Is Energy Efficiency Well-Targeted?

Hunt Allcott
New York University
National Bureau of Economic Research
E2e
ideas42
Poverty Action Lab

Rand Paul on energy efficiency

“This is what your energy efficiency standards are. Call it what it is. You prevent people from making things that consumers want. I find it really appalling and hypocritical and think there should be some self-examination from the administration on the idea that you favor a woman’s right to an abortion, but you don’t favor a woman or a man’s right to choose what kind of light-bulb, what kind of dishwasher, what kind of washing machine. I really find it troubling – this busy-body nature that you want to come into my house, my bathroom, my bedroom, my kitchen, my laundry room.”

– Rand Paul, US Senator from Kentucky

March 2011

The Competitive Enterprise Institute on energy efficiency

"Federally mandated energy efficiency has been touted as a real win/win policy for consumers – we save on energy and enjoy the societal benefits from a national decline in energy use. In reality, it has been lose/lose – we must endure the negative effects of Washington's preoccupation with energy conservation while the overall policy proves pointless.

"The real winners are the hundreds of energy-efficiency bureaucrats and allied activists, most of whom receive substantial federal funding for their efforts."

– Ben Lieberman, Competitive Enterprise Institute

April 1999

The Heritage Foundation on energy efficiency

“Proponents of [energy efficiency] programs argue that they save consumers and businesses money, reduce energy use, and reduce emissions. They ignore the fact that markets already incentivize Americans to be more energy efficient. They further disregard consumer preferences as well as the unintended consequences and energy inefficiencies that mandates and subsidies cause.

“The government should remove efficiency standards and give American families and businesses the freedom to pursue energy efficiency where it makes sense for them according to their individual preferences and budgets.”

– Nicolas Loris, The Heritage Foundation

March, 2013

What do free market proponents know that we don't?!

They know (classical) economics!

Adam Smith, 1776

*… by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an **invisible hand** to promote an end which was no part of his intention.*

Vilfredo Pareto, 1894

Il massimo di utilita data dalla libera concorrenza

The First Fundamental Theorem of Welfare Economics

- Under the assumption that there are no market failures,
  - Externalities, monopoly power, transactions costs, etc.
- *free markets are efficient.*
- **Market failures** justify energy efficiency policy
  1. Credit constraints
  2. Imperfect information
     1. Buying/renting cars, appliances, homes
  3. Consumer mistakes
  4. Energy is mispriced

Ken Arrow

Is energy efficiency well-targeted?

- Hundreds of policy analysts and policy implementers at this conference …
- Billions of dollars in public spending …
- All justified by market failures

- My question today:
- *How well-**targeted** are our efforts at the market failures that justify our efforts?*

Why targeting matters (historical example)

- The peasants have no bread? “Let them eat cake.”
  - “A great princess” in Rousseau’s Confessions, 1782

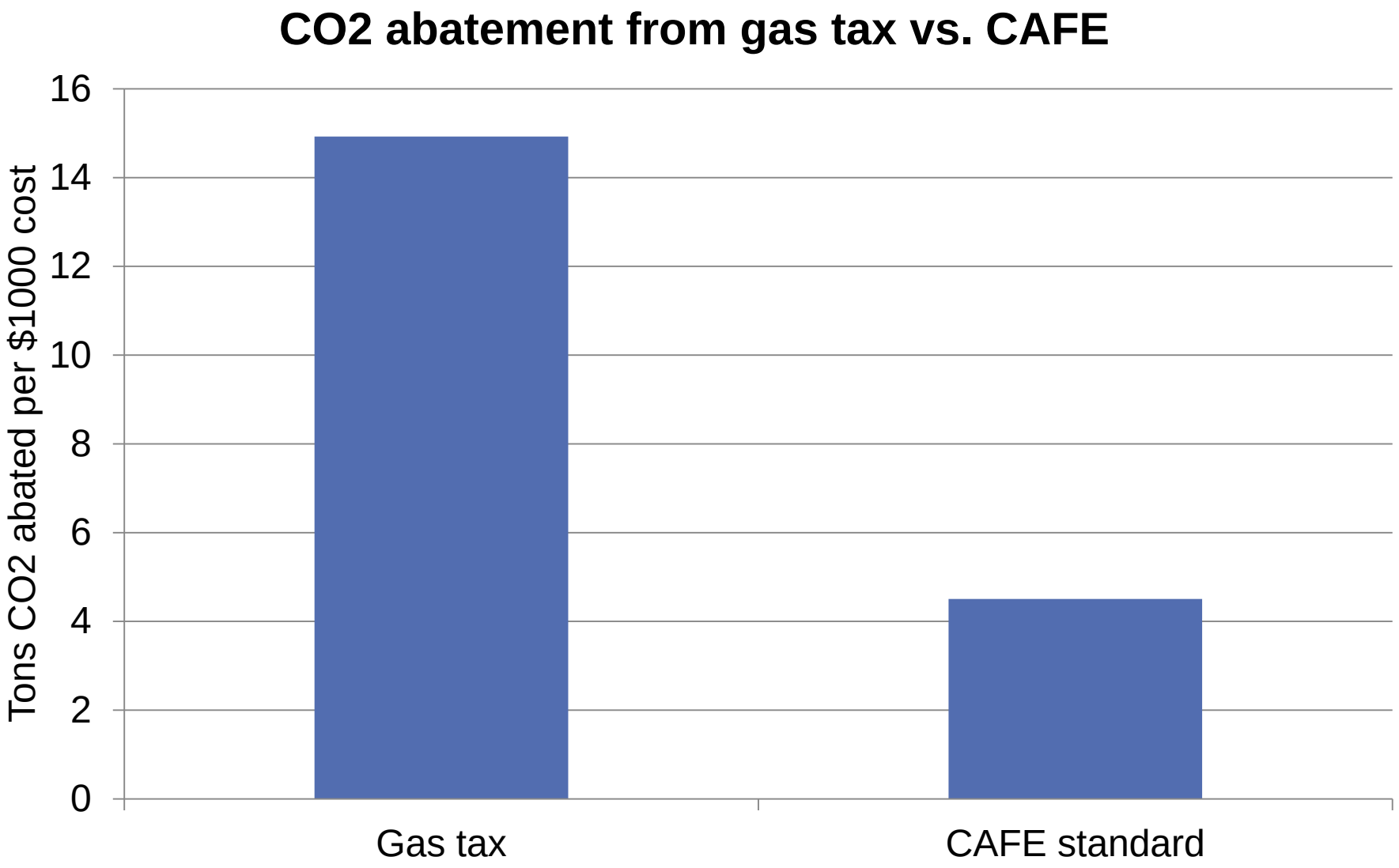
- This solution didn’t **target** the real problem: the peasants didn’t have money for bread or cake.

Why targeting matters (closer to home)

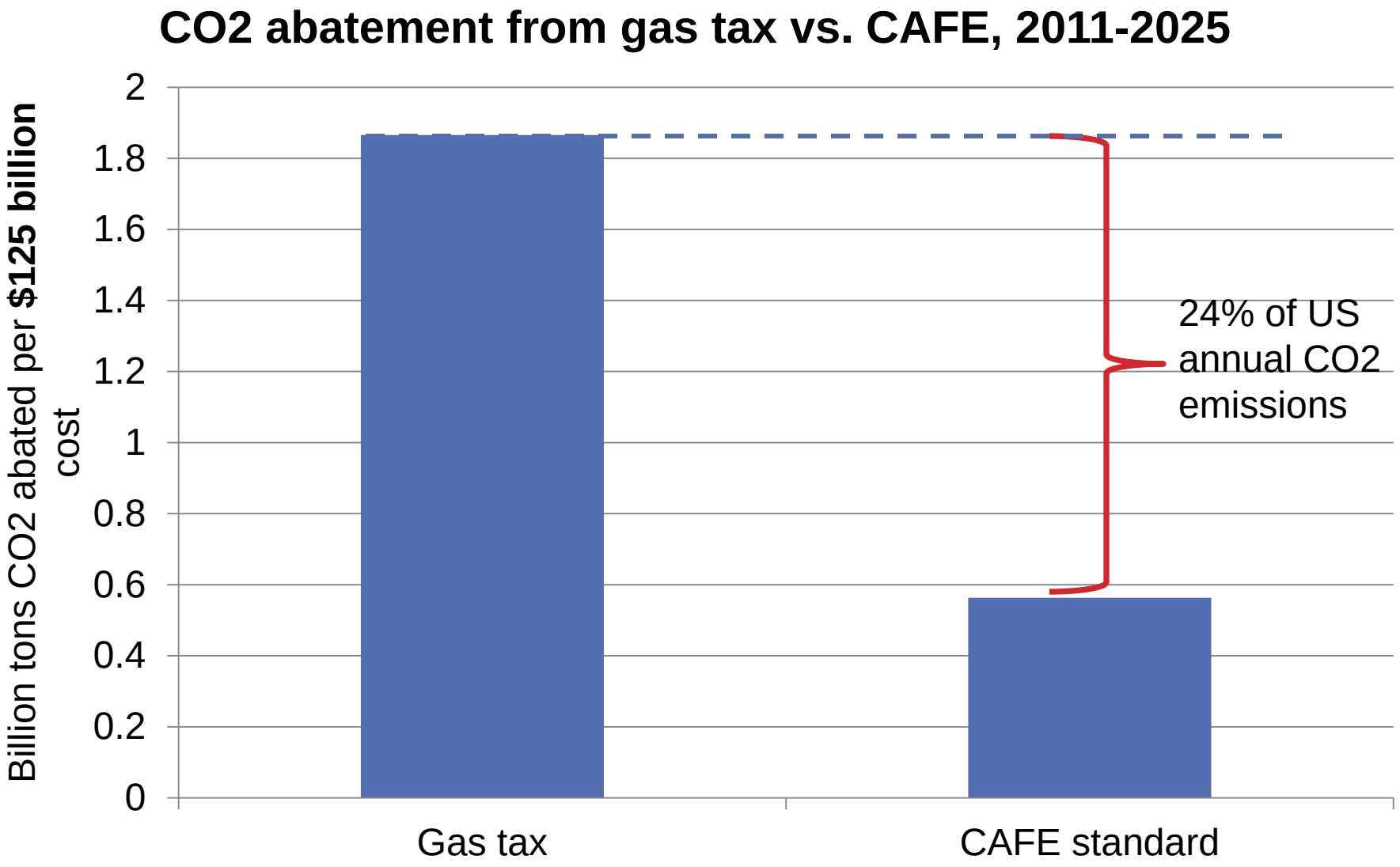
- Key goal of Corporate Average Fuel Economy standards: reduce carbon emissions
- Justified by a **market failure**: carbon emissions impose an unpriced externality on others.
- What's the most direct way to **target** the unpriced carbon externality?
- Price carbon
  - i.e. tax gasoline

- CAFE standards are a "second-best" approach: they don't precisely **target** the market failure

Why targeting matters (closer to home)



CAFE standards: environmental tragedy?



