Communities and Local Government

An e-Government Truth

Potential CO_2 efficiencies from online provision of local government services

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Potential CO_2 efficiencies from online provision of local government services

Prepared by Best Foot Forward Ltd

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Contents

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Ministerial Foreword

Local authorities have a significant role to play in tackling and adapting to climate change, both in reducing CO_2 emissions from their operations and as leaders of their communities on environmental sustainability. Moreover, their success in these areas is critical to the achievement of the Government's climate change objectives.

Many local authorities are already successfully reducing their carbon emissions, or working towards that aim. The new local government performance framework for local authorities and local authority partnerships published in October 2007 provides an increased focus on action on climate change to incentivise more authorities to reach the levels of the best.

Supporting Government ambitions for a low carbon economy, this new report commissioned from Best Foot Forward (with Sunderland City Council) provides a world-first quantification of the carbon benefits of online public service delivery.

Applying their proven accounting model for CO_2 footprint calculations to real-life data provided by Sunderland City Council, Best Foot Forward presents an objective analysis that debunks the received wisdom that increases in IT server capacity negate any CO_2 savings arising from the Internet economy.

Above all, it is demonstrated that improving the take-up of online services can form an important part of a broader carbon reduction strategy, with substantial CO_2 savings in key high-volume service areas such as payments. I recommend everyone in the public sector to take note of these findings with regard to the future management of their service operations.

Parmjit Dhanda MP,
Parliamentary Under Secretary of State.

Executive summary

"[I]f tackling climate change represents the greatest of challenges for the world, it is also the greatest of opportunities for Britain. And just as in each of the three previous technological revolutions Britain played a leading role, we now have the opportunity to play a leading role in taking the world towards a low carbon future."

Prime Minister Gordon Brown, 19th November 2007

"Some local authorities are already making a significant reduction in carbon emissions from their own estate … But all local authorities could do more to mitigate and adapt to the effects of climate change"

Strong and Prosperous Communities, Volume II, page 54, Communities and Local Government, 2006

This project examines the carbon footprint of five services provided by local government, based on data provided by a Sunderland City Council case study, and assesses whether this carbon footprint could be reduced by greater online provision of these services.

The study includes the CO_2 emissions associated with those aspects of the five council services which could conceivably be reduced (or increased) by a shift to online provision. This includes paper use, travel to council offices by service users, and server electricity use. It also includes an estimated hourly CO_2 impact of the energy and materials required to support a member of office staff (electricity, heating, stationery, office equipment, commuting, etc), based on previous Best Foot Forward studies.

The total CO_2 emissions during 2006/07 from the data obtained from Sunderland City Council are shown below in Figure 1.1, along with the estimated potential savings from a set of scenarios with a greater use of online systems:

Figure 1.1: Total carbon footprint of selected council services, and savings associated with different online scenarios (kg of CO_2) – see below for details of scenarios

Service	Current Annual CO_2	Online Scenario CO_2	Annual Saving	Annual Saving (%)	% of Total Saving
Planning	29,319	24,676	4,643	16%	6%
Schools	10,519	5,822	4,697	45%	6%
Registrar	43,684	30,876	12,808	29%	16%
Env. Services	20,026	11,181	8,845	44%	11%
Council Tax	180,619	132,179	48,439	27%	61%
TOTAL	**284,166**	**204,734**	**79,432**	**28%**	**100%**

Planning Scenario
50 per cent electronic applications, 50 per cent paper applications, without re-scanning

Schools Scenario
50 per cent electronic applications, 50 per cent paper applications, 50 per cent electronic booklets

Registrar's Scenario
50 per cent electronic applications, 35 per cent applications in person, 15 per cent posted applications

Environmental Services Scenario
50 per cent online entries, 48 per cent telephone enquiries, 2 per cent email enquiries

Council Tax Scenario
80 per cent of payments by Direct Debit (an increase from 59 per cent)

These savings take the form of reductions in staff time, distance travelled by service users, and printing. The division between these different savings is shown below:

Figure 1.2: Sources of carbon footprint reductions across the five services

Component	Change to CO_2 emissions across the scenarios	% of Change
Distance Travelled	–43,489	–54.8%
Staff Time	–31,514	–39.7%
Paper Use	–5,239	–6.6%
Data Transfer	+810	+1.0%
TOTAL	**–79,432**	**–100%**

Carbon emissions associated with general staff support (electricity, heating, stationery, office equipment, commuting, and so on) are based on a reduction in staff time, and would not necessarily translate into direct emission reductions unless the council actually reduced staff numbers, office capacity, etc – which is complementary to wider Government policy in terms of increasing the efficiency of local authority service delivery, but outside the scope of this report. It may be more usefully thought of as an increase in efficiency that would allow the council to carry out more work without increasing its carbon footprint, which combined with other measures (such as energy efficiency, the use of renewable electricity, a sustainable staff travel plan, etc) could form an important part of a broader carbon reduction strategy.

Well-designed online services properly integrated with day-to-day staff activities and the needs of service users were found to have a much better chance of creating carbon savings; these measures were also more likely to be successful if incorporated into a wider carbon management plan, as mentioned above.

A shift to online council services equivalent to the scenarios studied in this report, rolled out across the whole of England, could save between 11,915 and 14,457 tonnes of CO_2 per annum. This is equivalent to the average annual domestic energy use of between 1,900 and 2,300 UK households.

It should be borne in mind that the scenarios presented in this study for online service take-up may err on the conservative side in terms of potential – for example, the Government's e-planning blueprint take-up targets are for 60 per cent of planning applications to be online by the end of 2008[1]. Similarly, the schools scenario assumes a 50 per cent rate of online applications, but in Hackney 81 per cent of new secondary school places were applied for online in 2007[2]. In addition, the scaled-up totals only represent the savings available for the five local government services included in the study, and there are 750+ different services delivered by local government in the UK[3]. The scaled-up savings shown above can therefore be assumed to only represent a small part of the potential efficiencies available across all local government services in England.

Whilst of course it is important to provide a variety of methods for service users to interface with local government (particularly those without easy access to the internet), these results represent a clear case for local authorities to increase the take-up of online services, alongside integrated working practices that maximise the associated carbon and financial efficiencies.

[1] www.communities.gov.uk/planningandbuilding/planning/planningpolicyimplementation/eplanning/

[2] Figures sourced by Communities and Local Government from the eAdmissions National Project.

[3] Communities and Local Government figure

Introduction and scope

Objectives of the study

This project examines the carbon footprint of services provided by local government, and assesses whether this footprint could be reduced by greater online provision of these services. Real-life data provided by Sunderland City Council is used as a basis for comparison, and then scaled up to give an estimate for the potential savings available from a national increase in local government online service provision.

