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Research: A Strategic Monitoring Framework for the Planning System

Supplementary Report

Supplementary Research Report to the Welsh Government
November 2011

Wales Planning Policy Development Programme

A copy of the main report can be found at
http://wales.gov.uk/topics/planning/planningresearch/publishedresearch

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1 Introduction

This report has been produced as an extension of the Main Report on developing A Strategic Monitoring Framework for the Planning System. The main report contains only the necessary information to set out the studies recommended indicators and to enable public consultation.

However, the research brief for the Strategic Monitoring Framework study included a range of additional elements beyond that required to consult on a new indicator set. This included an examination of the role and relevance of ecological footprinting to planning.

This report contains the following additional elements:

- Ecological footprint analysis – introduction to ecological footprinting, and consideration of its relevance in assessing planning including the scope to use the component elements of the footprint as a composite indicator for the role of planning in delivering sustainable development.
- Existing data sources – part of the literature review undertaken at the outset of the study drawing upon other research reports and existing and proposed data sets and sources.
- Stakeholder views – an extract from the two discussions groups convened for this study. Provides a summary of the discussions around understanding and use of the ecological footprint.
- Testing the framework – as part of an iterative process of selecting and recommending indicators for inclusion within the Strategic Monitoring Framework, the recommended indicator set was tested across a number of scenarios including a Technical Advice Note, a local authority area and a individual settlement. Includes testing of the ecological footprint at a more local level. Note that as part of this iterative process, the indicators tested here are in some cases different to the final recommended indicator set.

2 The Ecological Footprint and Planning

2.1 Introduction

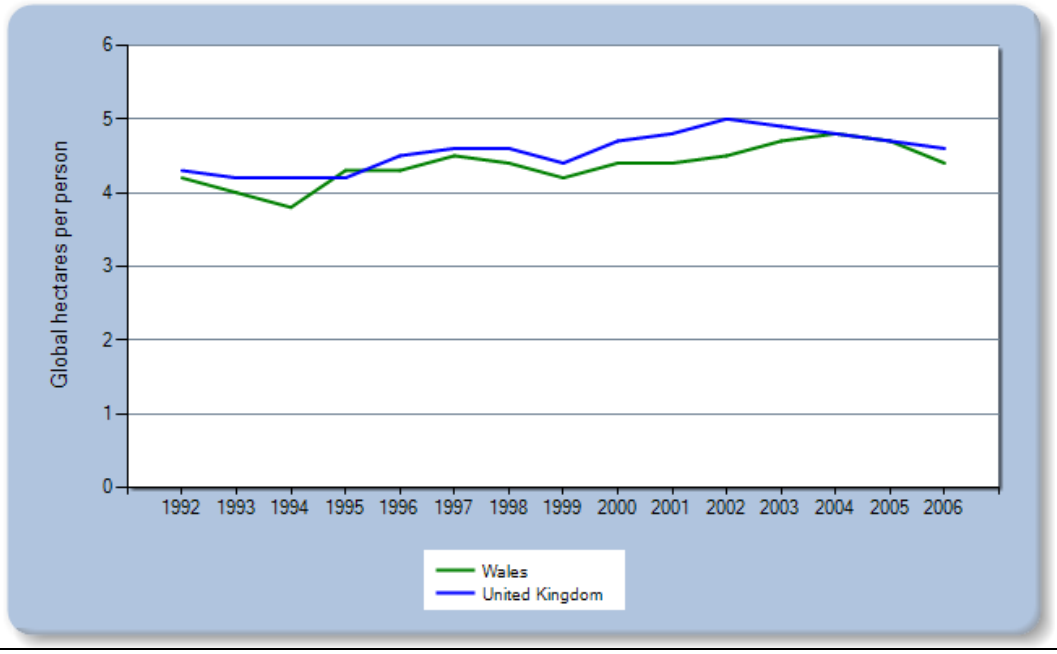
The One Planet: One Wales Sustainable Development Scheme (2009) sets out the Welsh Government's vision of a sustainable Wales. Integral to this is a commitment to reduce the ecological footprint of Wales to a sustainable level. The Sustainable Development Scheme defines a range of indicators which will be used to monitor progress in achieving the Welsh Government's vision. The ecological footprint is included as one of five 'headline indicators', alongside:

- % of Biodiversity Action Plan habitats and species recorded as stable or increasing;
- Gross Value Added (GVA) and GVA per head;
- % of the population in low-income homes; and
- Wellbeing in Wales.

In examining the potential indicators to be included within the Strategic Monitoring Framework, the study was tasked with reviewing the suitability of the ecological footprint as a composite indicator to measure the sustainable development outcomes of the planning system. Further, the study brief also required consideration of the effectiveness of the ecological footprint in measuring the impact of planning on sustainable development, and the potential for the ecological footprint to be a composite indicator, i.e. for the component elements of the ecological footprint to be used as the Strategic Monitoring Framework indicator suite itself.

2.2 The Ecological Footprint

The Welsh Government has made a commitment to reduce the Ecological Footprint of Wales to sustainable levels within one generation.



Source: http://www.statswales.wales.gov.uk/TableViewer/document.aspx?ReportId=5786 (retrieved July 2011)

The graph above shows Wales's ecological footprint up to 2006 (the latest published data). The ecological footprint has been increasing over time, but between 2003 and 2006 has declined in keeping with the wider UK trend. Wales currently has an ecological footprint of 4.4 gha (per person) based on 2006 data. This footprint varies across Wales with Monmouthshire, Powys and Ceredigion having the highest footprint of 4.7 gha per person and Blaenau Gwent having the lowest at 4.0 gha per person.

Although Wales has the lowest footprint of any UK region or devolved country, people in Wales are still living beyond their environmental limits. Indeed the footprint has been increasing at an average rate of 1.5% per year between 1990 and 2003. Between 2003 and 2006 there has been a trend towards reducing the ecological footprint which it is hoped can continue. If the productive area of the planet is divided between the current global population then a "fair share" of the earth's resources might be 1.8 gha[1].

The ecological footprint measures the burden that a place/people exert on the land they occupy. It measures this in terms of the space required to sustain the current activity level, type and nature. The Carbon Footprint is calculated as a sub-set of the overall Ecological Footrpint. The footprint is measured in global hectares (gha) per person and can be used to derive the equivalent number of 'planets' required to support a given set of consumption and pollution trends/levels:

[1] Living Planet Report, WWF, 2006

"Our Ecological Footprint, which is one of our headline indicators of sustainable development, shows us that, if everyone on the earth lived as we do, we would use 2.7 planets worth of resources. Unchecked, this could increase to 3.3 planets worth by 2020."

One Wales: One Planet - The Sustainable Development Scheme of the Welsh Assembly Government (2009)

2.3 Use of the Ecological Footprint

Since the ecological footprint was first developed by Rees and Wackernagel (between 1990 and 1994, but first published in 1992 as 'appropriated carrying capacity') the application of ecological footprint analysis has evolved from a purely academic concept for researching sustainability impacts into an indicator used by local and national governments to inform the development of policy and decision making. In the UK ecological footprint analysis is applied in a variety of ways using a variety of approaches, some of which include planning.

One example of the approach taken at the local planning authority level is work undertaken by the Stockholm Environment Institute (SEI) in carrying out a detailed ecological footprint analysis of planned growth for Ashford in Kent[2]. This analysis has since been used to inform different scenarios for its development plan. At the larger, regional, scale the South East Regional Assembly (since abolished) incorporated the ecological footprint as an indicator within the Regional Spatial Strategy (RSS). The RSS also included a target for stabilising and then reducing the ecological footprint[3].

Internationally, ecological footprint analysis has been used as a tool to inform the development of local and national government sustainability policy and to support the preparation of land use plans and policy decisions. This is particularly the case in Europe where the ecological footprint has been used in Finland, Italy, the Netherlands, Norway, Spain and Sweden[4]. The use of the ecological footprint in Norway is particularly interesting because it has been used to inform the design of housing, their spatial distribution and wider implications associated with the way settlement patterns affect individual's ecological footprint [5]. This last example has clear parallels with the issues or aspects that the planning system in Wales has to contend with and suggests that the ecological footprint can provide useful information for decision makers looking for developments that allow residents to live more sustainable lifestyles.

[2] Owen, A. Paul, A. and Barrett, J (2008). Ashford's Footprint – Now and in the Future. http://www.ashfordbestplaced.co.uk/pdf/Ecological_Footprint_Full_Report.pdf

[3] Policy CC3 of the South East Plan states that the 'Regional Assembly will promote measures that seek to stabilise the South East's Ecological Footprint by 2016, and to reduce the Ecological Footprint during the second half of the plan period'. The RSS was intended to run until 2026.

[4] McManus, P. and Haughton, G. (2006) Planning with Ecological Footprints: a sympathetic critique of theory and practice. Environment and Urbanisation 2006 18: 113.

[5] Holden, Erling (2004), Ecological Footprints and sustainable urban form. Journal of Housing and the Built Environment Vol 19, No 1, pages 91–109.

All of the examples described above align well with the planning system in Wales. However, there are also examples of the use of ecological footprint analysis applied 'from the bottom up' which provide useful examples of how potential developers could demonstrate how their proposals would allow residents or site users/developers to reduce their individual ecological footprint. The Findhorn Community in Scotland have undertaken an ecological footprint assessment of their community to calculate their collective or average per capita ecological footprint[6]. This has also been undertaken for similar low impact development or communities elsewhere, such as the BedZED development in London[7].

The review of research and examples of practice listed above clearly indicates that there are aspects of the ecological footprint that can be influenced by the planning process. It also demonstrates that the use of the ecological footprint as an indicator (either in its own right or as part of a wider multivariate indicator suite) can support decision makers looking to develop policies for spatial planning that contribute towards reducing a community's ecological footprint.

Technical Advice Note (TAN) 6: Planning for Sustainable Rural Communities defines the 'One Planet Development' objective that arises from the "One Wales: One Planet" Sustainable Development Scheme. TAN 6 states that One Planet Developments are intended to be exemplar schemes which demonstrate development that through its low impact either enhances or does not significantly diminish environmental quality. Whilst One Planet Developments should initially achieve a ecological footprint of 2.4 gha they should move towards the Welsh footprint level of 1.88 gha over time.

The Wales Footprint Network website (http://www.footprintwales.org) promotes best practice in the use value and application of the ecological footprint and associated resource accounting techniques in Wales. It includes a number of reports, case studies and advice which are useful in demonstrating practical examples of achieving and implementing the policy objectives behind TAN 6, Planning Policy Wales (PPW), and the Sustainable Development Scheme as they relate to the ecological footprint. Welsh Government studies funded through the ecological footprint grant are published here.

