

Reap Petite User Manual and Technical Annex

August 2009



DRAFT

Contents Page

1	Introducing Reap <i>petite</i>	3
1.1	What can REAP <i>petite</i> do?	4
1.2	Why collective action?	5
1.3	How do we define community?	5
2	Getting Started	6
2.1	The basics	6
2.2	Loading and saving projects	6
2.3	Buttons and the record list	7
2.4	Two layers of tabs	7
3	Using REAP <i>petite</i>	8
3.1	The questionnaire	8
3.2	Collecting data from your community	9
3.3	Data entry	10
3.4	The results bar	10
3.5	Making pledges	11
3.6	Footprint results	12
4	Next Steps	14
Annex 1	Acknowledgments	
Annex 2	Footprint methodology	
Annex 3	Footprint metadata	
Annex 4	Contact details and pricing structure	

1 Introducing Reap *petite*

REAP *petite* is a software tool designed to help communities calculate their environmental impact and then work on making this impact smaller. The basic foundation of the tool is a calculator which inputs questionnaire data community members. The questionnaire focuses on the themes of home energy, food, travel, shopping and activities to calculate the ecological and carbon footprint of the community as a whole and of each individual member. REAP *petite* also measures uptake of recycling and water usage in the home.



REAP *petite* was designed by the Stockholm Environment Institute (SEI) with a little help from a number of people and organisations (see Annex 1). REAP *petite* started life in 2007 as an Excel spreadsheet, produced for Aberdeenshire Council who wanted to footprint the results of a questionnaire they were running with two local schools. Aberdeenshire wanted to find out if the communities they were working with had a different footprint to the district council as a whole and needed a tool that could calculate a 'community averages' which would then be fed into SEI's main footprinting tool REAP.



REAP *petite* has now developed into a stand alone tool which calculates ecological and carbon footprints and direct water use of each individual in the community as well as determining the community average. The tool displays results in an easy to interpret format and shows the community how their footprint could be reduced through a number of actions.

1.1 What can REAP *petite* do?

REAP *petite* has the following functions:

- Data from an unlimited number of questionnaires can be inputted to the software tool
- The tool can calculate a per person or a community average ecological footprint measured in global hectares or carbon footprint, (which includes all greenhouse gas emissions), measured in tonnes of carbon dioxide equivalent
- A measure of direct water use in the home and recycling rates are also calculated
- A filter can be set up to show the footprint of a smaller group within the community who all share a similar characteristic. Common characteristics may include, but are not limited to, age range, income range and postcode
- The tool can break down the footprint to see the contribution of housing, personal travel, food and consumables
- The tool will provide information on how communal or individual pledges may reduced the footprint of the surveyed population

Version 2 of the software tool calculates the ecological footprint using 2006 conversion factors developed by SEI. The carbon footprint includes all greenhouse gases and uses a combination of Defra's June 2009 conversion factors and SEI's 2006 conversion factors.



1.2 Why collective action?

Collaborative action is crucial to stimulate a critical mass of people to change their behaviour with the environment in mind. The arguments for encouraging collective action are twofold: firstly, people are more willing to act on behalf of the environment if they see others taking action around them; secondly, people learn together through social experiences and this strengthens their motivation to make changes on an individual and collective level that benefit the environment.

REAP *petite* is designed to be used by a community or with a community. Schools or voluntary groups might use the tool themselves as part of their environmental activities. It could be used to support campaigning, fund-raising, awareness raising, engaging with the local council or simply as an exercise in itself. It can also be used by local government or charity groups to support engagement with communities and more importantly to collect 'bottom-up' data on consumption activities. REAP *petite* can also function to support the targeting of policies and to assess their importance.