Carbon footprinting

Carbon footprinting is a shorthand term for measuring the carbon dioxide emissions associated with a product, process or activity. A standard approach to accounting and reporting these emissions has been specified by the World Business Council for Sustainable Development in its Greenhouse Gas Protocol[4] which divides emissions into three categories: Scope 1 (direct GHG emissions), Scope 2 (indirect GHG emissions from consumption of purchased electricity, heat or steam) and Scope 3 (other indirect emissions, from purchased materials and fuels, further transport-related activities, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc).

Best Foot Forward adhere to the standard for our carbon footprint and accounting projects; from our experience, Scope 3 emissions frequently outweigh Scopes 1 and 2 in carbon footprint studies we have completed, hence the prominence of material inputs in this study. Best Foot Forward's methods also take into account the emerging Publicly Available Specification (PAS2050) on carbon footprints of products and services[5].

The commonly adopted approach to carbon footprints considers carbon dioxide (CO_2) but does not include other greenhouse gases (GHGs). However, these other GHGs have higher global warming potential (GWP) than CO_2 and therefore contribute significantly to climate change, even if emitted in small volumes. Unfortunately, current understanding of atmospheric chemistry, sources of other GHG emissions and therefore data availability are all limited and so for reasons of simplicity this study measures the carbon footprint in CO_2 only; this is not intended to downplay the importance of other greenhouse gases (although they would be unlikely to make a significant difference to this particular study).

[4] www.ghgprotocol.org/

[5] www.carbontrust.co.uk/

About Best Foot Forward

Best Foot Forward (BFF) is one of Europe's leading sustainability consultancies specialising in energy and natural resource accounting methodologies such as resource flow analysis, ecological footprinting and carbon accounting. BFF has undertaken more than 300 footprint studies for government, business and civil sector organisations. These range from large projects such as regional studies of Scotland, Northern Ireland and the South West of England, a corporate study of the National Health Service, through product analyses of packaging, drinks, electronic goods and furniture, to auditing the operations of numerous organisations. BFF methodology conforms to the *Global Footprint Network Footprint Standards 2006*.

BFF was awarded a Queen's Award for Enterprise in Sustainable Development in April 2005. This extremely prestigious award is for continuous achievement in sustainable development based on ecological footprint analysis, and recognises that BFF is a global leader in ecological footprinting.

Data quality assessment and scope of the study

Scope of the study

The study includes the CO_2 emissions associated with those aspects of council services which could conceivably be reduced (or increased) by a shift to online provision. This includes paper use, travel to council offices by service users, and server electricity use. It also includes an estimated hourly CO_2 impact of the energy and materials required to support a member of office staff (electricity, heating, stationery, office equipment, commuting, etc), based on previous BFF studies. It does not include carbon emissions associated with the provision of the national telephone network, as accurate data on this was not available. However, this impact would be expected to form only a very small part of the carbon footprint of council services.

The services analysed in this study are planning applications, schools applications, Registrar's certificate requests (for births, deaths and marriages), council tax payments and environmental services enquiries. Anti-social behaviour complaints were also examined, but the only aspect of this service which could reasonably be provided online – contact with the complainants – was found to have a (comparatively) negligible carbon footprint; this service was therefore not included in this study.

For a full explanation of the assumptions used in this report, please see Appendix A.

Data quality

We are grateful to Sunderland City Council for providing the following data for the period 2006/2007:

- Number, type and format of planning applications, schools applications, certificate requests, anti-social behaviour complaints, council tax payments and environmental service enquiries
- The amount of staff time required to deal with different types and formats of service user contact
- The proportion of recycled paper used in each of the relevant departments, and how much of that paper was likely to be recycled after use
- Typical distances travelled by service users to council offices
- Server room energy use and approximate split of server use between departments.

The overall quality of the data was good.

Total CO_2 from selected Sunderland City Council services

The total CO_2 emissions during 2006/07 from the data obtained from Sunderland City Council are shown below in Figure 2.1, along with the estimated potential savings from a set of scenarios with a greater use of online systems:

Figure 2.1: Total carbon footprint of selected council services, and savings associated with different online scenarios (kg of CO_2) – see below for details of scenarios

Service	Current Annual CO_2	Online Scenario CO_2	Annual Saving	Annual Saving (%)	% of Total Saving
Planning	29,319	24,676	4,643	16%	6%
Schools	10,519	5,822	4,697	45%	6%
Registrar	43,684	30,876	12,808	29%	16%
Env. Services	20,026	11,181	8,845	44%	11%
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TOTAL	**284,166**	**204,734**	**79,432**	**28%**	**100%**

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Environmental Services Scenario
50 per cent online entries, 48 per cent telephone enquiries, 2 per cent email enquiries

Council Tax Scenario
80 per cent of payments by Direct Debit (an increase from 59 per cent)

These savings take the form of reductions in staff time, distance travelled by service users, and printing. The division between these different savings is shown below:

Figure 2.2: Sources of carbon footprint reductions across the four scenarios (kg of CO_2 per annum)

Component	Change to CO_2 emissions across the scenarios	% of Change
Distance Travelled	–43,489	–54.8%
Staff Time	–31,514	–39.7%
Paper Use	–5,239	–6.6%
Data Transfer	+810	+1.0%
TOTAL	**–79,432**	**–100%**

Reductions in distance travelled and paper use give direct carbon savings within the boundaries of this project. On the other hand, carbon emissions associated with general staff support (electricity, heating, stationery, office equipment, commuting, and so on) are based on a reduction in staff time, and would not necessarily translate into direct emission reductions unless the council actually reduced staff numbers, office capacity, etc – which is complementary to wider Government policy in terms of increasing the efficiency of local authority service delivery, but outside the scope of this report. It may be more usefully thought of as an increase in efficiency that would allow the council to carry out more work without increasing its carbon footprint, which combined with other measures (such as energy efficiency, the use of renewable electricity, or a sustainable staff travel plan) could form an important part of a broader carbon reduction strategy.

Scaling up the carbon savings

The above service scenario figures can be scaled up in three different ways, to give an estimate for the potential national savings if all English councils were to make a similar shift towards greater online service provision (for more information on how these totals were calculated, please see Appendix A):

1) By population: Assuming a similar carbon saving per resident within all local authority areas, and taking into account the fact that Sunderland contains approximately 0.6 per cent of England's population, gives an estimated saving of 14,272 tonnes of CO_2 per annum.
2) By staff numbers: Assuming a similar carbon saving per staff member within all local authority areas, and taking into account the fact that Sunderland City Council employs approximately 0.7 per cent of England's local authority staff, gives an estimated saving of 11,915 tonnes of CO_2 per annum.
3) By individual services: Sunderland City Council received 0.3 per cent of England's planning applications, 0.6 per cent of England's school applications, and 0.6 per cent of England's (estimated) council tax payments last year. Scaling up based on these factors gives an estimated saving of 10,516 tonnes of CO_2 per annum for these three services across England.

As these three services together make up 73 per cent of Sunderland City Council's potential carbon savings from the five scenarios studied in this report, this suggests a national estimated saving from these five services of 14,457 tonnes of CO_2.

