Fleet vehicles – opportunities for carbon management

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Introduction

UNDP studies have looked at the Scope 1, 2 and 3 carbon emissions attributable to the delivery of Global Fund health programmes in Tajikistan, Montenegro and (most recently) Zimbabwe. The findings of this work have identified the components of grants which contribute most to the overall carbon footprint. The challenge then becomes how to manage and reduce this footprint, which requires action both at the strategic planning stage of grant formation, but also during the delivery phase of grant programmes. During delivery phase the opportunities to manage carbon lie with the teams responsible for day-to-day delivery of programmes – and the opportunity to achieve carbon reductions is dependent on the extent of control delivery teams have over how grant activities are carried out. One area where the delivery teams have good influence is over the use of vehicles. Emissions from vehicle use are a common element to all grant carbon footprints. This paper examines what opportunities exist for achieving carbon savings through this route.

Scope

The delivery of Global Fund health programmes makes use of large numbers of vehicles, under the control of various organisations and entities. These include:

- Use of vehicles in the supply and management of procured medical equipment, pharmaceuticals, and other goods;
- Vehicles used by the UNDP Country Offices;
- Vehicles used by the Project Implementation Unit (PIU) for day-to-day tasks; and
- Vehicles used by sub-recipient (SR) organisations.

This study has identified one of these groupings – use by the Project Implementation Unit – as its focus. This is not the component of vehicle use likely to have the greatest emissions (which will come from freight vehicles and from use by sub-recipients), but it is a vehicle fleet which is directly under the control of the UNDP PIU. If it is feasible, and useful, to implement measures to change the way vehicles are used then the PIU has the remit and authority to make this happen.

The other main grouping considered for analysis was that of vehicle use by sub-recipients. Many grants include the purchase of vehicles for sole use by sub-recipients for the delivery of health activities. The selection of the vehicles being procured is undertaken by the PIU and/or Country Office, and so to some degree the emissions arising from sub-recipient vehicle use can be influenced through these procurement decisions.

Generally, sub-recipient vehicles use fuel which has also been purchased under the Global Fund grants. The day-to-day running of these vehicles is largely the responsibility of the sub-recipient organisation for which it has been purchased, and is therefore out of the direct management of the PIU (albeit fuel use and maintenance expenditure are managed as with other expenses of SRs). However, the activities undertaken by sub-recipients are undertaken within the terms of contracts between the Principal Recipient and the Sub-recipient, and there may be scope for greater control over the use of vehicles to be effected through these agreements.

For the purposes of this study the set of vehicles studied are those of the PIU in Tajikistan, supporting the delivery of the HIV/AIDS and TB grants. These grants were studied under the previous carbon footprint project carried out by UNDP and Arup.

Challenge

The challenge is to understand the systems in place for purchasing, maintaining and fuelling, and managing the use of vehicles procured through the grant funding process for use by the PIU. It was then to understand patterns of use, and to identify the potential contribution of any changes to management on the carbon footprint of the grants in question.

The fleet in Tajikistan comprises six vehicles, which are used for carrying out a range of programme-related activities which include Monitoring and Evaluation activities (M&E), general administrative and planning tasks (such as delivery and collection of documentation and occasionally equipment).

Administrative processes for fleet management

There are a number of phases to the procurement and operation of vehicles within grant programmes, discussed in the following sections.

Purchasing of vehicles

Purchasing of vehicles for use in the vehicle fleet is carried out by the Country Office of the relevant country. This is due to the value of vehicles typically being above the threshold for PIU procurement.

Management of vehicle use

Management of the fleet is undertaken through two main administrative processes depending on whether a journey is taking place within the main city area (up to approximately 25km from the PIU location), or whether travel further afield is required (in which case additional security oversight is required).

Travel within the city area
For shorter journeys the process is:

1. Staff member requests a car/driver through an Access database system.
2. This is then approved by the relevant individual within the PIU.
3. Once approved the information is sent to the Fleet Manager, who books an available vehicle.

There is an Access database system which provides the booking system, and provides a record of journey bookings for later reconciliation.

Travel beyond the city area
Beyond the city there is a need for additional security. In this case the process is:

- An online request is made for security clearance for travel.
- Once clearance is granted a Local Travel Authorisation (LTA) is prepared which forms the approval document for travel. This is approved by the Programme Manager in the PIU, and by an authorised individual from the Country Office. The LTA also has a function relating to payment of expenses.
- A vehicle is assigned for use – the LTA is created for the passenger(s) and also the car driver.

