

Calculating Willingness to Pay using Poll Data

Respondents were asked if they would support a fee on their monthly electricity bill to combat climate change, and they were offered fees at various levels: \$1, \$10, \$20, \$40, 75 and \$100. (Each household was asked about only one of these levels.)

These responses can be used to infer how much people value addressing climate change. To give you a flavor of the approach, take the 37 percent of households that are in favor of at least a \$20 fee and the 32 percent that are in favor of at least a \$40 fee. Doing some back-of-the-envelope calculations, we find that 5 percent (37 percent minus 32 percent) of households would favor a fee between \$20 and \$40. We then assign the midpoint — \$30 — to this 5 percent of the population. We carry this approach through for the rest of the responses.¹

The net result is that, on average, American households are willing to pay \$33 to \$48 per month more on their electricity bill. The \$33 is a lower bound because it assumes that the entire 29 percent of respondents who accept at least \$100 are willing to pay \$100 at most, while the \$48 figure assumes that this group is willing to pay \$150 on average.

We can use these willingness-to-pay estimates to calculate the level of carbon tax that Americans would support. To do so, we take the average monthly fee that Americans are willing to pay (for example, the \$33 to \$48 estimates above), multiply it by 12 to get average *yearly* fee, then divide by the average tons of carbon emissions per American per year (16.2, [according to the EIA](#)). This gives us a range of carbon taxes between \$24 and \$35 per ton. ($33 \times 12 \div 16.2 = 24$, $48 \times 12 \div 16.2 = 35$)

¹ Since each household was only asked about one fee level, the poll occasionally returned a result such as the following: 37% of households report being in favor of a \$20 fee, but only 35% report being in favor of a \$10 fee. In these cases, we assumed that the average of the two values (36% in this case) would be willing to pay the higher fee (\$20 in this case). These cases are rare and do not lead to qualitatively different estimates.

Calculations

Scenario 1: Respondents not told what the revenue from the fee would be used for, 2021

Control							
Fee amount	0	1	10	20	40	75	100
% of sample willing to pay	100%	52%	35%	37%	32%	27%	31%
assumed % of population willing to pay	100%	52%	36%	36%	32%	29%	29%
fee amount interval	<1	1 to 10	10 to 20	20 to 40	40 to 75	75 to 100	>100
% of population	0.48	0.16	0	0.04	0.03	0	0.29
assumed exact fee amount	x	5.5	15	30	57.5	87.5	y
fee amount * percent of population	.48*x	0.88	-	1.20	1.73	-	.29*y
Average WTP, conditional on x and y	y=100	y=125	y=150				
x=0	32.81	40.06	47.31				
x=0.5	33.05	40.30	47.55				
x=1	33.29	40.54	47.79				
Equivalent Carbon Tax, conditional on x,y	y=100	y=125	y=150				
x=0	24.30	29.67	35.04				
x=0.5	24.48	29.85	35.22				
x=1	24.66	30.03	35.40				

Scenario 1A: Respondents not told what the revenue from the fee would be used for, 2018

Control							
Fee amount	0	1	10	20	40	75	100
% of sample willing to pay	100%	57%	28%	30%	23%	15%	16%
assumed % of population willing to pay	100%	57%	29%	29%	23%	16%	16%
fee amount interval	<1	1 to 10	10 to 20	20 to 40	40 to 75	75 to 100	>100
% of population	0.43	0.28	0	0.06	0.075	0	0.155
assumed exact fee amount	x	5.5	15	30	57.5	87.5	y
fee amount * percent of population	.43*x	1.54	-	1.80	4.31	-	.155*y
Average WTP, conditional on x and y	y=100	y=125	y=150				
x=0	23.15	27.03	30.90				
x=0.5	23.37	27.24	31.12				
x=1	23.58	27.46	31.33				
Equivalent Carbon Tax, conditional on x,y	y=100	y=125	y=150				
x=0	17.15	20.02	22.89				
x=0.5	17.31	20.18	23.05				
x=1	17.47	20.34	23.21				

Scenario 1B: Respondents not told what the revenue from the fee would be used for, 2017