In other words, a shift to online services equivalent to the scenarios studied in this report (for just the five services examined) rolled out across the whole of England, could save between 11,915 and 14,457 tonnes of CO_2 per annum. This is equivalent to the average annual domestic energy use of between 1,900 and 2,300 UK households.

It should be borne in mind that the scenarios presented in this study for online service take-up may err on the conservative side in terms of potential – for example, the Government's e-planning blueprint take-up targets are for 60 per cent of planning applications to be online by the end of 2008[6]. Similarly, the schools scenario assumes a 50 per cent rate of online applications, but in Hackney 81 per cent of new secondary school places were applied for online in 2007[7]. In addition, the scaled-up totals only represent the savings available for the five local government services included in the study, and there are 750+ different services

[6] www.communities.gov.uk/planningandbuilding/planning/planningpolicyimplementation/eplanning/

[7] Figures sourced by Communities and Local Government from the eAdmissions National Project.

delivered by local government in the UK[8]. The scaled-up savings shown above can therefore be assumed to only represent a small part of the potential efficiencies available across all local government services in England.

Whilst of course it is important to provide a variety of methods for service users to interface with local government (particularly those without easy access to the internet), these results present a clear case for increasing the scale and quality of online service provision in English councils, ideally as part of broader carbon reduction strategies.

[8] Communities and Local Government figure.

Development Control (Planning Applications)

Sunderland City Council received 2,140 planning applications last year. Of these, 245 (11%) were electronic (email or CD), and 1,898 (89%) were on paper. The Government's e-planning blueprint take-up targets are for 60 per cent of planning applications to be online by the end of 2008[9].

Applications vary in size, and require a large amount of supporting material in addition to the initial submission – committee papers, consultation documents, and so on. Paper applications are scanned; due to a glitch in the current system, electronic submissions also need to be printed out and scanned back in. All of this resulted in the printing of around 273,000 pages of A4 paper in 2006/2007, weighing 1.5 tonnes; it also required 342 MB of data transfer and 6,400 hours of scanning time. These results are summarised in Figure 3.1, and the associated carbon footprints are shown in Figure 3.2:

Figure 3.1: Paper use, data transfer and scanning time from planning applications at Sunderland in 2006/07

	Units	Per Application		Annual Total	
		Paper-Based	Electronic	Paper-Based	Electronic
Paper Use	*kg*	0.75	0.46	1,424	112
Data Transfer	*MB*	0	1.4	0	342.2
Scanning Time	*hours*	3	3	5,685	735

Note that there is still a significant amount of paper associated with electronic applications, partly because a copy of each application is printed for ease of reference and re-scanning, and partly because of all the supporting documentation. The re-scanning process also means that paper-based and electronic applications each require the same amount of scanning time.

Figure 3.2: Carbon emissions (kg of CO_2) associated with paper use, data transfer and scanning time from planning applications at Sunderland in 2006/07

	Per Application		Annual Total	
	Paper-Based	Electronic	Paper-Based	Electronic
Paper Use	2.1	1.3	3,985	312
Data Transfer	0	0.3	0	71
Scanning Time	11.7	11.7	22,094	2,857
TOTAL	**13.8**	**13.2**	**26,079**	**3,240**

[9] www.communities.gov.uk/planningandbuilding/planning/planningpolicyimplementation/eplanning/

The above information can be used to envisage potential scenarios in which more of the applications are made online, and in which the system glitch requiring re-scanning is fixed. The impacts of these scenarios are summarised in Figures 3.3 and 3.4 below:

Figure 3.3: Annual carbon emissions (kg of CO_2) associated with different scenarios for planning applications at Sunderland

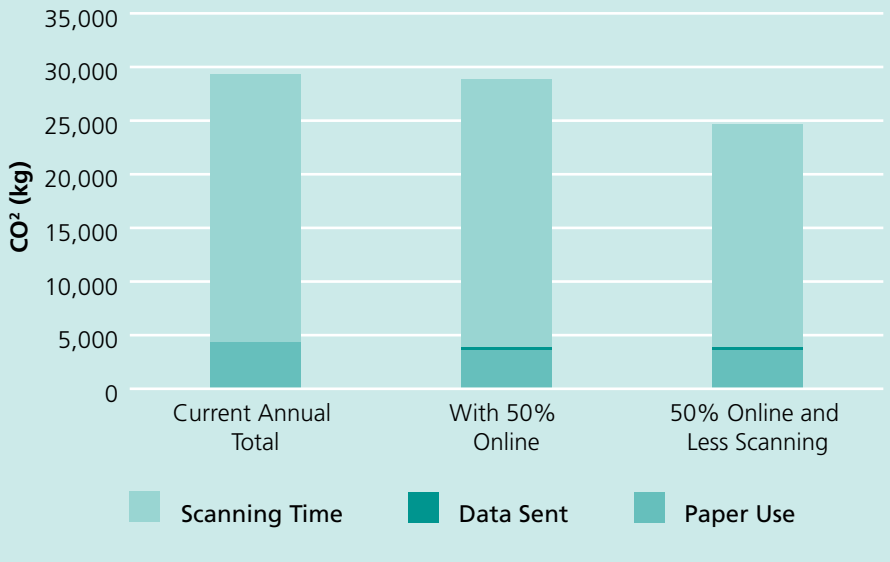
	Current[a]	Online Scenario 1[b]	Change	% Change	Online Scenario 2[c]	Change	% Change
Paper Use	4,297	3,596	–701	–16%	3,596	–701	–16%
Data Transfer	71	287	+217	+306%	287	+217	+306%
Scanning Time	24,951	24,951	0	0%	20,792	–4,158	–17%
TOTAL	**29,319**	**28,834**	**–484**	**–2%**	**24,676**	**–4,643**	**–16%**

[a] Current = 11% electronic applications, 89% paper applications

[b] Scenario 1 = 50% electronic applications, 50% paper applications

[c] Scenario 2 = 50% electronic applications, 50% paper applications, without re-scanning

Figure 3.4: Annual carbon emissions (kg of CO_2) associated with different scenarios for planning applications at Sunderland



Schools Applications

In 2006/07, 8000 information packs were sent to schools by Sunderland City Council, and 6697 applications for school places were returned. Of these, 2175 (32%) were posted, 4040 (60%) were hand-delivered to schools, and 482 (7%) were online applications.

Online applications require a fraction of the staff time of paper applications. Hand delivery was assumed not to require an extra journey – parents were expected to return the forms during a normal trip to school. In total, the applications process accounted for 2794 kg of paper, 27 MB of data, and 777 hours of staff time.

These results are summarised in Figure 4.1, and the associated carbon footprints are shown in Figure 4.2:

Figure 4.1: Paper use, data transfer and staff time associated with schools applications in Sunderland in 2006/07

	Units	Per Application		Annual Total	
		Paper-Based	Electronic	Paper-Based	Electronic
Paper Use	*kg*	0.418	0.402	2,600	194
Data Transfer	*MB*	0	0.06	0	27
Staff Time	*hours*	0.125	0.001	777	1

Note: there is still a significant amount of paper associated with electronic applications, due to the 8000 initial application packs sent out to schools.