How well-targeted is energy efficiency …

1. at people?
2. at places?
3. as a policy instrument?

- Approach: compare policies to the market failures they are intended to correct:
  1. Credit constraints
  2. Imperfect information
     1. Buying/renting cars, appliances, homes
  3. Consumer mistakes
  4. Energy is mispriced

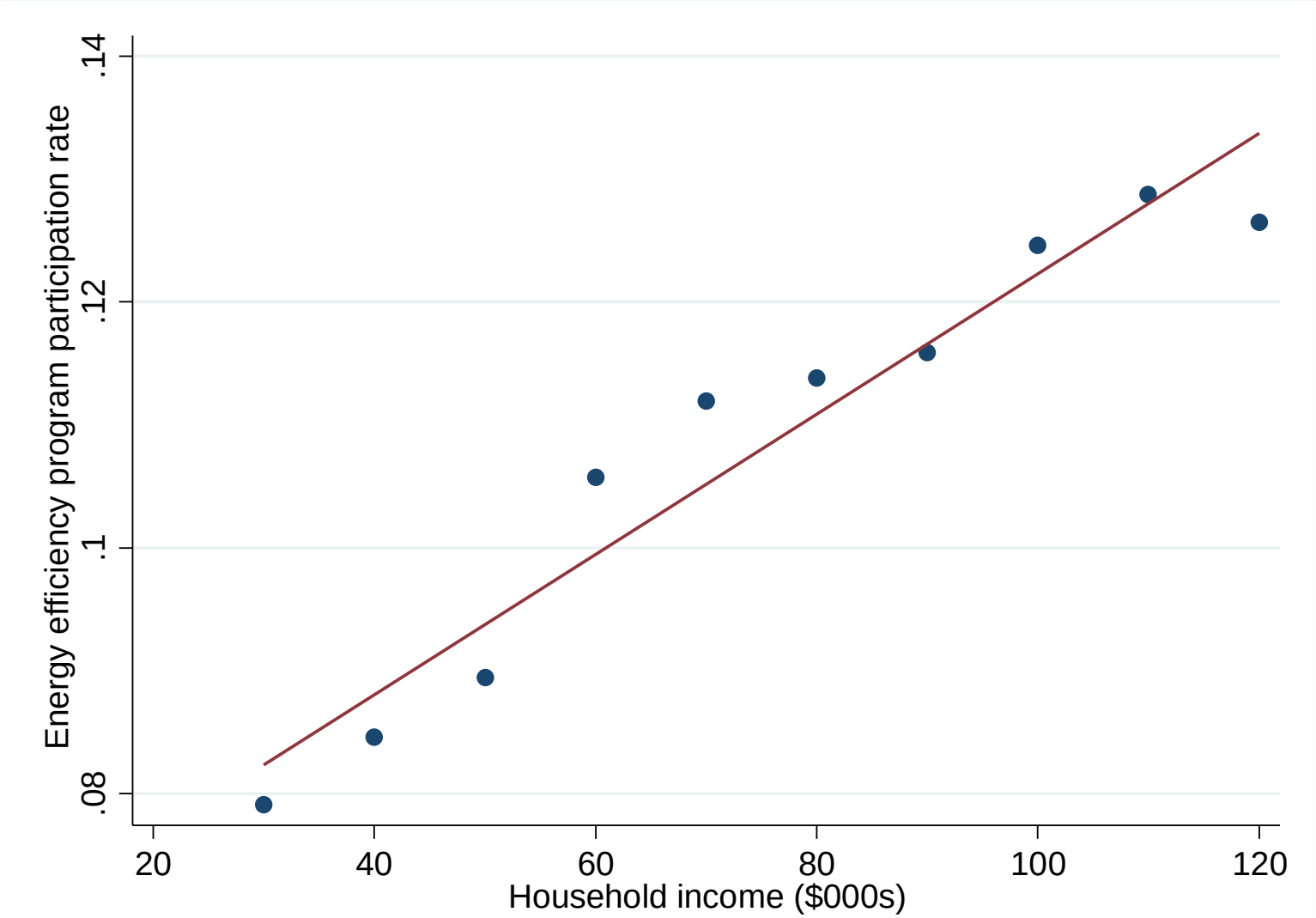
How well-targeted is energy efficiency … **at people?**

- Market failures that energy efficiency is intended to correct:
  - Credit constraints
  - Imperfect information
    - Buying/renting cars, appliances, homes
  - Consumer mistakes

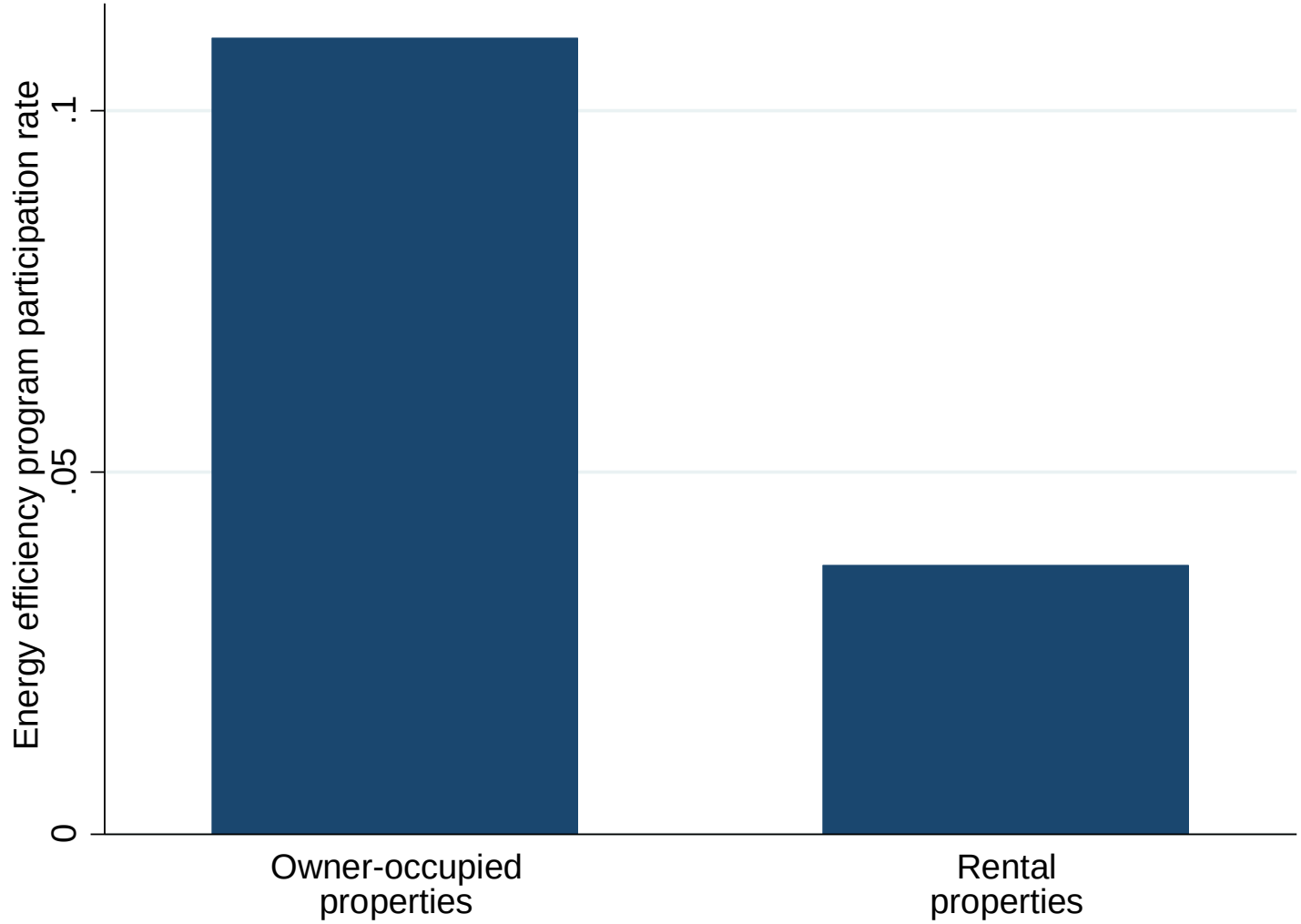
- So we want to target energy efficiency programs at people who are affected by these market failures:
  - less wealthy
  - landlords/renters
  - not environmentalists

- Is this what's happening?
  - Will use the example of a major [anonymous] utility with large energy efficiency programs.

