

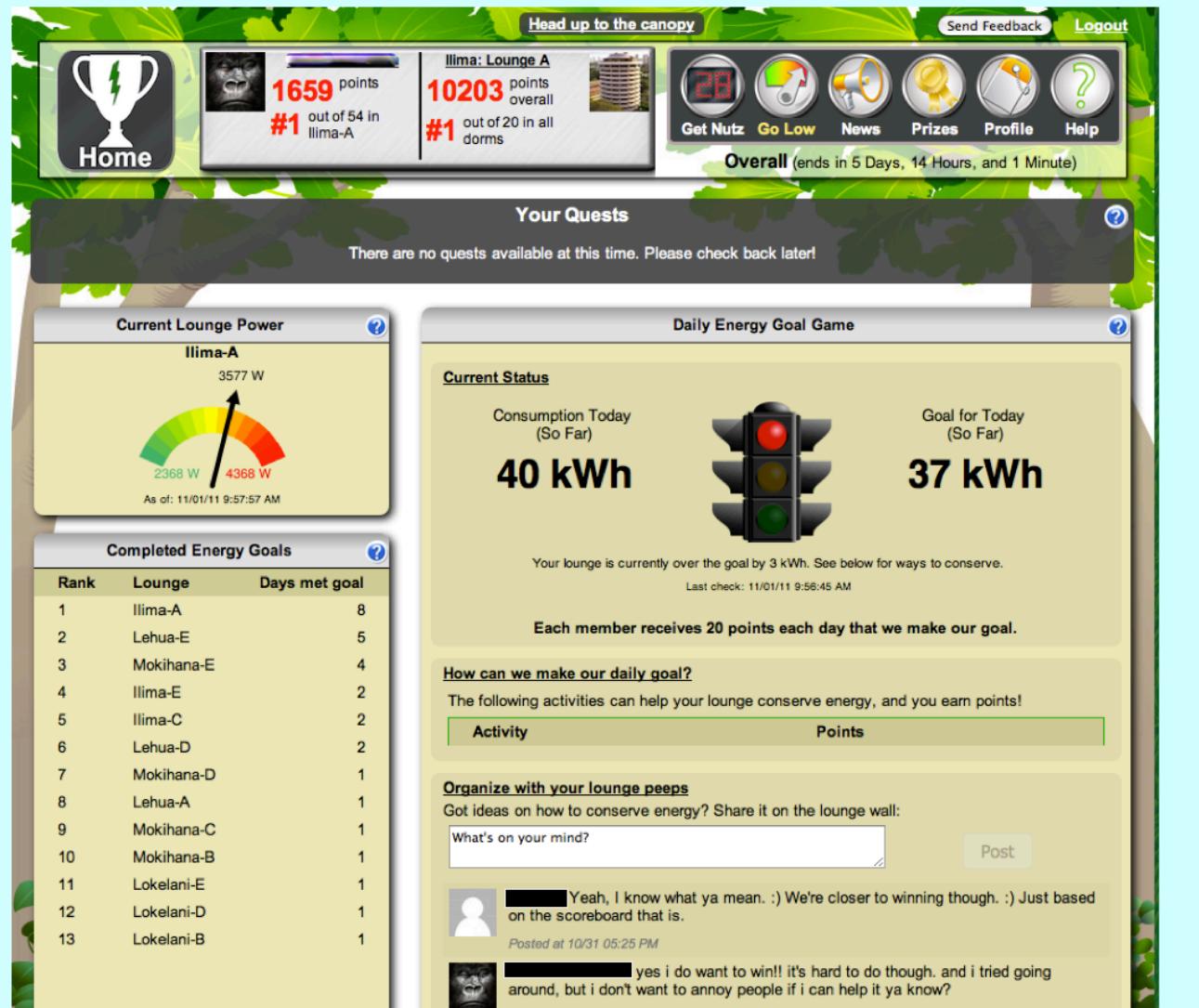
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Alex Young
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The Virtual World