1.3 How do we define community?

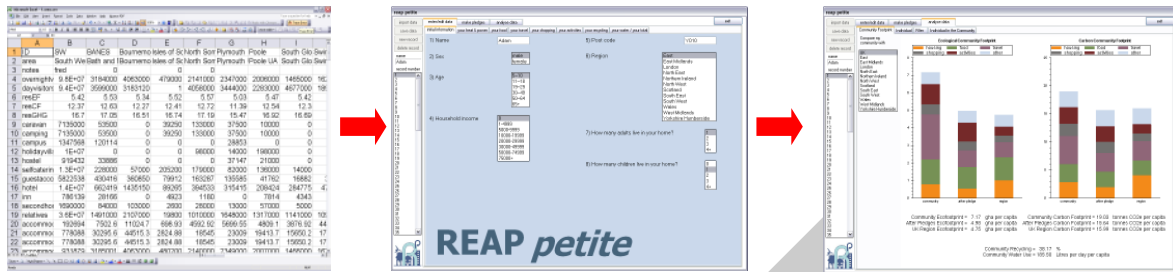
A community can be geographically bound, covering all the people who live on a certain street or within a particular neighbourhood. A community can also be defined as the members of a local group or the families whose children attend the local school. Alternatively, a community could be defined as the members of a UK wide club or even contributors to an internet forum who are dispersed throughout the UK.

REAP *petite* can be used with all of these groups but some footprint reducing actions such as communal gardens or car sharing clubs work best when a community can physically interact with one another.



2 Getting Started

2.1 The basics



REAP *petite* is essentially a calculator. Community questionnaire data is fed into the tool and the environmental impact is calculated. The data is saved in external tabular files or projects. This allows the user to work on several projects at once. The project of interest can be loaded into the tool, worked on or viewed.

2.2 Loading and saving projects

REAP *petite* is provided with a demo project file which contains the data for a fictional community group of 100 citizens. This data and other projects can be loaded using the 'import data' button. Projects can be saved using the 'save data' button.

The screenshot shows the REAP petite interface. The 'import data' button is highlighted in the top left. The 'initial information' form is displayed, showing fields for Name, Sex, Age, Household income, Post code, Region, and the number of adults and children living in the home. The 'save data' button is also visible in the top left.

2.3 Buttons and the record list

Buttons to the left control the loading and saving of project files and adding, deleting records held in the files.

The list box shows records contained in the project.

reap petite

import data | **enter/edit data** | make pledges | analyse data | exit

initial information | your heat & power | your food | your travel | your shopping | your activities | your recycling | your water / your total

1) Name: Adam

2) Sex: male (selected), female

3) Age: 5-10 (selected), 11-18, 19-29, 30-49, 50-64, 65+

4) Household income: 0 (selected), 1-4999, 5000-9999, 10000-19999, 20000-29999, 30000-49999, 50000-74999, 75000+

5) Post code: YO10

6) Region: East (selected), East Midlands, London, North East, Northern Ireland, North West, Scotland, South East, South West, Wales, West Midlands, Yorkshire Humberside

7) How many adults live in your home?: 1 (selected), 2, 3, 4+

8) How many children live in your home?: 0 (selected), 1, 2, 3, 4+

record number: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35

REAP petite

2.4 Two layers of tabs

reap petite

import data | **enter/edit data** | make pledges | analyse data | exit

save data | new record | delete record

name: Adam

record number: 1, 2, 3

initial information | your heat & power | your food | your travel | your shopping | your activities | your recycling | your water / your total

1) Name: Adam

2) Sex: male (selected), female

3) Age: 5-10 (selected), 11-18, 19-29

5) Post code: YO10

6) Region: East (selected), East Midlands, London, North East, Northern Ireland, North West

The top layer of tabs allow you to flick between the entering/viewing data part of the tool, the footprint reducing pledges and the graphs of the results.

The second layer of tabs allows you to flick between the themes of accommodation, food, travel, shopping and activities.

