By popular demand: what people want from a resource efficient economy – methodology

Below is the methodology used by researchers from the Centre for Industrial Energy, Materials and Products (CIEMAP) as the basis of our report.

The majority of information in the report was based on research conducted by CIEMAP researchers at Cardiff University, including through in depth qualitative workshops and a representative quantitative survey of 1,093 people. Additional analysis on the carbon impact of resource efficiency strategies was conducted by CIEMAP researchers at Leeds University, and originally published in 'Public acceptance of resource efficiency strategies to mitigate climate change' in *Nature Climate Change*.

Workshop design and protocol

To explore the public acceptability of a range of different resource efficiency strategies, CIEMAP researchers designed a series of two day deliberative workshops. Making use of established methods for the deliberation of science and technology issues, the workshops provided an open space for participants to explore possibly unfamiliar ideas around resource efficiency strategies and engage in critical discussion with other participants. A range of activities were developed around a set of 'scenarios for a low material future', aiming to elicit reflections on both the personal and social implications of resource efficiency strategies. Developed from a series of 22 expert interviews with policy makers, business and industry representatives and NGOs, these scenarios identified areas of everyday life that may change, including: products, business, ownership, community, waste and lifestyles. A set of resources (vignette storylines and information posters) were developed for each scenario. The first day of each workshop focused on the vignettes, which took the form of a story describing 'a day in your life' under each scenario. In small groups, participants then explored each scenario separately and were encouraged to imagine themselves in that future and think about how everyday life may change and how they would feel about that. After reconvening for a second day, participants took part in the poster activity, which was designed to remind them of the different products and services that might be available in each future scenario and provide an opportunity for wider group discussion of their pros and cons. Participants were given time to read the posters and highlight broadly how positive they felt about each option using green, yellow and red coloured stickers. The group then came together to discuss each poster in turn and explore which strategies they believed would be most publically acceptable.

Workshop sample and recruitment

Four workshops were conducted across two cities (Cardiff and Bristol) between November 2016 and January 2017. The two cities were chosen for their different socioeconomic profiles and, in each city, separate workshops were held with higher income and lower income groups. Overall, 51 participants took part (11-14 per workshop). Face to face, topic blind recruitment (where people did not know the subject matter in advance) was undertaken by a professional agency that recruited participants for a workshop entitled 'Exploring the future of consumption' in exchange for a cash honorarium. Table 1 shows the demographic distribution of participants. Participants were then divided into the high income and low income workshops on the basis of socioeconomic class: ABC1 (a spectrum of middle class professionals) and C2DE (a range of skilled workers and those currently unemployed or retired) respectively. Although not considered statistically representative, our diverse sample of participants was able to provide a rich and meaningful dataset through which to explore the public acceptability of resource efficiency strategies.

Table 1. Summary table of demographics for deliberative workshops participants.

		Cardiff 1	Cardiff 2	Bristol 1	Bristol 2	Total
No. Participants		11	13	13	14	**51**
Gender profile	Female	4	8	7	8	**27**
	Male	7	5	6	6	**24**
Age	20-29	0	3	5	4	**12**
	30-39	3	3	0	2	**8**
	40-49	4	1	1	2	**8**
	50-59	2	2	2	1	**7**
	60-69	2	1	3	2	**8**
	70+	0	3	2	3	**8**
Socio-economic status	A	N/a	0	N/a	0	**0**
	B	N/a	8	N/a	4	**12**
	C1	N/a	7	N/a	10	**17**
	C2	4	N/a	4	N/a	**8**
	D	2	N/a	4	N/a	**6**
	E	5	N/a	5	N/a	**10**

For further information about the workshops, contact: Dr Catherine Cherry, Cardiff University – cherryce@cardiff.ac.uk

Survey procedure

The survey was designed and administered through Qualtrics, using online panels for the recruitment process. Quotas were set for age, gender, education, region and income to ensure the sample was representative of the British public (see table 2 for demographic information). After pilot testing the survey questions, the main sample was recruited between March and July 2018. The survey took approximately 25 minutes to complete and 1,093 respondents were included in the final national sample (excluding respondents who failed the minimum time limit, respondents who were screened out based on their open responses and over samples from Wales and Scotland).

