maules Creek project provides an example:⁸

Approximately 1,665 ha of forest and woodland ... including [areas]... listed as Critically Endangered ...are proposed to be disturbed as a result of the Project. This will remove habitat for a range of threatened fauna species.

These areas may have non-use values to the community that could potentially be estimated using non-market valuation methods such as choice modelling or contingent valuation.

...

With the implementation of the above ecological offset proposal it is considered that the potential impacts of the Project on terrestrial fauna and flora would largely be

⁸ (Gillespie Economics, 2011a) p10

offset and hence no significant economic cost would arise that would warrant inclusion in the [economic assessment].

The economist evaluating the Maules Creek Project lists a line item for ecological impacts in the cost benefit analysis, but it is given a zero value and noted as:

Some loss of values but offset. Cost of offset included in capital costs and operating costs⁹

The economist's approach is to assume that the value of the offset is exactly equal to the value of the environmental damage. An identical approach is taken in most NSW major project assessments.¹⁰

The main problem with this approach in economic assessment is that it ignores the debate that occurs between ecologists about how likely it is that offsets achieve their goals. Ecologists have several reservations about offset programs, including:¹¹

- Protection of an existing asset does not offset destruction
- Uncertainty as to whether an environmental asset can actually be recreated
- Time scale issues – decades or centuries may be needed for offsets to mature into the assets they are replacing.

While some project assessments include sensitivity analysis around variables in their assessment, there is no consideration of how the value of the project might be affected if offsets are not perfectly successful. This approach seems certain to overstate the value of these projects to the public.

This seems particularly likely in the case of the Maules Creek Project. Four ecologists have reviewed the offsets proposed for the project and declared they are inadequate.¹² If this is the case, the loss in ecological values will represent a loss to the public which has not been considered in the economic assessment.

Such flaws are regularly pointed out to the NSW Department of Planning and Infrastructure (NSW DPI), but the department shows little interest in further investigation:¹³

The Department notes that the [economic assessment] assumes a 'negligible' cost in relation to most of the key externalities. While the Department expects there to be more than negligible impacts in relation to some, if not all, of these issues, it is satisfied that the recommended conditions of consent would provide for appropriate offsets, mitigation or management of these impacts. Consequently, the Department believes that it is likely that full consideration of all externalities would only lead to a minor reduction in the predicted [economic value].

This quote relates to the Wallarah 2 Coal Project on the NSW central coast near Wyong. Local communities are opposed to the project based on its possible effects on the drinking water catchment which serves 300,000 people. The NSW DPI seems to lack the capacity to adequately review economic assessment and understand the assumptions made in their compilation.

⁹ (Gillespie Economics, 2011a) p13

¹⁰ (DAE, 2013; ECS, 2012; Gillespie Economics, 2011b)

¹¹ (Bekessy et al., 2010; Gibbons & Lindenmayer, 2007; Walker, Brower, Stephens, & Lee, 2009)

¹² <http://www.abc.net.au/am/content/2014/s3963037.htm>

¹³ (NSW DPI, 2014) p50

New South Wales – Warkworth Coal Project

A different approach to economic assessment of environmental offsets was taken in the evaluation of Rio Tinto's Warkworth Extension Project. In that project the economists attempted to establish the value that the NSW public placed on the environmental damage to be caused and on the offsets to be provided. These and other 'non-market' values were estimated through a technique known as 'choice modelling'.

In choice modelling members of the public are given some information about an environmental or policy decision before being given a multiple choice survey. Each question in the survey asks respondents to choose between different quantities of environmental or social "goods" and also a financial payment. By modelling people's choices about the environmental or social goods against the payment variable, economists estimate the value the public places on these goods.

The Warkworth choice modelling study placed values on the 'endangered ecological communities' (EEC) to be destroyed and the offsets to be provided of:¹⁴

- \$459,393 to avoid a hectare of EEC being cleared
- \$113,497 for a hectare of EEC planted in the region
- \$320,459 for a hectare of existing EEC protected in the region.