3 Using REAP *petite*

3.1 The questionnaire

To calculate a person's environmental impact, a 52 question REAP *petite* questionnaire is used. The length of the questionnaire is a compromise between producing as accurate an estimate of a person's footprint as possible and not wanting to take too much time. Footprint analysis considers a person's total environmental impact based on every product or service consumed, bought or used in the last year. It would be time consuming and complex to ask questions on complete expenditure so it was decided to restrict questions to items where the footprint impact was large and or variable within a population. Jewellery expenditure is a good example of a product with a high impact and a varying expenditure pattern among different members of a community. For items without a specific REAP *petite* question, such as expenditure on glass and tableware or insurance the community member is assigned the average for the region. This is why the one of the initial questions asks which region the person is from.

The footprint calculation works by multiplying yearly spend on an item by a specific conversion factor for that item. Remembering or estimating yearly spend on catered food is not an easy task. It was decided for most questions to reduce the time period to a week or a month and give the respondent a clue as to what an average person living in that area typically spent. The community member then compares themselves to that average by describing their spend as 'about this amount' or more or less. Similarly, describing food intake in kilograms of meat, vegetables etc is almost impossible. For food, the respondent is asked to describe how many meals a week contain meat or fish and their dietary mix is estimated from this. Other parts of the questionnaire are easier to put a number to, such as weekly miles travelled in a car.

In addition, there are a few demographic details asked for, such as age, sex and income. These questions do not form part of the footprint calculation but can be used to split your data up at a later stage. In some situations, communities may decide that some of the questions are not suitable, or not of interest. Questions can be left out of the survey and an 'average' response can be used in place.



3.2 Collecting data from your community

It is important that data from a representative sample of the community is collected. When designing an approach for data collection you need to consider the characteristics of the community you are working in. Ideally, you want your sample to be large enough that you are confident it represents the community and varied enough that all types of people are represented.

You may consider using a **stratified sample** approach where you try to ensure that the gender and age characteristics of the community are reflected in the sample. So, for example, if 40% of your community is aged over 65, you would try to make sure that 40% of the records used in REAP *petite* are from respondents over 65. Other considerations may include trying to sample residents from a representative number of house types or diet types.

Data can be collected via paper questionnaires and then entered into the tool manually. This can be quite a time consuming task. Alternatively, an internet based surveying site can be used to collect community data and generate the input file. One such site is 'survey monkey' (<http://www.surveymonkey.com/>). In order to directly import the file generated by survey monkey, care must be taken to ensure that the response variables match the response variables found in REAP *petite*. One disadvantage with internet surveys is that certain household types may be excluded from the survey.

A third approach is to allow community members to enter their data directly into the tool. This has the advantage of allowing members to see their results instantly. This method could be facilitated by either taking a laptop to community members' homes and work through the questions together or setting up a computer at a local event such as a community meeting, library or perhaps a fete!



Data can be changed and updated at any time. This means that you don't have to do the entire questionnaire in one go. It may be more successful to focus on a single theme such as food one week with the community then move on to the next at a later stage.

3.3 Data entry

To start entering data into the tool, click 'new record'. Data is either typed in data entry boxes, or an item is selected from a data list box. For example, data on miles travelled or the community member's name would be typed into a data entry box, whereas house or car type is selected from a data list box.

reap petite

import data enter/edit data make pledges analyse data exit

save data delete record

new record

1) Name Adam

2) Sex male

3) Age 5-10

4) Household income 0

5) Post code YO10

6) Region East

7) How many adults live in your home? 1

8) How many children live in your home? 0

REAP *petite*

3.4 The results bar

dairy none around a quarter about half nearly all

other none around a quarter about half nearly all

4) Do you grow your own fruit and vegetables? no a small amount a large amount

Ecological Footprint of food 1.43 Global hectares

Carbon Footprint of food 2.92 tonnes CO2e

Footprint results are shown for each theme towards the bottom of the screen in the results bar.