Figure 4.2: Carbon emissions (kg of CO_2) associated with paper use, data transfer and staff time from schools applications at Sunderland in 2006/07

	Per Application		Annual Total	
	Paper-Based	Electronic	Paper-Based	Electronic
Paper Use	1.12	1.08	6,970	522
Data Transfer	0	0.01	0	6
Staff Time	0.49	<0.01	3,019	2
TOTAL	**1.61**	**1.10**	**9,989**	**530**

The above information can be used to envisage potential scenarios in which more of the applications are made online, and in which more of the application packs are provided electronically rather than on paper. The impacts of these scenarios are summarised in Figures 4.3 and 4.4.

Figure 4.3: Annual carbon emissions (kg of CO_2) associated with different scenarios for schools applications at Sunderland

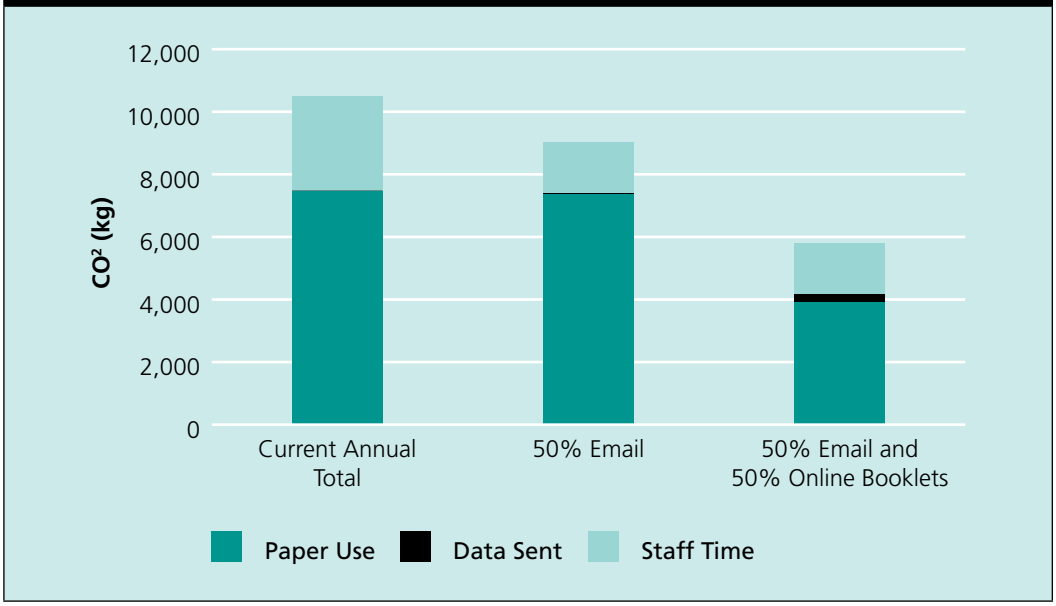
	Current[a]	Online Scenario 1[b]	Change	% Change	Online Scenario 2[c]	Change	% Change
Paper Use	7,492	7,383	–109	–1%	3,943	–3,550	–47%
Data Transfer	6	39	+33	+594%	250	+245	+4387%
Staff Time	3,021	1,629	–1,392	–46%	1,629	–1,392	–46%
TOTAL	**10,519**	**9,050**	**–1,469**	**–14%**	**5,822**	**–4,697**	**–45%**

[a] Current = 8% electronic applications, 92% paper applications

[b] Scenario 1 = 50% electronic applications, 50% paper applications

[c] Scenario 2 = 50% electronic applications, 50% paper applications, 50% of initial booklets electronic

Figure 4.4: Annual carbon emissions (kg of CO_2) associated with different scenarios for schools applications at Sunderland



Registrar's Certificate Requests

There were 15,191 certificate requests from Sunderland's Registrar's department in the last financial year. Of these, 10,646 (70%) were face-to-face, 4,383 (29%) were posted and 162 (1%) used the internet and a phone call.

Applications which make use of the internet require less staff time, as applicants can collect a reference number online that makes their application faster to process. In total, certificate requests required 245 kg of paper, 6.5 MB of data transfer, and 6,800 hours of staff time; applicants also travelled a total of 120,000 km. This travel was assumed to be split amongst different transport methods in line with UK average commuting methods.

These results are summarised in Figure 5.1, and the associated carbon footprints are shown in Figure 5.2:

Figure 5.1: Paper use, data transfer and staff time associated with certificate requests in Sunderland in 2006/07

		Per Application			Annual Total		
	Units	By Post	In Person	Online	By Post	In Person	Online
Paper Use	*kg*	0.04	0.01	0.04	179	60	6
Data Transfer	*MB*	0	0	0.04	0	0	6.5
Staff Time	*hours*	0.45	0.45	0.28	1,972	4,791	46
Travel	*km*	0	11	0	0	119,906	0

Figure 5.2: Carbon emissions (kg of CO_2) associated with paper use, data transfer, staff time and applicant travel from certificate requests from Sunderland in 2006/07

	Per Application			Annual Total		
	By Post	In Person	Online	By Post	In Person	Online
Paper Use	0.077	0.016	0.062	339	168	10
Data Transfer	0	0	0.008	0	0	1
Staff Time	1.749	1.749	1.101	7,665	18,619	178
Travel	0	1.569	0	0	16,704	0
TOTAL	**1.826**	**3.334**	**1.171**	**8,004**	**35,490**	**190**

The above information can be used to envisage potential scenarios in which more of the applications are made online. The impacts of these scenarios are summarised in Figures 5.3 and 5.4.

Figure 5.3: Annual carbon emissions (kg of CO_2) associated with different scenarios for certificate requests at Sunderland

