

Graphs and Tables and SOM: Supplementray Online Material for paper

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I thank XXX. All mistakes are mine.

I ???

1 PAPER Tables and Graphs

Table 1: Variable definitions

name	description
happiness	"All things considered, how satisfied are you with your life as a whole these days?" 1="dis-satisfied" to 10="satisfied"; WVS
PCGDP	GDP per capita (constant 2005 US\$); Code: NY.GDP.PCAP.KD; "GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 U.S. dollars."; WB
energy use, pc	Energy use (kg of oil equivalent per capita); Code: EG.USE.PCAP.KG.OE "Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport."; WB
unemployment, %	Unemployment, total (% of total labor force) (modeled ILO estimate); Code: SL.UEM.TOTL.ZS; "Unemployment refers to the share of the labor force that is without work but available for and seeking employment."; WB
co2 emissions, pc	CO2 emissions (metric tons per capita); Code: EN.ATM.CO2E.PC; "Carbon dioxide emis-sions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring."; WB
female life expectancy	Life expectancy at birth, female (years); Code: SP.DYN.LE00.FE.IN; "Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life."
road sector gasoline fuel con-sumption, pc	Road sector gasoline fuel consumption per capita (kg of oil equivalent); Code: IS.ROD.SGAS.PC; "Gasoline is light hydrocarbon oil use in internal combustion engine such as motor vehicles, excluding aircraft."; WB
percent urban	population (% of total); Code: SP.URB.TOTL.IN.ZS; "Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects."
maximum temperature in Jan-uary	"near-surface temperature maximum (degrees Celsius)" ; TYN.CY
maximum temperature in July	"near-surface temperature maximum (degrees Celsius)" ; TYN.CY

Variable sources. WVS: World Values Survey www.worldvaluessurvey.org; TYN.CY: Tyndall Centre (www.tyndall.ac.uk) Mitchell,T.D., Hulme,M., and New,M., 2002: Climate data for political areas. Area 34:109-112. http://www.cru.uea.ac.uk/~timm/cty/obs/TYN_CY_1_1_var-table.html; WB: World Bank <http://data.worldbank.org>

2 Only ONLINE APPENDIX

[note: this section will NOT be a part of the final version of the manuscript, but will be available online instead]

!!!TODO look more carefully at energy definitions!!

3 General Considerations

3.1 Electricity use: residential and non-residential

How is electricity used in United States homes? This is an important consideration because it really shows what we do with this electricity—how we consume it, what are the end uses. Data are shown in table 2. Furthermore end uses of energy changed over time, for instance from 1993 to 2009: appliances share increased from 24% to 35% and space heating dropped from 53% to 41% <http://www.eia.gov/todayinenergy/detail.cfm?id=10271&src=%E2%80%B9%20Consumption%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20%28RECS%29-b1>. Also, the good news is that average energy consumption per household dropped from 114 m BTU in 1980 to 90 m BTU in 2009 <http://www.eia.gov/consumption/residential/reports/2009/consumption-down.cfm?src=%E2%80%B9%20Consumption%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20%28RECS%29-b5>.

Table 2: Estimated U.S. Residential Electricity Consumption by End Use, 2012 www.eia.gov/tools/faqs/faq.cfm?id=96&t=3

End Use	Quadrillion		
Btu	Billion		
kilowatthours	Share of		
total			
Space cooling	0.85	250	18.00%
Lighting	0.64	186	14.00%
Water heating	0.45	130	9.00%
Refrigeration	0.38	111	8.00%
Televisions and related equipment 1	0.33	98	7.00%
Space heating	0.29	84	6.00%
Clothes dryers	0.2	59	4.00%
Computers and related equipment2	0.12	37	3.00%
Cooking	0.11	31	2.00%
Dishwashers3	0.1	29	2.00%
Furnace fans and boiler circulation pumps	0.09	28	2.00%
Freezers	0.08	24	2.00%
Clothes washers3	0.03	9	1.00%
Other uses4	1.02	299	22.00%
Total consumption	4.69	1375	

3.2 TODO Petroleum use: residential and non-residential

3.3 TODO Natural Gas use: residential and non-residential

4 countries

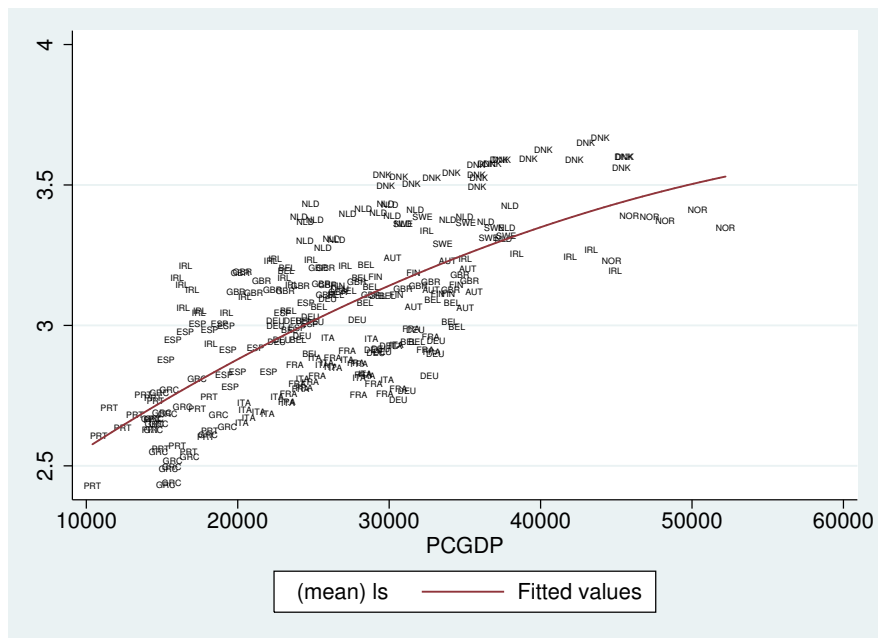
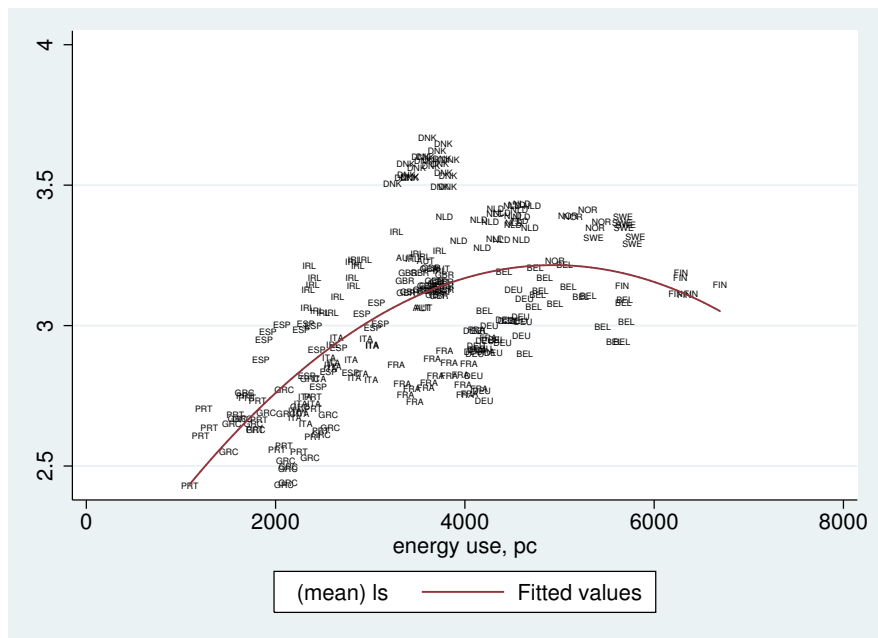
Literature about happiness across countries usually focuses on role of income, with a well known Easterlin Paradox, where economic growth does not lead to greater happiness over time.¹ Yet, in space, across countries it is agreed upon that richer countries are happier at least with quadratic relationship.