3.5 Making pledges

reap petite

import data | enter/edit data | **make pledges** | analyse data | exit

your heat & power | **your food** | your travel | your shopping | your activities | your recycling | your water / your total

save data | new record | delete record

name: Adam
record number: 2-35

1) Reduce the food I waste
☒ I already do this
☐ I will do this in the next year
☐ I'm unable to do this

2) Increase the proportion of organic food in my diet
☒ I already do this
☐ I will do this in the next year
☐ I'm unable to do this

3) Eat a low meat diet
☒ I already do this
☐ I will do this in the next year
☐ I'm unable to do this

4) Community allotment scheme
☒ I already do this
☐ I will do this in the next year
☐ I'm unable to do this

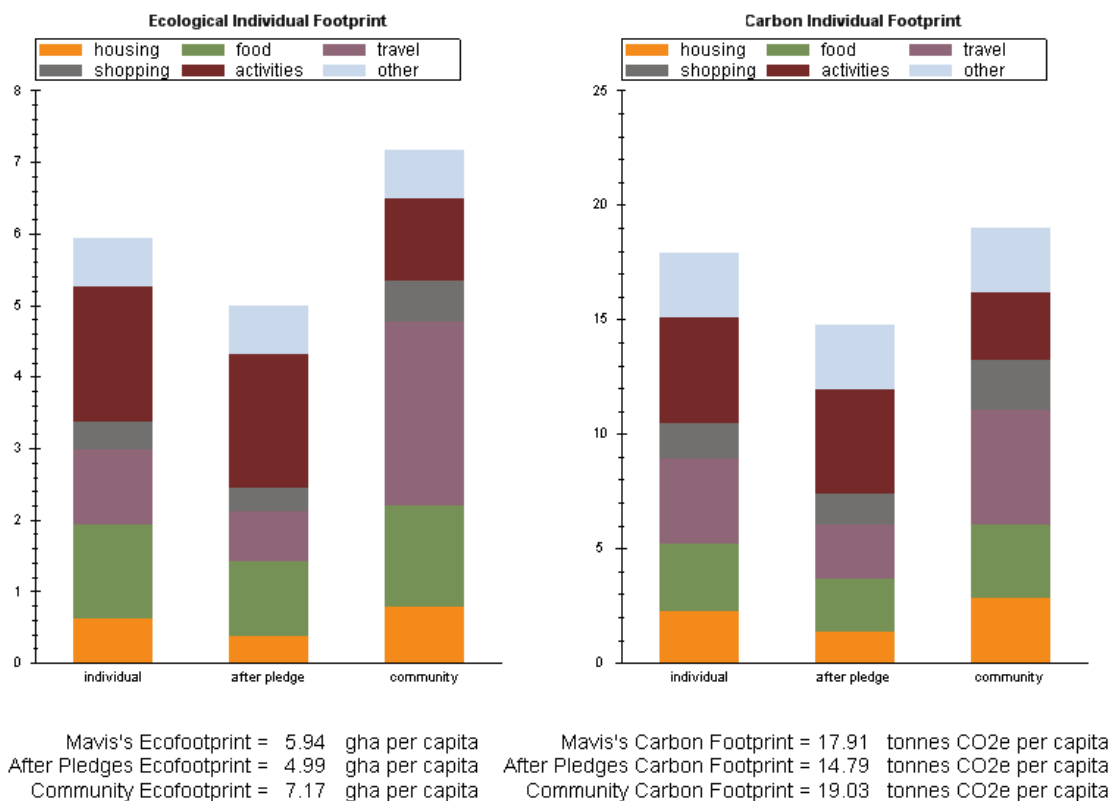
Ecological Footprint of food: 1.23 | New Ecological Footprint of food: 1.02 | Global hectares
Carbon Footprint of food: 2.70 | New Carbon Footprint of food: 2.34 | tonnes CO₂e

In addition to calculating an individual's footprint, footprint reductions can be estimated by the community member signing up to a number of pledges. There are pledges designed for each theme and range from the relatively easy - reduce food waste, to the more difficult - install a biomass boiler. Some pledges are designed at the community level, such as 'community allotment scheme'. The effect of the pledges is shown in the result bar and before and after footprints can be compared.

Pledges are tailored to the individual. For example, if a community member is vegetarian, they will not be able to pledge to eat a low meat diet in the future. The 'I already do this' option will have been preselected based on their baseline questionnaire response.

