

# JUST DO ENERGY STAR: How to Prompt Consumer Action



**P. WESLEY SCHULTZ**  
PROFESSOR OF PSYCHOLOGY

CALIFORNIA STATE UNIVERSITY

NOVEMBER, 2011

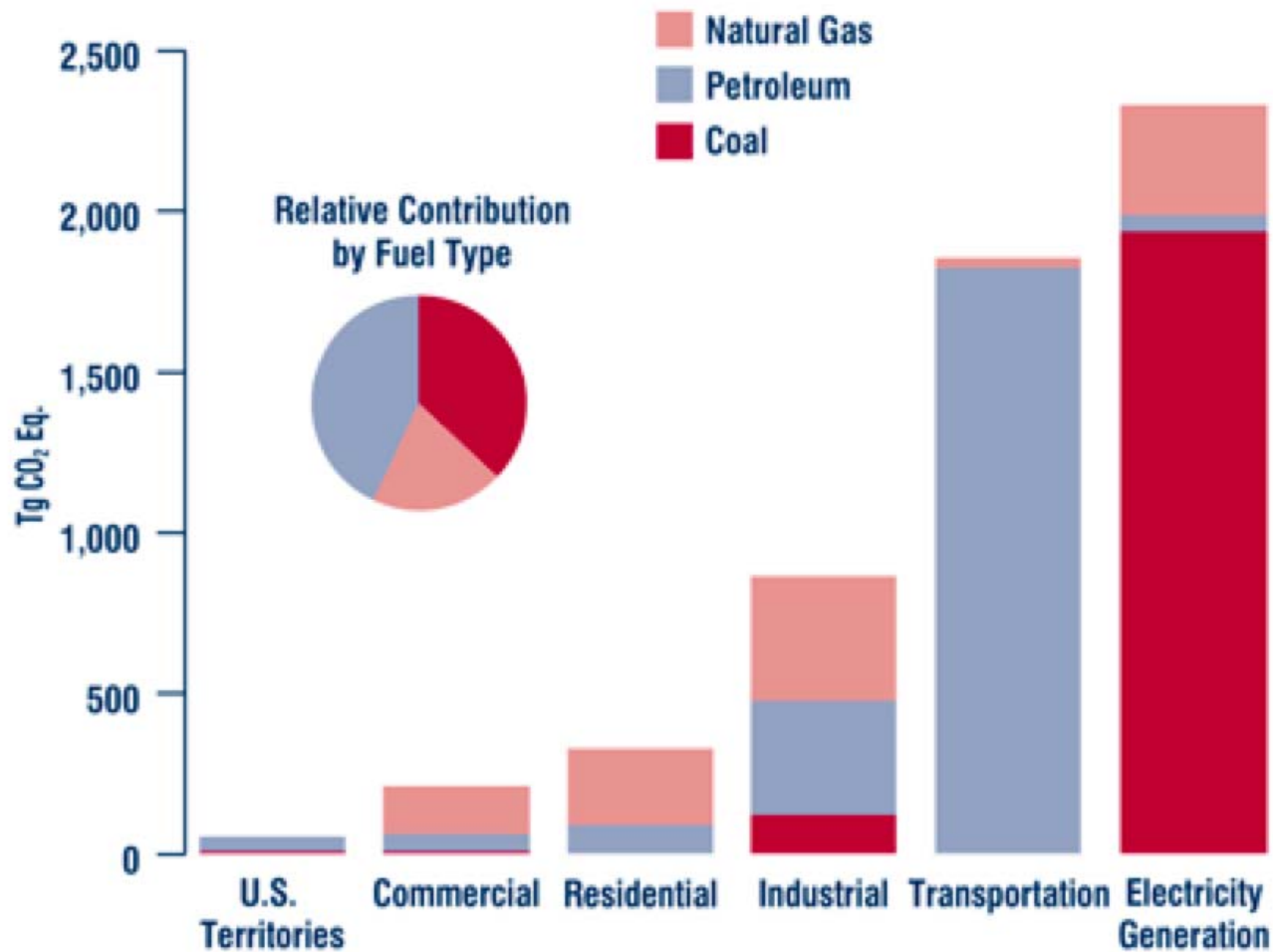
Presentation delivered at the 2011 U.S. EPA ENERGY STAR Partner Meeting. Charlotte, NC.

# Energy Consumption



- Worldwide use of energy has increased steadily over the past 50 years.
- Most energy comes from fossil fuels (coal, oil, natural gas)
- Energy is fundamental to industrialized societies, but poses a number of challenges:
  1. Nonrenewable resources (e.g., estimates for depletion of petroleum)
  2. Mining, transportation, and processing (e.g., Gulf Oil Spill, ANWR)
  3. Pollution and emissions (e.g., carbon emissions and climate change)

## 2006 CO<sub>2</sub> Emissions from Fossil Fuel Combustion by Sector and Fuel Type



Note: Electricity generation also includes emissions of less than 0.5 Tg CO<sub>2</sub> Eq. from geothermal-based electricity generation.

Source: Environmental Protection Agency. (2010). *Climate change: Greenhouse gas emissions*. Available online at: [http://www.epa.gov/climatechange/emissions/co2\\_human.html](http://www.epa.gov/climatechange/emissions/co2_human.html)

**Table 6.1. Percentage of total U.S. individual/household energy consumed by end use, ranked in order of magnitude**

End Use	Percent
<b>Transportation</b>	
Private motor vehicles	38.6
Air travel	3.4
Mass transportation and other	1.4
Subtotal	43.4
<b>In-home uses</b>	
Space heating	18.8
Air conditioning	6.2
(Space conditioning subtotal	25.0)
Water heating*	6.5
Lighting	6.1
Refrigeration and freezing	4.3
Electric (heating elements, small appliances, and small motors)	3.9
Clothes washing/drying*	2.5
Color TVs	2.5
Cooking	1.5
Computers	0.6
Propane and natural gas (swimming pool heaters, grills, and lamps)	0.5
Dishwashers	0.2
Other	3.0
Subtotal	56.6
Total	100.0
*Hot water for "Clothes washing" is included under "Water heating."	

Source: Stern et al. (2009). See [www.environmentmagazine.org](http://www.environmentmagazine.org) for a description of the calculation strategies and methods and a complete list of sources.