The range of guidance, research material and support is not limited to Wales and there are other examples across the UK. Local Footprints (http://www.localfootprints.org/) is a programme of the Sustainable Scotland Network and aims to help local authorities and schools make an effective contribution to reducing Scotland's footprint through the use of footprint analysis to inform policy and practice, to raise awareness and to change behaviour. The WWF also provides guidance and a calculator tool (see http://www.wwf.org.uk/what_we_do/working_with_local_authorities/exploring_ecological_footprints/). The Global Footprint Network (see

[6] SDRC, 2006. Ecological Footprint of the Findhorn Foundation and Community.
[7] BioRegional (2009). BedZED seven years on - the impact of the UK's best known eco-village and its residents.

http://www.footprintnetwork.org/en/index.php /GFN/page/footprint_for_cities/) is a non-profit research organisation developing new footprinting methodologies and tools.

The Welsh Government have commissioned further research to develop practice guidance for One Planet Development to support TAN6.

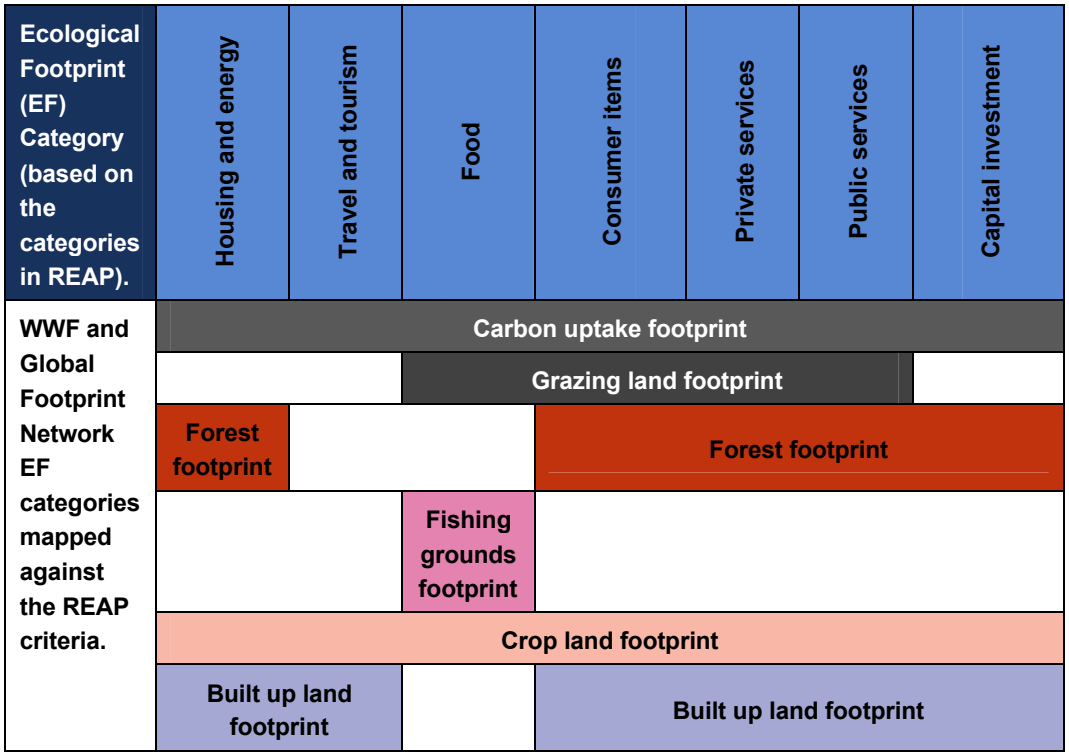
2.4 Elements of an Ecological Footprint Which Could be Related to the Outputs and Outcomes of Planning

This assessment is based on the current elements of the ecological footprint as described using the Resource and Energy Analysis Program (REAP), shown below:

- housing and energy;
- travel and tourism;
- food;
- consumer items;
- private services;
- public services; and
- capital investment.

However, the Ecological Footprint can also be broken down into different groups based on the natural resources that are consumed or used to absorb our waste (primarily greenhouse gas emissions). This is the approach that the Global Footprint Network adopts in their annual 'Living Planet Reports' (see http://www.footprintnetwork.org/en/index.php/GFN/page/2010_living_planet_report/). To illustrate how the categories in the living planet report relate to the REAP categories the following figure has been produced (see table below):

Comparison between the Living Planet ecological footprint categories and the REAP ecological footprint categories:



At the highest levels the elements of the ecological footprint that are directly related to the planning system include, travel, housing and energy and demand on public and private services e.g. water and waste. This is described in detail in the table below which examines each element of the ecological footprint, considers how it relates to the role of planning in delivering sustainable development and so considers its potential relevance as part of a composite indicator based on the ecological footprint:

Comparison between planning policy areas and ecological footprint (EF) categories

Key	Description
✓	Direct link between the planning policy area and the EF element
?	Indirect or unclear link between the planning policy area and EF

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
		Housing and energy	Travel and tourism	Food	Consumer items	Private services	Public services	Capital investment	
1 a) Housing land allocations – (net increase in number of dwellings).	As the number of houses increase the levels of energy demand may increase which has an impact on this category. This is due to the energy and electricity consumed by these additional dwellings. Furthermore, the EF of the materials consumed during construction will also result in an increase in the EF. In isolation housing policies do not increase the size of the population and therefore the per capita or combined EF of a population will not increase in the context of this category.	✓						?[8]	The EF is a very well suited to this type of analysis because the number of dwellings, their level of energy efficiency and the energy sources are closely linked to EF and planning policy can have a direct effect on their deployment in new development. *The housing and energy EF would be useful indicator for this planning policy area.*

[8] There are potential overlaps with the capital investment EF category because any development or investment in infrastructure will require funding, whether this comes from private or public sector sources. However, within REAP, this is set as a flat per capita rate across the UK. Therefore, it is not possible to model the impact of localised capital investment on an individual's EF without modelling that change in the context of the UK economy. This cannot be undertaken within REAP and would require modelling separately.

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
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1b) Housing land allocations resulting in population change.	The demand for more housing can often be driven by localised changes in the population. The greater the population living within a given area the greater the total levels of consumption. So where spatial planning policies will increase the resident population there will also be a corresponding increase in the total EF. The converse is true if there is net migration from an area. It is also worth noting that changes population affect all of the EF categories. However, when viewed in isolation population change will not alter the per capita EF because no other policies will cause those individuals to change their behaviour.	✔	✔	✔	✔	✔	✔	✔	It is difficult to predict the likely population change that could occur as a result of increasing the number of homes in a local planning authority's area. As consequence it is not possible to build a robust scenario of population growth and the change in EF that this would result in. The difficulty with predicted future population change may be further exacerbated by population displacement from other areas of Wales. *The EF is not a useful indicator for this area planning policy.*
3) Employment land policies.	There are no direct links between employment land allocations and the EF because the EF is derived from an individual's consumption of services and goods. However this can only be modelled within REAP by changing the amount that an individual would spend with two EF categories. It is not practicable to model this because planning policy cannot predict whether the services provide by an employment land allocation will only be consumed by those individuals living within the given local authority area. If they were to be included in the EF and they provided services used by people living elsewhere in the UK then the EF would result in an over estimate. However, the location of employment land will clearly have an impact on the way people travel to commute to and from work. To be able to model the impacts of this kind of policy on the EF of an area it is necessary to first predict the likely change in modal split and/or vehicle passenger kilometres on a per capita		✔					?[8]	Although assumptions would have to be made to analyse the impact of employment land policies on the EF travel and tourism it is possible and can be grounded by using national transport statistics and sensitivity analysis. *The travel and tourism EF would be useful indicator for this area of planning policy.*

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
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	or total basis. Although this is feasible it requires prior analysis drawing existing traffic data to generate passenger km for different modes of transport. Then assumptions would have to be made regarding how the spatial location of employment land allocations will change existing traffic volumes. From this the raw data to enter into a tool such as REAP can be generated to model the impact that employment land allocations have on the EF of travel.								
4) Social infrastructure policies (e.g. provision of community, education and healthcare facilities).	If the total number of facilities increases there will be an impact on EF from public services. The impact of this type of policy on this EF category can only be modelled by changing the amount that an individual spends on public services. As a result these impacts cannot be modelled effectively on the public services category. However, the location of social infrastructure will clearly have an impact on the way people travel to use these services. To be able to model the impacts of this kind of policy on the EF of an area it is necessary to first predict the likely change in modal split and/or vehicle passenger kilometres on a per capita or total basis. Although this is feasible it requires prior analysis drawing existing traffic data to generate passenger km for different modes of transport. Then assumptions would have to be made regarding how the spatial location of employment land allocations will change existing traffic volumes. From this the raw data to enter into a tool such as REAP can be generated to model the impact that employment land allocations have on the EF of travel.		✔				?	?[8]	The EF is not well suited to modelling the impact that the development of new social infrastructure has on EF of public services, this is particularly true where investment in social infrastructure does not alter the amount that an individual spends on public services via taxation. There are some potentially indirect links between development of social infrastructure and the capital investment EF. However, it would be difficult to obtain background data (e.g. energy consumption and embodied carbon associated with the construction of these facilities) in a format that would allow their contribution towards reducing a local authority's EF to be modelled. *The EF of public services and capital investment are not useful indicators for this area of planning policy.* Although assumptions would have to be made to analyse the impact of social infrastructure policies on the EF travel and tourism it is

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
		Housing and energy	Travel and tourism	Food	Consumer items	Private services	Public services	Capital investment	
									possible and can be grounded by using national transport statistics and sensitivity analysis. *The travel and tourism EF would be useful indicator for this planning policy area.*
5) Transport policies – the provision of infrastructure etc.	As mentioned above in relation to the location of services, facilities and employment sites travel forms a significant part of the EF. Spatial planning e.g. routes for quality bus corridors, cycle and footpath networks and transport interchanges all enable individuals to change behaviour and travel choices thereby altering the modal split and number of annual vehicle km travelled. However, for the impact of transport policies on the EF to be modelled the actual change in total or per capita vehicle km need to be predicted so that this can be modelled within REAP. In most cases this sort of information will not be available within the planning discipline. However, as many land use plans implement Local and Regional Transport Plans it may be the case that this information has already been gathered and/or calculated to form part of the evidence base to support the implementation of different transport interventions and to demonstrate how LTPs/RTPs contribute to DaSTS. Note that the travel proportion of the REAP EF also includes air travel. In some local authority areas with an airport there may be a desire to analyse the impact that transport policy and other airport related policy has on the number of flights that individuals take. However, within REAP flight impacts cannot be separated off in terms of where those flights leave the UK. As result it is not possible, within REAP, to model the impact that an individual airport development has on a local authority area's population.		✔				?	?[8]	Although assumptions would have to be made to analyse the impact of social infrastructure policies on the EF travel and tourism it is possible and can be grounded by using national transport statistics and sensitivity analysis as well as other information gathered by LPAs to inform the evidence for their LDPs. *The travel and tourism EF would be useful indicator for this are of planning policy.* *It should be noted that if LPAs are not interested with influencing people's use of air travel then this does not have to form part of travel and tourism analysis.*