3.6 Footprint results

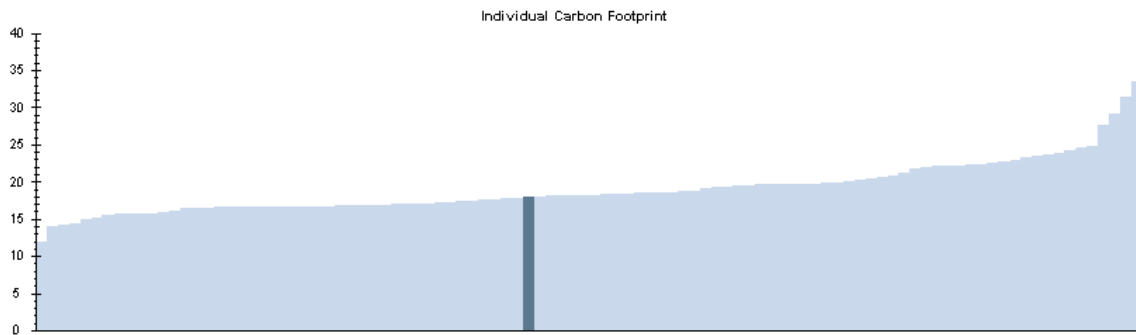
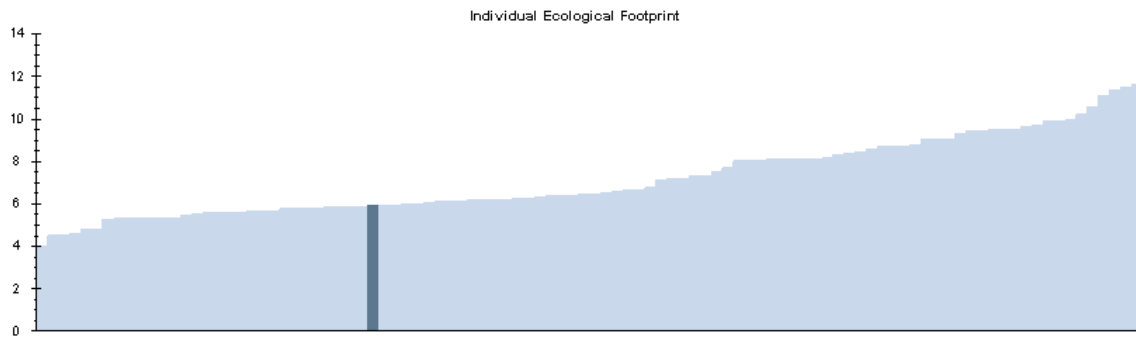
Clicking 'analyse data' brings up four results options. The user can choose to view a graph of the **community footprint** which shows the community's average carbon and ecological footprint, how the footprint has changes as a result of pledges and the footprint of the region of interest for reference. Alternatively, the **individual footprint** can be shown for any member of the community. Using the record list, any member's footprint can be compared to their reduced after pledge footprint and that of the community.



Mavis's Recycling = 60 %
Mavis's Water Use = 168.95 Litres per day per capita

Using the **filter** option, certain sub groups within the community can be investigated further. Here, for example, you could find out how over 65 year old males compare to the community average.

Finally, the **individual in the community** tab, allows you to see every member of the community's footprint lined up in size order with the selected record highlighted. This graph could be useful for community engagement so people can see how they compare to their peers. The graph can be shown for total footprint or any of the themes of home energy, good, travel, shopping or activities.



MavisTotal Ecological Footprint =	5.94	gha per capita
MavisTotal Carbon Footprint =	17.91	tonnes CO2e per capita
Mavis's Recycling =	60.00	%
Mavis's Water Use =	168.95	Litres per week per capita

3.7 Footprint targets

4 Next Steps

A community footprint tool is potentially very useful for communities:

Firstly, it provides a way of measuring the effect of an individual or community's activities on the environment and the process of collecting information to calculate the footprint can be a collective one that contributes to community development and civic action.