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## THE SHORT LIST

- Heating
- Cooling
- Water heating
- Lighting
- Refrigeration
- Electric motors
- Clothes cleaning
- Televisions

Source: Stern et al. (2009). See [www.environmentmagazine.org](http://www.environmentmagazine.org) for a description of the calculation strategies and methods and a complete list of sources.

# Behavioral Wedge



- Tom Dietz and colleagues ([behavioralwedge.msu.edu](http://behavioralwedge.msu.edu))
- Reviewed households actions linked with reduced carbon emissions: weatherization, transportation, maintenance, adjusting, modifying daily use.
- Plasticity: likelihood of producing change.

**Table 6-2: Achievable carbon emissions from household actions**

Behavior change	Behavioral Plasticity	Percentage Reduction in Total Household Emissions
<b>Weatherization</b>	<b>90</b>	<b>3.39%</b>
HVAC equipment	80	1.72%
Low-flow showerheads	80	.18%
Efficient water heater	80	.86%
Appliances	80	1.87%
Low rolling resistance tires	80	1.05%
Fuel-efficient vehicle	50	5.02%
Change HVAC air filters	30	.59%
Tune up AC	30	.22%
Routine auto maintenance	30	.66%
Laundry temperature	35	.04%
Water heater temperature	35	.17%
Standby electricity	35	.52%
Thermostat setbacks	35	.71%
Line drying	35	.35%
Driving behavior	25	1.23%
Carpooling and trip-chaining	15	1.02%

Source: Dietz et al. (2009)

# Community-Based Social Marketing (CBSM)



- [www.cbsm.com](http://www.cbsm.com)
- Effective approach to behavior change
- Origins in behavioral science research
- Five step, data-driven process
- “Community” based
- Removes barriers and enhance benefits



# Which Behaviors to Target?



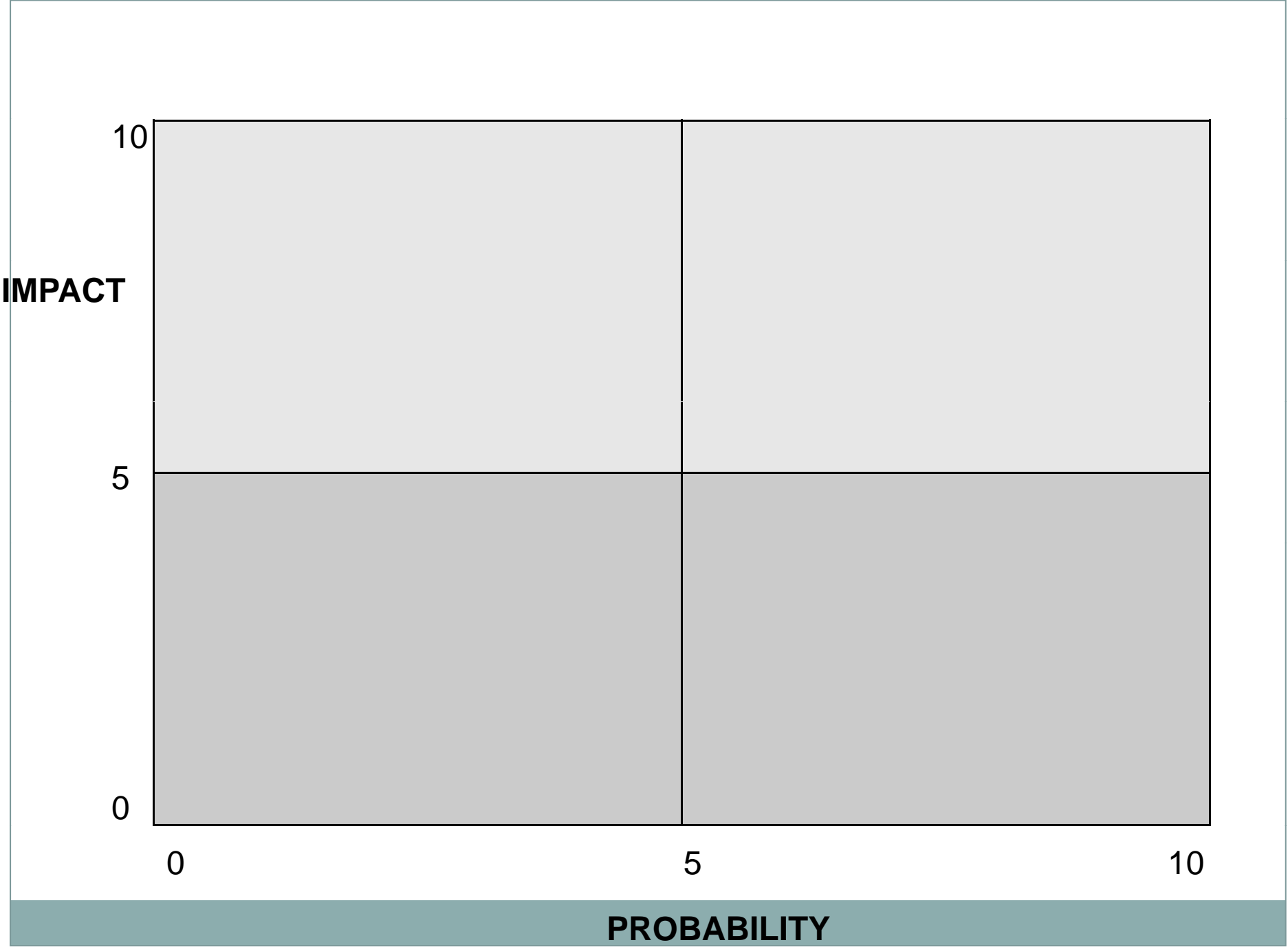
Impact:

Penetration:

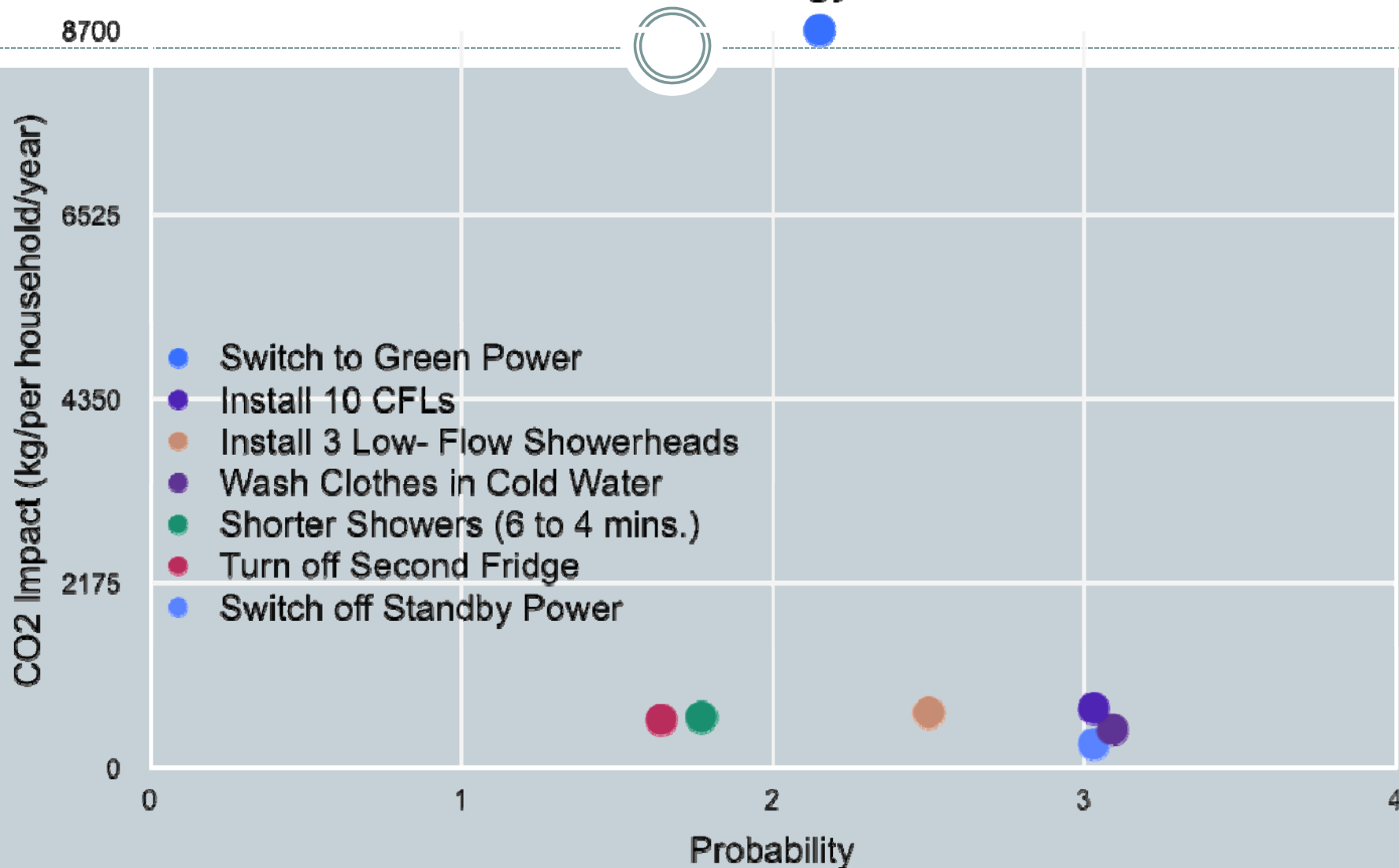
Probability:

End-state:

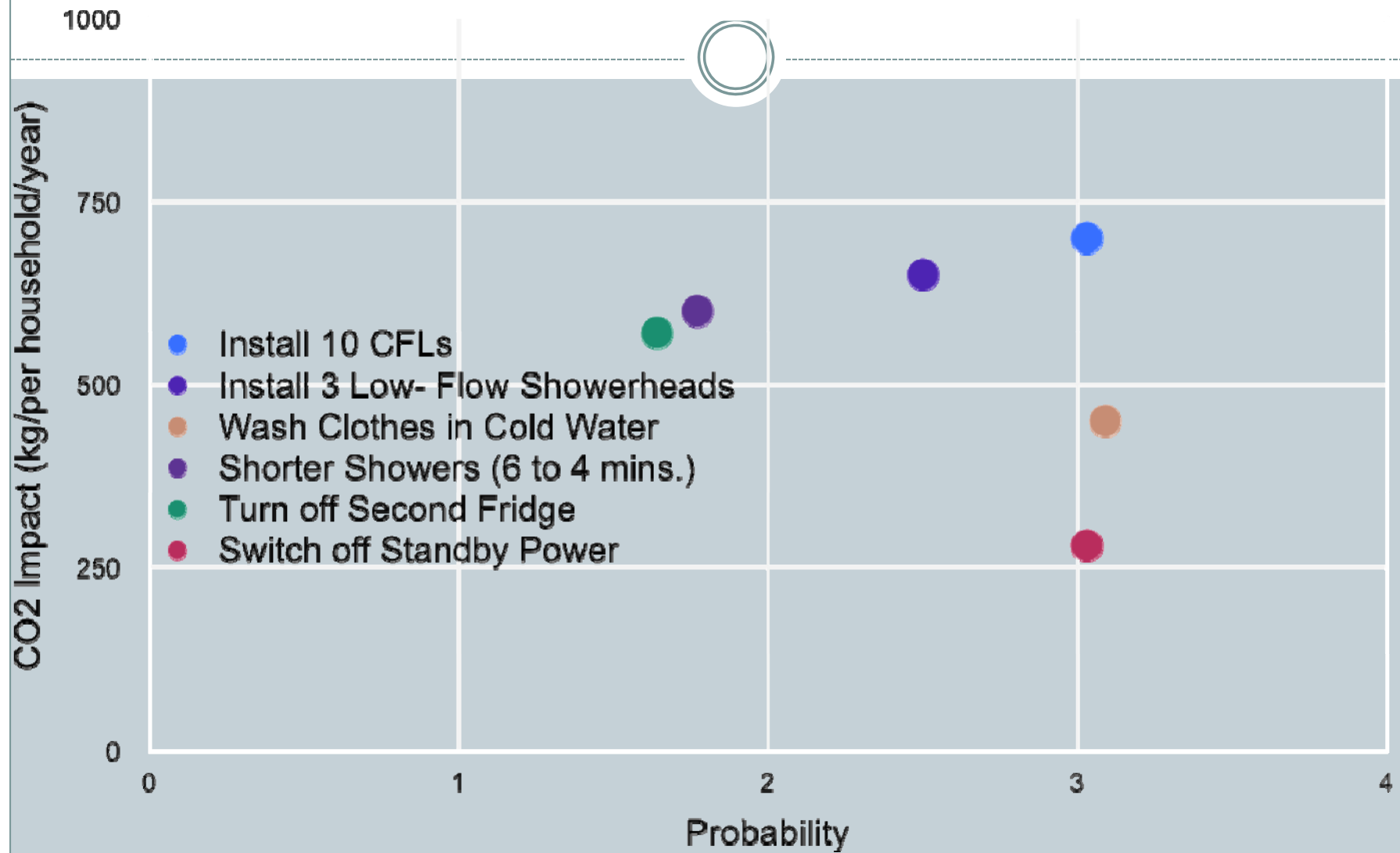
Nondivisible:



## Residential Energy Behaviors



## Residential Energy Behaviors



# The Science of Behavior Change



1. Information is not sufficient
2. The dark side of incentives
3. Rebound effects
4. The power of norms

# Information is Not Sufficient



- Knowledge-deficit model
- Knowledge is (often) correlated with behavior
- Education and information can increase knowledge
- **Increasing knowledge will (typically) not result in behavior change.**

# The Dark Side of Financial Incentives



- Incentives can change behavior
- But:
  1. Framing behavior as transaction creates expectations
  2. Behavior and context specific
  3. Size matters
  4. Undermining

# Rebound Effects



- Just owning an efficient device is not enough
- The case of the Prius
- Rebound effects
  - One behavior replaces another
  - Save money on fridge, so have two
  - More efficient A/C, so use longer
- Negative spillover
  - “Done my part”
  - Installed CFLs, so no need to purchase ENERGY STAR



# The Power of Norms



- Consumer Mindset
- “When deciding to conserve energy, how important...”
- Environmental protection
- Saving money
- Social responsibility

# Survey Results

**Table 3: Descriptive Results for Items Measuring Personal Motives**

Items Measuring Personal Motives	Average Response of Sample*			% Breakdown of Responses			
	N	Mean	SD	Not at All	Some-what	Very	Extremely
In deciding to conserve energy, how important is it to you that it protects the natural environment?	2418	3.31	.76	2%	12%	38%	48%
In deciding to conserve energy, how important is it to you that it benefits society?	2423	3.15	.78	2%	18%	43%	37%
In deciding to conserve energy, how important is it to you that using less energy saves money?	2433	3.12	.75	1%	19%	46%	34%
In deciding to conserve energy, how important is it to you that a lot of other people are trying to conserve energy?	2422	2.90	.82	5%	24%	47%	24%
In deciding to conserve energy, how important is it to you that people approve of trying to conserve energy?	2419	2.80	.92	10%	24%	42%	24%

# Normative Social Influence

## -- Study 1: Household energy conservation



**Note:** These findings are based on a thesis by Jessica Nolan, with assistance from a team of CSUSM students, including: Matt Dorlaque, Dulce Contreras, Veronica Bresino, Monica Tinajera, Nigel Hartfield, Leezel Nazareno, Ron Tilos and Christina Wade.

## Join your neighbors in conserving energy



Summer is here and most San Marcos residents are finding ways to conserve energy at home.

**"How are most San Marcos residents conserving this summer?"**

**By using fans instead of A/C!**



### Why?

According to a recent telephone survey conducted by Cal State San Marcos, *77% of San Marcos residents said that they often use fans instead of air conditioning to keep cool in the summer.*

**Using fans instead of air conditioning –  
San Marcos' Popular Choice!**



Please direct questions or comments to Jessica Nolan at CSUSM: 760.750.3022

## Energy Conservation

Summer is here and the time is right to  
conserve energy

How can you  
conserve energy this  
summer?

By using fans  
instead of A/C!



## Conservacion de energía

El verano esta aquí y es justo el tiempo para  
conservar energía

"¿Como podrá usted  
conservar energía  
este verano?"

¡Usando  
ventiladores en  
lugar de aire  
acondicionado!



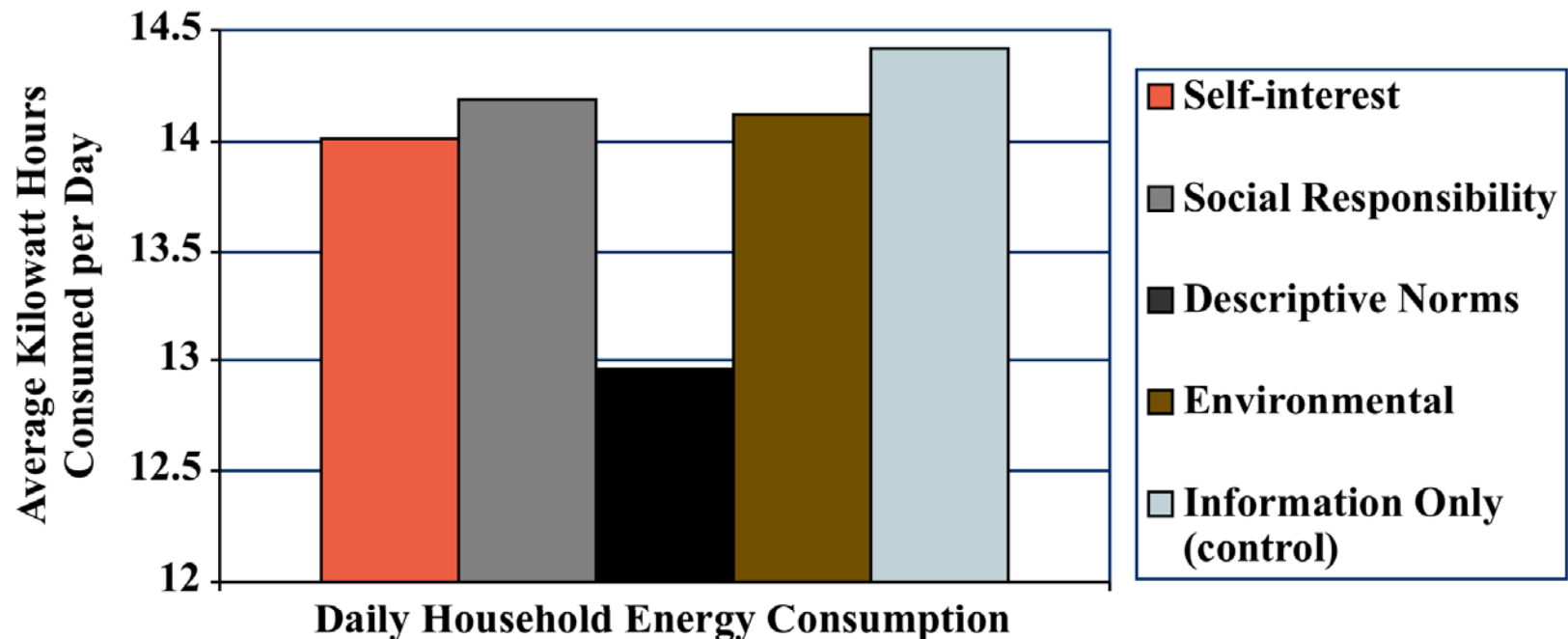
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# Results:

Average daily household energy consumption during the intervention

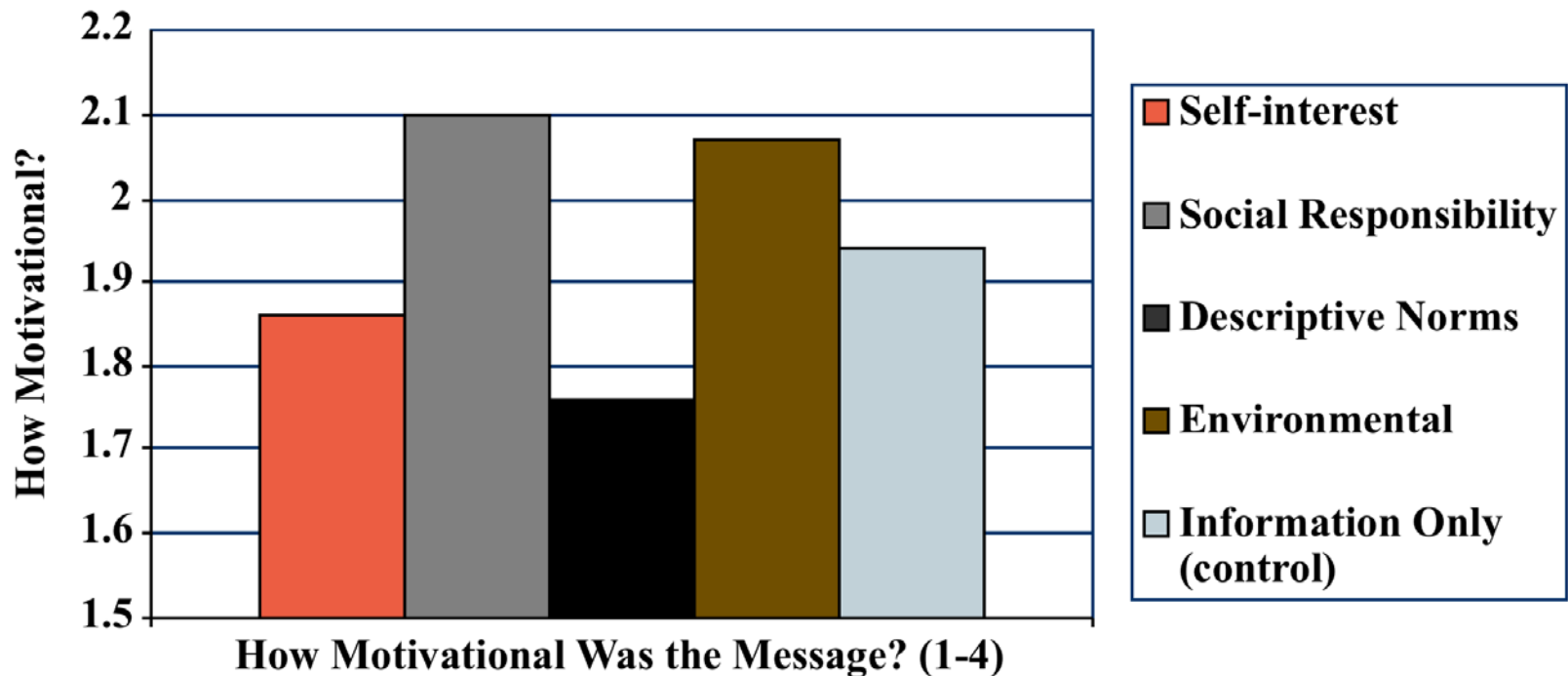


Results based on an ANCOVA using baseline consumption as a covariate. Pairwise comparisons show descriptive norms to be significantly lower than all other conditions.

Nolan, J., Schultz, P. W., Cialdini, R. B., Griskevicius, V., & Goldstein, N. (2008). Normative social influence is underdetected. *Personality and Social Psychology Bulletin*, 34, 913-923.

# Results:

Q: “How much did the information on these doorhangers motivate you to conserve energy?” 1 (not at all) to 4 (extremely)



Results based on oneway ANOVA. Pairwise comparisons show descriptive norms to be significantly lower than environmental and social responsibility.

Nolan, J., Schultz, P. W., Cialdini, R. B., Griskevicius, V., & Goldstein, N. (2008). Normative social influence is underdetected. *Personality and Social Psychology Bulletin*, 34, 913-923.

# Field Implementation at a local Beach Resort



**Note:** My appreciation to the team of CSUSM students who worked on this experiment: Azar Khazian, Michelle Hynan, Joy Francisco, Christine Jarvis, and Jenny Tabanico.



# Old Message:



## Hotel Study

-- New Message



**Many of our guests have expressed to us their approval of conserving energy. When given the opportunity, nearly 75% of hotel guests choose to reuse their towels each day.** Because so many guests value conservation and are in the habit of conserving, this hotel has initiated a conservation program.

Washing towels every day uses a lot of energy, so reusing towels is one way you can conserve.

If you would like your towels replaced, please leave your used towels in the basket on the bathroom floor. Towels left hanging on the towel rack tell us that you want to reuse them.

