

A Review of Energy Reduction Competitions

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Motivations

- 1. Large potential for energy savings from behavior**
- 2. California utilities are interested in exploring new program designs**
- 3. Competitions are promising but have not been systematically studied**
- 4. Objective approached to assess the value of competitions**

Primary Research Questions

- 1. Have competitions been successful at reducing energy?**
- 2. Under what circumstances are competitions more or less effective?**
- 3. What are best practices for future program developers?**

The Appeal of Competitions

- 1. Highly scalable**
- 2. Potential for deep savings**
- 3. Ability to reach diverse populations**
- 4. Potentially cost-effective (if “low touch”)**

Methods

- 1) Literature review (academic & gray literature)**
- 2) Steering Committee (10 total)**
- 3) Selected 20 projects (criteria: energy focus, measured results, range of domains (households, businesses, schools etc.))**
- 4) Conduct interviews**
- 5) Develop case studies (data, quotes, key lessons)**
- 6) Final report**

Case Studies / Projects

College / University Residence Halls

- 1: Campus Conservation Nationals
- 2: KuKui Cup

Inter-Community Residential

- 3: The CoolCalifornia Challenge
- 4: Energy Smackdown
- 5: Kansas Take Charge Challenge
- 6: Minnesota Energy Challenge
- 7: Western Mass. Saves Challenge

Intra-Community Residential

- 8: NYSERDA Residential Energy Competition
- 9: San Diego Energy Challenge
- 10: Opower Social - Facebook App

Inter-Community Home Energy Upgrades

- 11: NeighborWorks Competition
- 12: Efficiency Vermont
- 13: Community Energy Challenge

Inter-Business

- 14: 10 for Change Challenge (Boulder)
- 15: Energy Savings Challenge (El Paso)
- 16: Green Office Challenge
- 17: Kilowatt Crackdown (NEEA)

Intra-Business

- 18: Kilowatt Cup (PECI)
- 19: Cool Choices

National Buildings Performance

- 20: Battle of the Buildings

Background

Theoretical Foundation for Competitions: Why do they work?

1. Norms: Provide information on what others are doing and expected behavior
 2. Comparative Feedback: Let people know how well they are doing
 3. Positive Feedback: Help people feel good about taking actions
 4. Incentives: Provide tangible and/or non-tangible rewards
 5. Gamification: Increase enjoyment of taking actions
1. Social Diffusion: Spread adoption through existing social networks
 2. Visibility: Give people social credit for taking actions
 3. Competitive drive: Tap into natural rivalries and/or competitive spirit

Behavior Tools / Strategies Employed

Project	Local Messengers	Comparative Feedback	Social diffusion	Competition	Imagery	Incentives	Descriptive norms	Prompts	Commitments	Goal setting	Scarcity	Tailored Feedback	Reciprocity	Instantaneous Feedback	Gamification	Subjective norms	Loss aversion	Energy Coach / advisor	# of strategies used	
1	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	8
2	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	13
3	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	15
4	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	15
5	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	15
6	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	10
7	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	12
8	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	10
9	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	13
10	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	11
11	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	12
12	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	14
13	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	13
14	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	12
15	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	7
16	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	12
17	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	14
18	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	12
19	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	16
20	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	6
Score	36	34	33	32	31	31	29	29	27	23	16	15	15	12	12	10	10	10	18	

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Energy Savings

- Multiple methods – only three used experimental design
- 80% of programs reported savings between 2-10% for all participants
- Short-terms savings of >20% for highest participants
- Persistence typically not measured

Key Lessons: Campus / University Residents Halls (Dorms)

Campus conservation Nationals, Kukui Cup

Campus Conservation Nationals

- Over 100 college campuses running 3-week competitions
- Minimal investment – website, materials & webinars- schools run their own programs
- Successful (Oberlin) model: 1) Engage, 2) Educate, 3) Motivate, 4) Empower
- Average electricity reductions of 3-4%; top 10% achieved 30% savings
- Real benefit is in education – New majors? New careers? Change attitudes / habits?

Kukui Cup

- Focuses on education: students earn points for learning, not just energy reductions
- Software complimented by events, field trips and other activities

Recommendations

- Local programs are only as effective as motivation and training of local programs
- Critical to provide high quality educational components
- High cost if only considering short-term energy savings and interns/staff are paid
Low cost if volunteers are unpaid and if longer-term benefits are valued
- Need to strike balance between adding value with education and keeping costs low

Key Lessons: Inter-Community Residential Competitions

CoolCalifornia Challenge, Energy Smackdown, Kansas Take Charge Challenge, Minnesota Energy Challenge, Western Mass Saves Challenge

- Key to success is motivating local program managers
- Participants loved comparative feedback & sharing stories
- Any of the motivational strategies could work. It is just a matter of doing them well
- Build relationships with influential champions within communities & across the state
- Work with cities to build community and help set goals
- A more prescriptive program can be motivating, and more scalable, but cities will not be as personally engaged
- Select the cities based on natural rivalries
- Rewards don't seem to be very effective. Most aren't claimed.