Survey questions

The survey was designed to explore public perceptions of low material scenarios of the future and related strategies, while also examining criteria for acceptance (or dismissal) of certain strategies. After indicating their general attitudes about resource efficiency (relevance in relation to other issues, need for a shift) respondents were presented with four short animated clips that lasted 45-62 seconds. (The videos were designed by Howdy and are available through links provided below.) The clips described different versions of low material future societies, and were entitled: 'rethinking business', 'rethinking community', 'rethinking ownership' and 'rethinking lifestyles'. After each clip, respondents indicated their concerns, positive thoughts and general support for each future vision before being asked about specific values that might determine support (as identified by the deliberative workshops). The tested values for each clip were affordability, convenience, economic strength, quality of life, autonomy, social isolation, environmental impact and trust. Subsequently, respondents were asked to indicate their support (or opposition) for specific low material/resources strategies: biodegradable packaging, option of refurbished products, business responsibility for repair, household recycling schemes, material tax, communal office space, annual personal material allowance, shared living spaces, regulations for product recyclability and additional contract services. Furthermore, respondents answered questions assessing other potential concerns (eg cleanliness of products), their trust in relevant actors, personal values, moral concerns and social norms around resource efficiency.

For further information about the survey, contact: Dr Katharine Steentjes, Cardiff University – steentjesk@cardiff.ac.uk

Table 2. Demographic characteristics of survey sample

Sample size			**Age**	
	n	1 093	18-24	10%
Gender			25-34	15%
	Female	52%	35-44	15%
	Male	49%	45-54	20%
			55-99	41%
Region			**Income**	
	North East	4%	Less than £ 10 000	20%
	North West	12%	£10 000 – 19 999	28%
	Yorkshire and Humber	9%	£20 000 – 29 999	20%
	East Midlands	6%	£30 000 – 39 999	13%
	West Midlands	8%	£40 000 – 49 999	8%
	East of England	9%	£50 000 – 59 999	4%
	London	10%	£60 000 – 69 999	4%
	South East	15%	£70 000 +	4%
	South West	7%		
	Scotland	11%		
	Wales	9%		
Education				
	University degree	31%		

A level or equivalent	20%	
GCSE O - level	27%	
No academic qualification	6%	
Other	15%	

Contact details

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Animated clips (used in survey)

Clips were designed by Howdy https://www.howdy-pardners.com/

Rethinking Business:

Describing lifelong product guarantees, incentivised returns, module design of products
https://youtu.be/SZvYb-EVMws

Rethinking Community

Describing sharing of skills and products, library of things, community hubs
https://youtu.be/50O1RJ5n7YA

Rethinking Ownership

Describing contracts for services to replace owning products, service based consumption
https://youtu.be/KHHJfQ8I2sQ

Rethinking Lifestyles

Describing annual personal material allowance, a material tax (to replace VAT), higher use of public transport, less travel overall and the reduction or sharing of private living space.
https://youtu.be/1fqAoZwF5tw

Survey questions

1.What would you say will be the three biggest issues facing the UK in the next five years? *Please click up to three answer boxes*

1. National Health service (NHS)
2. Negotiating the BREXIT deal
3. Immigration
4. Poverty and inequality
5. International terrorism
6. The economic situation
7. Aging population
8. Climate change
9. House prices
10. Waste management (e.g. plastic waste)
11. Unemployment
12. Environmental pollution
13. Resource scarcity

Some people suggest that we should change the way we currently use and produce products with the aim to reduce waste and to use resources more efficiently. With resources we mean any natural materials needed to create products and infrastructure that we use in everyday life (eg fossil fuels, metals, minerals, wood, cotton).