¹veenhoven's criticism—have it somewhere—easterlin delusion etc

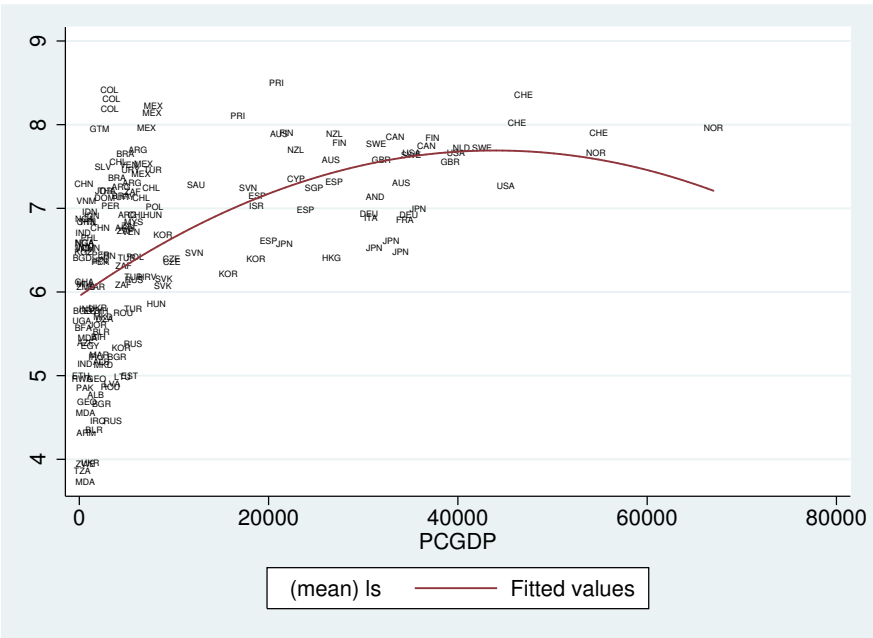
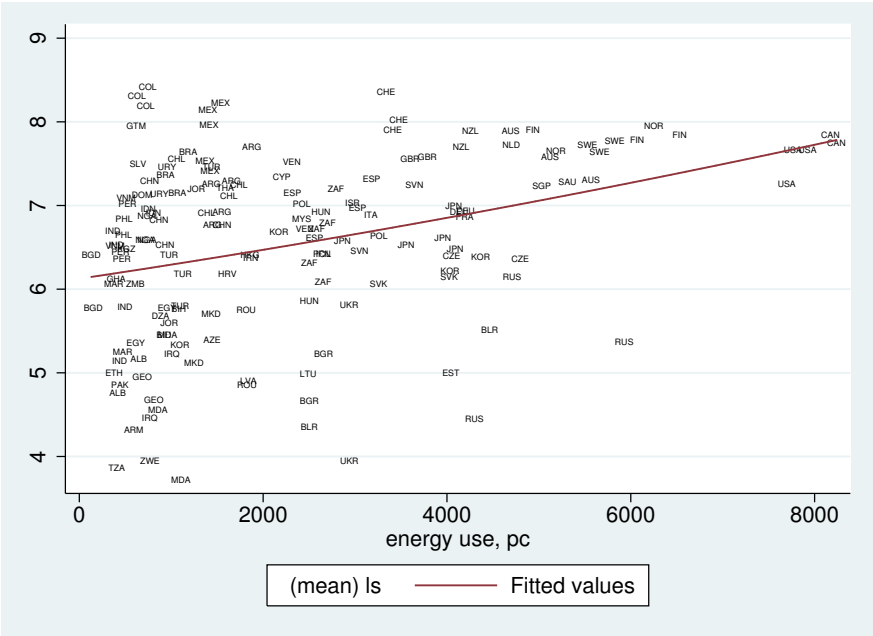
In this study we argue that countries that consume more energy are not happier when controlling for income—and interpret this as another argument for energy conservation. Also it counters common wisdom—one could think that greater energy consumption leads to greater happiness—if not then what's the point of energy consumption.

One explanation is that sustainable people are happy (cite that I think ecological economics paper—should be in bib)

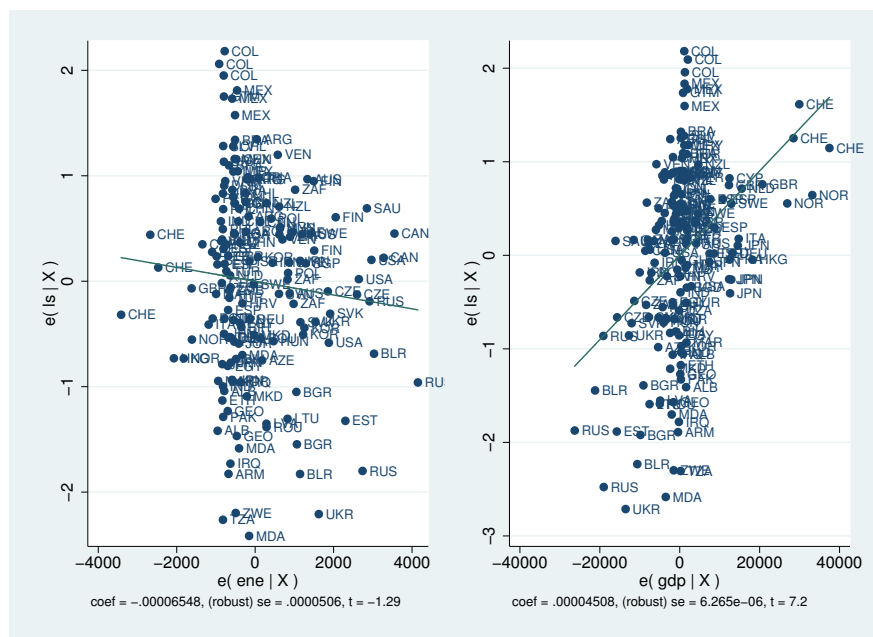
4.1 europe-mannheim



4.2 world



very interesting—when controlling for gdp, energy becomes negative!!



