

## Economic impact of the National Cycle Network

This report identifies some of the benefits of the National Cycle Network (NCN), from the wider economic benefits of the whole network to the impact on the communities through which it runs.

- The economic benefits of the NCN since 1995 are estimated to be £7.3 billion, with health benefits accounting for £6 billion
- The benefit cost ratio (BCR) of the NCN to date is 5.93:1, a huge improvement over road schemes that often fail to achieve a 2:1 BCR
- The development and maintenance of the NCN has sustained or created 4,259 jobs since 1995, with nearly 400 jobs created or sustained in the financial year 2014/15
- People who used the NCN to access shopping areas in 2014 spent at least £1.27 billion, 29% more than they would have if they had travelled by car

This report uses the Department for Transport's appraisal framework as a basis for estimating the overall economic benefit of the NCN as well as using data from two of Sustrans' largest projects, Linking Communities and Connect2 to calculate some of the other economic benefits of the NCN.

### Benefit of the NCN to the UK economy

We conservatively estimate that the NCN has benefited the UK economy by over £7 billion since it began in 1995. This means that for every pound that has been spent expanding and developing the NCN, the economy has benefited by nearly six pounds.

Table 1 shows that the majority of the economic benefits come from the health benefits as calculated by the World Health Organisation HEAT tool, which estimates the value of reduced mortality that results from the levels of walking and cycling on the NCN.

**Table 1 – Summary of economic benefits of the NCN since 1995**

Benefit	Cyclists	Pedestrians	Total
Health	£1,491,540,075	£4,791,512,213	£6,283,052,289
Absenteeism	£101,328,989	£93,307,485	£194,636,474
Amenity	£719,431,161	£10,518,456	£729,949,618
GHGs	£9,866,226	£1,900,693	£11,766,920
Accidents	£18,918,637	£3,645,771	£22,564,408
Decongestion	£111,605,782	£21,500,457	£133,106,239
Airquality	£907,364	£174,800	£1,082,165
Noise	£907,364	£174,800	£1,082,165
Infrastructure	£907,364	£174,800	£1,082,165
IndirectTaxation	-£45,368,204	-£8,740,023	-£54,108,227
<b>Total</b>	<b>£2,410,044,759</b>	<b>£4,914,169,454</b>	<b>£7,324,214,213</b>

We have also estimated the number of car trips that are replaced each year by people using the NCN, and the kilograms of CO<sub>2</sub> that are saved as a result<sup>1</sup>.

<sup>1</sup> Note, these values differ to the figure given in the 2013 NCN report, as that figure only used people travelling by bike or foot. The figure used in this calculation is a rolling average of the survey results from 2011-2013.

**Table 2 – Car trips replaced and kilograms of CO<sub>2</sub> replaced annually by people using the NCN (as of 2013)**

Car trips replaced	29,566,994
Kgs CO <sub>2</sub> saved annually	30,357,619

### Methodology

This estimate of the economic benefits of the NCN uses the Department for Transport’s appraisal framework (webTAG) as the basis of the calculation. Although this framework has been amended to calculate historic benefits, where possible the methodology has remained consistent with webTAG to ensure comparability with other appraisals.

This report assumes a working knowledge of the webTAG framework and as such does not explain the framework methodology. Rather it identifies the inputs used and the amendments made for this specific calculation.

### Inputs

The most recent usage figures for the NCN come from the 2014 Annual Usage Estimate (AUE) calculation, when it was estimated that 764 million trips were made on the NCN. This value has been used as the input value for this estimate.

An estimate of the 1994 NCN AUE (ie prior to the award of funding to develop the NCN) was calculated by taking the median<sup>2</sup> change in the annual usage per kilometre value since 2004<sup>3</sup> (2009 to 2010 was excluded due to a change in AUE methodology). This value (3.86%) was used to estimate the usage per kilometre value in 1994 and applied to the length of the NCN in that year. This gives an estimated usage at the start of 1995 of 12.3 million trips on the NCN, or 1.6% of the 2014 total.