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
		Housing and energy	Travel and tourism	Food	Consumer items	Private services	Public services	Capital investment	
	However, it is possible to undertake this type of modelling outside of the REAP software if there is sufficient information about where people using the airport live and where they fly to (i.e. domestic or international flights). It should also be noted that the travel category of EF is only concerned with private travel (using car or public transport). It does not include freight because that is accounted for within the consumer items and food EF categories.								
6) Sustainable development policies (e.g. specific sites identified for the creation of sustainable/ eco-settlements and or the use of CSH or other design standards).	The types of policy that fall within this area include those setting minimum standards for sustainable construction e.g. achieving a minimum BREEAM, CEEQUAL and/or Code for Sustainable Homes (CSH) standard. Of these CSH is particularly relevant to the EF because energy consumption from the use of domestic property is a significant component of an individual's EF. However, before the impact of this type of policy can be modelled the energy consumption of the new dwellings needs to be modelled which cannot be carried directly within REAP. However SEI[9] has developed an additional spreadsheet tool that allows these impacts to be modelled. Depending on the specific scope of the policy it may cover other aspects of sustainable design e.g. travel, building materials, water consumption and the provision of space to grow food. As a result it is possible for this type of policy to affect many other EF categories. However, as explained earlier these categories can only reflect changes in EF if a change in an individual's	✓	?	?	?			?[8]	LDP sustainable development policies cannot significantly alter the way that food, goods and services are produced or quantities that are consumed. *The EF of travel & tourism, food, consumer items and capital investment are not useful indicators for this area of planning policy.* However, if sustainable development policies include elements that drive developers to construct energy efficient and low/zero carbon buildings as described in relation to 1a then the housing and energy EF would be relevant.

[9] Stockholm Environment Institute (SEI) are the research body that has developed the REAP ecological footprinting tool and have also developed a spreadsheet that can be used to model the impact on per capita energy consumption from sustainability and energy efficiency interventions. It can also be used to model the emission savings from various types of micro-renewable energy sources.

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
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	pattern of expenditure can be predicted. It is unlikely that any reference data can be provided to base any predicted changes on. As a result any changes will be based on assumptions regarding how individual's expenditure patterns might change if they also have access to their own garden or allotment to grow food.								
7) Green space/ green infrastructure provision	The provision or protection of green space and green infrastructure in its own right does not have a direct impact on the EF, although capital expenditure to deliver new green space may do (see footnote 8). Indirectly, the role of green space may have an impact on the food category of the EF if it includes new allotment provision to allow individuals to grow their own food.			?				?[8]	*The EF is not a useful indicator for this area of planning policy.*

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
		Housing and energy	Travel and tourism	Food	Consumer items	Private services	Public services	Capital investment	
8) Waste management facilities.	Waste is generated as a consequence of many of our actions and activities. For example, it generated from the goods and services we purchase. We also pay for our own waste to be treated or recycled through taxes for public services provided by local authorities. As a result waste is not treated as an explicit element or category within REAP. Consequently it is not possible to model the impact of different spatial waste management policies on EF directly. There may be indirect links to transportation in terms of where waste management facilities are located and how waste is transported to them for sorting and treating. However, it would take a substantial amount of additional modelling to determine the likely change passenger km for private travel that such a policy stimulate. Notwithstanding the above, it is possible to analysis the impacts of different waste policies on the strategic approach to waste management at a local authority or county/sub-regional scale. Indeed the Welsh Government has become the first public sector organisation in the UK to apply this approach towards the development of strategic waste planning as part of the development of the waste strategy for Wales.		**?**						*The EF is not a useful indicator for this area of planning policy.* However, there is value in applying EF analysis to the methods of waste management that authorities might employ to avoid, re-use, recycle and recover waste. This can be undertaken as a standalone exercise, on a case by case basis.

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
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9) Renewables and low carbon energy generation.	Increasing the amount of renewable energy generation, particularly decentralised micro or community based generation, will have significant benefits for reducing the greenhouse gas emission associated with energy and electricity consumption and as a consequence is closely related to the housing and energy categories of the EF. For the impact of these types of policy to be measured the authority concerned needs to know the extent of the potential capacity within their area for different types of renewable power and heat sources. This then needs to be translated into the change in total domestic energy consumption as a result of the policy. With this information the impact on the EF can be quantified.	✔						?[8]	The EF is a useful indicator if it is used to calculate the effect of renewable and low carbon generation on the total EF of an individual living in a given local authority area. However, if analysis is more interested in the impact that increased renewable and low energy generation capacity has on a local authorities greenhouse gas emissions then a carbon footprint analysis would be more appropriate. *The housing & energy EF would be useful indicator for this planning policy area if its contribution towards achieving the One Planet Wales targets is of interest. However a 'production based' carbon footprint is more likely to be of use if the LPA is more interested in the contribution that a makes towards national or local targets for greenhouse gas emissions.*

Land use planning policy area	Description of how the land use planning policy area can impact on the different EF categories	Relevance to EF Category (based on the categories in REAP)							Utility of EF as an indicator and strengths and weaknesses of using EF analysis in a planning context
		Housing and energy	Travel and tourism	Food	Consumer items	Private services	Public services	Capital investment	
10) Safeguarding productive agricultural land.	Safeguarding productive agricultural land to retain the ability to grow our crops and rear our own livestock links into the food category of the EF. However, it is not possible to quantify the extent that such a policy would have on the food category of the EF because spatial planning policies cannot dictate what type of produce is grown, how it is processed and who ultimately consumes that food. As a result there are no guarantees that the residents living in the same local authority area would benefit from this policy if the food that was cultivated entered into a national supermarket's supply chain, for example.			**?**					*The EF is not a useful indicator for this area of planning policy.*

2.5 Use of the Ecological Footprint within the Strategic Monitoring Framework

Overall, the ecological footprint has some benefits in being used as a stand-alone composite indicator. The housing and energy category has some wide-reaching relevance to planning, as does the travel and tourism category, although this is perhaps less strongly related to planning given the way in which transport infrastructure is managed and delivered and the limited interactions with the planning system as several points in this process. Food, consumer items, private services, public services and capital investment each some tangential relevance to planning, but none in themselves offer a satisfactory level of explanation.

It is also possible to drill down to a more detailed level than the ecological footprint categories listed in the table above if required. It can also be used in such a way to aggregate the ecological footprint categories into one value so that the effects of a Local Development Plan on a local authority achieving the One Planet Wales ecological footprint targets might be assessed. Certainly, the ecological footprint does add value when used in planning in this way. It could also be used on a more settlement- or development-specific basis as a means of assessing alterative development scenarios or for improving and assessing the quality of a submission.

Therefore, the ecological footprint does not consistently align with the land use planning aspects investigated. In some cases it does not adequately match with planning's role in delivering sustainable development. It is not considered suitable (by itself) as a composite indicator of the role of planning in delivering sustainable development. It might be best considered, therefore as a good indicator of the global impact that planning is having 'down the line' (i.e. as an outcome) rather than directly assessing how well planning is operating (the process) of what planning is delivering (the output).

2.6 Summary

The main overlaps between spatial planning policies and with the ecological footprint are focussed on 'housing and energy' and 'travel and tourism' categories. Existing ecological footprint models (specifically REAP) only model impacts on the ecological footprint at the local authority spatial scale. As a result REAP cannot directly model the relative impacts of siting particular land use allocations in different locations.

However, it is possible for the ecological footprint to reflect certain aspects of these new developments if they can be modelled in a more global way. For example the impact of a development or allocation on the per capita energy consumption (in domestic developments) can be modelled as can an increase in micro- or community-scale renewable energy generation.

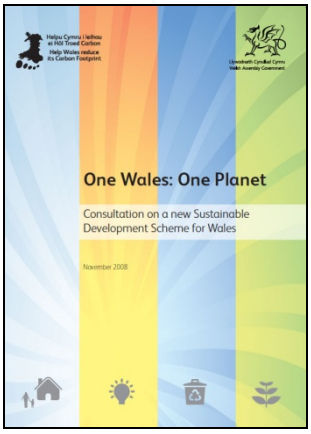
Further, in determining the appropriate location for various land use allocations, if the impact on private transport behaviour can be quantified then it should also be feasible to model the spatial impact of different policy interventions. However, it is worth highlighting the fact that this

would also require technical transport planning input to model the expected changes in total vehicle km by different modes of transport used by private individuals (i.e. excluding freight transport).

3 Existing Data Sources

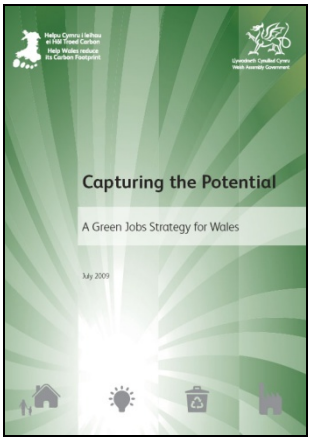
3.1 Key documents

As part of the process of identifying the suggested indicators for inclusion in the Strategic Monitoring Framework, a number of data sources, research reports, policy documents and indicator sets were consulted. The remainder of this section provides a summary assessment of the main data sources and documents consulted as part of this study:



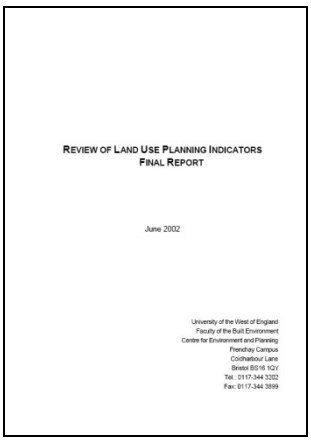
One Wales: One Planet – A New Sustainable Development Scheme for Wales

The Sustainable Development Scheme has a number of key themes. Under each theme are headline indicators, and under each headline indicator are a number of supporting indicators. This gives a total of 29 indicators. Appendix 3, which sets out the recommended Strategic Monitoring Framework, also identified each of these and 'maps' them to the framework structure. Importantly, this also includes Sustainable Development indicator 4 – Wales's global ecological footprint.