Logging of travel information
There are three main logs used for management/ reconciliation of fleet vehicle costs etc.:

- A log which records mileages, fuel purchases and costs for each vehicle.
- Contained within the log book is a record of vehicle maintenance and costs.
- Daily log – a single sheet per day for each car. On this is recorded who travelled and for what purpose, where to/from, mileage, and driver name.

Reconciliation of records
At month end the Daily Logs for each vehicle are reconciled with the two separate systems (the Access database, and the LTA records). Costs are then attributed to the different grant activities for budgeting and monitoring purposes. Typically these costs will be allocated to:

- Monitoring and evaluation activities.
- General office administrative budgets and/or specific vehicle fuel budget lines.

There is no final database recording all travel details from the two separate systems, although the costs attributable to all travel is entered into the UNDP ATLAS financial transaction system (although this will not record full details of usage such as destinations etc.).

Maintenance of vehicles

Maintenance of vehicles is managed by the fleet manager, and details of each vehicle's maintenance recorded in the vehicle log. This is also used to inform the financial reconciliation, to ensure that maintenance costs are also allocated to the relevant budget lines in the grant programme.

End use of vehicles

Vehicles which are purchased under the funding for an individual grant are used by the PIU for the grant in question, but are then retained for use in subsequent programmes. This can create an available pool of vehicles greater than just those identified under a grant programme, as there may be vehicles available from previous programmes. At the point where vehicles reach their end of useful life (through age or damage) there is a standardised process for 'retiring' vehicles, whereupon they can be sold, donated or scrapped.


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Opportunities for carbon management

There are various ways in which carbon emissions could be reduced through the way in which the vehicle fleet is managed as discussed below. These include:

- Purchase of more sustainable vehicles with lower embodied emissions
- Purchase of low emissions vehicles
- Avoided travel
- More efficient use of vehicles for day-to-day journeys

However, the actual capacity to achieve these savings is dependent on:

- Having administrative processes which support these activities
- Not compromising the delivery of grant programme outcomes

Procurement of vehicles

The UN has published guidance on procurement of vehicles, most recently in 2011[1]. This guidance sets out **basic** and **advanced** sustainability criteria for vehicles. The basic criteria are intended to be used within minimal cost increases. The criteria cover a wide range of sustainability topics (emissions, quality, recycled content, pedestrian safety etc.).

In carbon terms there is little relating to embodied carbon, although proportion of recycled material is included as a Basic level criterion, with minimum standards for aluminium and steel recycled content.

Fuel economy is included as a criterion in vehicle purchasing choice, with a points based system for prioritising vehicles with higher fuel efficiency.

In quantitative terms the selection of fuel efficient vehicles is likely to outweigh recyclable content in terms of potential carbon savings. On the basis that the vehicle procurement criteria are being used when considering vehicles for use in Tajikistan, then the potential savings from switching may be limited. However, there may be a case for ensuring an adequate mix of vehicles within the fleet. It will be wholly dependent on location, but there may be scope for smaller and more fuel efficient vehicles to be used for short journeys within the city area.

[1]http://www.unep.org/resourceefficiency/Portals/24147/scp/sun/facility/reduce/procurement/PDFs/UNSP_Product%20Sheet_Vehicles_basic%20and%20advanced_all%20regions.pdf

Efficiency of vehicle use

It is generally accepted that travel is not undertaken unnecessarily within grant programmes. But to achieve reductions in carbon emissions for these vehicles it would be necessary to:

- Avoid unnecessary journeys
- Combine trips to reduce overall emissions
- Use an appropriate vehicle for the trip being undertaken

Vehicle logs for a three month period were obtained from the PIU in Tajikistan. These showed the following usage for the six available vehicles.

Travel beyond the city

The period examined was Jan-Mar 2014. Across the six vehicles:

- January saw 5 trips undertaken (3 to Kulyab and 2 to Khorog) for a total of 46 days. At most three vehicles were allocated concurrently;
- February saw 1 trip undertaken (Kurgan) for a total of 3 days.
- March saw 8 trips undertaken (6 to Khorog, 1 to Kurgan, 1 to Khujand). At most three vehicles were allocated concurrently.

Given the volumes and durations of these journeys (relatively few in number, and expected to mainly relate to M&E activities) it is expected that there is little opportunity for these types of journey to be avoided.