5 Census Divisions

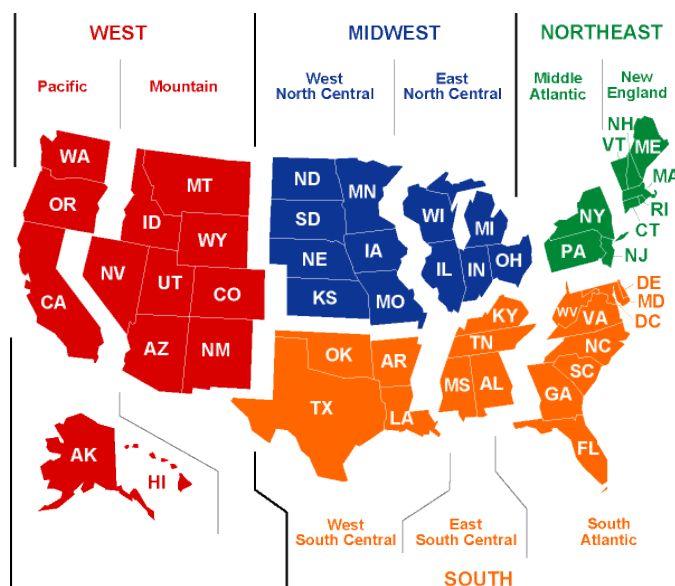


Figure 1: Census divisions.

have a ts graph here showing happiness by division and lectricity consumption—guess smooth them

6 States

This paper started as one author frequently flies from NJ to TX and noticed from the air and on the ground huge differences in energy use between the two states. Bigger houses, roads, cars, indeed everything is big in Texas! And indeed differences are striking—Texas consumee about twice as much enbrgy as NJ does per capita; yet interestingly not a big difference in residential energy consumption—perhaps everything is newer in TX and hence more enrgy efficient. The biggest diffences are in transportation ?? v ?? -ii

TETPB Total energy consumption per capita, m BTU
 TERPB Total energy consumption per capita in the residential sector, m BTU
 TEAPB Total energy consumption per capita in the transportation sector, m BTU
 TECPB Total energy consumption per capita in the commercial sector, m BTU
 TEIPB Total energy consumption per capita in the industrial sector, m BTU

sorted on TETPB, this is for 2009

state	TETPB	TERPB	TEAPB	TECPB	TEIPB
RI	182	58	60	44	20
NY	192	56	56	62	18
HI	205	27	100	31	48
MA	211	65	69	42	35
CA	212	40	84	41	47
CT	215	71	68	52	23
AZ	219	59	76	52	31
FL	222	66	77	54	25
NH	227	69	80	51	27
NV	244	58	80	43	63
VT	248	80	85	47	36
MD	256	74	81	74	27
OR	269	68	87	51	63
NC	273	78	76	63	56
NJ	273	68	103	72	31
MI	274	76	75	61	62
UT	274	59	86	55	74
PA	287	73	77	54	83
DE	294	77	79	71	67
CO	296	68	85	60	83
IL	303	76	78	63	86
GA	304	76	98	57	73
WA	307	77	91	59	80
VA	308	81	93	78	56
ME	311	68	94	48	101
WI	313	76	76	63	98
MO	313	89	96	69	59
OH	321	81	82	61	98
DC	324	61	34	222	7
NM	325	57	99	59	110
ID	326	82	80	55	109
TN	333	84	96	60	93
MN	340	77	90	66	108
SC	345	79	99	57	110
AR	360	78	100	57	125
MS	379	75	122	54	128
WV	382	94	92	60	136
AL	384	78	98	54	153
KS	402	84	102	75	141
OK	403	80	121	65	137
IN	423	87	92	59	186
NE	431	88	99	77	168
MT	431	90	116	81	144
KY	449	89	110	60	191
TX	452	64	110	58	219
SD	453	90	113	77	173
IA	477	81	100	68	227
ND	656	103	133	98	321
LA	841	79	150	62	550
AK	904	77	273	89	465
WY	933	85	217	111	519

(obs=306)

	TERPB	TEAPB	TECPB	TEIPB	TETPB
TERPB	1.0000				
TEAPB	0.2141	1.0000			
TECPB	0.2132	0.1255	1.0000		
TEIPB	0.3914	0.7993	0.1818	1.0000	
TETPB	0.4418	0.8620	0.3274	0.9757	1.0000

(obs=306)

	TERPB	TEAPB	TECPB	TEIPB	TETPB	1s
TERPB	1.0000					
TEAPB	0.2141	1.0000				
TECPB	0.2132	0.1255	1.0000			

TEIPB	0.3914	0.7993	0.1818	1.0000		
TETPB	0.4418	0.8620	0.3274	0.9757	1.0000	
Is	0.0952	0.2740	0.1246	0.2629	0.2839	1.0000

Is is happiness

Furthermore, interestingly transportation correlates negatively with commerce—DC one of the most efficient in transportation (61) is least efficient in commerce (222). Total energy consumption correlates most with transportation (.86) and especially industry (.9). Happiness does correlate positively with all energy uses, mostly with transport and industry and total (about .3).