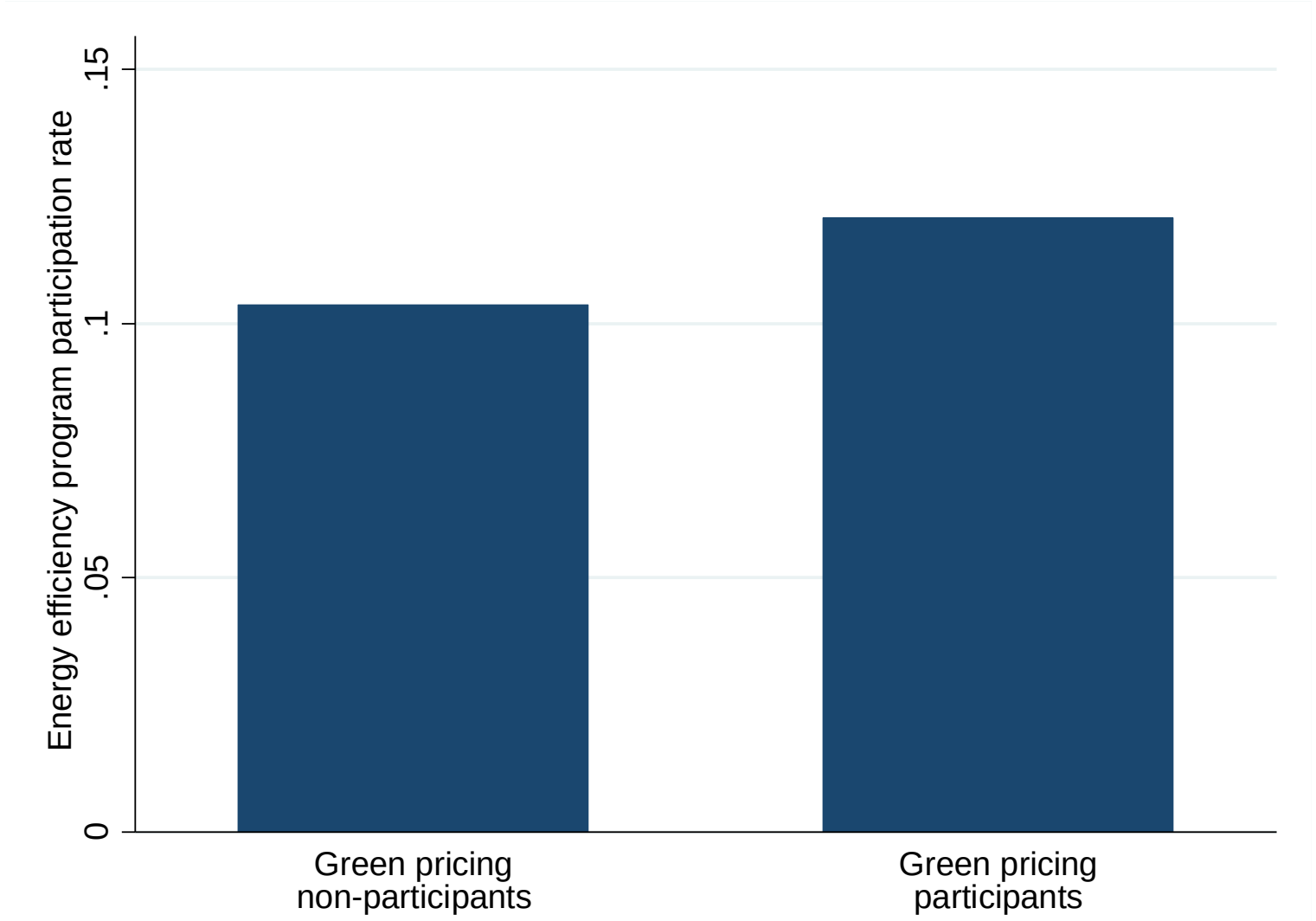
Energy efficiency is for the rich



Energy efficiency is **not** for landlords/tenants



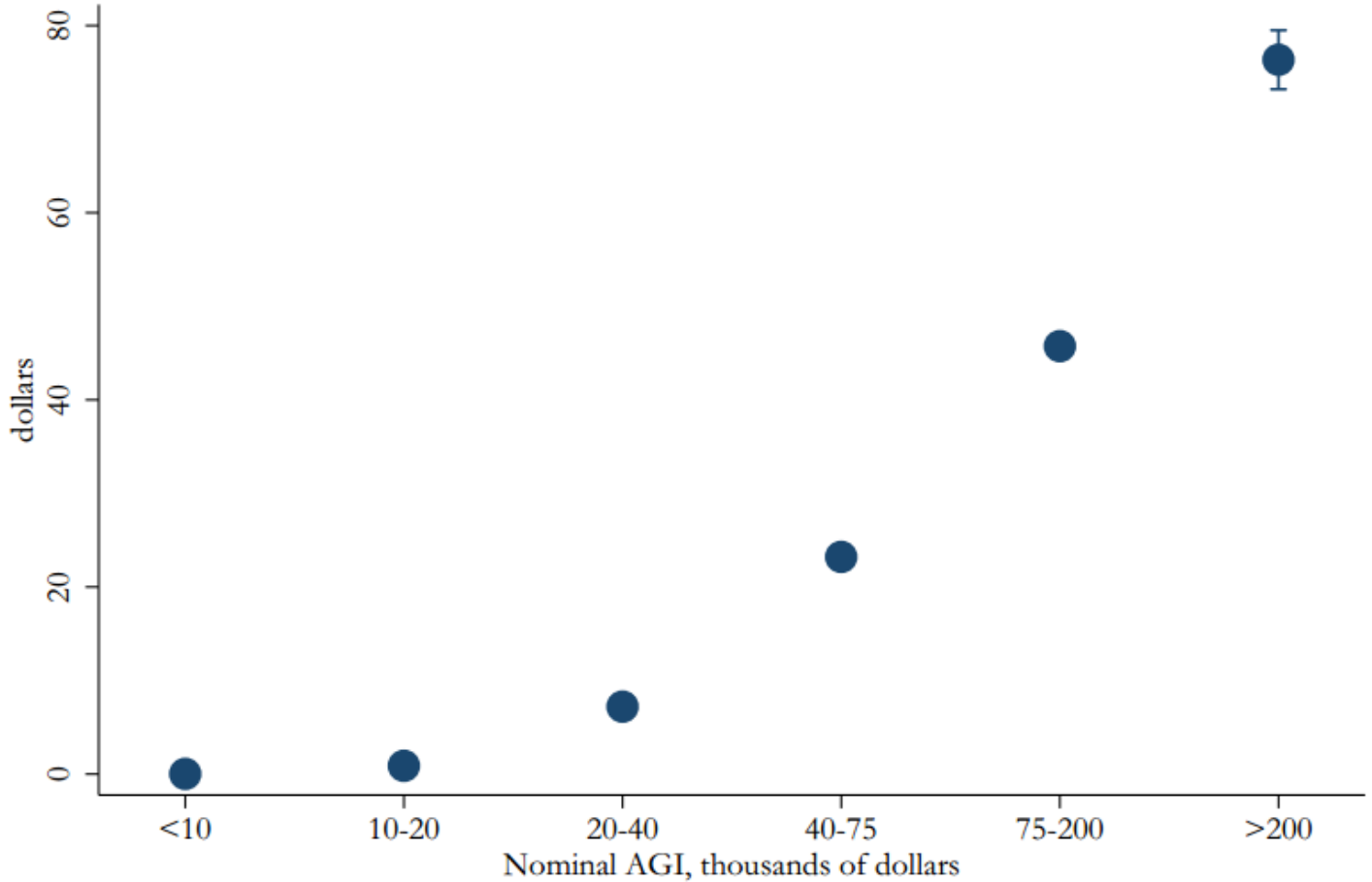
Energy efficiency is for environmentalists



Residential Energy Credits are also for the rich

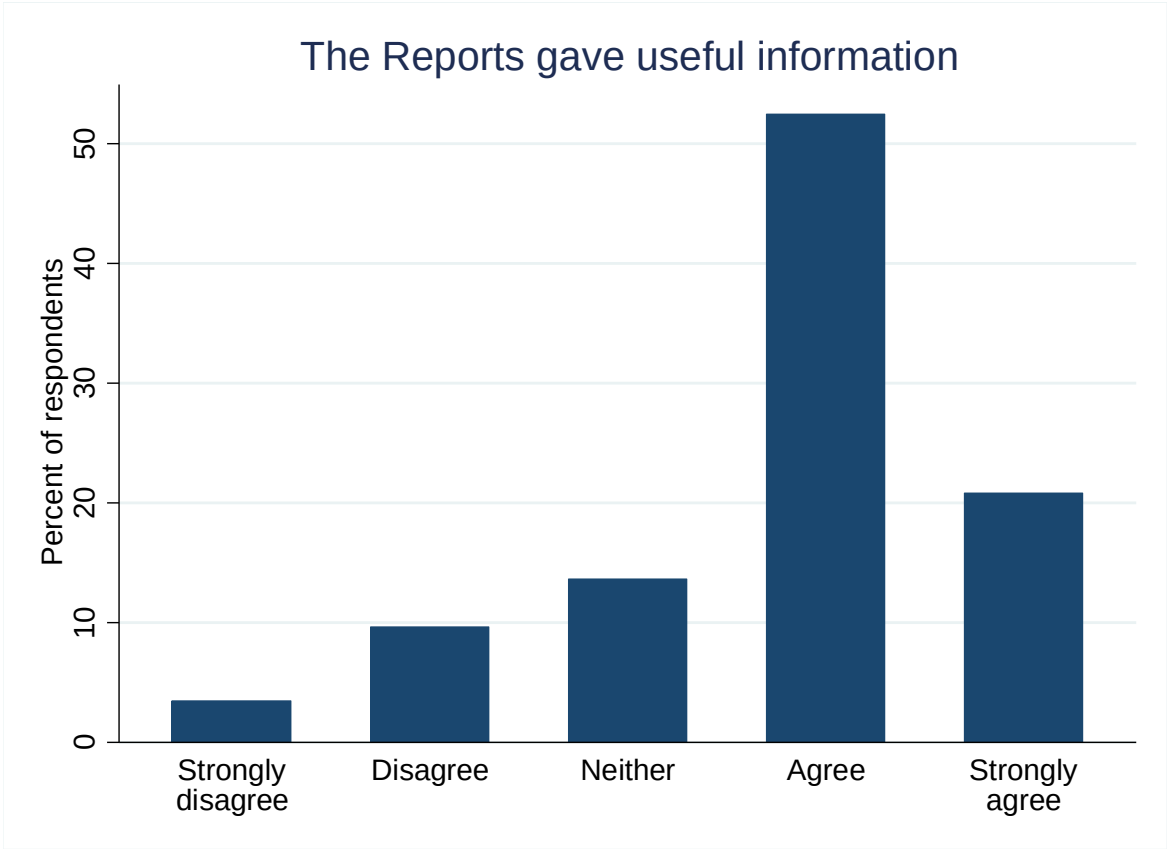
Figure 5: Average Credit Per Return, by Adjusted Gross Income