Secondly, the results can be broken down by activity and compared with those of other groups. The footprint allows quantification of environmental impact and the key areas for improvement can be easily identified. Ways of reducing the footprint can be discussed within the context of local issues.

Thirdly, now that a baseline has been established, subsequent surveys can be made with the community to chart progress in reaching footprint reduction targets.

Annex 1 - Acknowledgements

REAP *petite* could not have been made without the help and support of the following individuals and organisations:

Aberdeenshire Council

Action for Sustainable Living

Jan Owen - programming expertise

Trevor Watson - Lewes Council

Anne Winter - University of Stirling

DRAFT

Annex 2 - Footprint Methodology

Traditional methods of accounting for the impacts associated with human activities focus solely on ‘onsite’ or direct environmental impacts. In the UK, the discharge of pollution into our soils, rivers and air is monitored and controlled and we have a long history of regulating polluting industries and conserving natural areas. However, many of the goods and services the UK population buys are sourced from abroad and the pressures that the manufacturing processes place on the environment are felt elsewhere and not accounted for in UK environmental accounts.

An ideal accounting system would trace all the interactions that took place to produce a product or service at home and abroad. In essence, this would be a boundary free system. This approach starts by acknowledging that every product and service is merely part of an “integral chain” that we call the economy. No product is produced in isolation from this chain, and to account for the direct impacts only will always provide an underestimate of the costs and benefits associated with its use.

In REAP *petite*, footprint analysis is used to look at consumption activities. It accounts for the environmental consequences throughout the supply chain of what people buy and use. This form of accounting transcends territorial boundaries and takes into account the impact of products produced in other areas or countries *but consumed in your community*. At the same time it *excludes* the impacts of goods and services manufactured in your community and exported to other areas. The value of the footprint as a concept is the emphasis it places on exploring where reductions in the global environmental pressures can be made through policies which directly and indirectly influence individuals’ consumption patterns and behaviour.

The Carbon Footprint and NI 186

The **carbon footprint** is a measure of the total amount of green house gas emissions, measured in tonnes of carbon dioxide equivalence, that are directly and indirectly caused by human activity. The carbon footprint described in REAP *petite* is different to the national local authority area indicator 186 which documents the carbon dioxide emissions of local authority areas. NI186 results are estimated by AEA on behalf of Defra and are classified as full National Statistics.

NI186 tracks local authority carbon dioxide emissions for four main sectors in the UK: Industry, transport, domestic energy use, and land management. This is useful for sector-based analysis and can be used to look at the impact of domestic energy use. SEI’s carbon footprint provides further contextual information on the carbon dioxide emissions associated with all aspects of people’s lifestyle. It measures the carbon dioxide emissions associated with the

domestic energy we use and the way we travel as well as what we eat and what we buy and use. Because the Carbon Footprint focuses on people's everyday lives it helps relate climate change to local needs and priorities.

The ecological footprint

The **ecological footprint** works to estimate the full "resource consumption and waste assimilation requirements of a defined human population or economy." The ecological footprint is measured in terms of the resources (corresponding bioproductive land area) required to provide the goods and services consumed. If this exceeds what is available then the rate of consumption is unsustainable.

One key benefit of the ecological footprint is that it describes a finite limit to resource use. We only have one earth with a finite area of biologically productive land measured in global hectares (gha). The total bioproductive land area can be divided by the world's population to reveal a global 'fair share' identified by WWF in 2006 as 1.8 gha. This 1.8 gha is the average amount of land a global citizen has for provision of food, materials, energy and waste absorption each year and includes their travel and tourism activity.

Methodology

SEI calculates the footprint of consumption by residents using a binary Environmental Extended Input Output Model and is based on government statistics combined with socio-economic modelling at the local level. The methodology is complex but is best summarised by distinguishing between the 'production' and 'consumption' elements of the model.