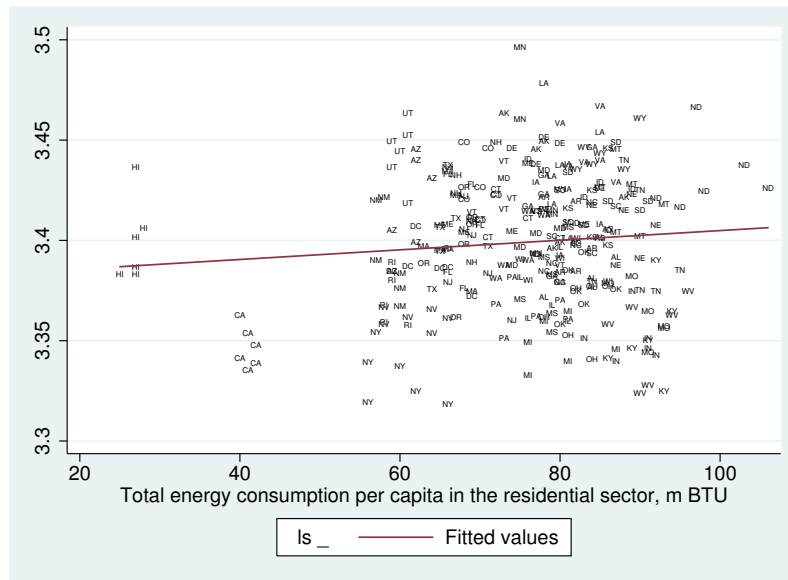


Figure 2: IfTERPBIs

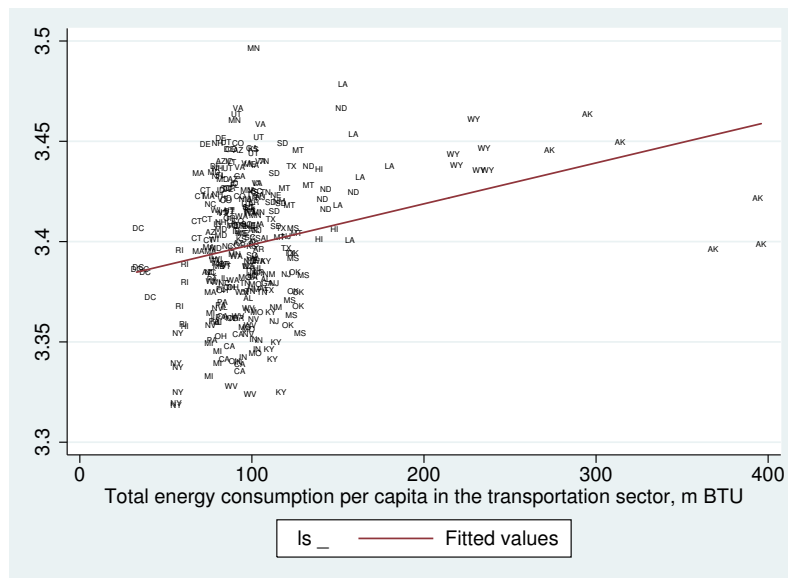


Figure 3: IfTEAPBIs

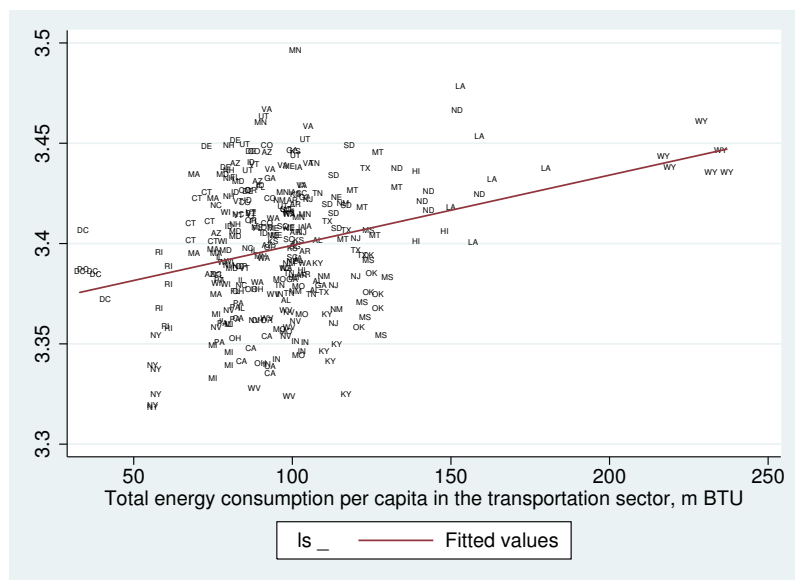


Figure 4: no alaska; IfTEAPBIsNoAk

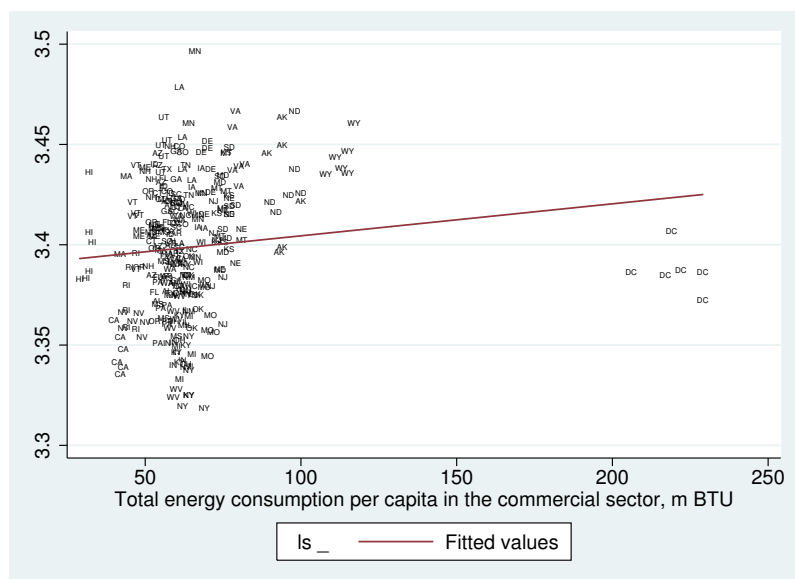


Figure 5: IfTECPBIs

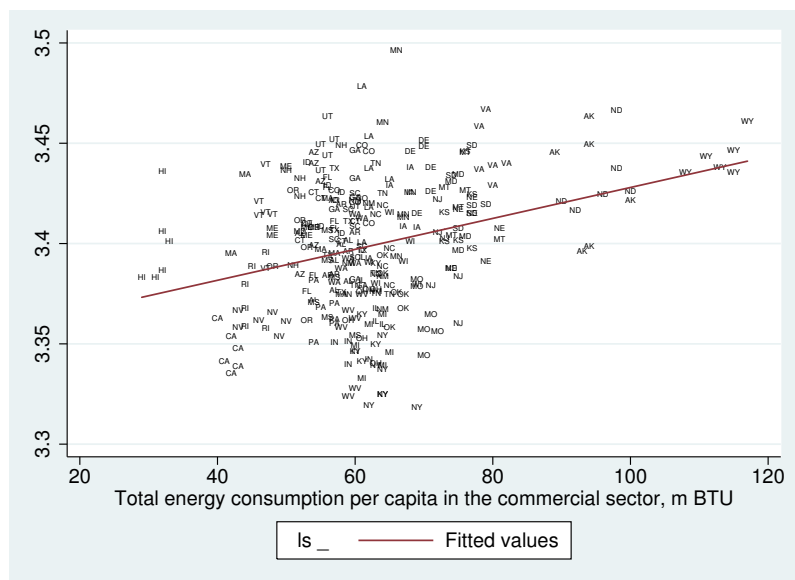


Figure 6: IfTECPBIsNoDc

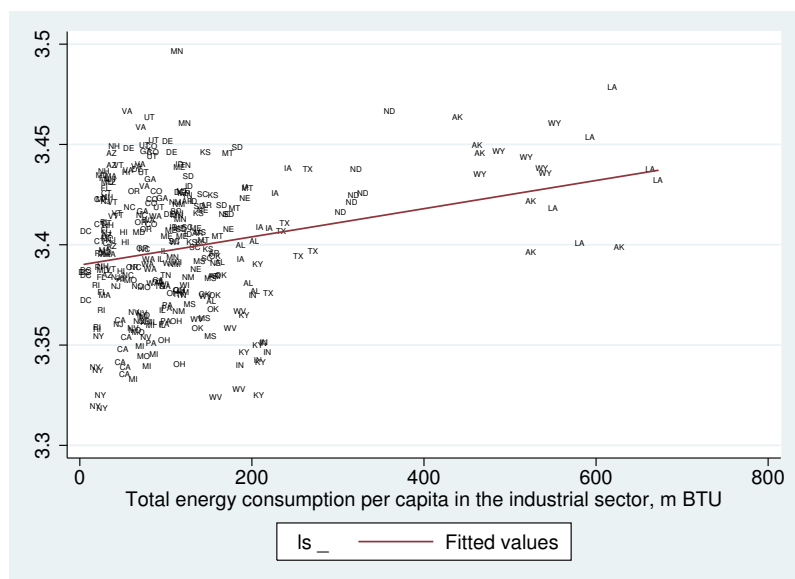


Figure 7: IfTEIPBIs

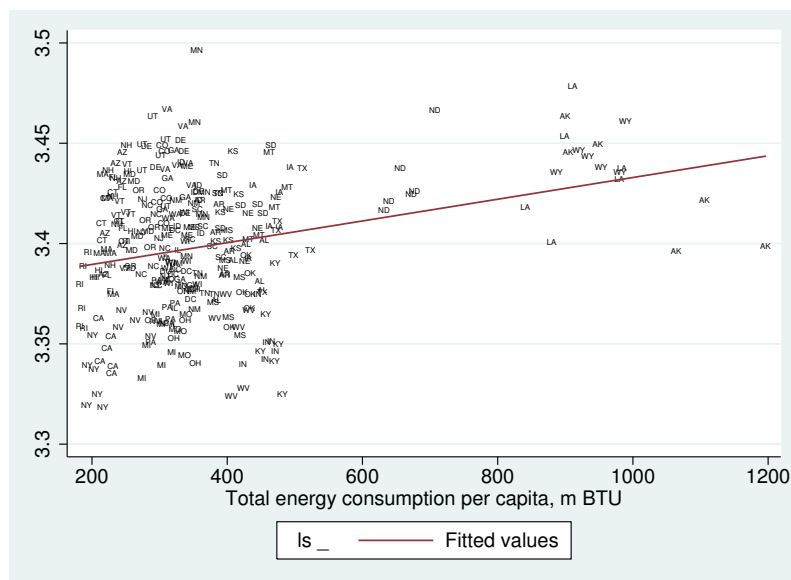


Figure 8: IfTETPBIs

We expect the more dense and more urban areas are less happy. Note that population density and percent urban are very different variables—population density is largely driven by history—when state was established—Western States (except California) are less dense than North Eastern states. It is also driven by size of state—large states like Pennsylvania are less dense than smaller states like Rhode Island. Percent urban is different—and it reflects administrative processes such as zoning and is sensitive to a definition of urban area. There are large differences in both variables. In some North Eastern states there are more than 1,000 people per square mile (NJ, RI), in most Western states, on the other hand, there are fewer than 100 people per square mile. Several states are above 90% urban, yet few states are mostly non urban. Below a table sorted on population density.