A: Residential Energy Credits, 2006-2012



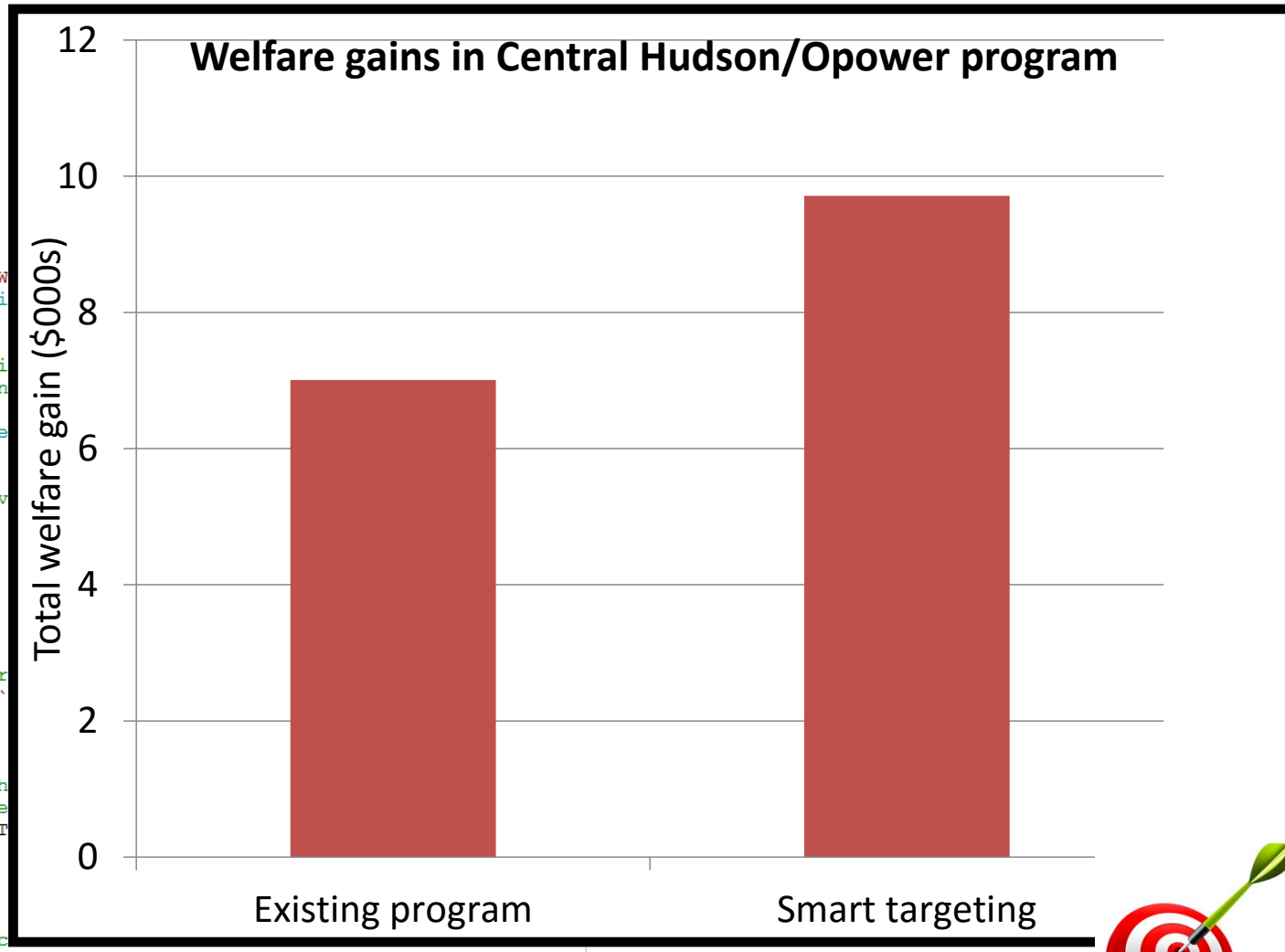
How can we better target people?

Use data



Better targeting with customer data

```
45  /* Loop over the objectives */
46  global ObjectiveList = "tau WTP W
47  foreach Objective in $ObjectiveLi
48      ** Initialize
49      gen delta_`Objective' = . //
50      global PVars = "" // Predicti
51      *local m_PVars = "" // Missin
52      local L = `L_`Objective'' //
53      local ShareTreated_`Objective
54
55      forvalues j = 1/$J {
56          * Initialize the objectiv
57          local Lj = -9999999
58          local ShareTreatedj = .
59          gen deltaj = .
60
61
62          foreach JVar in $XVars {
63
64              * Don't consider JVar
65              if strpos("$PVars","`
66                  continue
67              }
68
69              /* Predict using each
70              ** Initialize the pre
71              foreach Obj in tau WT
72                  gen `Obj'hat=.
73              }
74              forvalues k = 1/$K {
75                  if "`Objective'"
76                      ** WTP predic
77                      reg WTP `JVar' $PVars, robust, if k!=`k' & OptedOut!=1 // Respond
78                      predict WTPhattemp
79                      replace WTPhat = WTPhattemp if k==`k'
80                      drop WTPhattemp
```



How can we better target people?

Means testing

Weatherization Works

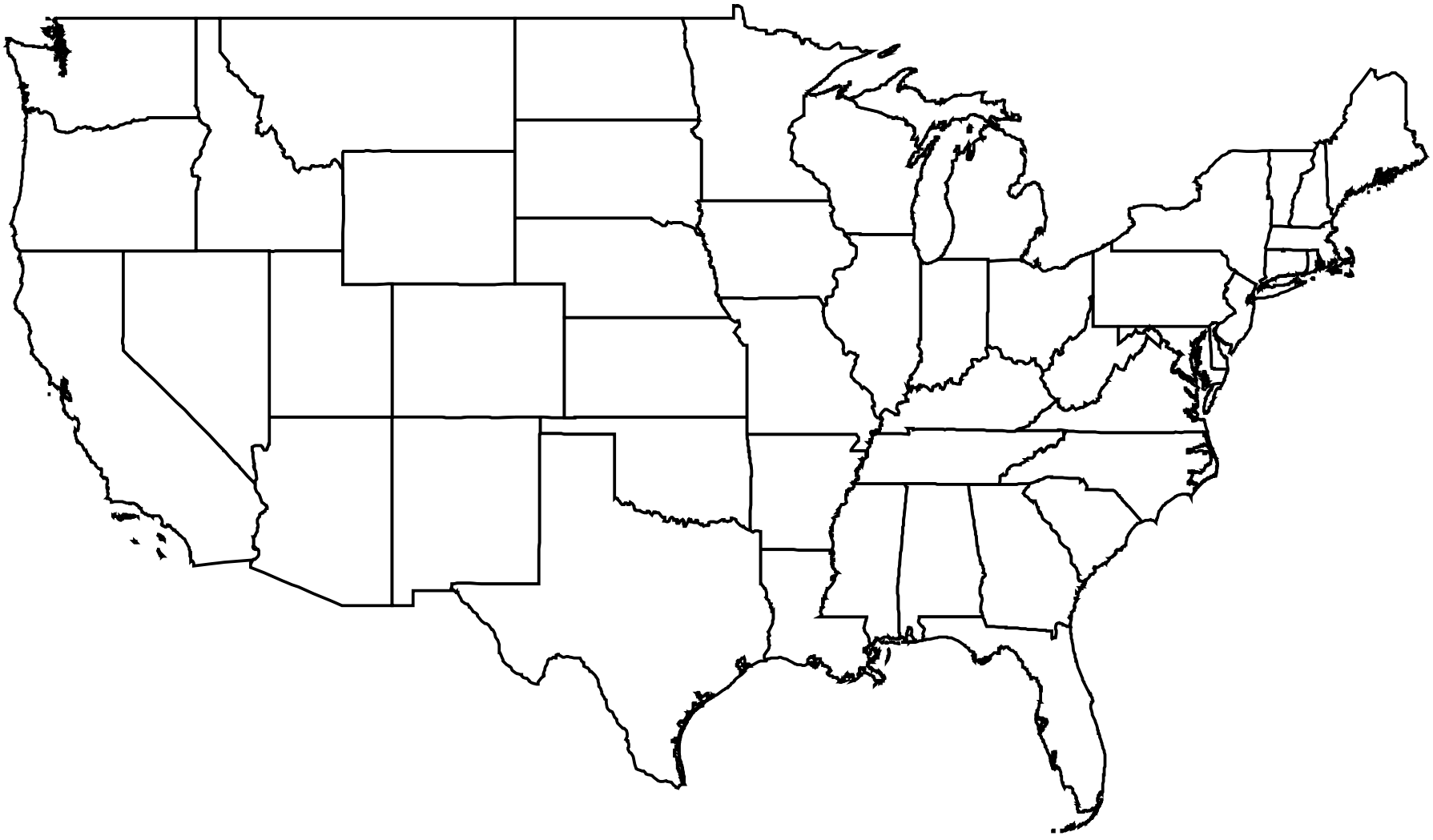
How well-targeted is energy efficiency … **at places?**

- Market failures that energy efficiency is intended to correct:
  - Credit constraints
  - Imperfect information
    - Buying/renting cars, appliances, homes
  - Consumer mistakes
  - Energy is mispriced

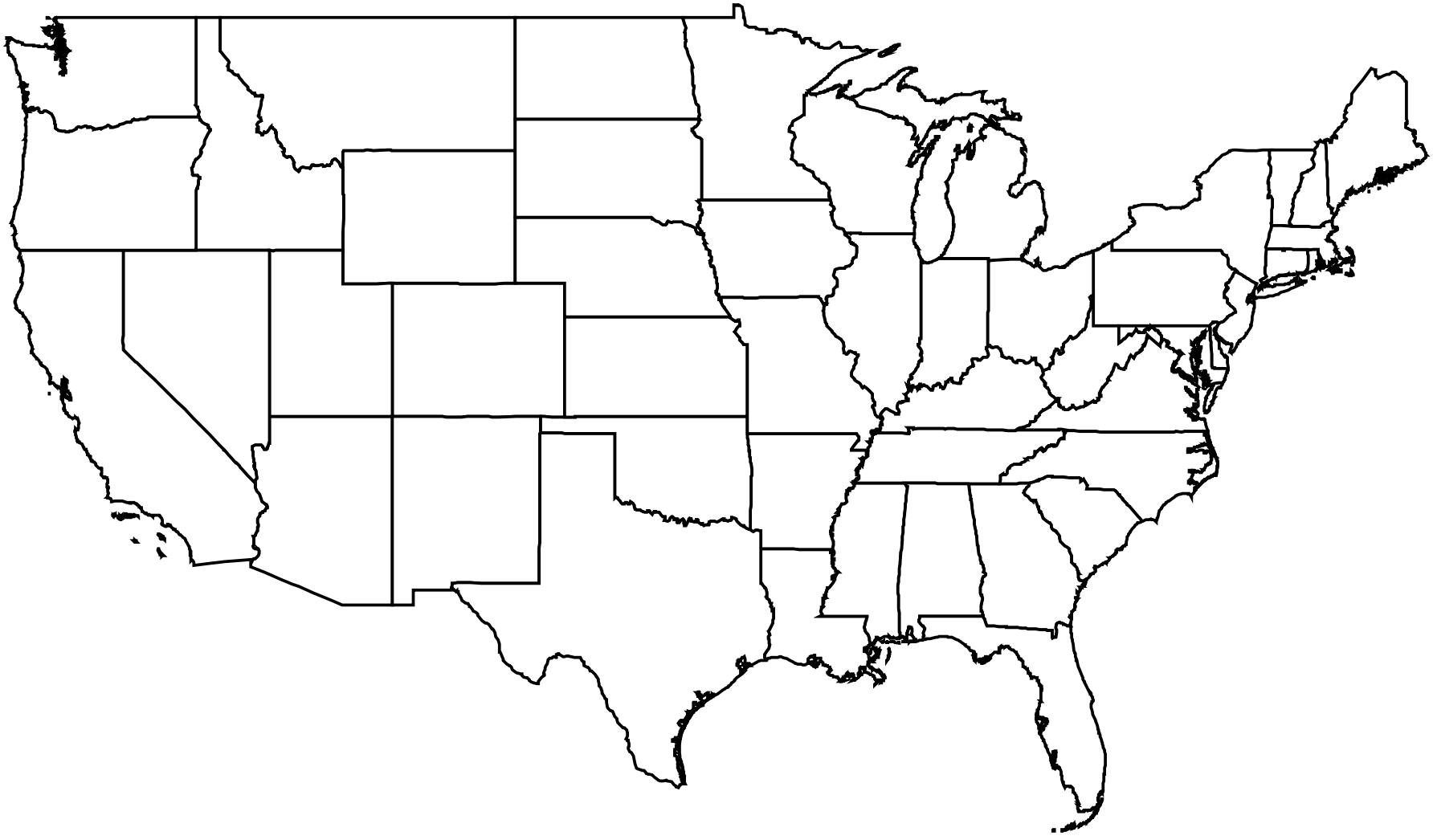
- So we want more energy efficiency programs in areas of the country that are more affected by these market failures:
  - less wealthy
  - fewer environmentalists
  - retail energy prices are “too low”

- Is this what’s happening?