Travel within the city area

These trips are far more numerous, comprising many shorter journeys. The period Jan – Mar 2014 records over 300 journeys, around 100 per month.

Examining January as an example saw 120 journeys, all but one of which were short trips on a single day, and 75% of less than 2 hours duration. Many of the journeys are to attend meetings, to transport documents and paperwork, and occasionally for transporting supplies.

Potential carbon savings from management changes

Benchmarking of vehicle emissions

For the purposes of this study an example carbon footprint analysis has been used, taken from the studies carried out in 2013. The Round 8 Phase 2 HIV/AIDS grant programme in Tajikistan had the following profile:

Inflation adjusted budget:
$15,368,588

Grant programme carbon footprint:
25,214 tonnes CO_2e

Vehicle use component of footprint (all scopes):
1,581 tonnes CO_2e (6%)

The estimated emissions from the of use of vehicle fuel is 1,581 tonnes CO_2e. This includes:

- Budget lines directly referencing the purchase of fuel
- An allowance within general vehicle overheads for purchased fuel
- An allowance within general administration budgets for purchased fuel

Vehicle fuel is purchased for a number of different grant activities, some relating to use by sub-recipient organisations, some identified as being for specific M&E activities, and some falling within the general administrative costs for the PIU.

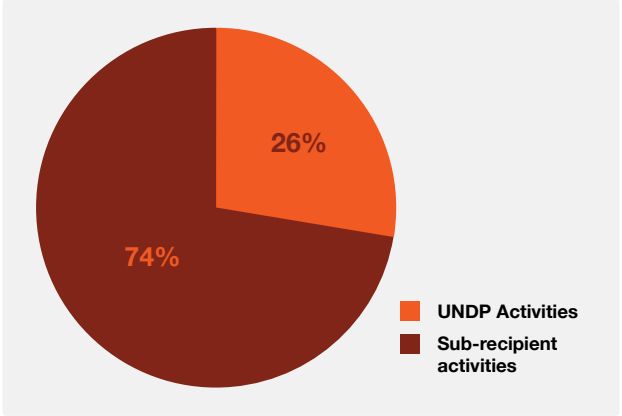

Figure 1. Identified fuel purchased by end user

It is estimated that around 26% of this fuel use is attributable to the PIU, with the remainder attributable to use by sub-recipient entities for the delivery of specific grant activities, see Figure 1.

This 26% is equivalent to 415 tonnes CO_2e, which is approximately 2% of the overall carbon footprint for the grant.

Alternative procurement

As set out above, the UNDP has guidance in place to inform procurement choices of vehicles. The precise types of vehicles in the fleet is not known but based on information from previous studies they are expected to comprise the following types:

Toyota Land Cruiser 200
approx. 12 litres diesel / 100 km

Toyota Land Cruiser Prado
approx. 14 litres diesel / 100 km

It is considered unlikely that alternative vehicles (of higher efficiency) could have been used for out-of-city journeys.

For the shorter within-city journeys it may have been possible to use more efficient vehicles. It is estimated that of the 415 tonnes attributable to the PR around 75% of emissions arise from within-city trips. Modelling the use of a more efficient vehicle (such as a hybrid with typical equivalent fuel consumption of 3 litres/100 km), and assuming an estimated 25% of within-city trips being carried out with this type of vehicle would provide greater emissions reductions. Adopting this measure would reduce the whole PIU car vehicle emissions by around 15%. This reduction could be taken further by using full-electric vehicles for short trips (especially beneficial in the context of Tajikistan where grid electricity is predominantly hydro-electrically generated).

Trip efficiency

The review of three month's sample data from Tajikistan provides some insight into the frequency and types of travel undertaken using fleet vehicles. Of these a proportion are out-of-city, and given the number and duration of these it is unlikely there is potential to manage this type of trip more efficiently.

Within the city area the sample data shows a large number of short trips, with 23% lasting less than 60 minutes, and 47% lasting between 60 and 120 minutes. Over the three month period 320 trips have complete date/time information – an average of 3.5 trips per day. This frequency of travel suggests that there is limited scope to optimise journeys on a day to day basis.

The narrative supplied with journey information indicates a range of reasons for trips – many for meetings and site visits, but also several for document delivery etc. It is unlikely that there will be scope to manage trips to any significant extent for journeys other than simple administrative tasks. A review of trip information suggests around 20% of trips are for the purposes of transporting documents. There is potential for UNDP to achieve improvements in this pattern of vehicle usage, many of which can be delivered through a more advanced vehicle management system. An integrated system for booking, allocating, routing and logging vehicle trips could contribute significantly to achieving efficiencies in fleet usage.