Finally, we will look at 2 key variables for happiness, social support, one measure of social capital, and the other “harder” measure—general health. States in West and North are more supportive with an exception of Delaware, which is very supportive and surrounded by unsupportive states.

state	popDen	perUrb	state	supp	gh
AK	.0012512	66.02	HI	4.03	3.52
WY	.0058089	64.76	NY	4.05	3.60
MT	.0068089	55.89	CA	4.09	3.53
ND	.009768	59.9	DC	4.10	3.72
SD	.0107636	56.65	TX	4.11	3.46
NM	.0170242	77.43	MS	4.11	3.30
ID	.0190094	70.58	AZ	4.13	3.57
NE	.0238206	73.13	CT	4.15	3.71
NV	.0246217	94.2	PA	4.15	3.55
UT	.0337594	90.58	FL	4.16	3.52
KS	.0349687	74.2	MI	4.17	3.53
OR	.0399737	81.03	SC	4.18	3.47
ME	.0430245	38.66	NV	4.18	3.51
CO	.0487062	86.15	RI	4.19	3.64
IA	.0546036	64.02	IN	4.19	3.48
OK	.0548	66.24	KY	4.20	3.35
AR	.056154	56.16	MO	4.20	3.48
AZ	.0564202	89.81	NM	4.21	3.51
MS	.0632948	49.35	AR	4.21	3.42
MN	.0666861	73.27	MT	4.21	3.59
VT	.0679205	38.9	OH	4.21	3.51
WV	.0771272	48.72	IL	4.21	3.53
MO	.0872253	70.44	NE	4.22	3.61
AL	.0945003	59.04	AL	4.22	3.34
TX	.0966383	84.7	NH	4.22	3.69
WA	.1014513	84.05	NJ	4.22	3.61
WI	.1050449	70.15	OR	4.23	3.58
LA	.1051988	73.19	CO	4.23	3.69
KY	.110114	58.38			