Online environment supporting education & competition

Go Low page



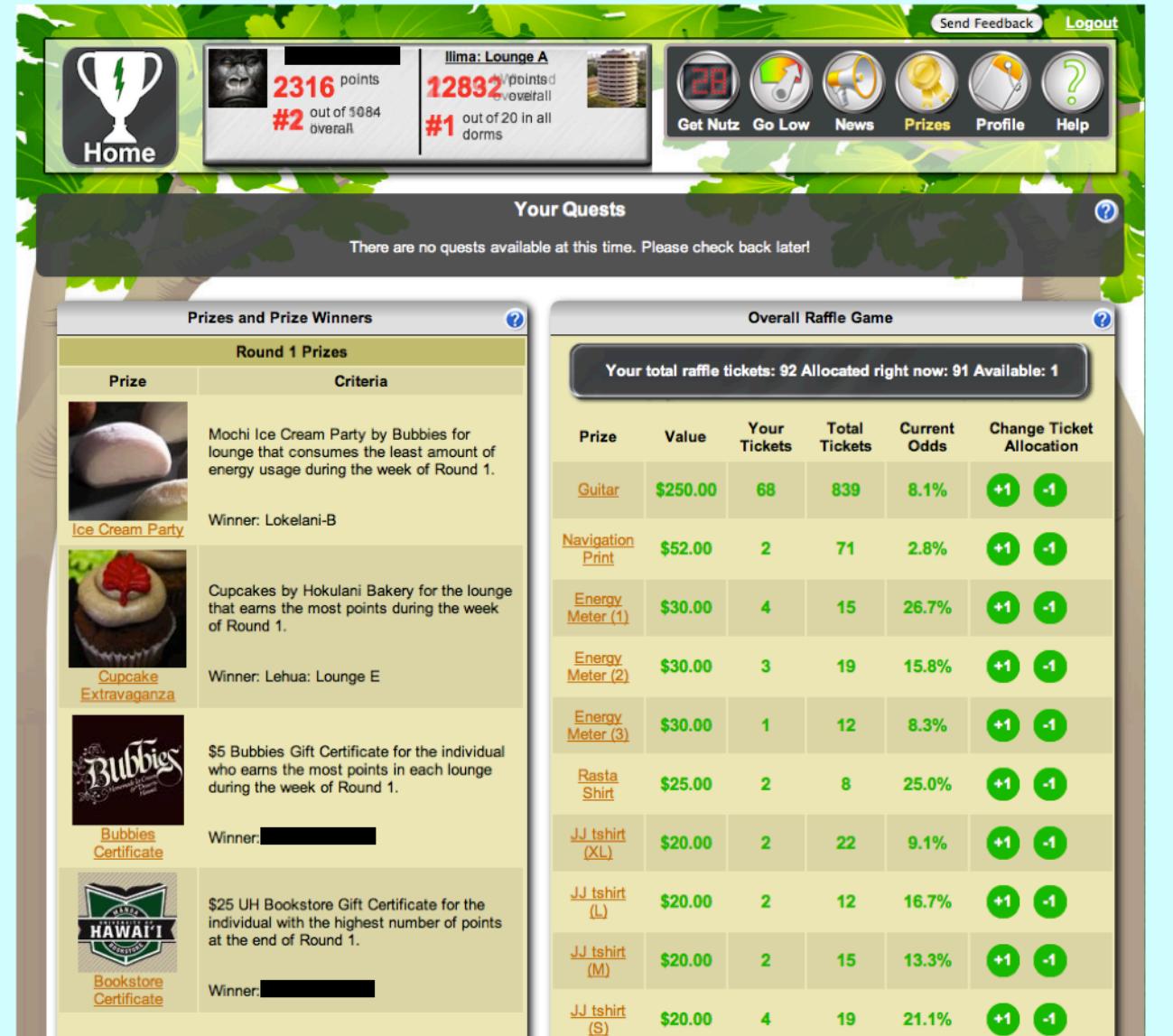
- Real-time power
- Energy scoreboard
- Energy goal visualization
- “Wall” for player discussion