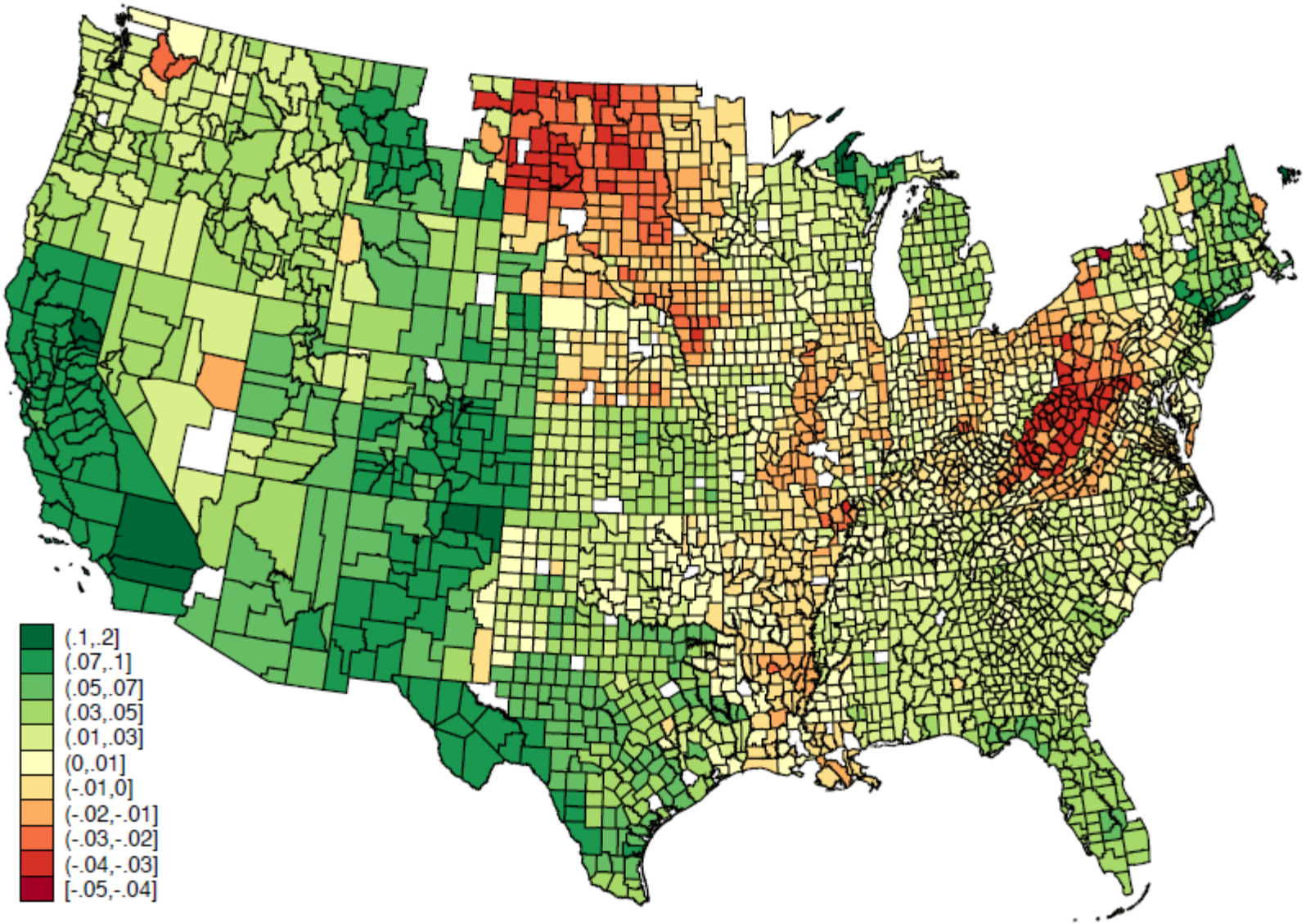
Mean Household Income



Hybrid Vehicle Share

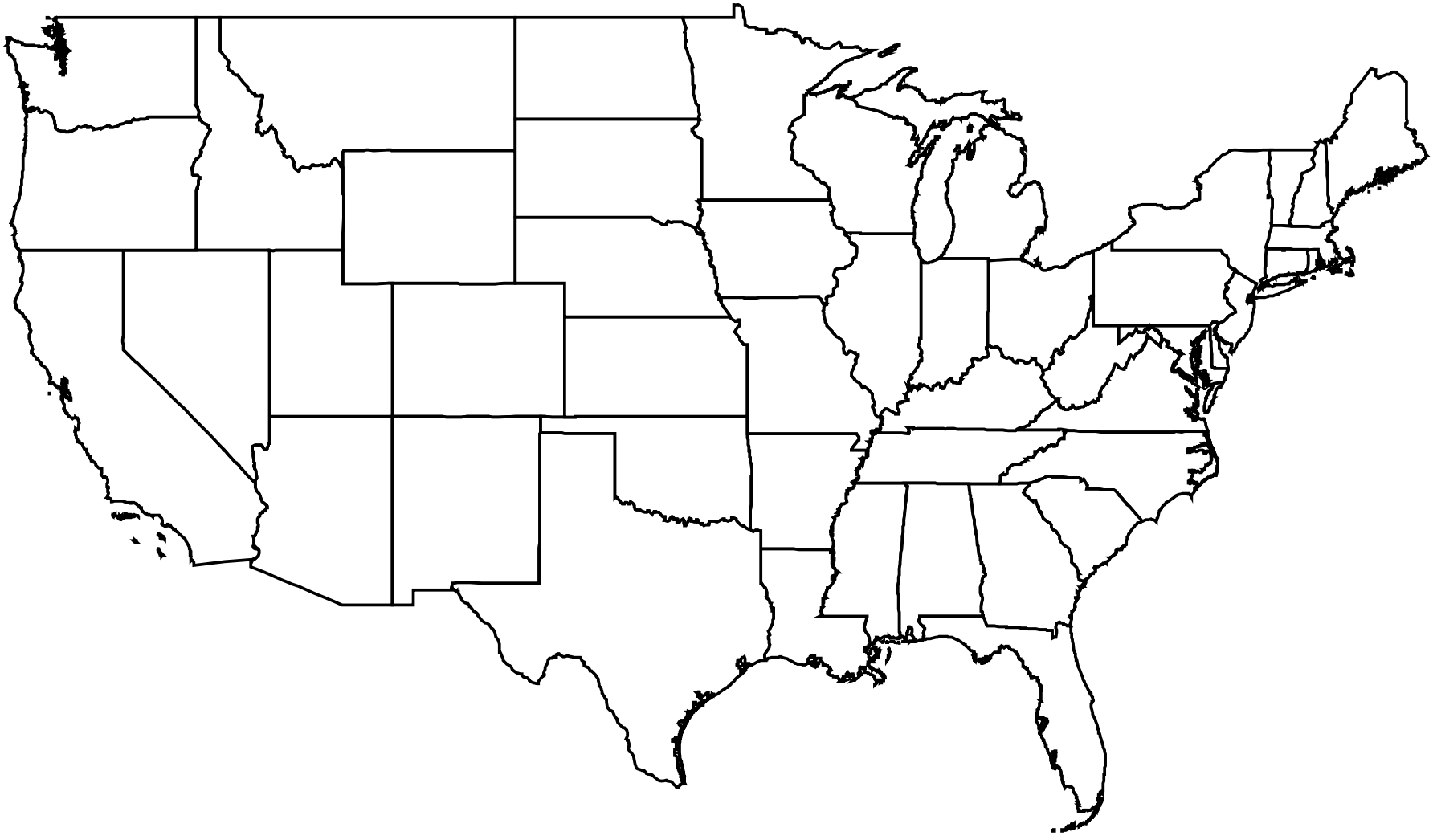


Estimated Price in Excess of Social MC ($/kWh)