**PLEASE REUSE YOUR TOWELS**

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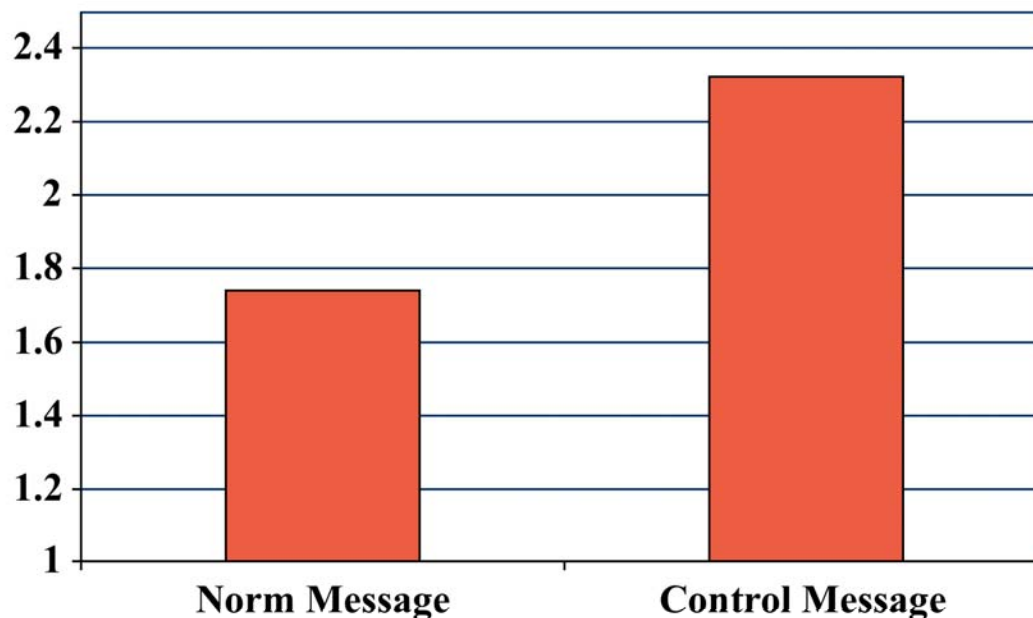
**\* If you have questions, please call the front desk \***

# Social Norm Messages



# Results

Number of towels taken out of the room on the first towel replacement day.



$F(1,792)=13.40$ ;  $p<.001$ ). A 25% reduction in the number of towels used!

**Note:** Data also tested in HLM with participant “nested” within room. ICC=.07; At level 2, treatment effect ( $\gamma_{01}=-.57$ ,  $t(142.14)=-3.25$ ,  $p<.001$ )

Schultz, P. W., Khazian, A., & Zaleski, A. (2008). Using normative social influence to promote conservation among hotel guests. *Social Influence*, 3, 4-23.

# Social Norms



- **Our Results:**
  - Can cause behavior
  - Not perceived as motivational
  - Apply to both private and public behavior
- **Problems in Application**
  - Can serve as an anchor for folks already doing the behavior
  - Implemented incorrectly (awareness campaigns)

# Social Norms

- Participants: 290 households with visible utility meters
- Distributed individual feedback and normative feedback to households for two consecutive weeks
- Conditions:
  - Usage level (above or below neighborhood average)
  - Emoticon (positive or negative 😊)





## Energy Conservation: How Do You Measure Up?



Recently, researchers from Cal State San Marcos were in your neighborhood collecting information about energy consumption. Here is what we found out about households in the Woodland Park area:

Electricity Consumption January 16-29, 2004	
Your household used:	Similar households in your neighborhood used:
kWh	kWh

*Details about our measures:* The results reported above are specific to your home and similar homes in your neighborhood, and were collected by researchers at CSUSM. Kilowatt Hours (kWh) are the units used to measure electricity consumption.

Last week, your household consumed **MORE / LESS** than other households in your neighborhood.

Here are some good ways to reduce your home energy consumption:

- Wear extra layers of clothing instead of using heat
- Turn off unnecessary lights
- Turn off your computer when not in use



Address:

This information has been provided to you because someone in your household completed a survey on home energy use over the summer. Please direct questions or comments to Jessica Nolan at CSUSM: 760.750.3022.



## Energy Conservation: How Do You Measure Up?



Recently, researchers from Cal State San Marcos were in your neighborhood collecting information about energy consumption. Here is what we found out about households in Discovery Hills:

Electricity Consumption January 8-16, 2004	
Your household used:	Similar households in your neighborhood used:
kWh	kWh

*Details about our measures:* The results reported above are specific to your home and similar homes in your neighborhood, and were collected by researchers at CSUSM. Kilowatt Hours (kWh) are the units used to measure electricity consumption.

Last week, your household consumed **MORE / LESS** than other households in your neighborhood.

Here are some good ways to reduce your home energy consumption:

- Turn off the heat at night
- Turn off the TV when you leave the room
- Install energy saving light bulbs



Address:

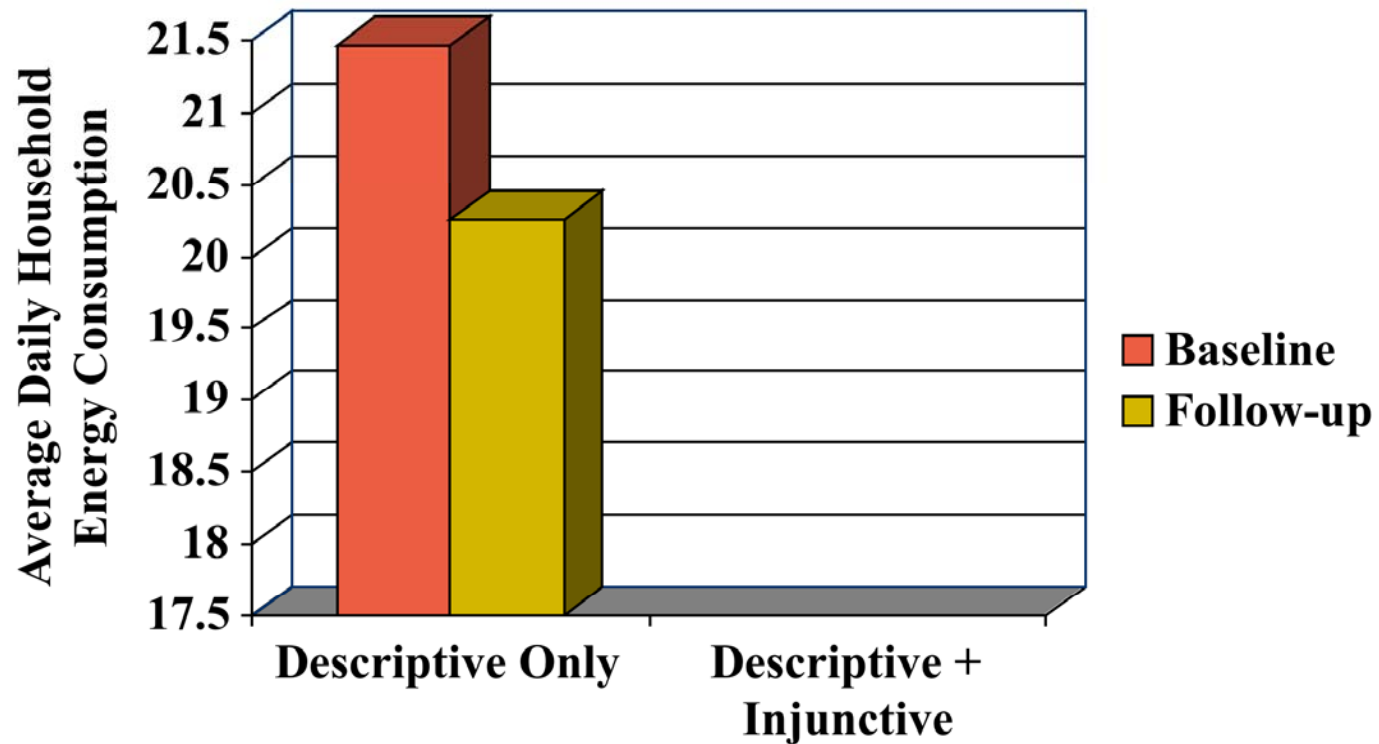
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# Normative Social Influence

## - Results

### High Consumers ☹️



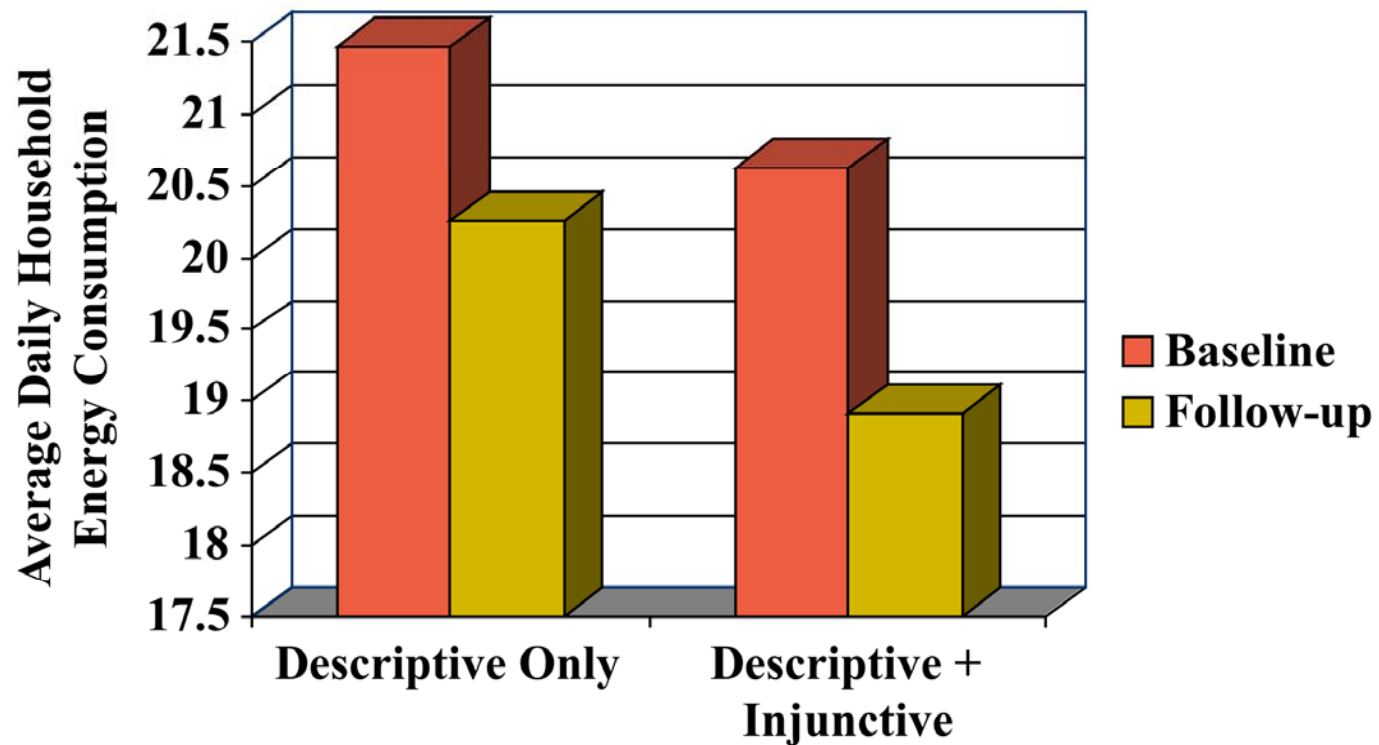
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# Normative Social Influence