2. To what extent do you think there is a need to shift towards a society that uses resources more efficiently?

Indicate on the sliding scale how much you feel the need for change

no need at all very strong need

0	1	2	3	4	5	6	7

3. Have you ever heard of the term 'carbon footprint'?
4. Have you ever heard of the term 'circular economy'?
5. Have you ever heard of the term 'throwaway society'?
   a) yes, I know what the term means
   b) yes, I heard the term before but I am not sure what it
   c) no, I have never heard that term

[Questions 6 -22 were repeated after each clip referring to 'Rethinking Business' 'Rethinking Community' 'Rethinking Ownership' or 'Rethinking Lifestyles']

We will now show you the first out of four short clips. Each clip will explain alternative strategies for how to organise our life, our economy and our society as a whole.

After each clip, we will ask you some questions about these strategies and your feelings towards them. Please note that we are simply interested in your honest opinion and there are no right or wrong answers.

6. When thinking about the clip 'Rethinking Business [Community/Ownership/Lifestyles]', how positive or negative do you feel about living in that described world?
   a) extremely negative
   b) moderately negative
   c) more negative than positive
   d) neither negative nor positive
   e) more positive than negative
   f) moderately positive
   g) extremely positive

Now imagine you would live in the world described in the last clip.

7. What is the one thing you would be most concerned about when you imagine living in a world described in the 'Rethinking Business [Community/Ownership/Lifestyles]' clip?
Please briefly describe your main concern in your own words

8. Now please rate how strongly you feel about the answer you just gave to the previous question. How concerned are you about the issue you described above?

a) not at all concerned
b) not very concerned
c) fairly concerned
d) very concerned
e) extremely concerned
f) don't know

Now imagine you would live in the world described in the last clip.

9. What is the one thing you would feel most positive about when you imagine living in a world described in the 'Rethinking Business [Community/Ownership/Lifestyles]' clip?
Please briefly describe your main positive aspect in your own words

10. Now please rate how strongly you feel about the answer you just gave to the previous question. How positive do you feel about the positive aspect you described above?

a) not at all positive
b) not very positive
c) fairly positive
d) very positive
e) extremely positive
f) don't know

11. I think that we should shift towards a society that is like the world described in the 'Rethinking Business [Community/Ownership/Lifestyles]' clip

12. I would personally like to live in a world described in the 'Rethinking Business [Community/Ownership/Lifestyles]' clip

13. I think others would like to live in the world described in the 'Rethinking Business [Community/Ownership/Lifestyles]' clip

a) strongly disagree
b) disagree
c) tend to disagree
d) neither agree nor disagree
e) tend to agree
f) agree
g) strongly agree

Now, imagine living in the world described in the clip and think about how that society would be different from the current situation in the UK.

14. Buying, repairing and disposing of products would be _____ for me in a 'Rethinking Business [Community/Ownership/Lifestyles]' world.

a) a lot more convenient
b) slightly more convenient
c) equally convenient as today's situation
d) slightly less convenient
e) a lot less convenient

15. Please think about how (in your personal opinion) the presented strategies could affect the UK economy. The UK economy would be _____ in a 'Rethinking Business [Community/Ownership/Lifestyles]' world.

a) a lot stronger
b) slightly stronger
c) the same as in today's situation
d) slightly weaker

e) a lot weaker

16. The products and services we use would be _____ for everyone in a 'Rethinking Business [Community/Ownership/Lifestyles]' world.

a) a lot more affordable
b) slightly more affordable
c) equally affordable as in today situation
d) slightly less affordable
e) a lot less affordable

17. In a 'Rethinking Business [Community/Ownership/Lifestyles]' world my personal quality of life would be _____.

a) a lot higher
b) slightly higher
c) equal to today's situation
d) slightly lower
e) a lot lower

18. In a 'Rethinking Business [Community/Ownership/Lifestyles]' world I would have _____ freedom and choice to live the way I want to live.

a) a lot more
b) slightly more
c) an equal level of
d) slightly less
e) a lot less

19. In a 'Rethinking Business [Community/Ownership/Lifestyles]' world loneliness and isolation within our society would _____.

a) be a much bigger problem
b) be a bigger problem
c) be much the same as it is today
d) be a smaller problem
e) be a much smaller problem

20. The impact of our lifestyles on the environment would be _____ in a 'Rethinking Business [Community/Ownership/Lifestyles]' world.

a) much worse
b) slightly worse
c) equal to today's situation
d) slightly better
e) much better