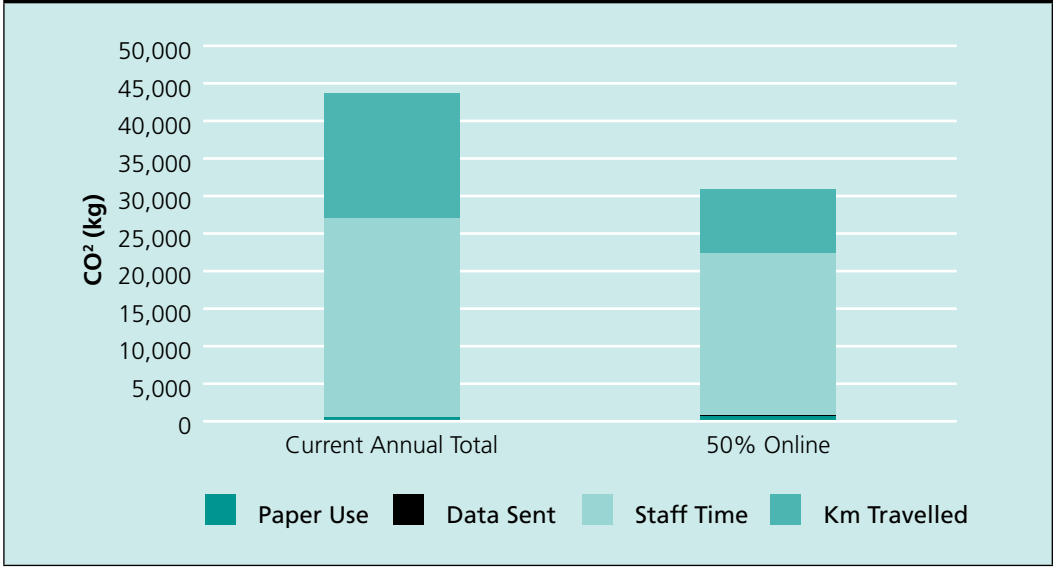
	Current[a]	Online Scenario 1[b]	Change	% Change
Paper Use	516	724	+207	+40%
Data Transfer	1	63	+61	+4589%
Staff Time	26,462	21,647	-4,815	-18%
Travel	16,704	8,442	-8,262	-49%
TOTAL	**43,684**	**30,876**	**-12,808**	**-29%**

[a] Current = 1% electronic applications, 70% applications in person, 29% posted applications

[b] Scenario 1 = 50% electronic applications, 35% applications in person, 15% posted applications

Note: in this scenario, there is an increase in paper use, as online applications (where the certificate is sent through the post in an envelope) require slightly more paper than collecting the certificate in person.

Figure 5.4: Annual carbon emissions (kg of CO_2) associated with different scenarios for certificate requests in Sunderland



Environmental Services

There were 143,364 Environmental Services enquiries last year. 138,684 (97%) were by phone, 4,680 (3%) were by email. A similar amount of staff time is required in each case for logging information into "Mayrise", the Council's automated back-office management system. 94 MB of data transfer and 5,100 hours of staff time were required in total.

These results are summarised in Figure 6.1, and the associated carbon footprints are shown in Figure 6.2:

Figure 6.1: Data transfer and staff time associated with environmental enquiries in Sunderland in 2006/07

	Units	Per Application		Annual Total	
		Email	Telephone	Email	Telephone
Data Transfer	MB	0.02	0	94	0
Staff Time	hours	0.04	0.04	166	4,931

Figure 6.2: Carbon emissions (kg of CO_2) associated with data transfer and staff time from environmental enquiries at Sunderland in 2006/07

	Per Application		Annual Total	
	Email	Telephone	Email	Telephone
Data Transfer	0.004	0	19	0
Staff Time	0.138	0.138	647	19,164
TOTAL	**0.142**	**0.138**	**666**	**19,164**

The above information can be used to envisage a potential scenario in which an online system is developed to allow service users to input their requests directly into Mayrise. The potential impact of such a scenario is summarised in Figures 6.3 and 6.4:

Figure 6.3: Annual carbon emissions (kg of CO_2) associated with different scenarios for environmental enquiries at Sunderland

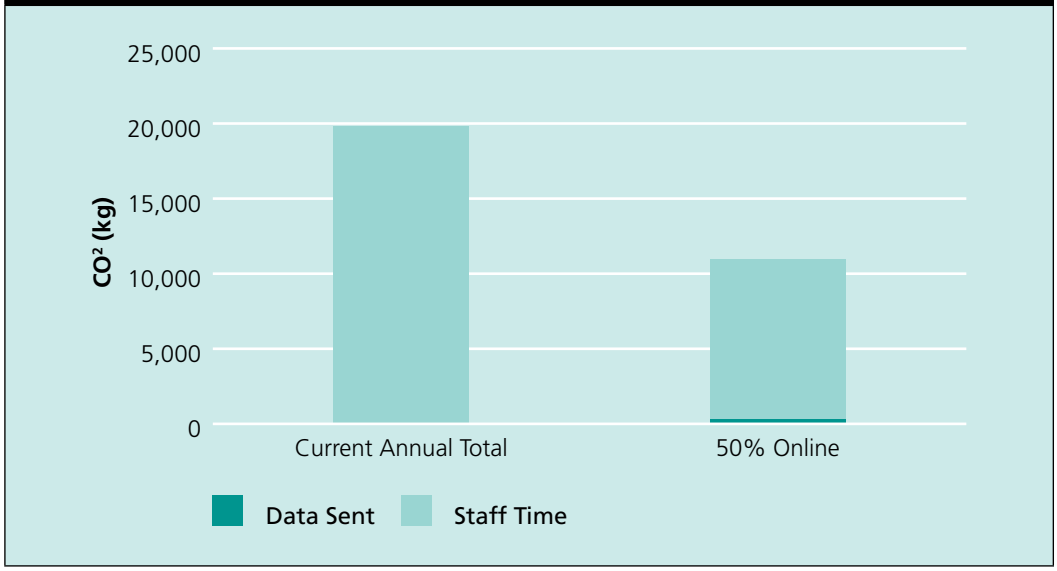
	Current[a]	Online Scenario 1[b]	Change	% Change
Data Transfer	19	306	+287	+1482%
Staff Time	19,810	10,679	–9,131	–46%
TOTAL	**19,830**	**10,985**	**–8,845**	**–45%**

[a] Current = 97% telephone enquiries, 3% email enquiries

[b] Scenario 1 = 50% online entries, 48% telephone enquiries, 2% email enquiries

This scenario assumes no overall increase or decrease in enquiries as a result of introducing an online system.

Figure 6.4: Annual carbon emissions (kg of CO_2) associated with different scenarios for environmental enquiries at Sunderland



Council Tax Payments

There were 1,036,194 council tax payments to Sunderland City Council last year. 610,891 (59%) were by direct debit, 287,652 (28%) were in cash, 57,786 (6%) by cheque/postal order, 38,192 (4%) by credit or debit card and 41,673 (4%) by other forms of money transfer (standing order, cash transfer or online payment). In total, this required 13.4 tonnes of paper, 18,000 hours of staff time and over 493,000 km of travel. The great majority of the paper (84%) was associated with bills, reminders, summonses, and other information sent to customers irrespective of their payment method, and so there are only small differences in paper use between most of the different payment options. Direct debits are a partial exception to this rule as they have a lower default rate than other methods and thus attract fewer reminders and summonses; however, this lower default rate may simply be due to the fact that direct debit users are more likely to be on stable incomes than those paying by other methods.

A third of the staff time (6,030 hours) is taken up by face-to-face dealings with taxpayers, which also account for all of the travel; at least another 22 per cent of the staff time (4,000 hours) is spent on dealing with non-payment. This gives the more automated forms of payment (and direct debit in particular) a clear advantage in terms of staff efficiency and transport footprint.