Capturing the Potential: A Green Jobs Strategy for Wales

This is the overarching strategy for the achievement of a sustainable economy. It includes suggested targets for greenhouse gas reduction, waste recycling and renewable energy generation. It also sets out the Welsh Assembly Government's support and promotion of the minimum Level 3 of Code for Sustainable Homes for residential developments and BREEAM 'excellent' standard for non-residential developments. Indicators include the ecological footprint, alongside Gross Value Added and Gross Value Added per capita.


REVIEW OF LAND USE PLANNING INDICATORS
FINAL REPORT

June 2002

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Centre for Environment and Planning
Frenchay Campus
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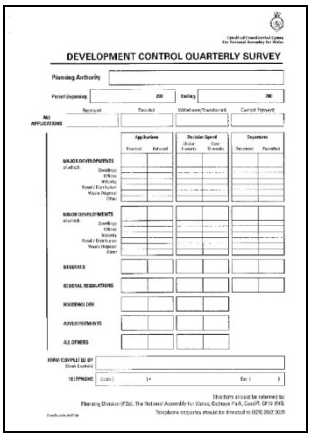
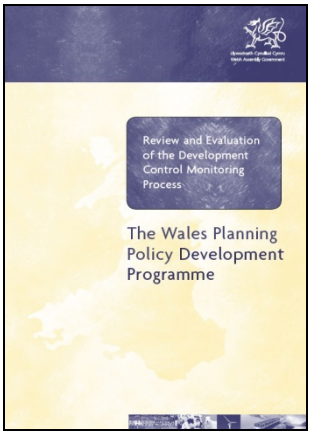
Review of Land Use Planning Indicators
Identified ten datasets as the basis for monitoring the sustainability planning decisions: the planning register, JHLASs, housing needs, land resources, contaminated land, modal split, industrial land, landscape assessment, air quality, and biodiversity information. Data on planning applications and JHLASs were recognised the most robust, due to their standardised approach, level of coverage and frequency of collection. Generally, it was highlighted that there is a requirement for data to be standardised and for discrepancies in terms of data collection methods to be addressed.

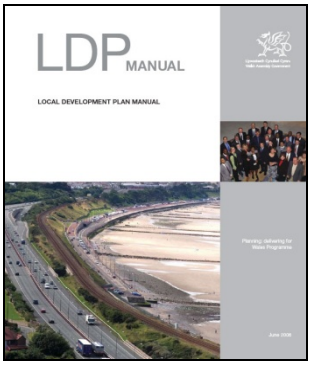

DEVELOPMENT CONTROL QUARTERLY SURVEY

Development Control Quarterly Survey
This data provides a rich and robust insight into the volume and performance elements of the development management system. It is also a strong source of time-series information and used by all local planning authorities to monitor and manage their services.

Data sets collected include: total number of applications determined, number of planning applications received by category/type, % of planning applications determined within 8 or 13 weeks and departure applications – those contrary to the adopted development plan.

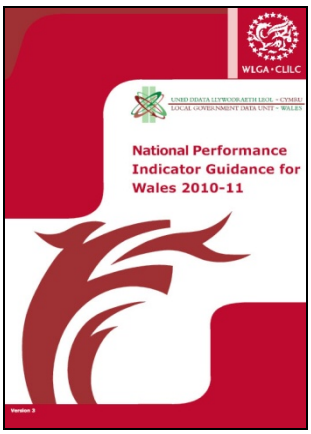


Review and Evaluation of the Development Control Statistics Monitoring Process
Review of the current Development Control Quarterly Survey, comprising an assessment of the content and use of present survey data alongside government and local authority data needs. Included a recommended updated return, covering: applications with an environmental statement, applications for development in a flood plain, renewable energy applications by energy source and capacity, net change of playing fields and open space; and permissions on brownfield and greenfield sites.



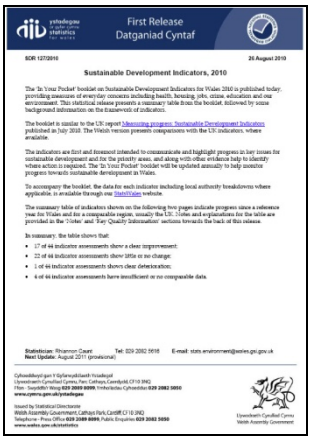
Local Development Plan Manual

Prepared to report on progress on Local Development Plans, Annual Monitoring Reports should assess the impact that planning policy is having locally, regionally, nationally and globally. Importantly, they also require reasons to be indentified where a particular target or plan aspect has not been met. Full coverage of AMRs is not expected until 2017 at earliest and there is considerable local discretion in terms of the information recorded.



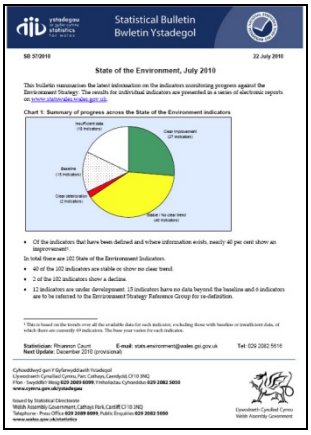
National Performance Indicators

The National Indicator set provides a high-level assessment of public sector service delivery and covers a wide spectrum of areas. Local planning authorities closely follow PLA/004 (the proportion of planning applications, by type, determined within target timescales) and all set their own targets for this. The delivery of affordable housing units as a proportion of all additional housing (PLA/006) forms part of the strategic indicator set. Other measures cover appeals, enforcement and housing provision on previously developed land.



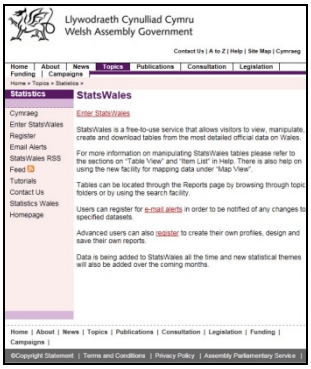
Sustainable Development Indicators for Wales

A suite of sustainable development indicators based on the One Wales: One Planet Sustainable Development Scheme. It is updated annually, where available, with a long-term aim of creating a data set that will monitor the progress towards sustainable development. A traffic light system has been adopted, and categories of: ‘clear improvement’; ‘little or no change’; ‘clear deterioration’; and ‘insufficient or no comparable data’ are applied to each indicator. Wider benchmarking comparison is possible with Defra UK data. Some indicators have limited data availability.



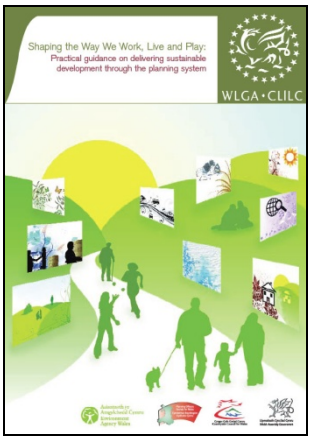
State of the Environment Report for Wales

Presents data on the indicators that monitor progress against the WG's Environment Strategy. The full set of data, analysis, and notes on all of the indicators are available on the Stats Wales website. The Stats Wales reports are updated twice a year, in July and December. A statistical bulletin showing the status of each indicator is produced annually in July to provide a snapshot of progress across all the indicators, whilst the December Stats Wales updates indicators where new data is available i.e. the status of indicators (e.g. clear improvement, clear deterioration) are not updated.



Stats Wales/Welsh Assembly Government Statistical Directorate

The Statistical Directorate (SD) is responsible for collecting, compiling, processing, analysing, interpreting and disseminating a range of statistics. These are disseminated in the form of first/headline releases, bulletins, articles and via StatsWales tables. The Stats Wales website provides a comprehensive data source for key sustainable development themes. Data can be manipulated and downloaded by users.



Shaping the way We Work, Live and Play

Welsh Local Government Association research to provide practical guidance on how local planning authorities can ensure they are promoting sustainable development. For each topic covered, also suggests a number of monitoring indicators. The majority of suggested indicators are 'ideal' new indicators not based on existing data sources, although there is a strong link between suggested policies and monitoring information. Examples of suggested indicators cover habitat creation, community heating/power supply, prevalence of SUDS and open space provision.

3.2 Other initiatives

The Local Development Plan Pathfinder Group has considered means of ensuring consistency in the preparation of Annual Monitoring Reports. Their initial findings (February 2011) showed significant variation in the level of consistency in recording the Local Development Plan Wales indicators – some had a high degree of confidence and consistency whilst others were undertaken on a varied basis.

Similarly, the Welsh Local Government Association Review of the Performance Improvement Framework for Wales considers the scope for Public Accountability Measures and Service Improvement Data. The Public Accountability Measures for 2011-12 only include one planning indicator, namely National Indicator PLA/006 – the number of additional affordable housing units provided during the year as a percentage of all additional housing units provided during the year.

It is also important that the planning system 'appreciates' that development occurs within ecosystems and that there is an environmental limit to acceptable change. This is in keeping with the Welsh Natural Environment Framework (NEF) which brings together the environmental aspects of development under the 'A Living Wales' banner (see http://wales.gov.uk/topics/environmentcountryside/consmanagement/nef/?lang=en).

4 Stakeholder Views

4.1 Introduction

Section 3.7 of the Main Report provides details of the two stakeholder discussion seminars that were convened as part of this study, and also provides the main opinion and discussion points from those sessions. Both seminars also covered issues around the ecological footprint including awareness of it and how applicable it might be to planning. These comments are provided below.

4.2 Ecological footprinting

The majority of attendees and interviewees had limited awareness and understanding of the ecological footprint. A few (already working in this area) had a strong understanding. The majority of local authority representatives were not aware that the ecological footprint data was already collected, prepared and freely available to download at a national and local authority level. In this vein, some authorities felt that using the ecological footprint could be burdensome to collect. There was also concern regarding the practicality of the footprint to local authorities. Other concerns were based around reservations about its usefulness, time burden and relevance, and broached the issue that footprinting only covers environmental sustainability as opposed to the 'three pillars' of sustainability including economic and social considerations which were often locally emphasised.

There was also concern that due to the limited knowledge of ecological footprinting by the authorities, developers could potentially 'take advantage' of the planning system. An example of this was made in one of the focus groups, whereby the ecological footprint was used by an appellant in a hearing to justify a scheme on the basis that it would create a better footprint. The local authority in question did not have the capability to robustly challenging the data presented.