21. In your opinion, how much does realising the 'Rethinking Business [Community/Ownership/Lifestyles]' world depend upon actors (eg government, businesses, citizens) trusting each other?

a) a great deal
b) a lot
c) a moderate amount
d) a little
e) not at all

22. How likely do you think it is that life in the UK will be similar to the 'Rethinking Business [Community/Ownership/Lifestyles]' clip in 10 to 15 years' time?

a) extremely likely
b) somewhat likely
c) neither likely nor unlikely
d) somewhat unlikely
e) extremely unlikely

Please indicate how much you agree or disagree with each of the following statements:

23. I would prefer to lease products rather than own them.
24. I would be willing to return products to the manufacturer if I no longer need them.
25. I think there is currently a conflict between business profits and resource efficiency.
26. I would be worried about damaging products that do not belong to me.
27. I would be worried about entering into additional contracts with service providers (eg for using a washing machine).
28. Currently products are usually difficult to get repaired.
29. I like the flexibility that owning products gives you (eg through having tools at home).
30. All packaging should be made of recyclable materials.
31. I would worry about the cleanliness of shared products.
32. Increased waste regulations would encourage more fly tipping.
33. I often feel frustrated about how long products last

a) strongly disagree
b) disagree
c) tend to disagree
d) neither agree nor disagree
e) tend to agree
f) agree
g) strongly agree

34. When thinking about products you have owned in the past: In general, how satisfied or dissatisfied have you been with how long products have lasted?

a) extremely dissatisfied
b) moderately dissatisfied
c) slightly dissatisfied
d) neither satisfied nor dissatisfied
e) slightly satisfied
f) moderately satisfied
g) extremely satisfied

After hearing about all these different strategies to change how we use and produce products, how much would you support or oppose each strategy as large scale schemes within the UK?

35. Regulations to require the design of products to be resource efficient, reusable and recyclable.
36. Increase availability of shared living/office spaces to encourage downsizing of private spaces.
37. Widespread community product sharing facilities (eg library of things).
38. Introduce an annual personal material allowance (as described in 'Rethinking Lifestyles').
39. Widespread communal office spaces.
40. Increase household recycling schemes for products and appliances.
41. Businesses required to provide repair, maintenance and disposal services for the products they sell/produce.
42. Businesses provide remanufactured and refurbished products.
43. All packaging has to be resource efficient, recyclable or biodegradable.

a) strongly oppose
b) oppose
c) tend to oppose
d) neither oppose nor support
e) tend to support
f) support
g) strongly support

We would like to hear about how you currently buy, reuse or recycle products. Please indicate how often you do each of the following:

44. Consider recyclability when buying a new product.
45. Buy secondhand products from charity shops.
46. Use leasing schemes instead of buying new (eg for washing machines, cars).
47. Borrow or share products with family and friends.
48. Avoid buying new things (eg clothing, luxury items).
49. Buy products with less/ no packaging.
50. Repair existing products rather than buying new.

a) never
b) rarely
c) sometimes
d) often
e) always

When thinking about alternative schemes of consumption, how much do you generally trust (or distrust) each of the following actors?

51. Local government (city or county council)
52. Other citizens using the schemes
53. The manufacturer
54. Small, localised businesses
55. Big businesses

a) strongly distrust
b) tend to distrust
c) neither trust nor distrust
d) tend to trust
e) strongly trust

56. Being environmentally friendly is an important part of who I am.
57. I admire people who own expensive homes, cars and clothes.
58. I like a lot of luxury in my life.
59. I would be happier if I could afford to buy more things.
60. I am confident that, together, people in the UK can make a difference when it comes to efficiently using natural resources.
61. People close to me are too quick to throw away products.
62. People close to me would expect me to use resources efficiently (reuse, recycle etc).
63. People close to me always want the latest product.
64. Most people are basically honest.
65. If given a chance, most people would try to take advantage of you.
66. When dealing with strangers, one is better off using caution before trusting them.
67. We have a moral responsibility to use natural resources efficiently.

a) strongly disagree
b) disagree
c) tend to disagree
d) neither agree nor disagree
e) tend to agree
f) agree
g) strongly agree