Data transfer is very difficult to allocate between different methods, as little or no information is readily available on the processing power required to manage different forms of payment. All payments clearly require a certain amount of processing, whatever form they take; any differences between them on this score will only become relevant if central computing power makes up a significant part of the overall council tax carbon footprint. To assess this, the total amount of the central server's energy use allocated to the Council Tax department was divided between all council tax payments, and was found to be responsible for an average of 4 grams of CO_2 per payment. This compares to totals between 60 and 636 grams of CO_2 per payment depending on method (as shown below), meaning that server power is responsible, on average, for only 1 – 7 per cent of the footprint of each payment. Considering the time constraints of this project, it seems reasonable not to pursue such a small (yet complex) part of the footprint in any more detail; this average estimate of 4 grams per payment has therefore been included in the assessment as it stands, mainly for illustrative purposes.

These results are summarised in Figure 7.1, and the associated carbon footprints are shown in Figures 7.2 and 7.3; for further clarification, the current distribution of payment methods is shown in Figure 7.4:

Figure 7.1: Paper use, travel and staff time associated with council tax payments in Sunderland in 2006/07

		Per Application					Annual Total				
	Units	**Cash**	**Cheque**	**Transfer**	**Card**	**DD**	**Cash**	**Cheque**	**Transfer**	**Card**	**DD**
Paper Use	*kg*	0.017	0.046	0.016	0.017	0.010	4,958	1,190	649	658	5,896
Staff Time	*hrs*	0.034	0.054	0.017	0.034	0.007	9,809	1,725	726	1,302	4,491
Travel	*km*	0.905	1.900	0	3.239	0	260,277	109,215	0	123,690	0

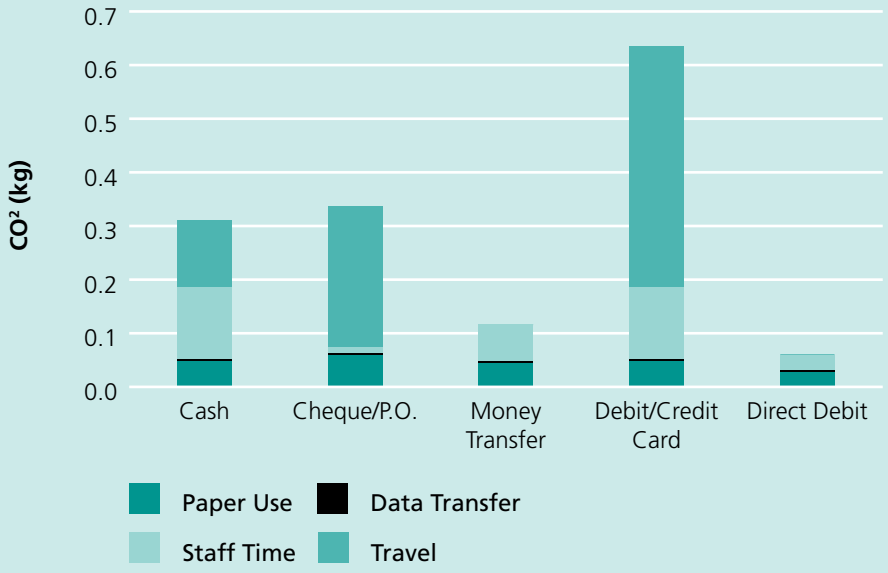
Cheque – includes postal orders, and payments both in person and by post
Transfer – includes standing orders, bank transfers and online payments
Card – includes debit and credit cards, either in person or over the phone
DD – stands for Direct Debit.

Figure 7.2: Carbon emissions associated with paper use, travel, data transfer and staff time from council tax payments at Sunderland in 2006/07

	Per Application ($kgCO_2$)					Annual Total (tonnes CO_2)				
	Cash	**Cheque**	**Transfer**	**Card**	**DD**	**Cash**	**Cheque**	**Transfer**	**Card**	**DD**
Paper Use	0.048	0.058	0.044	0.048	0.027	13.9	3.3	1.8	1.8	16.5
Data	0.004	0.004	0.004	0.004	0.004	1.2	0.2	0.2	0.2	2.6
Staff Time	0.133	0.116	0.068	0.133	0.029	38.1	6.7	2.8	5.1	17.5
Travel	0.126	0.263	0	0.451	0	36.3	15.2	0.0	17.2	0.0
TOTAL	**0.311**	**0.441**	**0.116**	**0.636**	**0.060**	**89.5**	**25.5**	**4.8**	**24.3**	**36.5**

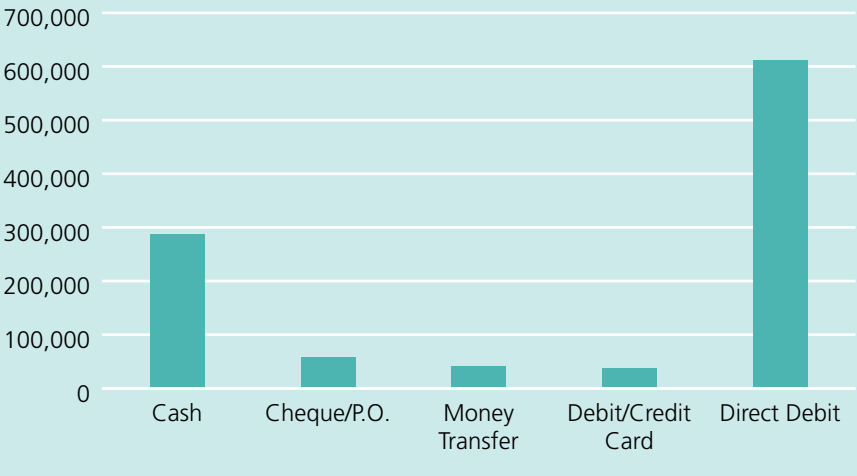
Cheque – includes postal orders, and payments both in person and by post
Transfer – includes standing orders, bank transfers and online payments
Card – includes debit and credit cards, either in person or over the phone
DD – stands for Direct Debit.

Figure 7.3: Carbon emissions per payment of council tax in Sunderland in 2006/07



Note: the high travel footprints for card, cheque and postal order payments reflect the fact that many of these transactions (40 per cent of cheque/P.O. payments and 81 per cent of card payments) currently take place in person. If more of these payments were carried out by post or by phone, this could lead to a reduction in the council's travel footprint; this demonstrates that any shift towards online services is likely to be most effective as part of a package of measures that takes these other options into account.