Several authorities however, thought that the ecological footprint could serve as a powerful and communicative tool and would not be resource intensive if the data continued to be made available. One attendee highlighted that although they support the use of the footprint, the data has yet to be configured for national park geographies. Further, some questioned the usefulness of the footprint at a settlement or development level. There were comments on the positive 'education' element of the footprint, particularly at the community level.

There were mixed views with regard to the relevance of footprinting as an indicator. Some believed planning only has a limited influence over the ecological footprint. Others commented that they did not believe there was a way for the ecological footprint to measure the effect of planning on sustainable development, partly down to the credibility and the burden of data collection (the footprint being model- and assumption-led).

Several attendees believed the ecological footprint was a useful tool but erred on the side of caution. Several interviewees concluded that the ecological footprint should sit within a wider suite of indicators. This was because the ecological footprint on its own may show an increase due to development (more people/places means more resources consumed), but might not separately show the 'efficiency' gains in new developments being more sustainable. In addition, although it is a good tool that measures more than the effect of planning, it must be comparable between authorities (or other levels of measurement) and have a consistent methodology.

5 Testing the Framework

In devising the suggested Strategic Monitoring Framework, this study undertook some initial testing of the proposed indicators. This has used five 'real world' examples or scenarios of planning work aimed at increasing sustainability, including:

- Technical Advice Note (TAN) 8: Planning for renewable energy;
- Technical Advice Note (TAN) 18: Transport;
- Assessment at the local authority level, using Carmarthenshire County Council as an example;
- Assessment at the settlement level, using Coed Darcy in Neath Port Talbot as an example; and
- Assessment of the ecological footprint, based on development at Tir Y Gafel Ecovillage in Pembrokeshire.

The purpose of this was to 'road test' the suggested Strategic Monitoring Framework to try and identify what trends and information could be gleaned from looking at the data in a range of locations and contexts and whether there is a discernable difference in 'before' and 'after' data that the logic chain can be used to interpret. Each example looks at a relevant data sub-set of the overall indicator suite. In the case of the ecological footprint, it has been necessary to create a 'development specific' sub-set of indicators. It is not suggested that these be included within the overall Strategic Monitoring Framework due to the potential burden this might impose upon local authority recording systems.

Finally, selecting the indicators for inclusion within the Strategic Monitoring framework and testing that framework was an iterative process over several rounds. Therefore, some of the indicators tested below are not those contained within the final recommended indicator set. This also includes the process and outcome indicators which are presented within the Main Report as supporting the main indictor set comprised principally of output indicators.

5.1 TAN 8: Planning For Renewable Energy

5.1.1 Title

Technical Advice Note (TAN) 8: Planning for Renewable Energy (2005)

5.1.2 Description

TAN 8 (2005) provides technical advice on:

- renewable energy and planning;

- onshore renewable energy technologies;
- design and energy;
- implications for Development Plans;
- Development Control; and
- monitoring.

TAN 8 (2005) is a replacement for TAN 8: Renewable Energy (1996) and was developed with partners and stakeholders, and included detailed research in order to develop the technical basis for the policy.

The TAN relates to the land use planning considerations of renewable energy, however UK energy policy also provides part of its context. Energy policy is a reserved function that is not devolved to the Welsh Government. Nevertheless, all decisions relating to renewable energy in Wales must take account of the Welsh Government's underlying policy.

This document should be taken into account by local planning authorities (LPAs) in Wales in the consideration of 'saved' Unitary Development Plans that have not yet progressed to Inquiry, and in the preparation of Local Development Plans. The TAN policies may be material to decisions on individual planning applications and appeals and will be taken into account by the Welsh Government's Planning Decision Committees when taking decisions on called-in planning applications and by Planning Inspectors in the determination of appeals in Wales.

5.1.3 Indicators included

Area	Process	Output	Outcome
Low Carbon Infrastructure	Proportion of LPAs with an up to date renewable energy assessment	Renewable energy generation (MW) granted by source and capacity	Electricity from renewable sources installed (%)
	Proportion of LPAs requiring planning applications for new non-residential buildings over 1000m2 to be accompanied by an Energy Design Advice Report where appropriate		Greenhouse gas emissions

5.1.4 Sample Data

Indicator	Pre-2005 data	Post-2005 data	Comments

Indicator	Pre-2005 data	Post-2005 data	Comments
Proportion of LPAs with an up to date renewable energy assessment	-	-	This data is available, but not collected or collated.
Proportion of LPAs requiring planning applications for new non-residential buildings over 1000m2 to be accompanied by an Energy Design Advice Report where appropriate	-	-	This data is not collected.
Renewable energy generation (MW) granted by source and capacity	-	-	This data is not collected, but a Review of the Development Control Quarterly Survey recommended its collection. The Welsh Government is currently considering its response to the Review.
Electricity from renewable sources installed (%)	2000 2.8 2001 2.4 2002 2.4 2003 2.6 2004 2.9 2005 3.5	2006 3.9 2007 4.2 2008 4.3	Data for Wales as a whole. Source: StatsWales

Indicator	Pre-2005 data	Post-2005 data	Comments
Greenhouse gas emissions	1990 55.0 1995 51.3 1998 53.1 1999 54.1 2000 55.9 2001 52.7 2002 46.0 2003 47.0 2004 50.6 2005 49.4	2006 50.5 2007 47.3 2008 49.5	Data for Wales as a whole. Source: The State of the Environment Report

5.1.5 Commentary

The data for the indicator 'Proportion of LPAs with an up to date renewable energy assessment' is not available at the national level as it is not collected centrally. However collecting data for this indicator would consist of a periodic 'tick-box' review exercise at the local level, therefore lending itself to be less onerous in its collection. Based on desk based research for a selection of local authorities used in this testing exercise, it appears that Carmarthenshire County Council does not have a renewable energy assessment, however Pembrokeshire does. This was adopted in 2010 and covers a period up to 2021. As the assessment was adopted by Pembrokeshire County Council in 2010 it can be seen that this was a direct response to (and so attributable to) TAN 8 and therefore the planning system itself.

Data is not available at a Wales-wide level for the 'Proportion of LPAs requiring planning applications for new non-residential buildings over 1000m2 to be accompanied by an Energy Design Advice Report where appropriate'. Although it is a recommended indicator within TAN 8, our desk based research suggests local authorities do not collect this data at a local level. Again, collection of this data would consist of a periodic 'tick-box' review exercise, and would not be particularly arduous or burdensome. For this particular indicator, as data is unavailable, it could be suggested that although planning policy recommends certain monitoring frameworks, there is either a lag in data collection or ultimately no data collection at all. The absence of data does not support or

contradict the policy logic chain of an energy assessment resulting in a balanced framework against which to assess forthcoming schemes.

Data is not collected for the indicator 'Renewable energy generation (MW) granted by source and capacity'. It is however an indicator suggested in the 'Review and Evaluation of the Development Control Survey Monitoring Process', and is pending Welsh Government implementation of recommendations.

There appears to be more data collected and monitored at the outcome stage of the logic chain for those indicators relating to TAN 8. Data has been collected on an annual basis since the year 2000 for the indicator 'Electricity from renewable sources installed (%)' allowing a comparative view to be made. The statistics show an incremental increase over time in the percentage of electricity from renewable sources installed, with 2.8% in 2000 increasing to 4.3% in 2008. Although the introduction of TAN 8 may have played a role in increasing the percentages post 2005 (3.8% in 2005 increasing post-2005), there already appear to have been minor annual increases since 2002. Therefore as the percentage of electricity from renewable sources installed increases pre-introduction of TAN 8, it is difficult to quantify (or at least, isolate) the effect that TAN 8 and subsequently planning has had on this indicator. Data for the periods post-2008 may allow us to view better the role planning policy has played. It is perhaps likely that planning has been one element of a much wider push towards increasing the prominence of generation from renewable sources. Certainly, collecting the above data on consented generating capacity will be a powerful tool to distinguish the role of planning.

The indicator 'Greenhouse gas emissions' includes a 'basket' of six green houses gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). Data is available annually for this indicator at a national level only and has a large range of data available, dating from 1990 to 2008. The overall trend shows a decrease in green house gas emissions over time, from 55.0 in the year 1990 to 49.5 in the year 2008. However this figure fluctuates on an almost yearly basis. With the introduction of TAN 8 in 2005, the figures have surprisingly increased (from 49.4 in 2005 to 50.5 in 2006, 47.3 in 2007 and 49.5 in 2008). This illustrates the comparatively minor role TAN 8 (and subsequently planning) have on this particular indicator. However, the inclusion of this data ensures that the ultimate logical chain outcomes of the planning inputs and processes can be examined in a holistic fashion.

5.2 TAN 18: Transport

5.2.1 Title

Technical Advice Note (TAN) 18: Transport (2007)

5.2.2 Description

TAN 18 was produced in 2007 and provides technical advice on:

- integration between Land Use Planning and Transport;
- location of development;
- parking;
- design of development;
- walking and cycling;
- public transport;
- planning for transport infrastructure; and
- assessing impacts and managing implementation.

In response to transport challenges, the Welsh Government has pursued a sustainable development approach within which strategies and policies are developed. Planning Policy Wales, which sets out the land use planning policies of the Welsh Government, and the Wales Transport Policy both aim to secure the provision of transport infrastructure and services, which improve accessibility, build a stronger economy, improve road safety and foster more sustainable communities.

TAN 18 notes the integration of land use planning and the development of transport infrastructure has a key role to play in addressing the environmental aspects of sustainable development, in particular climate change and the outcomes identified in the Welsh Government's Environment Strategy. Integration can help the Welsh Government achieve these environmental outcomes, together with its wider sustainable development policy objectives.

5.2.3 Indicators Included

Area	Process	Output	Outcome
Minimising the need to travel	Proportion of LPAs included with an up to date regional transport plan	Number of applications submitted with transport assessments	Proportion of Transport Implementation Strategies (TIS) monitored to completion Proportion of households within 15, 30, 60 and 90 minute travel time threshold(s) of A 'Key Centre' (as defined by Regional Transport Consortia) between 10am and 12pm on a Tuesday (I) by public transport and (ii) by car (iii) by cycling and (iv) by walking
Accessibility and integration	Proportion of LPAs requiring transport assessments as part of planning applications (including Transport		Detailed Commuting patterns in Wales (by LPA)

Area	Process	Output	Outcome
	Implementation Strategy and/or a Travel plan		

5.2.4 Sample Data

Area	Indicator	Pre-2007 data	Post-2007 data	Comments
Minimising the need to travel	Proportion of LPAs included with an up to date regional transport plan	-	-	This data is available, but not collected or collated.
	Number of applications submitted with transport assessments	-	-	This data is not collected.
	Proportion of Transport Implementation Strategies (TIS) monitored to completion	-	-	This data is not collected.
	Proportion of households within 15, 30, 60 and 90 minute travel time threshold(s) of A 'Key Centre' (as defined by Regional Transport Consortia) between 10am and 12pm on a Tuesday (I) by public transport and (ii) by car (iii) by cycling and (iv) by walking.	-	Please see separate table below for the national level statistics. Source: Monitoring the National Transport Plan, Interim Report, March 2010	Data also available at LA and postcode level, however the extraction of this data can be onerous. Source: Transport Statistics, the Statistical Directorate. Note: Based on 1,339,836 domestic addresses in Wales. These results can also be mapped.