NH	.1471073	60.3	NC	4.23	3.47
TN	.1541655	66.39	WA	4.24	3.59
SC	.1542213	66.33	ME	4.24	3.60
GA	.1688821	75.07	SD	4.25	3.64
MI	.1746762	74.57	VT	4.25	3.74
IN	.1811528	72.44	ID	4.25	3.57
NC	.1966354	66.09	OK	4.25	3.38
VA	.2031902	75.45	MA	4.26	3.74
HI	.2123741	91.93	MD	4.26	3.63
IL	.2312725	88.49	VA	4.27	3.63
CA	.2396597	94.95	LA	4.27	3.40
OH	.2825454	77.92	WY	4.27	3.63
PA	.2840687	78.66	KS	4.27	3.60
FL	.3514421	91.16	GA	4.28	3.54
NY	.4116164	87.87	WI	4.28	3.61
DE	.4618843	83.3	AK	4.28	3.64
MD	.596153	87.2	UT	4.29	3.71
CT	.7391024	87.99	IA	4.29	3.60
MA	.8414038	91.97	ND	4.30	3.59
RI	1.018562	90.73	WV	4.30	3.26
NJ	1.197	94.68	MN	4.31	3.72
DC	.	100	DE	4.31	3.62
			TN	4.32	3.42

Below regressions follow. We have seen that there is a weak to moderate relationship between energy use per capita in different sectors and in general and happiness. How do these relationships hold in regressions? We proceed in a following way. We look at three major energy uses: residential, commercial, and transport and also total. We leave off industrial hence this energy is less likely to impact wellbeing of people directly and it may bias it—because this energy use is dictated by industry—there may be indirect effects—through employment, wages and development, but that should be picked up by GDP. First, we consider a model where we control for level of economic development (per capita income). Then we add environmental factors, density, percent urban and average temperatures in Jan and Jul following Abdallah et al. (2008), Brereton et al. (2008)—we use average for each month Jan and Jul and not the single max day. Finally, and this is perhaps innovation in ecological literature, we add at state level two aggregated from BRFSS key person level predictors of happiness—social support and happiness—there is substantial variation on these variables as discussed earlier.

We do not control for crime that is distributed unevenly within each state, and hence global control is not informative.

Let's start with residential energy, TERPB. In column 1, relationship is positive. However, once controlling in column 2 for population density and percent urban and temperatures, the relationship between TERPB and happiness disappears. Likewise, when added in column 3 controls for social support and general health, the relationship stays non-existent.

In transportation (TEAPB), on the other hand, the relationship is positive, and if anything it increases with added controls, which is puzzling. There are at least 2 explanations—perhaps thrill of travel. Also, Americans prefer (Fuguitt and Brown 1990, Fuguitt and Zuiches 1975) and are happier (Okulicz-Kozaryn 2014, Berry and Okulicz-Kozaryn 2011) in suburbs than in big cities, and there are likely to be more consumption of energy in transportation in states with more suburbs. Likewise, when considering total energy use (TETPB) a positive relationship persists. This warrants further exploration.

Table 3: ols1

	TERPB1	TERPB2	TERPB3	TEAPB1	TEAPB2	TEAPB3	TETPB1	TETPB2	TETPB3
Total energy consumption per capita in the residential sector, m BTU	0.000+	0.000	0.000						
Total energy consumption per capita in the transportation sector, m BTU				0.000***	0.000**	0.000***			
Total energy consumption per capita, m BTU							0.000***	0.000+	0.000***
Real gross domestic product, m chain 05usd, PC	0.000+	0.002***	0.001***	0.000*	0.002***	0.000+	0.000	0.002***	0.000
popukation density, thosands per sq m		-0.029***	-0.023***		-0.022**	-0.012**		-0.024**	-0.012*
perUrb		-0.001***	-0.001***		-0.000**	-0.000***		-0.001**	-0.000***
avgJanTemp		-0.000	0.001***		-0.000	0.001***		-0.000	0.001***
avgJulTemp		0.001*	0.002***		0.001*	0.002***		0.001*	0.002***
gh			0.204***			0.221***			0.233***
supp			0.203***			0.201***			0.191***
constant	3.368***	3.261***	1.654***	3.369***	3.256***	1.605***	3.373***	3.263***	1.616***
N	306	288	288	306	288	288	306	288	288

+p<0.10 *p<0.05 **p<0.01 ***p<0.001; robust standard errors

First considering enrgy use in residential and in commerce (columns a), interestingly it appears that the positive relationship is driven by commerce, residential energyu use indeed turns negative. Then in columns b, when considering all, three, residential, commerce, and transportation, thw first two remain insignificant and transportation coomes out positive

Table 4: ols2

	a1	a2	a3	b1	b2	b3
Total energy consumption per capita in the residential sector, m BTU	0.000	-0.000	-0.000+	0.000	-0.000	-0.000
Total energy consumption per capita in the transportation sector, m BTU				0.000***	0.000	0.000***
TET*						
Total energy consumption per capita in the commercial sector, m BTU	0.000	0.001***	0.001***	-0.000	0.000	-0.000
Real gross domestic product, m chain 05usd, PC	0.000	0.002***	0.000*	0.000	0.002***	0.000+
popukation density, thosands per sq m		-0.023**	-0.018***		-0.022**	-0.012**
perUrb		-0.001***	-0.001***		-0.001**	-0.000**
avgJanTemp		-0.000	0.001***		-0.000	0.001***
avgJulTemp		0.001*	0.002***		0.001*	0.002***
gh			0.201***			0.218***
supp			0.208***			0.204***
constant	3.374***	3.280***	1.665***	3.350***	3.276***	1.603***
N	306	288	288	306	288	288

+p<0.10 *p<0.05 **p<0.01 ***p<0.001; robust standard errors

These findings are lagrly replicated with fixed effects estimatiion—there is no increase in happiness from energy use in residential or total, but tehre is an increase in transportation. Note, hausman test indicates that we should use fixed, not random effect.