Figure 7.4: Distribution of different council tax payment methods in Sunderland in 2006/07



The above information can be used to envisage a potential scenario in which direct debits – the method with the lowest per-payment footprint – make up an even greater proportion of the total payments. The potential impact of such a scenario is summarised in Figures 7.5 and 7.6:

Figure 7.5: Annual carbon emissions (kg of CO_2) associated with different scenarios for council tax payments at Sunderland

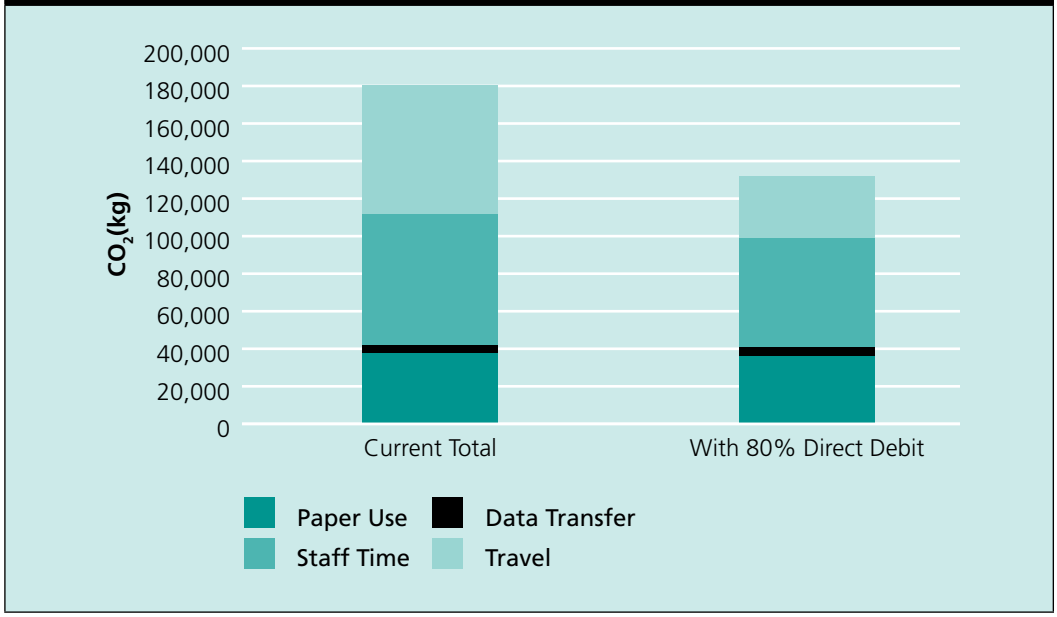
	Current[a]	Online Scenario[b]	Change	% Change
Paper Use	37,355	36,159	-1,195	-3%
Data Transfer	4,394	4,394	0	0%
Staff Time	70,165	58,148	-12,016	-17%
Travel	68,705	33,478	-35,227	-51%
TOTAL	**180,619**	**132,179**	**-48,439**	**-27%**

[a] Current = 59% direct debit, 28% cash, 6% cheque/postal order, 4% credit/debit card and 4% other forms of money transfer

[b] Scenario = 80% direct debit, 14% cash, 3% cheque/postal order, 2% credit/debit card and 2% other forms of money transfer

This scenario assumes no overall increase or decrease in server use, or number of payments; it also assumes that the current low default rate for direct debits is maintained.

Figure 7.6: Annual carbon emissions (kg of CO_2) associated with different scenarios council tax payments at Sunderland



Analysis and comment

Across all five services reviewed, a shift towards greater provision of services via email and the internet would lead to a reduction in the carbon footprint of the local authority. However, it is worth looking at these potential reductions in more detail, as not all of these savings are as straightforward as they may first appear:

Travel

Carbon savings from the reduction in travel by the public to council offices are based on an average travel distance estimated by Sunderland City council staff, combined with UK average commuter methods from the National Transport Survey (see Appendix A). Local authorities with a smaller geographical area and strong public transport and/or cycling links should expect to have lower carbon savings in this area – for example, if we had assumed that service users were using the average methods for travel within Inner London in this study, a shift to online service provision would have yielded travel savings of only 25,170 $kgCO_2$ rather than 43,489 $kgCO_2$ – a 42 per cent lower saving (see Appendix A). Conversely, local authorities based in rural areas with more widely distributed populations and less public transport provision could expect to make much greater carbon savings from transport through such a shift.

The importance of travel reduction in reducing emissions suggests that there could be methods other than an increase in online provision that could also create savings, such as increasing the amount of telephone contact with service users. However, whilst it is important to bear in mind that online provision is just one of a variety of measures that councils could take to reduce their emissions, these other measures fall outside the scope of this particular report.

Staff time

Savings from reduced staff time are based on a "typical" figure for $kgCO_2$ per hour of office-based staff working, based on studies carried out by BFF. It includes office energy use, staff commuting, (non-paper) stationery, office equipment and waste. However, as noted earlier in this report, a reduction in staff time would not necessarily translate into direct emission reductions unless the council actually reduced staff numbers, office capacity, etc – which is not a course of action recommended by this report. Instead, by reducing the amount of staff time required to carry out the tasks examined in this study (eg scanning papers, dealing with routine enquiries), more staff time could instead be allocated to other work, allowing the council to provide more and/or better quality services to its residents without requiring an increase in carbon emissions. Combined with other measures (such as energy efficiency, the use of renewable electricity, a sustainable staff travel plan, etc), greater staff efficiency could be an important

part of a broader carbon reduction strategy, enabling the local authority to carry out the same amount of work (or more) whilst simultaneously reducing its CO_2 emissions.

Paper use

Printed materials require energy for the initial paper manufacturing and also for the printing process itself. This study showed that a shift towards online service provision could save 5,329 kg of CO_2 per year from reduced paper use at Sunderland. This is, perhaps surprisingly, the area with the lowest savings, despite the fact that Sunderland overwhelmingly sources its paper at present from non-recycled sources (documents printed on virgin paper have a carbon footprint around 15 per cent higher than documents printed on recycled paper). However, this may be related to the scenarios used in this study – councils could well be able to find other ways to reduce paper use through online service provision that are not considered within this report.

Server use

A linear relationship is assumed to exist between the amount of data transferred via email and websites, and the amount of energy required to power council servers; this assumption means that the figure of 810 kg of extra CO_2 per year that would be generated from a shift to online services at Sunderland should be treated with some caution. However, the fact that this increase is equivalent to only 1 per cent of the projected annual decrease of 80,242 kgCO_2 that could result from a greater use of online services shows clearly that this increase would be overwhelmingly outweighed by the carbon savings from transport, staff time and paper use.

Integration

Well-designed online services properly integrated with day-to-day staff activities and the needs of service users have a much better chance of creating carbon savings, as shown by the examples of the superfluous scanning time in Development Control, and the fact that online schools applications are still supported by large amounts of printed material.

A clear picture therefore emerges from this study: although the precise savings will vary from council to council (depending on their current practices and other external factors), there is strong evidence that providing more services online can, where systems are well-designed and properly thought-through, lead to significant reductions in a local authority's carbon footprint. If such a shift towards online service provision were to take place as part of a wider carbon reduction plan, the potential savings could be even greater.

Appendix A: Assumptions used in this study

Travel assumptions

Figures for the number of face-to-face applicants for Registrar's certificates were provided by Sunderland City Council (SCC). The number of face-to-face Council Tax payments was derived from data provided by SCC, based on the following assumptions (which were confirmed as reasonable by SCC): All cash transactions were carried out in person; all transactions at local council offices were carried out in person; 40 per cent of cheque/postal order payments were carried out in person; credit and debit card payments processed via the Moorside call centre were carried out by phone, and the remainder of the card payments (81%) were carried out in person.

