

**Comparing returns in carbon mitigation
investment projects**

A report by Small World Consulting Ltd

Full Report

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**An associate company of
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1 Introduction

This document assesses in broad terms the likely effectiveness of investment in the Arbolivia project compared to arranged alternative carbon mitigation investments.

We have considered a range of scenarios for investing both in this project and in alternatives. The scenarios assume fairly high (9%) discount rates and for this project we have included scenarios with varying financial returns and varying degrees of success in carbon terms. Whilst this paper focuses on carbon and financial investment returns it should be remembered that the Arbolivia project also sets out to deliver, on top of these, important biodiversity, social benefits which are not features of many of the competing investment opportunities that we have considered here.

1.1 Arbolivia

Our analysis for the Arbolivia project is based upon information provided in the Cochabamba project prospectusⁱ and from communication with project organisers on the predicted outcomes on the ground and potential financial returns on the investments (see appendix A).

The rest of this report focuses on comparing Arbolivia to other carbon mitigation schemes including household level investment in;

- loft insulation,
- micro wind turbines,
- photovoltaic panels,
- double glazing.

These scenarios have been adjusted and updated from our original analysis as presented in Mike Berners-Lee's book 'How Bad Are Bananas'ⁱⁱ.

2 Findings

Table 1 summarises the carbon return per pound and the potential financial return provided by each scenario normalised to a £10,000 investment. We have applied a 9% discount rate throughout to take into account the fact that money available to you right now is worth more to you than the promise of the same amount of money to be paid to you in the future provided that things go well. (Applying a 9 percent discount rate is equivalent to saying that you'd be just as happy to have £910 in your pocket now as you would be to have £1000 promised to you in a year's time.) Clearly a 7.5% annual return does not fully compensate for a 9% discount rate, but if the investment does actually deliver a 7.5% compound return and repay the original capital, then Arbolivia compares particularly favourably

	Loft insulation (0 to 270mm)	Loft insulation (50 to 270mm)	Micro wind turbines	PV Panels	Double glazing	Arbolivia Investment	Arbolivia Donation
Lifetime of investment (yrs)	40	40	10	40	40	38	38
Annual Return	£ 3,000	£900	£1,450	£730	£325	£750	£0
Embodied CO2e in investment (kg CO2e)	7,600	7,600	6,000	3,500	45,000	0	0
Net financial return over lifetime (without discount)	110,000	26,000	4,500	19,200	3,000	156,000	-10,000
Return over lifetime excluding initial investment (with discount)	22,297	-311	-293	-2,141	- 6,501	-1,966	-10,000
Net Carbon saving over lifetime	696,400	192,400	44,000	68,500	19,000	663,500	663,500
£ spent per tonne saved	-32	2	7	31	342	3	15
Total carbon saved per £ spent (kg)	-31	619	150	32	3	338	66

Figure 1: Returns in terms of carbon and finance for investment proposals.

3 Discussion

The above analysis shows the Arbolivia project to be a **very favourable way to invest in a low carbon world**. Even with the application of a fairly severe 9% discount rate to take account of risk, inflation and opportunity costs, the project is not far from being financially attractive, quite aside from the social and environmental benefits that this project has been established to provide.

In terms of financial return, Arbolivia is beaten only by the installation of loft insulation. In terms of carbon saved per £, Arbolivia is more than twice as efficient as micro-wind (even with feed-in tariffs), over ten times more efficient than PV panels (even with feed in tariffs) and over a hundred times as efficient as double glazing. A report conducted for Exmoor Carbon Neutral Strategyⁱⁱⁱ¹ draws broadly similar conclusions as the relative cost effectiveness of carbon mitigation options.

Loft insulation, fitted where none previously existed, is the most financially attractive of the options considered here, paying for itself in 4 years and providing generous returns over its lifetime. Thanks to feed-in tariffs, we estimate that investments in micro-wind turbines will typically pay back in around 6 years and generate £7250 per year thereafter². However our analysis suggests that once a discount rate is applied, many carbon mitigation schemes do not offer positive financial returns (see table below).

¹ The analysis conducted by small World takes account of UK government feed-in tariffs whereas that conducted for Exmoor Carbon Neutral Strategy predates these.

² The UK government has a feed-in tariff that pays 24p per unit on top of the money you save on your own fuel bills.

	Loft Insulation (from 0 to 270mm)	Investment in Arbolivia	PV panels	Double glazing
Initial cost	£10,000	£10,000	£10,000	£10,000
Payback time (yrs) without discount rate	3.3	13.3	13.7	30.8
Payback time (9% discount applied)	4	Never (lose about 20%)	Never (lose about 21%)	Never (lose about 65%)

Figure 2: Financial returns on investments.

4 Conclusion

Arbolivia offers a cost effective way of investing in a low carbon world. Unlike any of the other options considered here it also delivers important biodiversity and social benefits, and is not influenced by government subsidy schemes. Furthermore, if the project succeeds fully, it will provide a 7.5% return on investment.

Our analysis suggests that carbon conscious donors and investors should first check that they have high quality loft insulation. Once this is done, and based on the figures supplied by the project itself, our analysis suggests that Arbolivia can be viewed as an attractive investment option in both carbon and financial terms.

Sources:

ⁱ The Cochabamba Project Ltd. Share Offer 2010

ⁱⁱ Berners-Lee, M. (2010) 'How Bad are Bananas' Profile Books

ⁱⁱⁱ Climate Action West (2009) 'Options assessment of proposed intervention measures: sub paper to the Exmoor Carbon Neutral Strategy'.

Appendix A:

Arbolivia Carbon Sequestration Assumptions

In calculating the carbon sequestered per £ invested, the following assumptions have been made:

- Total Carbon sequestered – 1,409,425 tonnes^a
- Full project involves 5000 plantation hectares
- Average of 1000 trees per hectare^b
- Each tree costs £5 when sold under tree subsidy programme^c
- Project term is 38 years^d
- Investment return is 7.5% compound which results in a total return of £156,140 over 38 years^e
- The investment pays for the maintenance of 700 hectares at a total cost of around £4250 per hectare over the full term^f

^a The Arbolivia Project has been certified at the highest level as a CDM project by JACO and the project is also being certified under the Plan Vivo Standard. This certification is an assurance that the stated amount of carbon has actually been sequestered, or will be in the future. The total tonnes of carbon that will be sequestered by the project when it is fully implemented, including hectares for agroforestry and wildlife corridors, is conservatively estimated at 1,409,425. This includes a 25-30% buffer for tree losses.

^b This is a conservative figure – it may well be more like 1100

^c This is a subsidy whereby companies and individuals can elect to support the project by subsidising the growing of trees.

^d The project runs to 2048. In practice, the term of investment may be shorter if investment is not required are breakeven. This would have the effect of substantially enhancing the amount of carbon sequestered per £ invested.

^e This is the annual rate of interest declared by the Cochabamba IPS. The actual investment return may be less than this as it depends upon the net returns to the Society from its investment in the project.

^f The IPS has a contract with the project managers to this effect