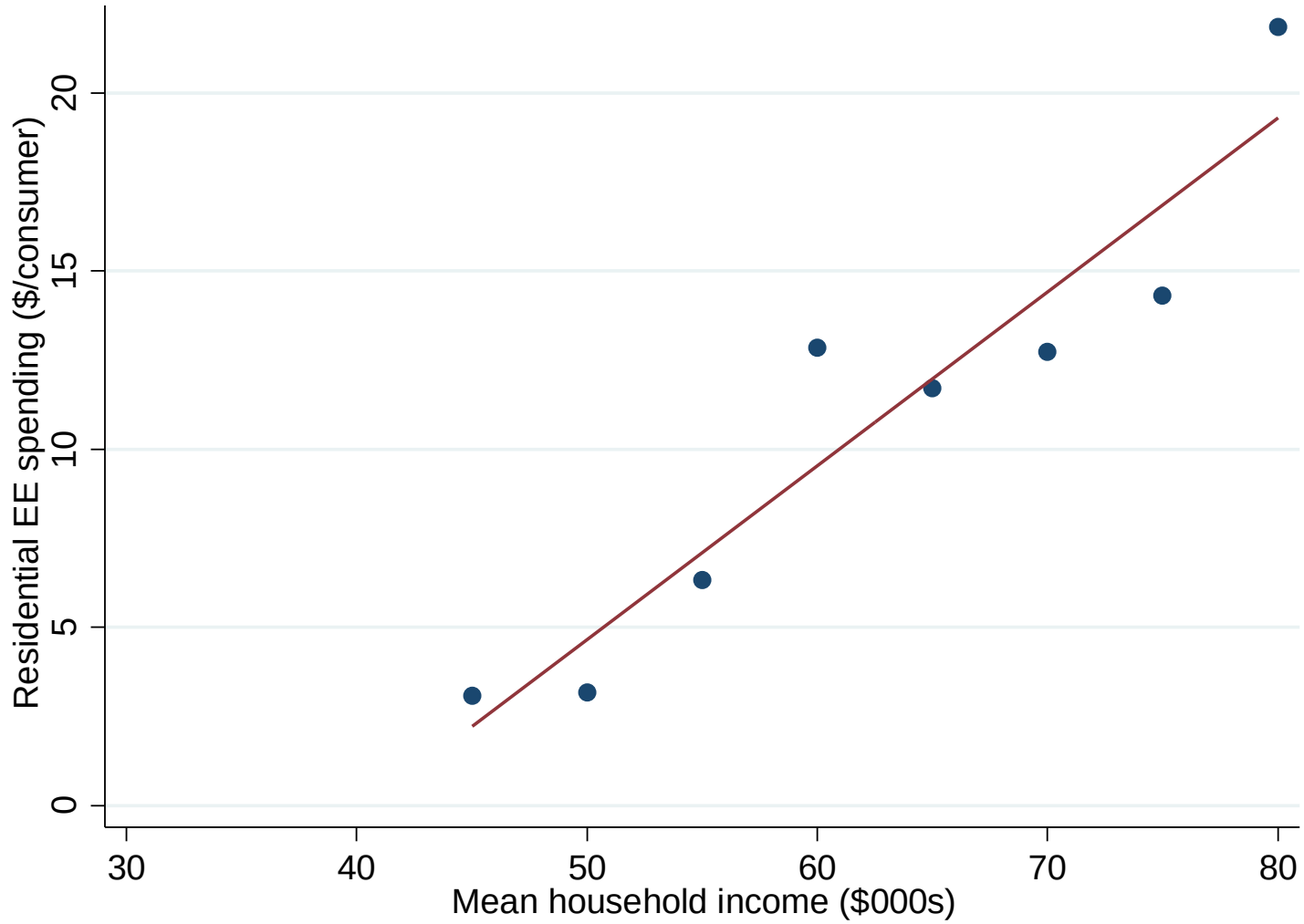


Notes: Residential bundled service customers only. Preliminary: Not for Citation or Recirculation

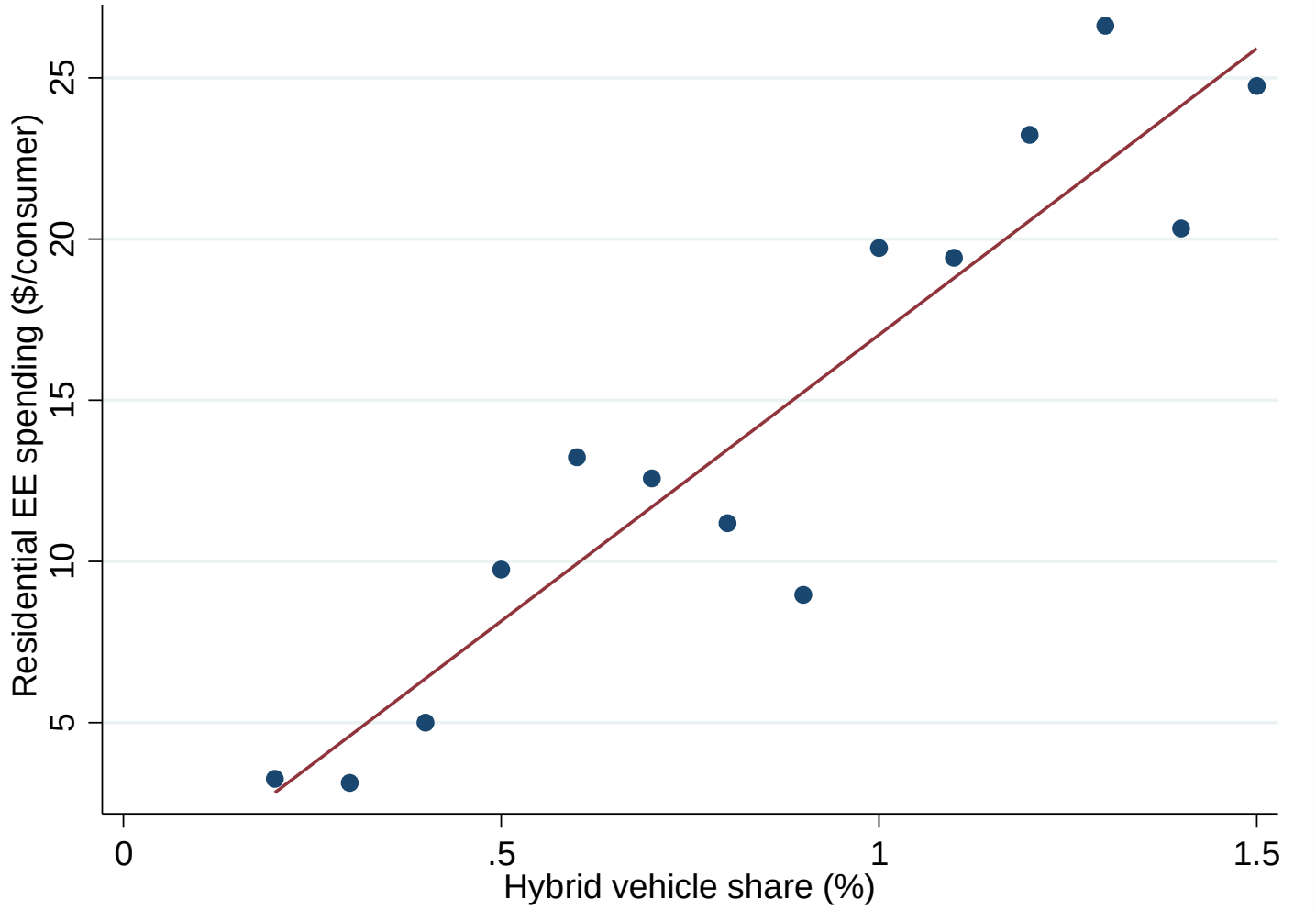
Residential Energy Efficiency Spending per Consumer



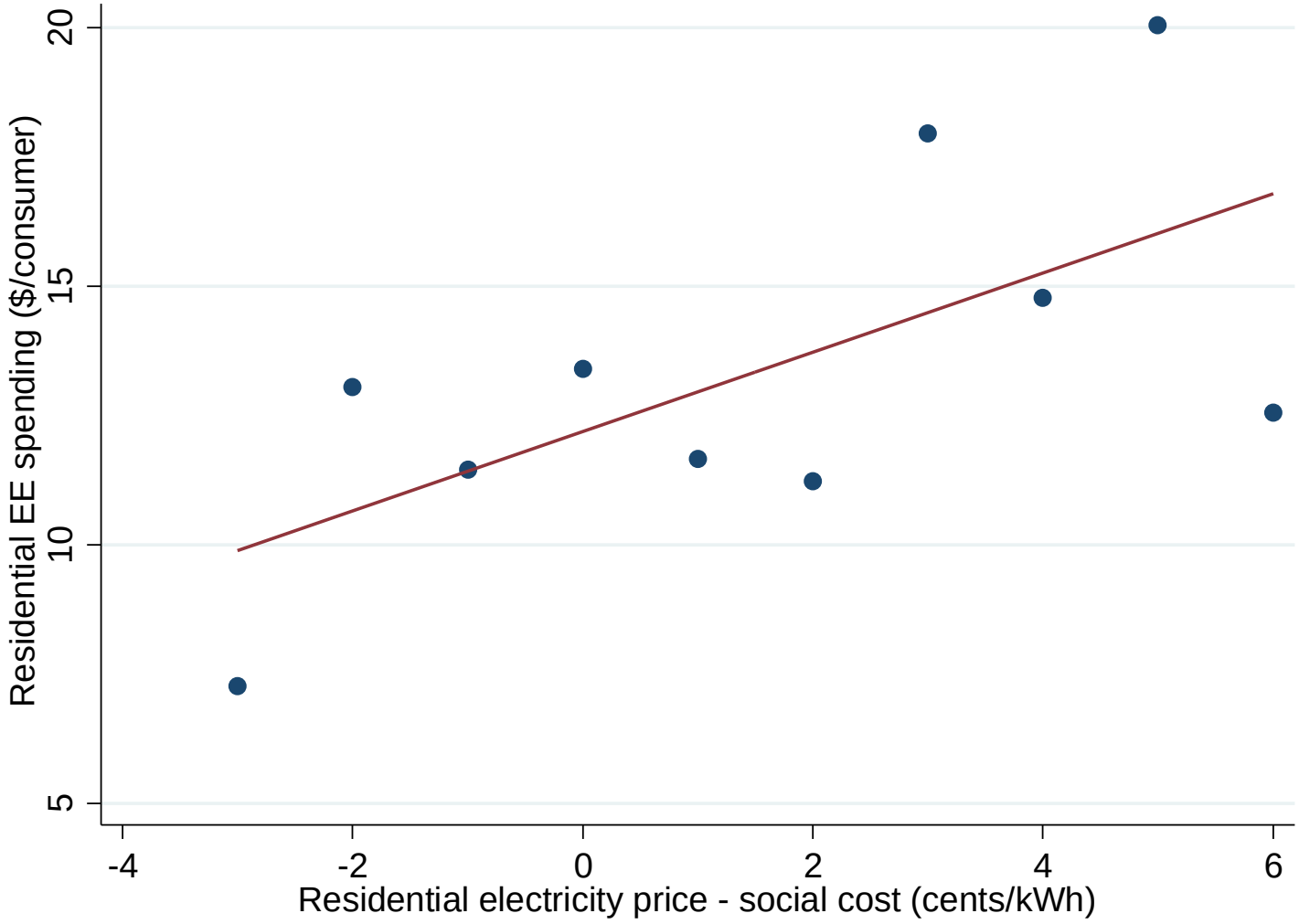
Wealthy areas have more energy efficiency