Table 5: fe1

	TERPB1	TERPB2	TERPB3	TEAPB1	TEAPB2	TEAPB3	TETPB1	TETPB2	TETPB3
Total energy consumption per capita in the residential sector, m BTU	-0.001+	-0.001	-0.000						
Total energy consumption per capita in the transportation sector, m BTU				-0.000+	-0.000	0.000+			
Total energy consumption per capita, m BTU							-0.000	0.000	0.000
Real gross domestic product, m chain 05usd, PC	0.003***	0.003***	0.003***	0.003***	0.003**	0.002**	0.003***	0.002*	0.002**
population density, thousands per sq m		0.456	0.027		0.532	0.175		0.687+	0.135
perUrb		0.011***	0.008**		0.011***	0.008**		0.011***	0.008**
avgJanTemp		0.000	0.000		0.000+	0.000		0.001*	0.000
avgJulTemp		0.003***	0.002***		0.002***	0.001**		0.002***	0.002***
gh			0.212***			0.220***			0.212***
supp			0.162***			0.168***			0.161***
constant	3.307***	2.211***	1.168***	3.288***	2.193***	1.033***	3.285***	2.140***	1.134***
N	306	288	288	306	288	288	306	288	288

+p<0.10 *p<0.05 **p<0.01 ***p<0.001; robust standard errors

7 Counties

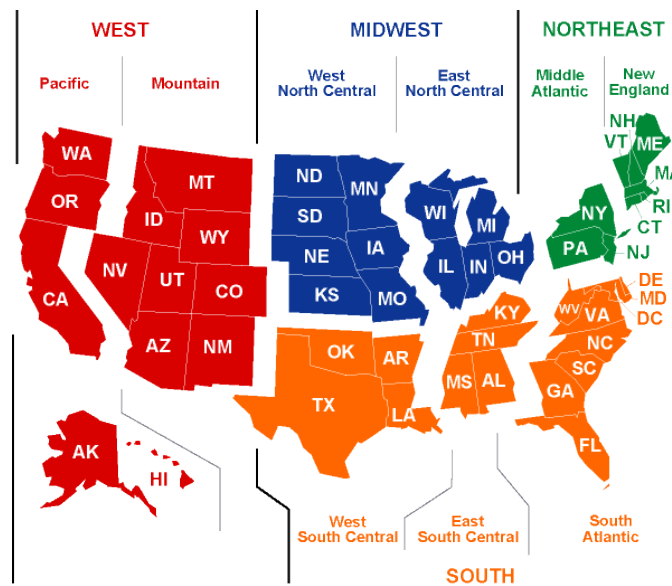


Figure 9: California climate divisions correspondencies with California counties. http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/CLIM_DIVS/california.gif.

Note, as shown in figure 9, there is not always an exact overlap between counties and climate divisions. They were matched in the following way

The limitation of states is that, well, it is very ecological—large areas! and second, there is not much difference is happijess ascross states, buit there is much more across counties.

Here in bivariate case, too, like across states, there is a positive relationshippe between energy consumprion and happiness, yet it is somewhat weaker.

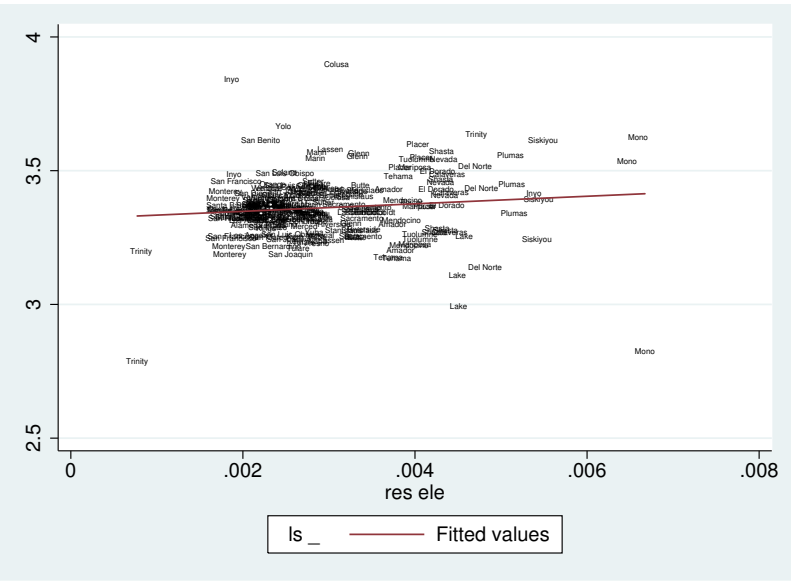


Figure 10: IfELERESIs

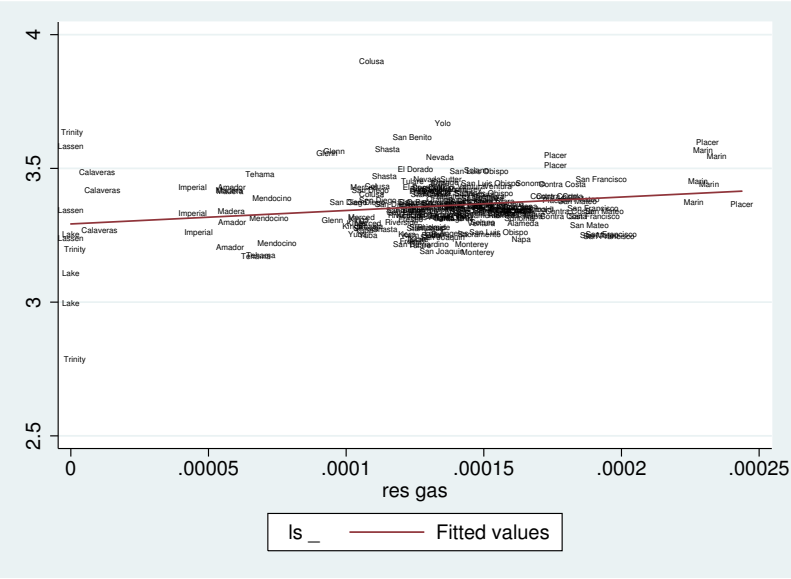


Figure 11: IfGASIs

SORTED OON ELERES		
county	eleres	eletot
Trinity	0.8	8.1
Monterey	1.8	5.9
Inyo	1.9	4.5
Santa Barbara	1.9	7.5
San Francisco	1.9	7.3
Los Angeles	2.0	6.8
Alameda	2.0	7.2
San Benito	2.1	5.6
San Diego	2.1	6.1
Ventura	2.1	6.5
Santa Clara	2.2	9.3
San Bernardino	2.2	6.5
San Mateo	2.3	6.6
Kings	2.3	9.7
Orange	2.3	6.9
Santa Cruz	2.3	4.8
Solano	2.4	7.5
San Luis Obispo	2.4	6.1

San Joaquin	2.4	8.1
Yolo	2.5	8.2
Kern	2.5	17.7
Tulare	2.5	8.5
Merced	2.6	14.1
Contra Costa	2.6	8.8
Madera	2.7	9.1
Fresno	2.7	7.5
Napa	2.8	7.5
Marin	2.8	5.6
Sonoma	2.8	5.9
Sutter	2.8	6.3
Yuba	2.8	6.7
Riverside	2.8	6.2
Imperial	2.8	8.0
Colusa	3.0	12.0
Lassen	3.0	11.5
Stanislaus	3.2	8.9
Sacramento	3.2	7.5
Glenn	3.3	10.7
Butte	3.3	6.5
Humboldt	3.6	6.8
Tehama	3.7	7.8
Amador	3.7	8.4
Placer	3.8	8.4
Mendocino	3.9	6.8
Mariposa	4.0	6.2
Tuolumne	4.1	8.1
Shasta	4.2	8.8
El Dorado	4.2	6.9
Nevada	4.3	6.7
Calaveras	4.4	7.1
Lake	4.6	7.0
Del Norte	4.8	8.1
Plumas	5.2	10.2
Siskiyou	5.4	11.2
Mono	6.6	14.5
Alpine	.	.
Sierra	.	.
Modoc	.	.