**Table 3 - Annual percentage growth of NCN usage per kilometre<sup>4</sup>**

Year	Percentage growth
2004	6%
2005	17%
2006	3%
2007	1%
2008	3%
2009	4%
2010	*
2011	10%
2012	-4%
2013	4%
2014	4%

\*Value not included due to methodological change

The estimated NCN usage is split between existing users that were displaced onto the NCN as the network grew and new users who have started cycling and walking on the NCN since the start of 1995.

The level of existing users each year is calculated by assuming that the estimated usage per km value in 1994 has remained constant for these users. This value is then applied to the length of the NCN each year. This assumes that there has not been a change in the level of usage by people cycling and walking prior to 1995.

The level of new users of the network each year assumes that the estimated change in the annual usage per km value is a result of people taking up cycling and walking. The additional usage per km value each year (base 1994) is then applied to the length of the network.

<sup>2</sup> Median used due to distribution of annual growth values

<sup>3</sup> When records began

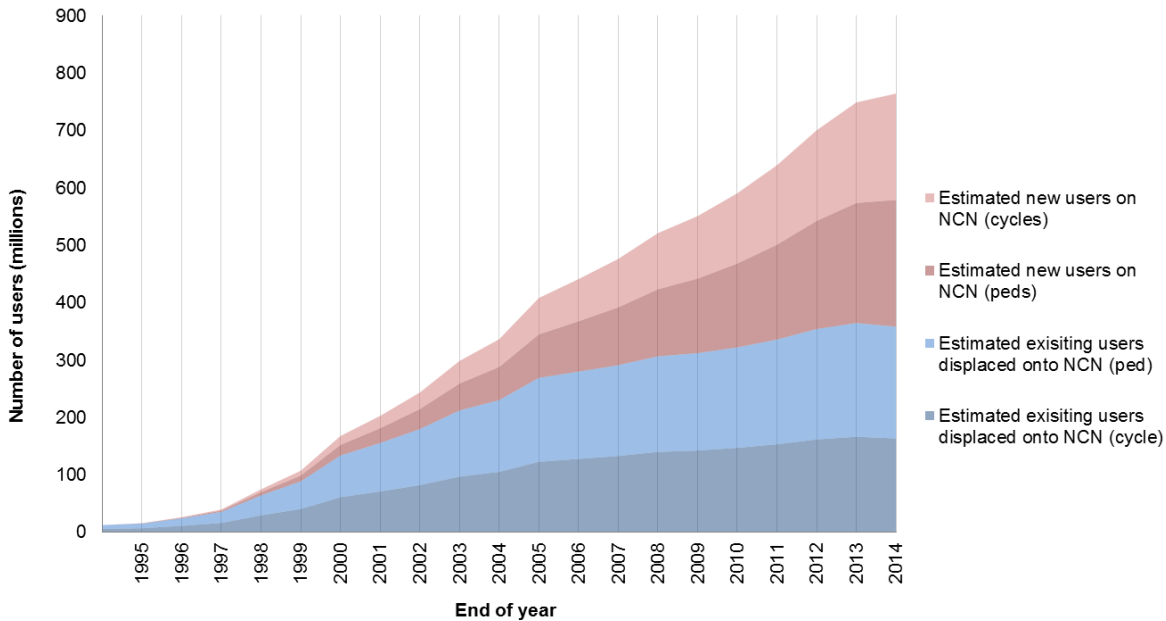
<sup>4</sup> Note, some values differ to those reported in the 2014 AUE output as they are calculated using NCN km at the end of the financial year rather than the calendar year.

The proportion of users who are cycling or walking has been assumed to be consistent with the values estimated in 2014<sup>5</sup>.

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<sup>5</sup> See 2014 NCN AUE

**Chart 1 – Estimated NCN users since 1995<sup>6</sup>**



This economic evaluation of the NCN does not assume that all benefits experienced by existing users can be attributed to the development of the network, nor does it assume that new users have started cycling and walking exclusively as a result of the NCN.

We have conservatively assumed that the development of the NCN accounts for 50% of the growth in usage over this period, and 50% of the benefits to existing users can be attributed to the NCN. Table 4 shows the sensitivity of the estimate of economic benefit to variations in these assumptions.