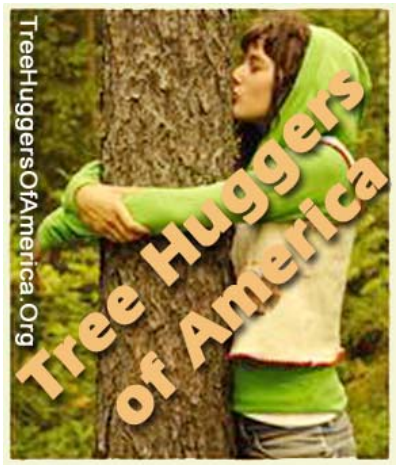
Environmentalist areas have more energy efficiency



Overpriced areas have more energy efficiency



This is not a statistical accident



Don't need energy efficiency

More interested in energy efficiency

- **Question:** *Can we target energy efficiency dollars and advocacy less at places like California and more at places like Alabama?*

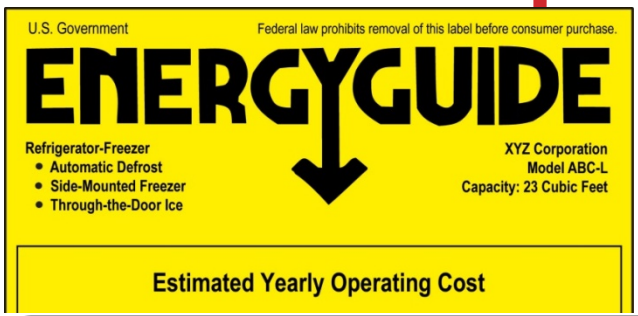
How well-targeted is energy efficiency … **as a policy instrument?**

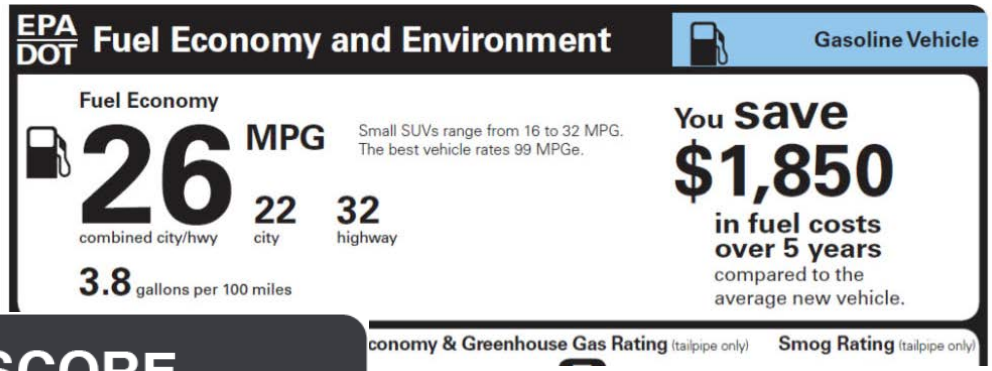
- Market failures that energy efficiency is intended to correct:
  - Credit constraints
  - Imperfect information
    - Buying/renting cars, appliances, homes
  - Consumer mistakes
  - Energy is mispriced

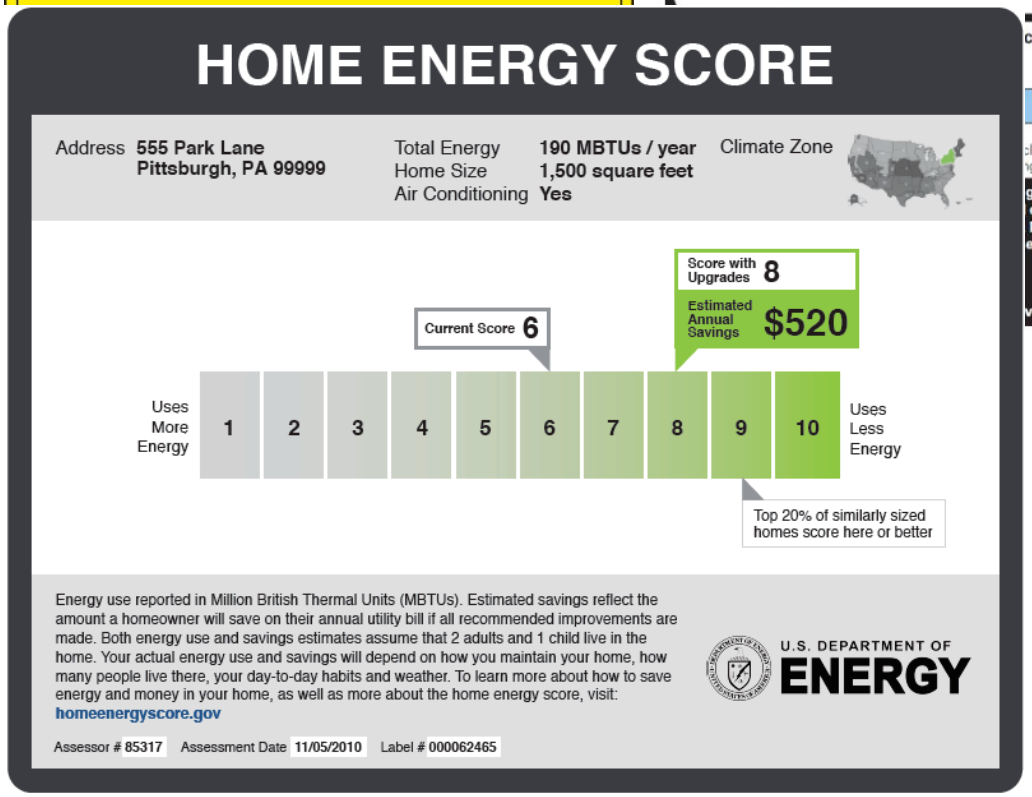
- So we want energy efficiency policies to
  - provide credit
  - provide information
  - help consumers make better decisions
  - get prices right

- Is this what's happening?

Well-targeted policy instruments: **information provision**







Well-targeted policy instruments: **loan programs**

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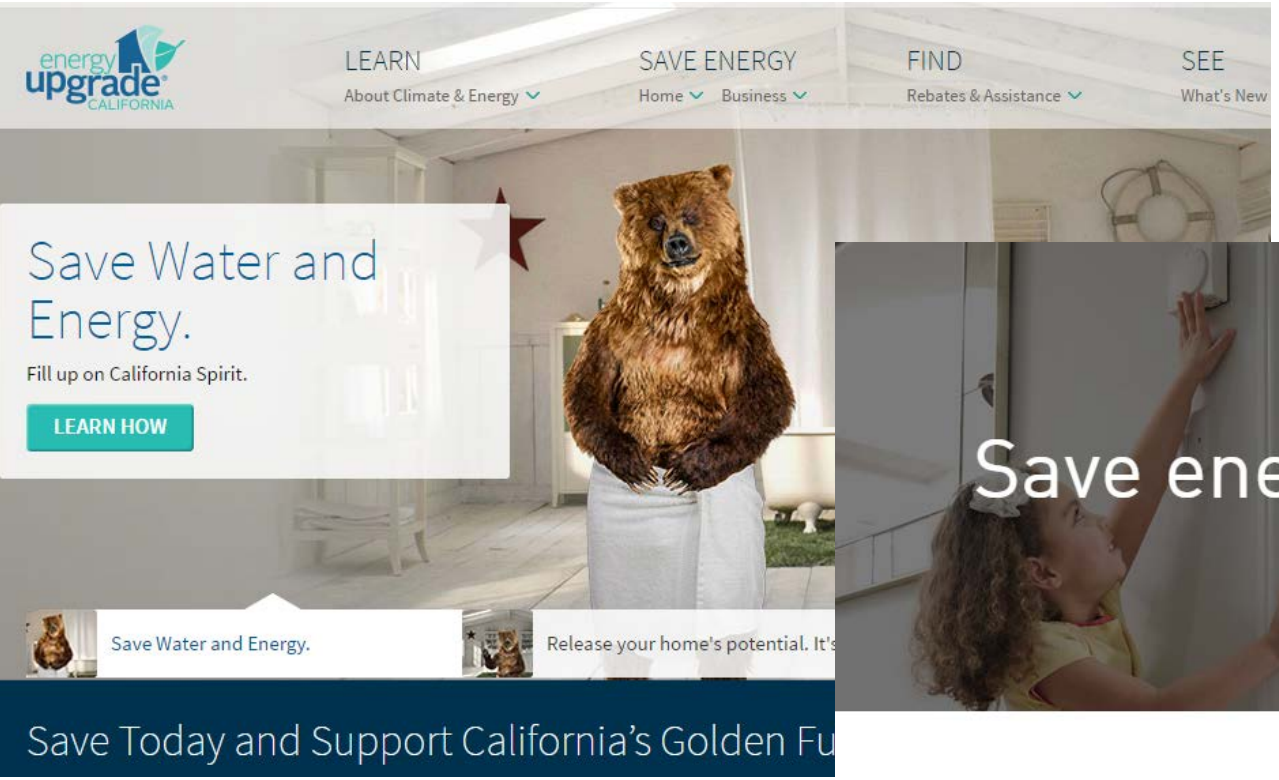
Special Financing for Residential Energy-Efficient Home Improver