In other words, the study found that the NSW public valued the areas of native vegetation that the project would destroy at nearly \$460,000 per hectare, and that this could be offset by planting a new hectare of this vegetation (worth \$113,000) and protecting an existing hectare in perpetuity (worth \$320,000).

These estimates were used in the cost benefit analysis of the Warkworth project to estimate the value of ecological impacts of \$328 million and an almost equivalent value of offsets of \$317 million.

Economists from The Australia Institute were involved in the appeal against approval of the Warkworth project in the NSW Land and Environment Court. In finding against Rio Tinto, the judge said:¹⁵

The Choice Modelling study, which provides the values for the non-market benefits and costs, was deficient in limiting the survey respondents to residents of New South Wales, and providing inaccurate, indiscriminate and uninformative information to survey respondents which affected their choices and values.

The flawed values calculated by Rio's economists, Gillespie Economics, were a factor in the judge's ultimate decision:¹⁶

I am not satisfied that the economic analyses provided on behalf of Warkworth support the conclusion urged by both Warkworth and the Minister, namely that the economic benefits of the Project outweigh the environmental, social and other costs.

Similar choice modelling studies have also been criticised by the NSW Planning and Assessment Commission:¹⁷

¹⁴ (Gillespie Economics, 2009) p31

¹⁵ (Preston, 2013) p155-56

¹⁶ (Preston, 2013) p155

¹⁷ (PAC, 2012) p5

The Commission has noted in response that narrowly-based cost-benefit analyses of the kind usually undertaken for coal mining projects are unlikely to ever value any single environmental attribute or feature above the value of the coal that would have to be foregone to protect it. The Commission's view is that such assessments should therefore be approached with extreme caution rather than being uncritically accepted as justifying propositions for destruction of significant natural features. The techniques available for placing an economic value on natural features are still relatively crude and, in the Commission's view, their application usually falls well short of the standard required to withstand rigorous scrutiny.

Despite the identified flaws in these choice modelling studies, economic assessments which are based on their results have been accepted by Planning and Assessment Commissions and the NSW DPI. In February 2014 the DPI Environmental Assessment Report into the Wallarah 2 Coal Project accepts a \$186 million dollar value based on a similar study, which represents over one third of the estimated value of the project.¹⁸

Conclusion

Economists are not the right people to be making decisions relating to endangered species and ecosystems. Decisions relating to the desirable standards of ecological protection for Australia's environmental assets, particularly native habitat and ecosystems, should be guided primarily by environmental scientists. Once environmental scientists have established the necessary standards, economists should be involved in establishing efficient systems of maintaining these standards.

Environmental offsets can be an efficient means of compensating the community for environmental damage. They are particularly useful as they reduce the need to engage in difficult and subjective environmental valuation exercises. Concerns that offsets are imposing excessive costs on development are misguided. The Productivity Commission's view that offsets impose excessive costs by favouring environmental values over other values is an extreme view that is not supported by real world events.

Offsets are generally poorly treated in economic assessment of major projects. In Queensland most projects do not bother to evaluate any economic costs or benefits, and certainly not the complex question of if offsets are performing their job from an economic perspective. In NSW economists assume that offsets work perfectly, which is unsupported by the views of ecologists. Such an approach over values projects and understates their true environmental cost.

Cases like Maules Creek, NSW, show that project approvals and offset plans need to be scrutinised not only by professional ecologists, but by independent, professional ecologists. Economic assessment that is based on proponent-commissioned ecological analysis is likely to understate costs to the community.

In rare cases extensive environmental valuation exercises have been done to evaluate habitat destruction and offset provision. These studies have been done poorly and have not stood up to scrutiny in courts or other decision making forums. This underlines the problems associated with environmental valuation.

We would be happy to expand on this submission in person or in writing at a later stage of this inquiry.

¹⁸ (NSW DPI, 2014) p50

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