Accessibility and integration	Proportion of LPAs requiring transport assessments as part of planning applications (including Transport Implementation Strategy and/or a Travel plan)	-	-	This data is available, but not collected or collated.
	Detailed Commuting patterns in Wales (by LPA) (%)	2007: 71 2008: 71	2009: 71	2009 indicator used: % of residents working in home authority 2007 and 2008 indicator used: % of residents working in area of residence Source: Annual population survey

Proportion of households within 15, 30, 60 and 90 minute travel time threshold(s) of a 'Key Centre' between 10am and 12pm on a Tuesday by: public transport; car; cycling; and walking (2010):

Households (%)	15mins	30mins	60mins	90mins
Car	90.5	8.5	0	-
Public transport	26.6	43.0	4.5	2.1
Cycling	42.3	26.0	6.6	7.3
Walking	12.1	14.2	9.4	16.0

5.2.5 Commentary

Beyond the recent journey time threshold work as part of the Transport Monitoring Framework, limited data exists across the logic chain process for the area 'Minimising the need to travel'. The process indicator 'Proportion of LPAs included with an up to date regional transport plan' is a 'tick box exercise' in gathering up to date information on the current status of authority policy making, and would place only limited burden on local authorities for data collection. Data is also not collected for the indicators entitled 'Number of applications submitted with transport assessments' and 'Proportion of Transport Implementation Strategies (TIS) monitored to completion'. Data collection of both indicators by LPAs

would not be onerous; in the case of the latter, little burden would be placed upon authorities as it is already within their remit to monitor and enforce TIS'.

The outcome indicator 'Proportion of households within 15, 30, 60 and 90 minute travel time threshold(s) of A 'Key Centre' (as defined by Regional Transport Consortia) between 10am and 12pm on a Tuesday (i) by public transport, (ii) by car, (iii) by cycling and (iv) by walking' is the only indicator which has existing data along the logic chain of 'Minimising the need to travel'. However, data only exists for 2010 having been produced to inform the emerging Transport Monitoring Framework. This data source lends itself to use at the national level due to the onerous requirements associated with extraction of data at LA and postcode level (although data does exist at these spatial scales). Further, these current statistics took around 18 months to generate and so it is unclear when the next iteration might be undertaken. Since planning does not solely control the strategic network, it has minimal impact on longer distance journeys. However, it does have a role in influencing local journeys and modal patterns. Therefore the completion of the data sets in the area 'Minimising the need to travel' will play an important role in measuring how attributable planning is to the outcome indicator.

With regard to the area 'Accessibility and integration', no data is currently collected for 'Proportion of LPAs requiring transport assessments (TAs) as part of planning applications (including Transport Implementation Strategy and/or a Travel plan)'. However, TAN 18 states '*Planning authorities should set out in their development plans the circumstances in which TA will be required to accompany planning applications'*. Furthermore '*TAs should be secured for developments that... generate significant levels of movement or are likely to have significant effects on existing patterns of movement*'. Therefore this data can be easily monitored and collected, without a burden being placed on LPAs.

The outcome indicator 'Detailed Commuting patterns in Wales (by LPA)' has existing data for the years 2007, 2008 and 2009. However, it must be noted that the years 2007 and 2008 use a different indicator to the 2009 data set. Although the wording of the indicator is different, the % of residents working in home authority/ area of residence has remained at 71% for the 3 years. Looking across the logic chain process, if data was collected for the process indicator, it would help in determining how attributable planning is to the outcome indicator 'Detailed Commuting patterns in Wales (by LPA)'.

Overall, the absence of data across two or more time points for most indicators makes identifying the current 'direction of travel' difficult. However, the framework indicators should be able to measure the 'cause' and 'effect' of the planning process as one of the influences on transport policy, provision and use.

5.3 Carmarthenshire County Council

5.3.1 Title

An individual Local Planning Authority: Carmarthenshire County Council

5.3.2 Description

Carmarthenshire County Council is a Unitary Authority situated in the south west of Wales. Its three largest towns are Llanelli, Carmarthen and Ammanford, with the area of Llanelli being the most populous. It has a population of approximately 178,000, of whom over half are Welsh Speakers.

The unitary authority is bounded to the north by Ceredigion, to the east by Powys, Neath Port Talbot and Swansea, to the south by the Bristol Channel and to the west by Pembrokeshire.

The Council has commenced work on the preparation of the Carmarthenshire County Council Local Development Plan and, upon adoption, this will supersede the existing Unitary Development Plan..

5.3.3 Indicators included

Area	Process	Output	Outcome
Urban shape	Proportion of LPAs with an up to date Open Space Assessment	Net change in open space and playing fields	Proportion of LPAs which meet or exceed benchmark standards for access to open space (or, where set meet or exceed local targets for access to open space)
Flood risk adaptation	Number of applications submitted with Flood Consequent Assessments (Level 1/Level2/ Level 3)	Percentage of new development permitted in the floodplain Number of applications granted (by type) on the floodplain (by flood risk category)	The number and proportion of completions on flood risk sites

Area	Process	Output	Outcome
Ecosystems, conservation and enhancement	Proportion of LPAs which have an Environmental Capacity Study in place Proportion of Conservation Areas with an up-to-date Appraisal in place	Total footprint area of consented development in protected areas (European, national and local designations) Number of Article 4 Directions in place	
Historic and Cultural Heritage	Number of listed buildings (by grade)	Number of Listed Building Consents	Number of Listed Buildings on the 'Buildings at Risk' register (at Risk/vulnerable/Not at risk) Analysis of Condition Profile on the 'Buildings at Risk' register (Very Bad/Poor/Fair/Good)
Employment, Services, spaces	Proportion of LPAs with an up to date Employment Land Review	Employment land bank (years provided)	Gross Value Added (GVA) and GVA per head
Social Inclusion	Proportion of LPAs with an up to date Community Involvement Scheme	Proportion of LPAs with an up to date Community Involvement Strategy	Deprivation (Welsh Index of Multiple Deprivation)
Overarching	Proportion of LPAs with an up to date LDP Sustainability Appraisal	Proportion of LPAs with an up to date adopted LDP	Ecological Footprint

5.3.4 Sample Data

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
Urban shape	Proportion of LPAs with an up to date Open Space Assessment	-	-	Document entitled 'Leisure vision 2007-2012' states an Open Space Strategy for Consultation would be produced in 2007, however extensive desk based research shows this target has not yet been met.
	Net change in open space and playing fields	-	-	This data is currently not collected, but it is proposed to be collected and monitored within the Development Control Quarterly Survey.
	Proportion of LPAs which meet or exceed benchmark standards for access to open space (or, where set meet or exceed local targets for access to open space).	-	-	This data is not collected.
Flood risk adaptation	Number of applications submitted with Flood Consequent Assessments (Level 1/Level2/ Level 3)	-	-	This data is not collected, but a Review of the Development Control Quarterly Survey recommended its collection. The Welsh Government is currently considering its response to the Review.
	Percentage of new development permitted in the floodplain	-	-	This data is not collected, but a Review of the Development Control Quarterly Survey recommended its collection. The Welsh Government in response to the Review, will be collecting this data (will only include development in floodplain C1 and C2). For this study, we have used the indicator ''Consultations which required consideration on flood risk grounds' which falls under the main indicator '% of new development permitted in the floodplain'. This is only available at the national scale. Source: Stats Wales

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
	Number of applications granted (by type) on the floodplain (by flood risk category)	-	-	This data is not collected, but a Review of the Development Control Quarterly Survey recommended its collection. The Welsh Government is currently considering its response to the Review.
	The number and proportion of completions on flood risk sites.	2008 6.3%	2009 8.2%	Source: LPA own website and the Welsh Government website.
Ecosystems, conservation and enhancement	Proportion of LPAs which have an Environmental Capacity Study in place	No	-	The LPA does not have an Environmental Capacity in place one in place.
	Proportion of Conservation Areas with an up-to-date Appraisal in place	None	-	No conservation area appraisals have been undertaken.
	Total footprint area of consented development in protected areas (European, national and local designations)	-	-	This data is not collected.
	Number of Article 4 Directions in place	4	-	4 Article 4 Directions in place (1 in 1986: 2 in 2008; 1 unknown date).
Historic and Cultural Heritage	Number of listed buildings (by grade)	-	-	This data is not collected and is proposed as a new indicator.
	Number of Listed Building Consents	-	-	This data is not collected and is proposed as a new indicator.
	Number of Listed Buildings on the 'Buildings at Risk' register (at Risk/vulnerable/Not at risk) (%)	2008: At Risk: 10.00 Vulnerable: 17.76 Not at Risk: 72.4	-	Data collected on a regional level (Carmarthenshire falls within Central Wales). Source: Cadw, Buildings at Risk.