Production: mapping supply chains

1. The 2006 National Environmental Accounts provide annual data on the direct greenhouse gas emissions from industrial activity.
2. These figures are combined with trade data in input-output tables which capture all interactions between industrial sectors and estimate the direct and indirect environmental 'impact' associated with each industrial sector's output. SEI has created input-output models for every year from 1992 to 2006. These can be used to create time series results at a national level.
3. Next we map output by 178 industrial sectors (by SIC code) to product groups and services that people and government consume. This gives us our **conversion factors**; the footprint associated with a pound spent on each consumption category.

Consumption: estimating household expenditure in the community

Once we have conversion factors for each consumption category, the next step is to estimate how much people consume in within the community. While much

of this is collected via questionnaire, some data is taken from regional consumption averages. Generally there is a shortage of consistent data on resident consumption behaviour at the local level. SEI uses four main sources of consumption data to overcome this:

1. The Household Expenditure Survey 2006. This is available at Government Office Region (NUTS2) level and is provided by the Office of National Statistics.
2. 2006 vehicle occupancy and distance travelled by mode and purpose by region (NUTS2) published in the National Travel Survey 2006 and Transport Statistics Great Britain 2007 by the Department for Transport and the Office of National Statistics.
3. Mosaic consumer classifications for the UK provided by Experian. Mosaic classifies all consumers in the UK into 61 types, aggregated into 11 groups. Mosaic UK uses over 400 data variables, 46% of this is built from non-Census sourced information that is updated annually. This enables Mosaic to monitor changes in consumer behaviour and incorporate these each year within the classification
4. 2006 Household energy consumption data by NUTS2 and NUTS4 provided by AEA and published on the Department for Business, Enterprise and Regulatory Reform (BERR) website.

What is included and excluded in the results

Resident consumption

The methodology works by attributing all supply chain impacts to household or government expenditure. Businesses are treated as part of the supply chain so their impact is embedded in the footprint of the goods and services and attributed to the people that buy them. The methodology is suitable only for measuring the footprint of residents in your community and is not suitable for measuring the footprint of local government operations or the footprint of local businesses.

Direct and indirect pressures

The methodology encompasses both direct and indirect environmental pressures associated with resident's consumption activities.

- Direct pressures occur during the use phase of products. They include emissions from private vehicle usage and the burning of fuels in the home.
- Indirect pressures occur during the generation of electricity and the production of goods and services. Public transport and aviation are classed as indirect pressures because the user is purchasing a transport

service (a journey). Indirect pressures generally make up around 70 percent of the footprint associated with household consumption.

Accounting for domestic waste

Waste is treated as an industrial sector, it doesn't have a footprint from consumption because we don't buy or use it. The waste sector's impact is taken into account as an indirect or supply chain impact using the input-output tables and the ONS Environmental Accounts. It is also important to understand that the way household waste is disposed of will have a very small impact on the total footprint of an area. Only measures taken at the top of the waste hierarchy such as reducing food waste (by planning food purchases) will have a significant impact on the size of an area's footprint because they indirectly tackle consumption patterns.

DRAFT

Annex 3 - Footprint metadata

Here I will add tables showing whether the conversion factors are SEI or Defra.
And I'll make notes of assumptions used in calculations for each question.

DRAFT

Annex 4 Contact details and REAP *petite* pricing structure

Contact

To find out more about REAP *petite*, get hold of a free demo copy or place an order for a full version of the tool, please contact:

Anne Owen
Stockholm Environment Institute
University of York
York
YO10 5DD

01904 434559

ao502@york.ac.uk

Prices and licenses

Cost for a single community group	Costs for 2 or more community groups within a single Local Authority Area
£600	£400 per group

A REAP *petite* license covers the use of the REAP *petite* tool for an unlimited time period.

The license is restricted to use by members of the community group.

The program can be installed on multiple numbers of computers within the community group.

The license covers any future upgrades to the REAP *petite* tool. Newer versions will be sent out when available.

REAP *petite* may be available free of charge for completely unfunded groups, individuals and students.