SORTED ON GASRES

county	gasres	gastot
Lake	0.0	0.0
Lassen	0.0	0.0
Trinity	0.2	0.5
Calaveras	1.0	2.0
Imperial	4.4	17.6
Madera	5.8	28.3
Amador	5.8	24.1
Tehama	6.9	17.3
Mendocino	7.3	12.1
Glenn	9.5	27.6
Kings	10.2	44.9
Merced	10.6	45.3
Yuba	10.7	16.6
San Diego	10.9	18.1
Colusa	11.1	121.9
Shasta	11.4	19.2
Riverside	12.1	18.3
Kern	12.1	276.3
San Benito	12.2	23.7
Fresno	12.3	30.3
Tulare	12.4	35.3
El Dorado	12.7	17.3
Stanislaus	12.9	33.6
San Bernardino	13.2	24.1
Orange	13.4	21.2
Nevada	13.4	19.1
Butte	13.4	21.6
Yolo	13.5	30.9
San Joaquin	13.5	28.9
Sutter	13.8	22.7

Los Angeles	13.8	31.8
Monterey	13.9	26.0
Santa Cruz	13.9	21.9
Santa Clara	14.5	25.6
Sacramento	14.8	22.2

Ventura	14.9	24.3
San Luis Obispo	15.0	29.3
Solano	15.1	54.6
Santa Barbara	15.5	29.9
Humboldt	15.7	24.7

Alameda	15.8	27.7
Sonoma	16.0	23.7
Napa	16.6	29.2
Placer	17.6	26.1
Contra Costa	17.8	96.4

San Mateo	18.4	30.7
San Francisco	19.0	32.7
Marin	22.6	31.4
Modoc	.	.
Alpine	.	.

Del Norte	.	.
Siskiyou	.	.
Inyo	.	.
Plumas	.	.
Mono	.	.

Sierra	.	.
Mariposa	.	.
Tuolumne	.	.

And now regressions. Natural gas usage is a function of its availability, not necessarily gas hunger—for instance Lassen County has zero natural gas use. Furthermore if gas is unused then it may be compensated with other sources, hence electricity and gas in one regression. And as expected, no effect in happiness.

Table 6: CAols1

	elers1	elers2	elers3	eletot1	eletot2	eletot3	gasres1	gasres2	gasres3	gastot1	gastot2
m kWh per 1k people	0.020	0.023	0.009				0.041**	0.041*	0.016		
per capita personal income	0.000**	0.000***	0.000	0.000*	0.000**	0.000	0.000	0.000	-0.000	0.000***	0.000***
popDen		-0.000*	-0.000		-0.000**	-0.000		-0.000+	-0.000		-0.000**
avgJanTemp		0.001	0.002		-0.001	0.002		0.001	0.002		-0.002
avgJulTemp		0.003	0.003		0.003	0.003		-0.000	0.001		0.002
gh			0.135*			0.146**			0.105+		
supp			0.183*			0.185*			0.194*		
m kWh per 1k people				0.001	0.001	0.002				0.007	0.006
m Therms 100k people							0.005	0.005	0.004		
m Therms 100k people										-0.000	-0.000
constant	3.227***	2.916***	1.773***	3.294***	3.085***	1.764***	3.134***	3.092***	1.966***	3.229***	3.160***
N	219	219	219	219	219	219	198	198	198	198	198

+p<0.10 *p<0.05 **p<0.01 ***p<0.001; robust standard errors

and in table 7 a bit of bumner –electricity residential appears to have effect on happiness if in fixed effects model adn together with natural gas:(

Table 7: CAfe1

	elers1	elers2	elers3	gasres1	gasres2	gasres3
m kWh per 1k people	0.053*	0.062*	0.037	0.154***	0.164***	0.149***
per capita personal income	-0.000	0.000	0.000	-0.000	0.000	0.000
popDen		-0.000	0.000		-0.000	-0.000
avgJanTemp		0.005	0.005		0.005	0.006+
avgJulTemp		0.001	0.006		-0.001	0.001
gh			0.175**			0.177***
supp			0.148**			0.067
m Therms 100k people				-0.007	-0.004	0.005
constant	3.363***	2.975***	1.322+	3.056***	2.799***	1.533*
N	219	219	219	198	198	198

+p<0.10 *p<0.05 **p<0.01 ***p<0.001; robust standard errors

8 Counties–SMART version

A limitation of BRFSS data at county level is that it is not representative of counties. And there are likely problems—for instance Mono county increased happiness from 2.82 in 2008 to 3.62, which is an extremely large increase and likely due to sampling. To perform a robustness check whether these results may be due to sampling, we have rerun models using SMART version of data that is representative of counties

!!TODO!!

References

- ABDALLAH, S., S. THOMPSON, AND N. MARKS (2008): "Estimating worldwide life satisfaction," *Ecological Economics*, 65, 35–47.
- BERRY, B. J. AND A. OKULICZ-KOZARYN (2011): "An Urban-Rural Happiness Gradient," *Urban Geography*, 32, 871–883.
- BRERETON, F., J. CLINCH, AND S. FERREIRA (2008): "Happiness, Geography and the Environment," *Ecological Economics*, 65, 386–396.
- FUGUITT, G. V. AND D. L. BROWN (1990): "Residential Preferences and Population Redistribution: 72-1988," *Demography*, 27, 589–600.
- FUGUITT, G. V. AND J. J. ZUICHES (1975): "Residential Preferences and Population Distribution," *Demography*, 12, 491–504.
- OKULICZ-KOZARYN, A. (2014): "Natural Sprawl," *Forthcoming in Administration & Society (Disputatio Sine Fine section)*.