Quotes

It is mostly not about energy. It is more about community and giving people an excuse to feel good and be with their neighbors. – Donald Kelly, Energy Smackdown

Its going to take a lot more follow up than you think...People really want to take the challenge, they didn't feel comfortable with the content to be the voice for it. – Judy Thommes, Minnesota Energy Challenge

Key Lessons: Intra-Community Residential Competitions

NYSERDA Residential-based Competition, San Diego Energy Challenge, Opower Social

- Programs do not grow virally
- It is resources intensive to figure out what messaging works
- Challenging to scale up – from bottom up
- Opt-out is more effective than opt-in (SDG&E, Opower)

Quotes

It's not as easy as it looks . - Paola Rosselli, SDG&E

Experimental design is difficult to do. It's confining. - Paola Rosselli, SDG&E

Key Lessons: Inter-Community Home Energy Upgrade Competitions

NeighborWorks, Efficiency Vermont, Community Energy Challenge (Pacific Northwest)

- Customer service is critical to home energy upgrade programs (more than incentives, financing, information)
- Trusted advisor model (technician and advisor) yields strongest results
- Competition not necessary component, but goal is helpful
- Every public dollar invested yields \$5 in local economic activity (Community Energy Challenge)

Quotes

Customer service is more important than incentives – Ludy Biddle, NeighborWorks

Social diffusion was the pillar of the program...customers are your sales force. - Paul Markowitz, Efficiency Vermont

Key Lessons: Inter-Business Competitions

Ten for Change Challenge (Boulder), Energy Savings Challenge (El Paso), Chicago Green Office Challenge, Kilowatt Crackdown (Pacific Northwest)

- Focus on similar business types (e.g., leased offices – Boulder) & natural rivalries (e.g., fire stations, El Paso)
- Can be very cost-effective (El Paso \$6k investment yields \$30k savings), but not if you have ambitious reduction goals
- Keep building on program & relationships to build capacity, trust & brand recognition
- Give people enough time to adopt new behaviors
- Give more points for more difficult actions, e.g., reporting energy is a difficult action itself (Chicago)
- Engineering advice is very valuable, but costly. Need to find ways to keep costs low

Quotes

Get them to commit, give them metrics and feedback, give them recognition, and be around long enough so they can feel like the program was valid...It's just really critical to build these relationships and to have a lot of credibility in your program -Elisabeth Vasatka, Ten for Change Challenge

Key Lessons: Intra-Business Residential Competitions

Cool Choices, Kilowatt Cup (PECI)

- Works best in companies where sustainability is core mission (over 50% participation common)
- Value for companies is in employee satisfaction and team building more than energy savings
- Make it more about participation than winning
- People will say they are not competitive, but they really are
- Use the competition to figure out what can be automated (PECI)

Quotes

For me the key piece is be willing to simplify and streamline in a way that is appropriate for the audience...address people where they are at, not where you think they should be. – Kathy Kuntz, Cool Choices

Key Lessons: National Buildings – National Awards or Prizes

- Very cost-effective
- Standardizes use of Portfolio Manager
- Limited opportunity to scale beyond what already exists

Conclusions

1. **Scalability** - Competitions have the ability to massively scale up interventions.
2. **Cost-effectiveness** - Competitions can be very cost-effective, if “low touch” & enabling
3. **Success depends on other factors, not competition alone**
4. **Ability to achieve deep savings** – NeighborWorks program has enabled nearly 5% of home owners in complete home retrofits, with an average of 30% energy savings.
5. **Engaging hard to reach populations**
6. **EM&V** - No examples of RCT. Only 3/20 used experimental designs
7. **Competitions are better suited to conservation than energy efficiency**
8. **Persistence** - Competitions that resulted in purchase of equipment have long-lasting benefits.
9. **Strategies** - Most programs used a kitchen sink approach
10. **Winners and Losers** - A drawback of competitions is there are winners and losers.
11. **Capacity Building** - The key to success of any program
12. **Spillover** - Some programs, particularly school-based programs, have explicit goals of raising awareness.