Journeys by service users to the central SCC office were estimated by SCC staff to be an average of 7 miles (11.3 km) round trip. It was assumed that these journeys were undertaken using the national average commuting methods from the 2006 National Travel Survey[10], and that all of these journeys were specifically for the purpose of visiting the Council. To counterbalance the risk of overestimating the travel impacts of service provision with this latter assumption, it was assumed that all travel to local offices was either by foot/bicycle, or took place as part of another trip; the travel impacts of visiting local offices were therefore assumed to be zero.

The transport comparison on page 25 is based on the National Travel Survey 2006 figures for "Inner London".

Staff time assumptions

Previous office footprints calculated by BFF for a variety of different organisations produced per-staff-member carbon footprints in ranging from 0.78 to 11.40 kg CO_2 per hour. A median figure of 6.5 kg CO_2 per hour was chosen as a proxy for the carbon "cost" per staff member, including office energy use, stationery, office equipment, waste, commuting, and business travel. However, it must be borne in mind that this is an average figure that does not reflect the differences between different offices and employees. In a more efficient office, or one with better public transport provision, this figure could be considerably lower; conversely, a more wasteful office could have a higher per-staff footprint. The per-staff-member average carbon figure also includes business travel, although this is unlikely to be evenly distributed amongst all staff in real life.

The "staff time" footprint should therefore be seen as an illustrative figure only, for the purposes of comparison between scenarios rather than as a definitive measure of real-life carbon emissions.

[10] www.statistics.gov.uk/cci/nscl.asp?id=8070

Paper use assumptions

A small amount of the paper used by staff dealing with schools applications was purchased from recycled sources. The remainder was from non-recycled sources. Where not stated, printing paper weight was assumed to be 80 gsm; envelopes were assumed to be C5 sized and 100 gsm. All printing was carried out using standard UK grid electricity.

People paying council tax in person were all assumed to receive a (1/3 A4 sized) receipt. 10 per cent of people paying by phone requested a receipt.

Server use assumptions

A simple linear relationship was assumed between the amount of electronic data transferred via websites and email, and the energy consumed by local government servers. In real life, the relationship is more likely to be a staggered line, as extra server capacity is added in large blocks as old servers reach full capacity. However, this is far more difficult to model, and the simpler linear model should be sufficient for the purposes of this study; as with the staff time conversion factor, it is intended for the purposes of comparison between scenarios rather than as a definitive measure of real-life carbon emissions.

A previous study carried out by BFF found an average carbon footprint of 4.14 grams of CO_2 from computer and server energy use per 20 KB email, or 0.21 gCO_2 per KB of data transferred. This figure was cross-checked against Sunderland's real-life data as follows:

The servers and accompanying equipment at SCC consumed 168,012 KWh of grid electricity in 2006/07. The following approximate breakdown of server capacity use over the six services was provided by SCC:

Service	%	kWh/year
Planning	5.00%	8401
Council Tax	5.00%	8401
Complaints	0.50%	840
Schools Admission	0.03%	50
Refuse	0.03%	50
Registrar Functions	0.10%	168

Taking schools admissions as an example of a service focused around one specific function, it is possible to divide the electricity use amongst the 482 online schools applications carried out in 2006/07. Assuming average UK grid electricity, this results in 54.7 grams of CO_2 per application. Using the data transfer conversion factor mentioned above, this suggests that each applicant is transferring, on average, 265 KB of information. This seems like a reasonable figure – the schools application form is 56 KB in size, and the online schools directory is 256 KB, so an average transfer of 265 KB could represent every applicant downloading the form, and 81 per cent of applicants also downloading the directory.

The 0.21 g of CO_2 per KB figure therefore seems to be of the correct order of magnitude and a realistic figure to use – although, as noted above, it is only intended for the purposes of comparison between scenarios, and not as a definitive measure of CO_2 emissions.

This factor has therefore been applied to the services examined in this report (with the exception of council tax), based on the following assumptions (from web research):

One page of text in an A4 document is approximately 25 KB in size;
One page of images in an A4 document is approximately 123 KB in size;
An average email is 20 KB in size.

The complexity of the electronic operations associated with different payment methods meant that it was not possible to make similar assumptions about the data transferred for council tax transactions. Instead, the 8401 KWh of server electricity associated with council tax was divided amongst the 1,036,194 payments to give an average of 0.008 KWh, or 0.004 kgCO2 per transaction.

Scaling up assumptions

Using population: The population of England is 50,975,800 (Communities and Local Government); the population of Sunderland is 283,700 (SCC). This means that Sunderland contains 0.6 per cent of the English population.

Using staff numbers: English local authorities employ around 2,100,000 people (Communities and Local Government); Sunderland City Council employs 14,000 people (SCC). This means that Sunderland employs 0.7 per cent of the staff of English councils.

Using planning applications: English local authorities received 650,000 planning applications last year (Communities and Local Government) Sunderland City Council received 2,140 applications. This means that Sunderland received 0.3 per cent of planning applications in England last year.

Using schools applications: English local authorities received 1,172,000 schools applications last year (Communities and Local Government). Sunderland City Council received 6,697 applications. This means that Sunderland received 0.6 per cent of schools applications in England last year.

Using council tax payments: English local authorities received 233,000,000 payments of all kinds last year (Communities and Local Government). Sunderland City Council received 1,036,194 council tax payments, and 1,376,060 payments in total. This means that 75 per cent of the payments received by Sunderland were from council tax; assuming a similar national ratio gives an estimated total of 175,452,525 council tax payments in England per annum. This in turn means that Sunderland City Council received 0.6 per cent of all council tax payments in England last year.

Combining payments with schools and planning applications: The carbon savings from the planning, schools and council tax payments scenarios total 57,779 kg CO_2 per annum; this is 73 per cent of the total annual potential savings from the online scenarios (which total 79,432 kg). Scaling up the schools, planning and council tax payment savings to the national level based on the percentages explained earlier on this page gives a total national annual saving of 10,516 tonnes for these three services; scaling them up across all five services based on the 73 per cent figure gives an annual figure of 14,457 tonnes.

The comparison with UK household energy use is based on average annual domestic consumption figures of 20,111 KWh of gas and 4,600 KWh of grid electricity, from DTI research[11].

Disclaimer

The figures calculated in this report based on the above assumptions are averages and estimates only. They are intended to illustrate the potential carbon savings available from a switch to a greater use of online services by local government. They are not intended to represent an accurate carbon footprint of Sunderland City Council or any other local authority. Local authorities wishing to calculate their carbon footprint are recommended to carry out a more comprehensive energy, materials and transport audit, using appropriate carbon calculation tools (eg www.footprinter.com).

[11] www.dti.gov.uk/files/file20328.pdf