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
	Analysis of Condition Profile on the 'Buildings at Risk' register (Very Bad/Poor/Fair/Good) (%)	2008: Very bad: 1.80 Poor: 11.70 Fair: 43.50 Good: 42.90	-	Data collected on a regional level (Carmarthenshire falls within Central Wales). Source: Cadw, Buildings at Risk.
Employment, Services, spaces	Proportion of LPAs with an up to date Employment Land Review	Yes, May 2010		Employment Land Study, May 2010
	Employment land bank (years provided)	-	-	Data not provided within the Employment Land Study 2010
	Gross Value Added (GVA) and GVA per head £ (million)/ £ per head	1995: 2,893/ 8,168 1996: 2,966/ 8,381 1997: 2,978/ 8,390 1998: 2,972/ 8,340 1999: 3,008/ 8,400 2000: 3,116/ 8,646	2001: 3,235/ 8,935 2002: 3,391/ 9,318 2003: 3,603/ 9,842 2004: 3,865/10,503 2005: 4,130/11,204 2006: 4,369/11,801 2007: 4,586/12,299 2008: 4,644/12,382	Data configuration exists as an amalgamation of Swansea Bay, Pembrokeshire and Carmarthenshire Source: StatsWales
Social Inclusion	Proportion of LPAs with an up to date Community Involvement Scheme	Yes, August 2007	-	The CIS is stated within the 'Carmarthenshire Local Development Plan, Delivery Agreement, August 2007'.
	Proportion of LPAs with an up to date Community Involvement Strategy	Yes, 2011 to 2016	-	Integrated Community Strategy for Carmarthenshire 2011-2016

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
	Deprivation (Welsh Index of Multiple Deprivation)	2005-58.6	-	The 2008 data is only available at the LSOA level. Source: Welsh Government, Welsh Index of Multiple Deprivation
Overarching	Proportion of LPAs with an up to date LDP Sustainability Appraisal	Consultation period on the LDP Deposit SA ended April 2011	-	
	Proportion of LPAs with an up to date adopted LDP	-	-	No LDP currently exists- in the process of adopting one.
	Ecological Footprint (gha/capita)	2003 4.7 2006 4.4	-	Source: Stats Wales http://www.statswales.wales.gov.uk/tableviewer/document.aspx?reportid=5786

5.3.5 Commentary

This case study has shown that on the whole limited data exists for geographical levels smaller than the national level, such as the local authority scale. However, many indicators could form a 'tick box exercise' feeding into the national level, therefore minimising the burden of data collection on local authorities. It can be seen that some areas of planning are moving towards sustainability objectives, such as 'employment, services, and spaces'. However, with the lack of data for a number of indicators, it can be heard to measure (at this scale) the exact role planning has played in the realm of sustainability.

With regard to the area of urban shape, all three indicators situated across the logic chain have limited data availability. For the indicator 'Proportion of LPAs with an up to date Open Space Assessment' it was noted through desk based research that although the LPA discusses the production of an Open Space Strategy for consultation in 2007, in reality this has not been achieved and an Open Space Assessment does not exist. Assuming the logic chain is sound, this will have an effect on the following output and outcome indicators. As data does not currently exists for the two indicators of 'net change in open space and playing fields' and 'Proportion of LPAs which meet or exceed benchmark standards for access to open space' it is hard to tell the results that both indicators would produce. The former indicator however, is proposed to be collected and monitored within the Development Control Quarterly Survey, possibly enhancing the robustness of the logic chain.

Three indicators relating to Flood risk adaptation do not currently have existing data. However, the Review of the Development Control Quarterly Survey recommended their collection and the Welsh Government is currently considering its response to the Review. The outcome indicator 'number and proportion of completions on flood risk sites' does have data availability, albeit limited. The data appears to be moving in a direction away from sustainable development, as in 2008 only 6.3% of completions were made on flood risk sites, however this increased to 8.2% in 2009. Factors outside of the realm of sustainable planning, such as land constraints, can however play a role in a percentage increase in this indicator.

With regard to 'ecosystems, conservation and enhancement', limited sustainable objectives appear to have been met in Carmarthenshire. Although TAN 5: Nature Conservation and Planning (2009) advises that when developing an overall strategy of a plan, local planning authorities should seek to 'consider the use of evolving techniques such as environmental capacity studies', desk based research demonstrates that Carmarthenshire does not appear to have an Environmental Capacity Study in place. In addition, no conservation area appraisals have been undertaken. For the indicator looking at the 'number of Article 4 Directions in place', four currently exist at this period of time. One (possibly two) of the Article 4 Directions have been created post the 1995 Town and Country Planning (General Permitted Development) Order, which created significant improvements to the process, possibly resulting in the increase. The ramifications of this increase may highlight a move towards conservation and enhancement within the local authority. However, it may also signify a move away from other sustainable objectives such as employment growth.

For those indicators relating to historical and cultural heritage, data is limited to the outcome side of the logic chain. For the two indicators that have existing data, the data only exists for 2008 hindering its comparability. Furthermore it has been collected at a regional level, disallowing for full assimilation into the logic chain. This will be particularly apparent if the two indictors of 'number of listed buildings (by grade)' and 'number of listed buildings on the 'Buildings at Risk' register' are measured at the local scale.

The indicator 'proportion of LPAs with an up to date Employment Land Review' is a 'tick box exercise' and as highlighted previously, would place limited burden on Local Authorities for the data collection. For Carmarthenshire, the employment land study was published in 2010, meeting the requirements of the first indictor within the logic chain. However, within the study 'employment land bank' data has not been provided. It would however not be burdensome on the local authority to collect this data if they have an up to date employment land review. The final indicator within the login chain process is 'Gross Value Added (GVA) and GVA per head'. There is a large range of data available dating from 1995 to 2008; however the data consists of an amalgamation of statistics from Swansea Bay, Pembrokeshire and Carmarthenshire and appears that it cannot be disaggregated further. Although this data is valuable, there is a limit to its usefulness within a suite of indicators measured at the

local scale. The overall trend shows an increase in GVA and GVA per head, with GVA standing at £2, 893m and GVA per head standing at £8,168 in 1995, increasing to £ 3,235m and £8,935, respectively. Although planning may in part be attributable to this rise, other factors also play an important role. It is therefore integral to the logic chain process for the 'employment land bank' indicator to be monitored in order to evaluate how far planning has played a role in the increase in GVA and GVA per head.

Two out of the three indicators within the area of 'Social Inclusion' take the form of tick box exercises, limiting the burden of data collection for local authorities. Desk based research has shown Carmarthenshire to have an up to date Community Involvement Scheme, published in 2007, as well as an up to date Community Involvement Strategy valid from 2011 to 2016. Currently, only 2005 data exists for the 'Deprivation' indicator as the 2008 data is available at the Lower Super Output Area (LSOA) level. Although only one year of data exists for 'Deprivation' for Carmarthenshire, it can be useful to see how Carmarthenshire County Council does in relation to other local authorities. Furthermore, if feasible the aggregation of the 2008 data and any subsequent data sets would help establish the role planning plays in the realm of social inclusion. For this it would be particularly useful to establish data post-publication of the Community Involvement Scheme and the Community Involvement Strategy.

The overarching indicators are split evenly across the logic chain process and again, two out of the three are tick box exercises. Carmarthenshire currently does not have an adopted Local Development Plan Sustainability Appraisal, although desk based research has highlighted that it is far in the process towards adoption. In addition, Carmarthenshire County Council is in the process of adopting an up to date Local Development Plan. With regard to the output indicator 'proportion of LPAs with an up to date adopted Local Development Plan ' it can be noted that the Welsh Government will be collecting this data on a national scale, highlighting the delivery agreement milestones and indicating progress made. The ecological footprint indicator has strong time series data (on Stats Wales) from 1992 through to 2006. Local authority level data is available for 2003, 2004 and 2006. Although the ecological footprint is not limited to the influence of planning, collecting the data will be a powerful tool to distinguish the role of planning.

5.4 Coed Darcy, Neath Port Talbot

5.4.1 Title:

An individual settlement: Coed Darcy, Neath Port Talbot

5.4.2 Description

On the 8th March 2008, an outline application was approved by Neath Port Talbot County Borough Council for an urban village compromising approximately 4,000 dwellings, 41,200sq m of B1 business uses, up to 3,800sq m of retail (gross) and 8,000 sq m of other commercial, education,

community facilities, highways, drainage, services, infrastructure, car parking and landscaping.

The Brownfield site located to the north east of Swansea is situated on a former Llandarcy oil refinery. The objectives of the master plan are to restore and re-use the former heaving industrial site and form a new sustainable community based on an urban village of interconnected neighbourhoods with mixed land uses.

It will see the transformation of 270 hectares of industrial dereliction into a new place, for 21st century people to live and work, and aims to attract 'over 1,200 employment opportunities'.

5.4.3 Indicators included

Area	Process	Output	Outcome
Renewable Materials and re-use	Proportion of LPAs with SPGs in place that require use of recycled or reclaimed materials where possible in new construction	The proportion of local and recycled materials used in new developments	Proportion of construction and demolition waste and recycled (recycled/used in landfill/deposited at landfill/spread)
Housing, safe neighbourhoods	Proportion of LPAs with an up to date Local Housing Market Assessment	Number of new affordable housing units granted permission	
Infrastructure for communities		Proportion of new developments with water saving technology	Sustainable water resource management-percentage of resource zones reporting headroom deficits
Supporting the Economy		Total floor space granted/refused (by type) (combining Greenfield and Brownfield land) (offices/industry/retail/distribution)	Proportion of workplace-based employment in top three occupational categories ('Managers & Senior Officials'; 'Professional Occupations'; 'Associate Professional & Technical Occupations')

5.4.4 Sample Data

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
Renewable Materials and re-use	Proportion of LPAs with SPGs in place that require use of recycled or reclaimed materials where possible in new construction	-	-	The SPGs do not state this information. Data collected at the LA level.

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
	The proportion of local and recycled materials used in new developments	-	-	This data is not collected.
	Proportion of construction and demolition waste reused and recycled (recycled/used in landfill/deposited at landfill/spread)	-	-	Data is only available at the national level.
Housing, safe neighbourhoods	Proportion of LPAs with an up to date Local Housing Market Assessment	-	-	A Strategic Housing Market Assessment has been undertaken as opposed to a Local Housing Market Assessment.
	Number of new affordable housing units granted permission	2007-2008: 35	2008-2009: 81 2009-2010: 138 2010-2011: 162 2011-2012: 100	Alternative indicator used: 'additional affordable housing provision by all providers, by location in Wales over time'. Source: StatsWales Data only available at the LA level
Infrastructure for communities	Proportion of new developments with water saving technology	-	-	This data is not collected.
	Sustainable water resource management- percentage of resource zones reporting headroom deficits	-	-	Data is only available at the national level.
Supporting the Economy	Total floor space granted/refused (by type) (combining Greenfield and Brownfield land) (offices/industry/retail/distribution)	-	-	This data is not collected, but a Review of the Development Control Quarterly Survey recommended its collection. The Welsh Government is currently considering its response to the Review.

Area	Indicator	Period 1 data	Period 2 data (if applicable)	Comments
	Proportion of workplace-based employment in top three occupational categories ('Managers & Senior Officials'; 'Professional Occupations'; 'Associate Professional & Technical Occupations') (%)	2001 27.0 2002 27.4 2003 30.0	2010 13.5	Available at national level and LA level. Source: StatsWales LA level data has been used.

5.4.5 Commentary

Almost no data exists at settlement level for the preceding indicators, therefore we have sourced data for the Coed Darcy settlement at the local authority level i.e. Neith Port Talbot. Where feasible, information has been sourced from the submitted outline planning application (and supporting information) so that it can relate to the settlement itself as far as possible.