**Table 4 – Economic benefits of the NCN since 1995 (£billion)**

		Proportion of benefit to existing users attributable to the NCN											
		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
Proportion of new users attributable to NCN	0%	0.00	0.78	1.55	2.33	3.11	3.89						
	10%	0.69	1.46	2.24	3.02	3.80	4.57	5.35					
	20%	1.38	2.15	2.93	3.71	4.48	5.26	6.04	6.82				
	30%	2.06	2.84	3.62	4.39	5.17	5.95	6.73	7.50	8.28	9.06		
	40%	2.75	3.53	4.30	5.08	5.86	6.64	7.41	8.19	8.97	9.75	10.52	
	50%	3.44	4.22	4.99	5.77	6.55	7.32	8.10	8.88	9.66	10.43	11.21	
	60%		4.90	5.68	6.46	7.23	8.01	8.79	9.57	10.34	11.12	11.90	
	70%			6.37	7.15	7.92	8.70	9.48	10.25	11.03	11.81	12.59	
	80%				7.83	8.61	9.39	10.16	10.94	11.72	12.50	13.27	
	90%					9.30	10.07	10.85	11.63	12.41	13.18	13.96	
	100%						10.76	11.54	12.32	13.09	13.87	14.65	

<sup>6</sup> The slight decrease seen in existing users in 2014 is a result of a reduction in the length of the NCN. See 2014 AUE for details.

Data on trip frequency and purpose are also required by this methodology, as well as the proportion of trips that were made by bicycle or foot only and the proportion of trips that could have been made by car. This data comes from surveys conducted on the NCN in 2011, 2012 and 2013. These surveys are aggregated each year and analysed as an annual dataset. These values have been assumed to have remained consistent since 1995 as historic data are not available. This means that it has been assumed that there has been no change in either the trip frequency or trip distance since 1995.

The cost of the NCN between 1995 and 2015 is estimated to be £1.23 billion. This has been calculated from Sustrans' accounts, where it has been assumed that Sustrans' expenditure accounts for 30% of the development and maintenance of the NCN each year.

The rest of the costs are assumed to be met by other parties, primarily local authorities. These costs have been converted to 2010 prices using the inflation values from the webTAG data book.

### **Discount rate**

Appraisals conducted using webTAG use a discount rate (-3.5% p/a) to estimate the decrease in value of future benefits. This discount rate has been applied to the benefits estimated here, meaning that benefits calculated for recent years are discounted more heavily than benefits from the early years of the NCN. This improves consistency with existing appraisals.

### **Build up rate**

It has been assumed that it took five years for the benefits of the NCN to build up to 100% of the values taken from the webTAG data book.

### **Benefit values**

The values used to calculate the benefits are all taken from the webTAG data book and are in line with other appraisals. It is worth noting that it has been assumed that these values have remained consistent throughout the life of the NCN (adjusted for inflation).

The amenity benefits for cyclists and pedestrians have been calculated using values for on-road non-segregated cycle lanes, which have been assumed to be most representative of the NCN. In addition, pedestrian benefits have been calculated using values for directional signage only, again to ensure the values are representative of the whole NCN.

### **Limitations**

A number of assumptions have been made in estimating the value of the NCN to the UK economy. The most substantial assumption has involved estimating the impact of the NCN on changing usage since 1995. We do not have data to allow us to estimate these values. Table 4 shows the sensitivity of our estimate of the economic benefits of the NCN since 1995 to variations in these assumptions.

It has also been assumed that there has been no change in the frequency or distance of trips on the NCN since 1995. We do not have any data to support any change in these values.

The benefit values used in the calculation have been assumed to remain consistent since 1995 (adjusted for inflation). In some cases this will not be accurate. However, it has been assumed that changes in the value of different benefits will counteract each other.

## **Economic benefits to communities**

### **Job creation and maintenance**

The NCN helps to create and sustain local employment through the development and maintenance of routes and through increased accessibility to employment. We estimate that Linking Communities created or sustained 6.9 FTE jobs for every £1 million invested<sup>7</sup>. This is substantially higher than many major road schemes and with route construction and maintenance often undertaken by local contractors the benefits are locked into local communities.