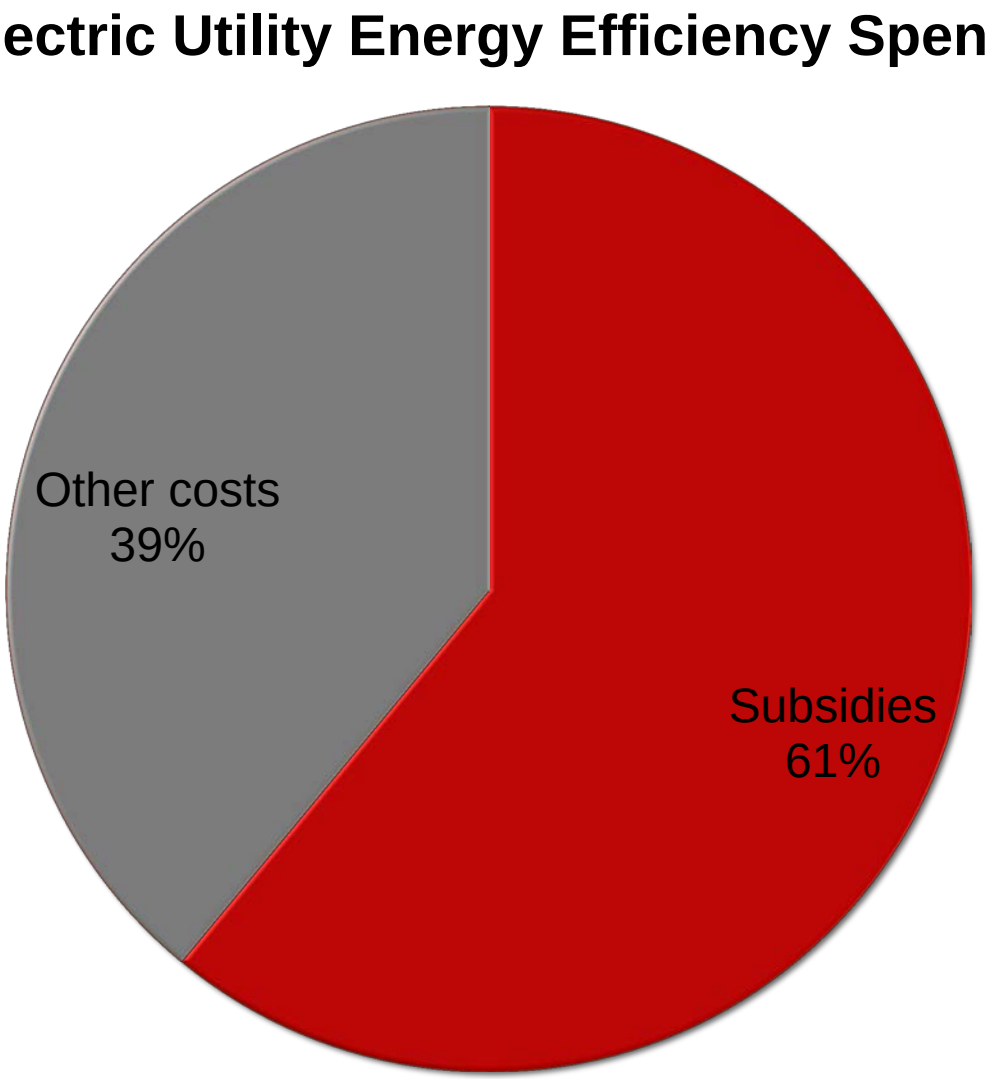
Poorly-targeted policy instruments: **subsidies**



Get up to $6,500* in rebates when you make your home more energy efficient

You can receive up to $6,500 in rebates when you make energy-saving home improvements. Energy Upgrade California® Home Upgrade evaluates all of the systems in your home to determine which upgrades can reduce your energy use and improve the comfort of your home.

61% of energy efficiency spending is on subsidies



Summary

- At least some energy efficiency programs target the people and places that need energy efficiency the least:
  - rich people
  - environmentalists
  - states where retail prices already too high and the grid is clean

- And the bulk of utility program spending is on subsidies instead of policies that precisely target market failures.

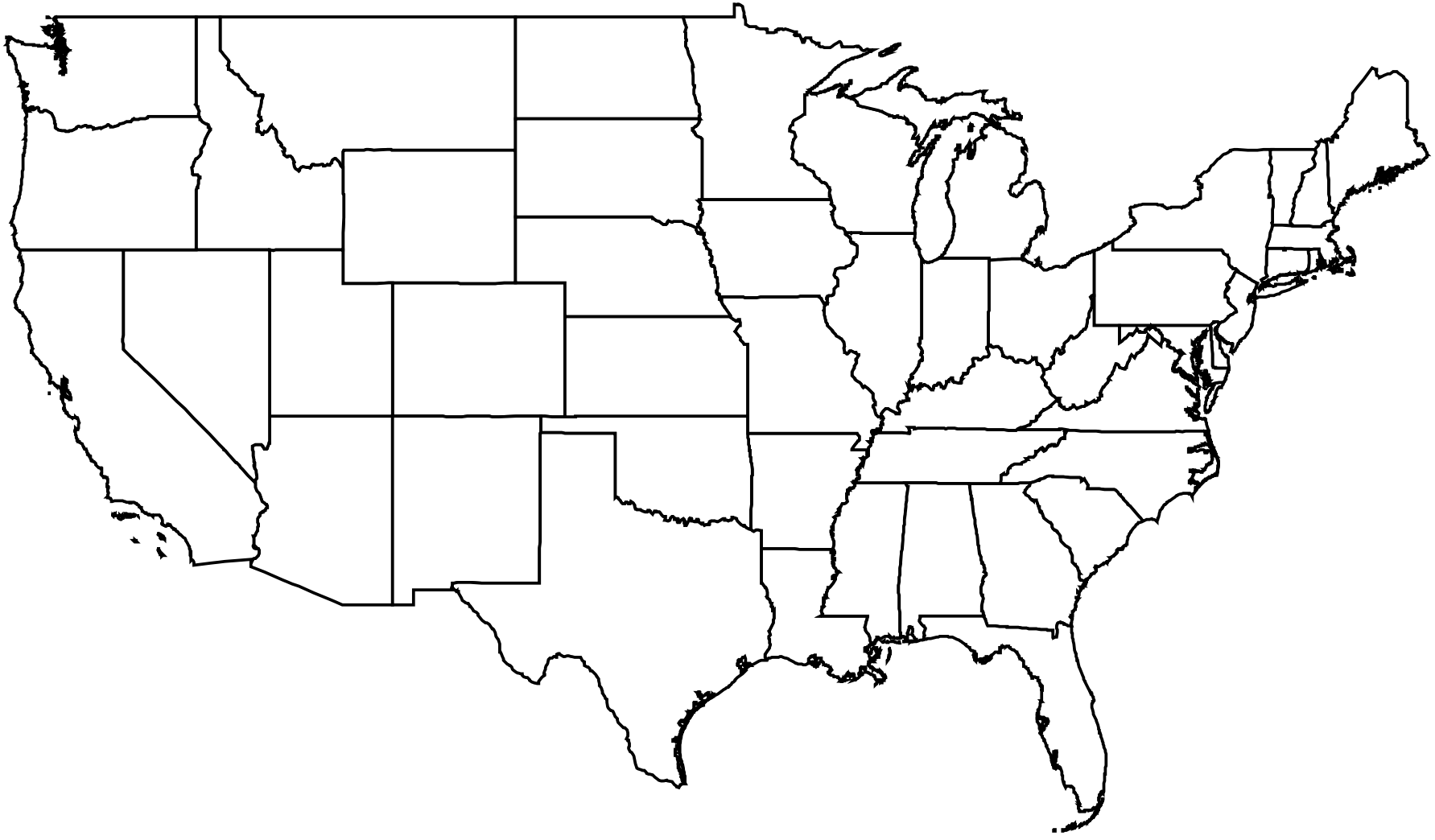
When you're back in the office …

- Several specific market failures are the raison d'être of energy efficiency policy
  - Credit constraints
  - Imperfect information
    - Buying/renting cars, appliances, homes
  - Consumer mistakes
  - Energy is mispriced

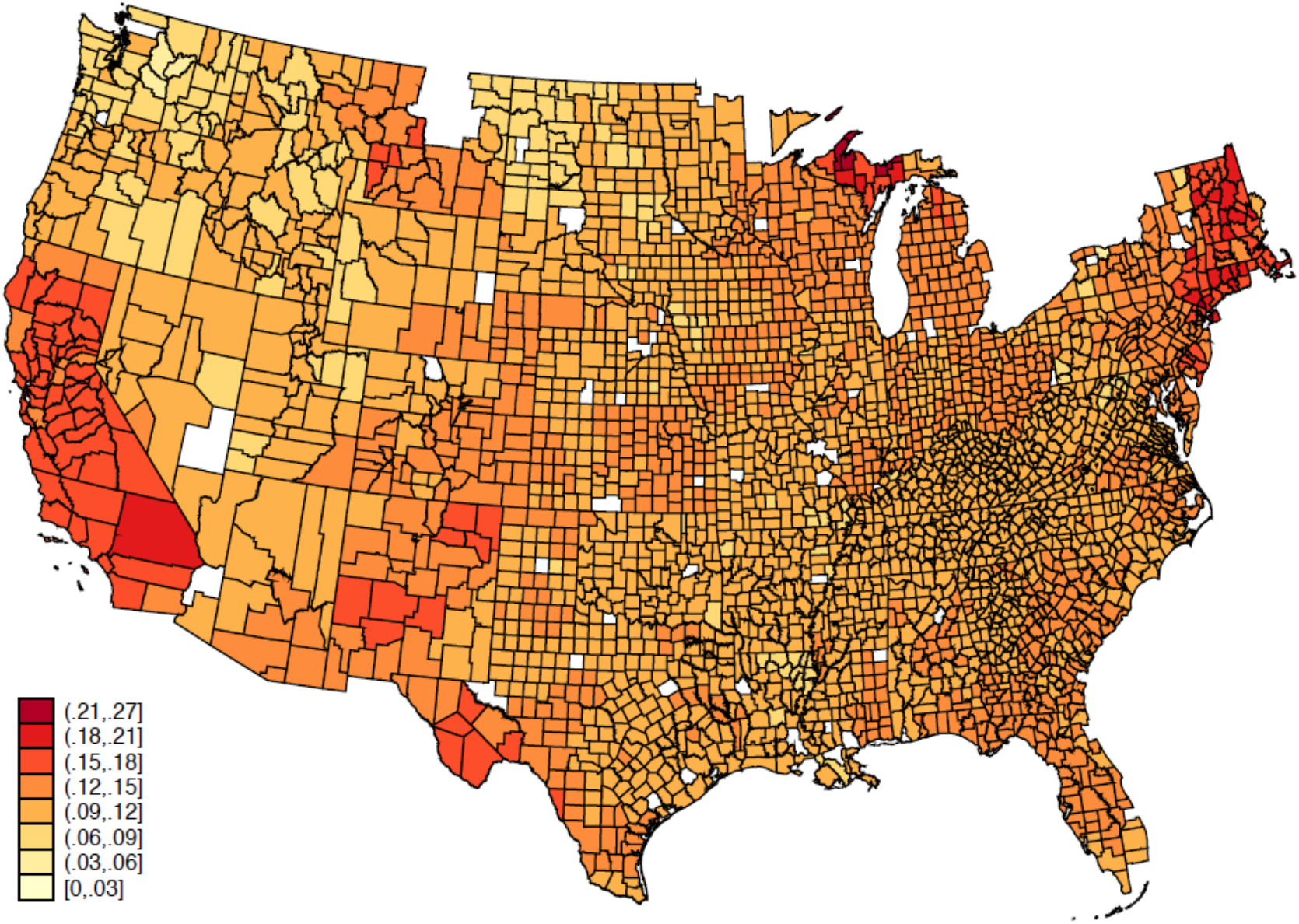
- In policy debates and program implementation, ask:
  - What is the market failure that we are fixing?
  - What is the precise way to **target** that market failure?

Appendix

Electricity Social Cost: System Lambda + Marginal Damages



Average Variable Price ($/Kwh)



Notes: Residential bundled service customers only

Why we don’t subsidize iPhones

vs.