With regard to the area of 'renewable materials and re-use', limited information exists at the scale of settlement. The indicator 'Proportion of LPAs with SPGs in place that require use of recycled or reclaimed materials where possible in new construction' cannot be applied to the settlement level and only at the local or national level. Neath Port Talbot does not however meet the criteria of this indicator. The indicator 'proportion of local and recycled materials used in new developments' is not currently monitored. The 2007 report by Welsh Local Government Association (WLGA) entitled 'Shaping the way we work, live and play' suggested it should be monitored on an annual basis. However the lack of data could be due to a time lag in the implementation and collection of the data set. In addition, it is feasible for this indicator to be monitored at the settlement level, however may place a burden on the developers for data collection. Through desk based research, it appears that there is no information on the 'the proportion of local and recycled materials used in new developments' for Coed Darcy. This could partly be because the application is only an outline planning application and subsequently is not as detailed as a full planning application.

Data only exists at the national level for the indicator entitled 'proportion of construction and demolition waste and recycled'. Although it appears to be an indicator suited to the settlement level, research has established that this data is collected by the Environment Agency on an ad hoc basis due to the extensive time period needed for data collection. In addition, data is based on estimates due to limited response from LPAs.

The indicator 'proportion of LPAs with an up to date Local Housing Market Assessment' can only be monitored at the local or national level, eliminating its use as an indicator for the settlement level. The output indicator 'Number of new affordable housing units granted permission' has been replaced by an alternative indicator entitled 'additional affordable housing provision by all providers, by location in Wales over time', for which there is existing data from the year 2007/2008 to 2011/2012. It

shows an increase in the number of affordable houses provided, from 35 provided in the period 2007/2008 increasing to 162 in the period 2010/2011. Conversely, the data decreases from 162 in 2010/2011 to 100 in 2011/2012. It is not however easy to ascertain the actual effect planning had on this indicator.

It is feasible for the indicator 'number of new affordable housing units granted permission' to be monitored at the scale of settlement. The Section 106 Agreement attached to the application states 'the details of the Dwellings submitted to the Authority for approval as Reserved Matters shall identify not less than 20% of the total number of dwellings as affordable housing'. The percentage in this case, can be translated into a number to meet the requirements of the indicator. Exploring the logic chain relationships, it can be deduced that the local level process indicator can sit alongside the settlement level output indicator allowing us to ascertain whether the output indicator was a direct response to the planning system itself.

With regard to the area of 'infrastructure for communities', data is limited at the settlement scale. Data does not exist at any geographical level for the indicator 'proportion of new developments with water saving technology'. In addition, figures are only available at the national level for the outcome indicator entitled 'Sustainable water resource management- percentage of resource zones reporting headroom deficits'. It may be relatively easy for data to be collected for the output indicator, however data is only limited to both the national level and river basin management plan area, disallowing the link between planning and sustainability to be made.

For both indicators within the area of 'supporting the economy', data does not exist at the settlement level. Data is not collected for the indicator 'total floor space granted/refused (by type)'. It is however an indicator suggested in the 'Review and Evaluation of the Development Control Survey Monitoring Process', and is pending the Welsh Government implementation of recommendations. Furthermore, it is an indicator easily achievable at the local level. Data is collected for the indicator 'proportion of workplace-based employment in top three occupational categories' at both the local and national level; however this is sporadic with data available for the time periods of 2001 to 2003, however not again until 2010. The statistics show a dramatic decrease in the 'proportion of workplace-based employment in top three occupational categories' with 30% in 2003 decreasing to 13.5% in 2010. Certainly, collecting the above data on floor space granted/refused will be a powerful tool to distinguish the role of planning.

5.5 Tir Y Gafel Ecovillage, Pembrokeshire

5.5.1 Title

Tir Y Gafel Ecovillage Development, Pembrokeshire[10] Developed and Administered by Lammas Low Impact Initiatives Ltd.

5.5.2 Description

The Tir Y Gafel Ecovillage Development in Pembrokeshire is the first such development by Lammas. Lammas has been created to support the development of ecovillages in West Wales and aims to create a model development that can be replicated elsewhere. It also aims to be an exemplar 'One Planet Development' as described in TAN6 (Planning for Sustainable Rural Communities).

The Ecovillage is located within 31 hectares of woodland and mixed pasture, near the village of Glandwr and is also close to the Pembrokeshire Coast National Park. The development consists of:

- nine 'eco-smallholdings' consisting of five detached dwellings and a terrace of four dwellings.
- a campsite; and
- a community hub building.

In order to create a One Planet Development the design and specification of Tir Y Gafel has focussed on a number of aspects covering housing materials and design, the provision of site services (e.g. energy, water, food and waste disposal), transport, community facilities and agriculture.

The buildings use a mixture of recycled, reclaimed and natural materials and design styles including straw bale, earth sheltered, timber frame and cob which have low embodied carbon. In terms of services the site generates electricity from a hydro-turbine on site. Heating is provided from biomass fuels grown on site that included elephant grass and coppiced willow. Drinking water is sourced from a spring on site and rainwater is collected from rooftops for other uses. Organic waste will be composted on site using composting toilets, wormeries and compost heaps. A combination of a car share scheme and restrictions of private car ownership means that transport impacts can be reduced. Furthermore a minibus service to local towns will provide residents with access to services and facilities not available locally. A community building is also included and acts as a central hub for the community as well as acting as an exemplar for low impact building design and construction. Agricultural small-holdings will provide residents with food, fuel and surplus produce to make products to sell at local markets to generate an external income.

[10] For further information about this development can be found on the following website http://www.lammas.org.uk/ecovillage/index.htm. The planning submission that was made to Pembrokeshire County Council can be viewed using reference number 08/0962/PA.

5.5.3 Indicators included

Area	Process	Output	Outcome
Ecological Footprint of new One Planet and Low Impact Developments	Proportion of LPAs requiring a predicted EF calculation as part of planning applications for new rural residential low impact developments (One Planet Developments).	Comparison with TAN6 requirements in per capita EF (global hectares (gha) per capita) of an individual in living in the development.	Reduction in EF from the development (gha per capita).
	Proportion of LPAs requiring the EF of Low Impact Rural Development to be monitored post construction.	Comparison with TAN6 requirements in per capita EF (global hectares (gha) per capita) of an individual in living in the development.	Reduction in EF from the development (gha per capita).

The table above shows that the ecological footprint itself can be represented with its own indicator sub-set. This was undertaken to try and assess the footprint on a site-specific basis for the ecological footprint element of the research brief and is not suggested for inclusion within the overall Strategic Monitoring Framework.

5.5.4 Sample data

Indicator	Data	Comments
Proportion of LPAs requiring planning applications rural Low Impact Developments (as defined in TAN 6) EF assessments to accompany planning applications.	-	This data is not collected. However, it may be possible to collect this data from planning submissions as they are made.
Proportion of LPAs rural Low Impact Developments (as defined in TAN 6) where EF is monitored.	-	Development Control Survey review and Evaluation (not currently collected, pending the Welsh Government implementation of recommendations).
Existing EF for Welsh citizens.	Available from the Stockholm Environment Institute for each lower tier local authority.	This data only provides a snapshot in time and does not allow progress towards the One Planet Wales targets to be monitored at the national or local authority scales. However, it does provide a benchmark for Low Impact Developments to compare their performance against the average footprint of an individual living in the same local authority area.
Reduction in the EF for residents living in rural Low Impact Developments compared to the national standard in	-	Currently, no data has been specifically collected for planned new developments (or planning applications) in Wales, whether this is in the form of ecological footprint assessments for new developments or monitoring the effects of completed and occupied developments. The

Indicator	Data	Comments
TAN6.		Tir Y Gafel Ecovillage, for example, has not actually predicted the likely reduction in the per capita ecological footprint for residents living there. Likewise, they have not, thus far, provided post occupation monitoring to provide actual data on the ecological footprint to the LPA. A number of studies have looked at the ecological footprint at a community level, such as the use of REAP Petite in Machynlleth (see http://www.footprintwales.org/en/content/cms/Latest_news/Dyfi_Footprint/Dyfi_Footprint.aspx) and also work using the WWF EF calculator.

5.5.5 Commentary

From the planning documents that have been submitted to the local planning authority relating to the Tir y Gafel Ecovillage it is evident that TAN6 (particularly sections 4.15 to 4.23 relating to Low Impact Developments) and the local planning authority's Supplementary Planning Guidance[11] have influenced the design of the development and the information that was submitted. However, although TAN6 requires One Planet developments, such as Tir y Gafel to achieve an ecological footprint of 2.54 gha per capita from the outset (compared to the average for a Welsh citizen of 4.41) no evidence could be found to suggest that this was case. The planning application does include a copy of correspondence with the Stockholm Environment Institute and a questionnaire that would provide data to allow the ecological footprint of the average resident in Tir y Gafel to be assessed. Nevertheless, there was nothing submitted to the authority in writing demonstrating that the development will achieve the target of 2.54 gha per capita from the outset.

It is not clear why an assessment of the ecological footprint of residents in the new development was not completed. There may well be a number of reasons for this including other aspects of the application being of greater concern to the authority and a lack of guidance for the authority and applicant regarding how to undertake such an assessment and interpret the results. The approach that was being proposed would have provided a robust approach to calculating ecological footprint of the new development and would also have served to provide a monitoring framework that would allow the community to provide the authority with annual monitoring on their progress towards the One Planet Wales target of 1.88 gha per capita over time.

Evidence from elsewhere in the United Kingdom suggests that it would be possible to calculate the ecological footprint of the residents in a new development, monitor this over time and to achieve the initial target of 2.54gha set out in TAN 6. A study carried out by the Sustainable Development Research Centre[12] of the Findhorn Community in Moray,

[11] Pembrokeshire County Council (Adopted 26th June 2006) Supplementary Planning Guidance – Low Impact Development making a positive contribution.
[12] SDRC, 2006. Ecological Footprint of the Findhorn Foundation and Community.

Scotland, suggests that this may be possible. The study calculated the average ecological footprint of its residents living in a community with forty low impact buildings along with visitors to the site's conference and educational facilities. Their combined ecological footprint came to 2.56 gha per capita. This was achieved by a community that does not have the same requirements for self-sufficiency as set out in TAN 6 for Low Impact developments by constructing low impact homes and living low impact lifestyles.

From this example it is fair to assume that the Tir y Gafel development should be able to achieve the initial target set out in TAN 6 and is also likely to be moving towards the low target of 1.88 gha. It also serves as an example of the sort of impact a residential development could have in contributing towards the One Planet Wales in more urban or semi-urban settings where there is less space to allow food and fuel to be cultivated.