Assuming that 50% of this value can be applied to expenditure across NCN, we estimate that the development and maintenance of the NCN created or sustained 393 jobs in financial year 2014/15, when £114 million was invested<sup>8</sup>. Table 5 shows the sensitivity of this calculation to adjustments to the number of jobs created and sustained for every £1million invested.

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<sup>7</sup> Sustrans (2014) Improving access for local journeys

<sup>8</sup> S:\RMU\01 Analysis Team\30\_Projects\NCN 20th Anniversary\3 Accumulating data\2 Economic benefit\2 Economic benefit to local communities\Source material\Money vs Length.xls

**Table 5 – Jobs created or sustained by NCN development and maintenance (investment in financial year 2014/15)**

		Jobs created or sustained per £million invested (£111 million invested in 2013/14)								
		3	4	5	6	6.9	7	8	9	10
Proportion applicable to whole network	0%	-	-	-	-					
	20%	68	91	114	137	157				
	40%		182	228	274	315	319			
	50%			285	342	393	399	456		
	60%				410	472	479	547	615	
	80%					629	638	729	821	912
	100%						798	912	1,026	1,140

The total investment in the NCN since 1995 is estimated to be £1.23 billion (including match funding), meaning that we estimate that 4,259 jobs have been created and maintained by the NCN over the last 20 years.

**Table 6 – Jobs created or sustained by NCN development and maintenance (total since 1995)**

		Jobs created or sustained per £million invested (total invested to date)								
		3	4	5	6	6.9	7	8	9	10
Proportion applicable to whole network	0%	-	-	-	-					
	20%	741	988	1,234	1,481	1,704				
	40%		1,975	2,469	2,963	3,407	3,456			
	50%			3,086	3,703	4,259	4,321	4,938		
	60%				4,444	5,111	5,185	5,925	6,666	
	80%					6,814	6,913	7,900	8,888	9,875
	100%						8,641	9,875	11,110	12,344

### Retail benefits

We estimate that people who used the NCN to access shopping areas in 2014 spent at least £1.27 billion.

Extending the NCN through Connect2 and Linking Communities has helped to link residents to shopping areas. Nearly 50% of all those interviewed in shopping areas at Connect2 schemes stated they had used the new route to get there while on the wider NCN over 87 million trips were for shopping purposes in 2014. Our research also suggests that overall monthly spend in retail areas by pedestrians and cyclists is at least 29% higher than those travelling by car (£285/£234 compared to £181) and they make double the number of trips to shops<sup>9</sup>.

<sup>9</sup> Sustrans (2014) Connect2 final report (internal document)

In 2014 16.1% of pedestrian trips and 5.3% of cyclist trips on the NCN were for shopping purposes. Using trip frequency data, we are able to calculate that these shopping trips were made by over 900,000 people. Assuming that these shoppers spend 50% of the typical monthly spend identified in the Connect2 data, we estimate that people who used the NCN to access shopping areas in 2014 spent at least £1.27 billion (Table 7). This is 29% more than they would have spent if they had travelled by car (assuming the typical monthly spend identified above).

**Table 7 – 2014 retail spend by people using the NCN for shopping purposes (£billion)**

		Average monthly spend (£)								
		100	181	200	234	285	300	400	500	600
Proportion of monthly spend applied	0%	-	-	-	-	-				
	20%		0.39	0.43	0.51	0.62	0.65			
	40%			0.87	1.02	1.24	1.30	1.74		
	50%				1.27	1.55	1.63	2.17	2.71	
	60%					1.86	1.95	2.61	3.26	3.91
	80%						2.61	3.47	4.34	5.21
	100%							4.34	5.43	6.51

## Conclusion

This report has identified some of the benefits of the National Cycle Network (NCN). It shows that the NCN brings positive economic benefits to the communities through which it runs while also benefitting the wider economy. Our research suggests that the money that has been spent on the NCN has provided a far higher benefit cost ratio than that spent on road schemes, which typically receive much more funding.