Control							
Fee amount	0	1	10	20	40	75	100
% of sample willing to pay	100%	51%	39%	27%	31%	12%	18%
assumed % of population willing to pay	100%	51%	39%	29%	29%	15%	15%
fee amount interval	<1	1 to 10	10 to 20	20 to 40	40 to 75	75 to 100	>100
% of population	0.49	0.12	0.1	0	0.14	0	0.15
assumed exact fee amount	x	5.5	15	30	57.5	87.5	y
fee amount * percent of population	.49*x	0.66	1.50	-	8.05	-	.15*y
Average WTP, conditional on x and y	y=100	y=125	y=150				
x=0	25.21	28.96	32.71				
x=0.5	25.46	29.21	32.96				
x=1	25.70	29.45	33.20				
Equivalent Carbon Tax, conditional on x,y	y=100	y=125	y=150				
x=0	18.67	21.45	24.23				
x=0.5	18.86	21.63	24.41				
x=1	19.04	21.81	24.59				

Scenario 2: Respondents told that the revenue would be used to fund adaptation initiatives in communities affected by climate change, 2021

Adaptation Assistance							
Fee amount	0	1	10	20	40	75	100
% of sample willing to pay	100%	58%	36%	38%	31%	33%	21%
assumed % of population willing to pay	100%	58%	37%	37%	32%	32%	21%
fee amount interval	<1	1 to 10	10 to 20	20 to 40	40 to 75	75 to 100	>100
% of population	0.42	0.21	0	0.05	0	0.11	0.21
assumed exact fee amount	x	5.5	15	30	57.5	87.5	y
fee amount * percent of population	.42*x	1.16	-	1.50	-	9.63	.21*y
Average WTP, conditional on x and y	y=100	y=125	y=150				
x=0	33.28	38.53	43.78				
x=0.5	33.49	38.74	43.99				
x=1	33.70	38.95	44.20				
Equivalent Carbon Tax, conditional on x,y	y=100	y=125	y=150				
x=0	24.65	28.54	32.43				
x=0.5	24.81	28.70	32.59				
x=1	24.96	28.85	32.74				

Scenario 3: Respondents told that the revenue would be used to fund research and development for clean technologies, 2021

Research and Development							
Fee amount	0	1	10	20	40	75	100
% of sample willing to pay	100%	53%	38%	39%	27%	25%	24%
assumed % of population willing to pay	100%	53%	39%	39%	27%	25%	24%
fee amount interval	<1	1 to 10	10 to 20	20 to 40	40 to 75	75 to 100	>100
% of population	0.47	0.145	0	0.115	0.02	0.01	0.24
assumed exact fee amount	x	5.5	15	30	57.5	87.5	y
fee amount * percent of population	.47*x	0.80	-	3.45	1.15	0.88	.24*y
Average WTP, conditional on x and y	y=100	y=125	y=150				
x=0	30.27	36.27	42.27				
x=0.5	30.51	36.51	42.51				
x=1	30.74	36.74	42.74				
Equivalent Carbon Tax, conditional on x,y	y=100	y=125	y=150				
x=0	22.42	26.87	31.31				
x=0.5	22.60	27.04	31.49				
x=1	22.77	27.22	31.66				

Scenario 4: Respondents told that the revenue would be used to fund a tax rebate for all Americans, 2021

	Tax Rebate						
Fee amount	0	1	10	20	40	75	100
% of sample willing to pay	100%	47%	41%	33%	26%	25%	24%
assumed % of population willing to pay	100%	47%	41%	33%	26%	25%	24%
fee amount interval	<1	1 to 10	10 to 20	20 to 40	40 to 75	75 to 100	>100
% of population	0.53	0.06	0.08	0.07	0.01	0.01	0.24
assumed exact fee amount	x	5.5	15	30	57.5	87.5	y
fee amount * percent of population	.53*x	0.33	1.20	2.10	0.58	0.88	.24*y
Average WTP, conditional on x and y	y=100	y=125	y=150				
x=0	29.08	35.08	41.08				
x=0.5	29.35	35.35	41.35				
x=1	29.61	35.61	41.61				
Equivalent Carbon Tax, conditional on x,y	y=100	y=125	y=150				
x=0	21.54	25.99	30.43				
x=0.5	21.74	26.18	30.63				
x=1	21.93	26.38	30.82				