## - Results

### High Consumers ☹️

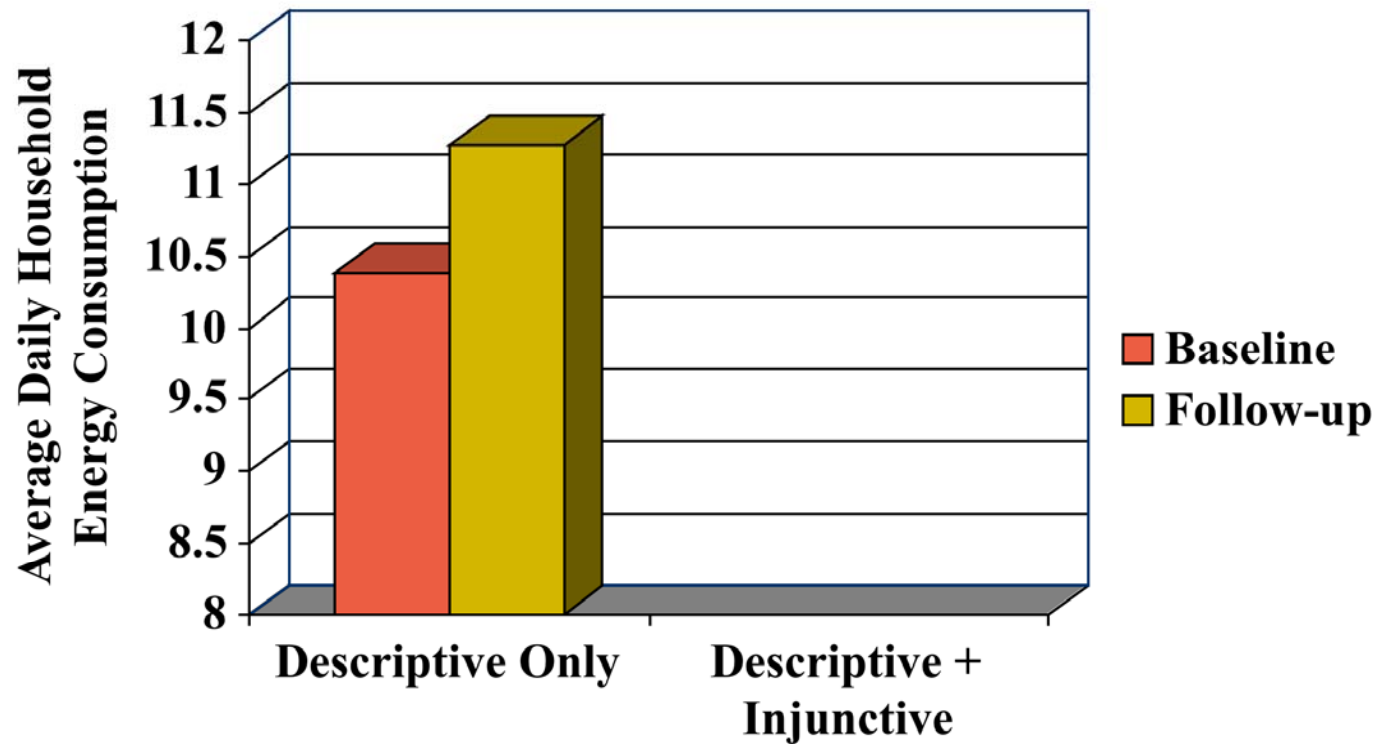


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# Normative Social Influence

## - Results

### Low Consumers 😊

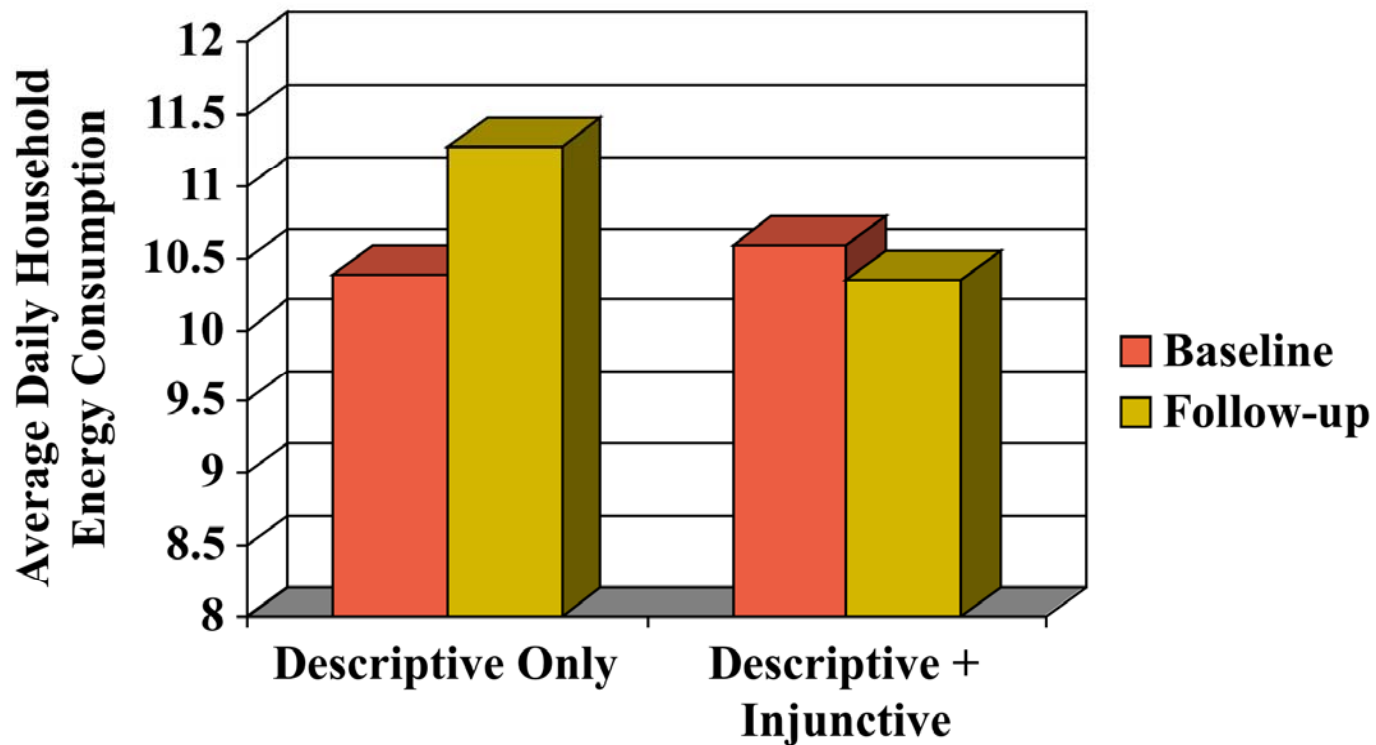


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# Normative Social Influence

## - Results

### Low Consumers 😊



Schultz, P. W., Nolan, J., Cialdini, R., Goldstein, N., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18, 429-434.

# Conclusions



- Behavior matters
- Behavior can change
- Community-based social marketing
- Behavior selection
- Pitfalls to avoid (rebound, negative spillover)
- The case of social norms

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