68. Some people have moral concerns about resource use. For example, because they think that they feel a moral responsibility towards future generations or because of the harmful impacts on our global ecosystem. To what extent, if at all, do you have moral concerns about resource efficiency?

a) not at all
b) a little
c) moderately
d) quite a bit
e) very much

69. Some people say that we live in a so called 'throwaway society' today.
How much do you agree with that point of view?

a) strongly disagree
b) disagree
c) tend to disagree
d) neither agree nor disagree
e) tend to agree
f) agree
g) strongly agree

70. How much would you support a drastic shift towards a resource efficient society, even if that substantially changes the way I live?

a) strongly oppose
b) oppose
c) tend to oppose
d) neither oppose nor support
e) tend to support
f) support
g) strongly support

Emissions savings calculations

A carbon footprint measures the emissions associated with the consumption of goods and services in a country, regardless of where they are produced (ie it includes emissions embodied in imports). In exploring the synergies between material and product demand with determinants of public preferences, we consider emissions embodied in household consumption, which represent 80 per cent of the UK's carbon footprint. In 2013, this equated to 576 $MtCO_2e$, with an additional 151 $MtCO_2e$ produced directly from household heating and private car travel. Greenhouse gas emissions reductions from the adoption of material productivity measures by UK households are quantified using an input-output framework. The framework traces how sector-based emissions flow through complex international supply chains and become embodied in the final consumption of products. We use case study evidence to assess the range of impacts for each strategy on the basis of two different variables: material ambition (the level of material reduction across different strategies using case study evidence) and adoption (uptake by intermediate and final consumers to reduce material and product use).

We analyse the design of and demand for emissions intensive non-consumable materials and goods common to households: clothing, footwear and textiles, packaging, vehicles, consumer electronics and appliances, furniture, leisure equipment, and construction (buildings and transport infrastructure). Collectively, they embody around 13 per cent (75 $MtCO_2e$) of emissions satisfying household demand, although the majority of these are emitted along manufacturing supply chains existing outside the UK. We exclude: food and drink, chemicals including medicines, paints and cleaning agents, energy used directly for heating and car travel (which are the target of the majority of existing household climate policies). Food and chemicals, in particular, represent high throughput products, requiring a very different range of resource efficiency strategies than those discussed here. Accordingly, the focus is on previously under-researched household goods and services. We chose not to change the carbon intensity of energy in the production and use of products. This allowed us to quantify additional emissions savings to the mainstream decarbonisation agenda, isolating the effect of resource efficiency strategies as a mitigation option.

We mapped 43 case studies onto the three resource efficiency categories enabling us to make some quantification of reduced material and product demands from the status quo today. Scaling up the case study evidence, we identify how UK household goods can be (1) designed with less material inputs, (2) used more intensively through sharing, and (3) used for longer. Due to overlapping and interlinked schemes, some case studies could have been allocated to more than one strategy, eg demand for cars can be reduced across all strategies: cars can be redesigned (using less metal), used more intensively (through car clubs), or can be used longer before replacement. If we were to run each scenario individually and add the emissions savings together, we would overestimate reductions across cars. Using a lightweight car for longer saves less than using a conventional car for longer. Therefore, when calculating the overall savings we combine the changes to calculate the effect of a combination of measures.

Our analysis focused on household demand related to public perceptions, and, therefore, we did not model, for example, service sectors using their electrical equipment for longer. There is evidence to suggest that people would extend their resource efficient behaviours to the workplace. This could realise further emissions savings than we anticipate. However, rebounds, where the money saved from reduced demand is spent on additional products, can have the opposite effect of reducing the emissions saving potential. We chose not to model the rebound effect as we do not presuppose that the pricing structures will not change as a result of the implementation of the demand reduction strategies. However, this would add an additional layer of uncertainty. Each case study was modelled in isolation then aggregated into three overarching strategies to avoid double counting.

For a detailed description of the method see: Cherry et al, 2018, 'Public acceptance of resource efficiency strategies to mitigate climate change' in *Nature Climate Change*, or contact:

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