To understand potential impact of changes in use, an indicative saving of 100% of simple document transfer trips (through combining these with other journeys) would reduce the PIU fuel use footprint from 416 tonnes CO_2e to 353 tonnes CO_2e (a 15% reduction).

Cumulative carbon savings

Combining potential savings through vehicle selection and removing simple document trips would achieve reductions of emissions attributable to the PIU vehicle use.

Carbon saving potential

Grant Carbon footprint:	**25,214 tonnes CO_2e**
Vehicle use component of footprint (all scopes):	**1,581 tonnes CO_2e**
Vehicle use by PIU:	**416 tonnes CO_2e**
Emissions after using more efficient vehicles:	**354 tonnes CO_2e**
Emissions after reducing the number of trips:	**353 tonnes CO_2e**
Total emissions after combining both changes:	**304 tonnes CO_2e**

This is further presented in Figure 2 where it can be seen to equate to a combined reduction against PIU vehicle use of some 27%. If this were achieved it would deliver a reduction in overall grant carbon footprint of about half a percentage point.

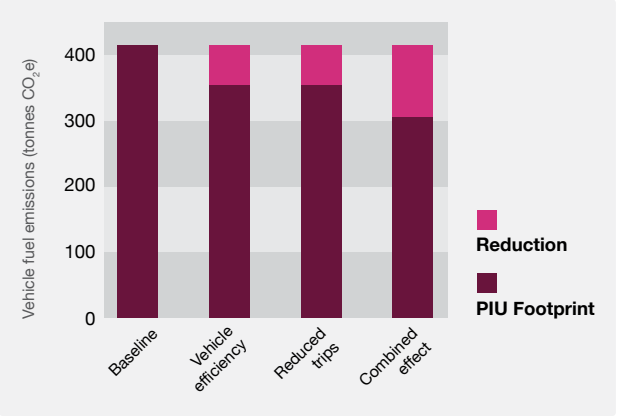

Figure 2. Vehicle emission reductions potential

Opportunity of hybrid technologies

The carbon savings modelled take a conservative view of what might be achievable through the use of more efficient vehicles and through more effective trip and vehicle management. There is potential to realise these savings across a greater range of vehicles and their use, through working with sub-recipient organisations, and through changes to the selection of vehicles for use.

A move towards full use of hybrid vehicles (with an estimated typical 75% reduction in vehicle emissions per km) would achieve significantly greater impact. Implementing full hybrid vehicle use could cut approximately 5% from the total grant footprint, equivalent to a saving of approximately 1,180 tonnes CO_2e. This would require the identification and procurement of hybrid vehicles capable of operating under the required performance conditions. Close work between UNDP and vehicle suppliers is required to identify what vehicles might be currently available, and the operational conditions under which they would be used across different geographical locations.


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Conclusions

The initial arguments for examining fleet vehicle use is that it is an area within the direct control of the PIU; and the findings of this paper indicate this potential and the carbon saving's possibilities it represents. The case study review of Tajikistan found that the applied administration system is not state-of-art and uses multiple platforms, has no automated or customized analysis, no vehicle position system, and requires a re-conciliation of manual recording with an electronic requisition system. By contrast an integrated system for booking, allocating, routing and logging vehicle trips could contribute significantly to achieving efficiencies in usage.

An intervention such as this would be challenging, but the subsequent benefits would be justifiable if the updated systems were applicable beyond just the PIU – extending to the country office, and potentially broader UNDP programmes within other countries. In this regard the opportunity should be looked at from a UNDP corporate /strategic perspective and the cost efficiency, security and environmental benefits it could bring.

It is therefore recommended that the UNDP undertake a broader review of its vehicle management systems, which would inform the purchase, running and maintenance of vehicles across its operations and the systems that support their use. In time this scale of intervention would have potential to influence the behaviour of those parties involved in the delivery of transport in a range of geographies. This influence could partly be realised through extending these savings into the activities of sub-recipient organisations (often government bodies and agencies in the target countries). As an example extending the modelled vehicle emissions reductions to sub-recipients could deliver around a 2% reduction in the carbon footprint of a country grant programme, while also demonstrating direct cost savings to project/programme delivery.

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