Get Nutz page



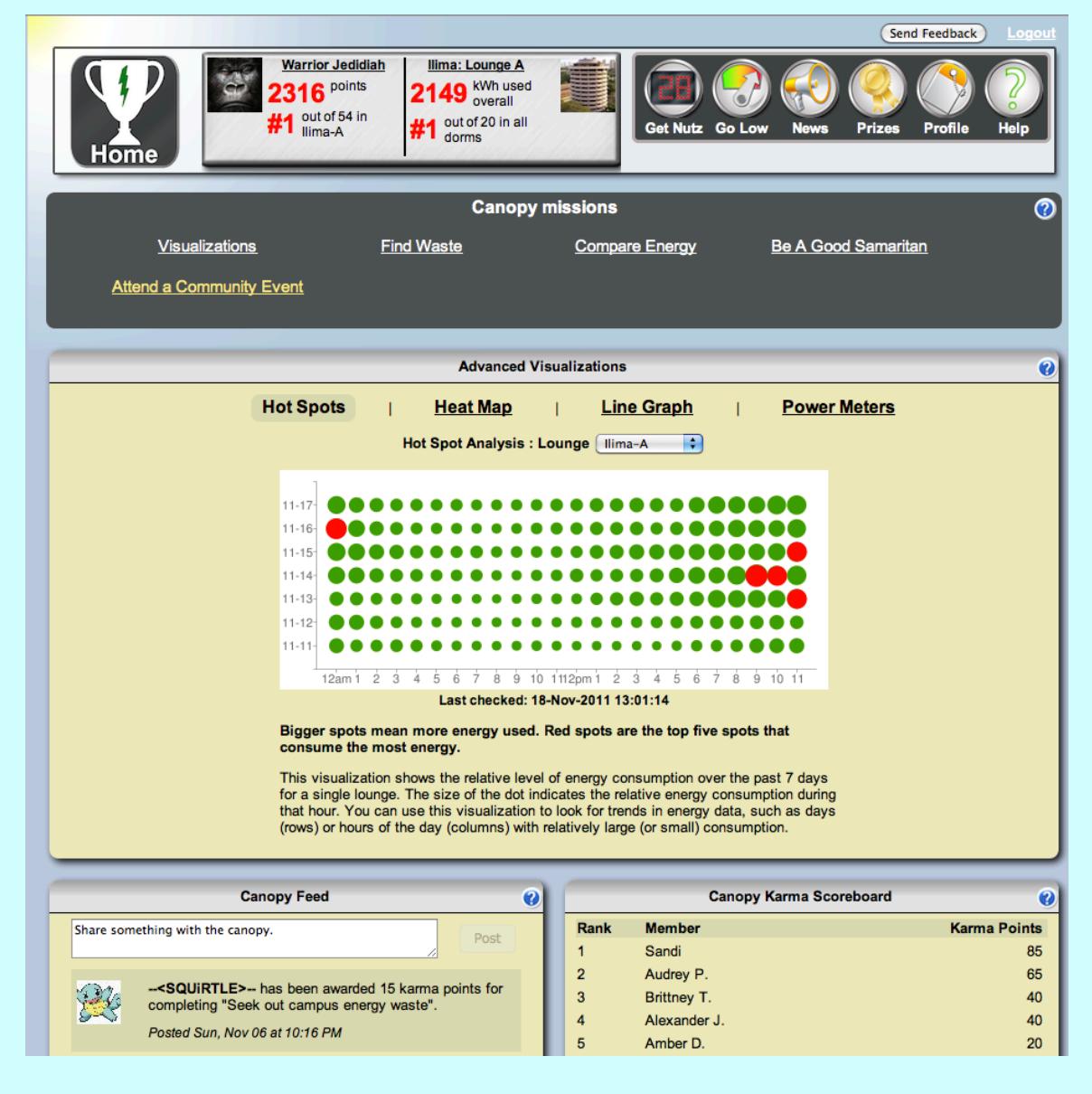
- Smart Grid Game
- Earn points by completing activities
- Point scoreboard
- List of upcoming events

Prizes page



- Prizes for top players
- Prizes for top lounges
- Raffle game: chance for anyone to win

The Canopy



- Only top players invited
- Another “level” of game
- More complex quests
- More in-depth energy visualizations

Motivation and Approach

State of Hawai’i Clean Energy Initiative

- 70% clean energy by 2030
- 30% from conservation

Improve energy-use behavior

- How to support sustained conservation?
- How to improve energy literacy?

Kukui Cup: combine competition with energy literacy

- Individual & group competition
- Hawai’i-specific literacy content
- Real-time energy feedback
- Both real world and virtual activities

Evaluated in university student housing

- 3 week competition
- 1030+ residents

Playing the Kukui Cup

Energy competition

- Metered by pairs of floors (20 “lounges”)
- Which lounge can use the least energy?
- Data sampled every 15 seconds

Energy Goal Game

- Energy conservation goal set (5-10%)
- If daily goal is met, lounge players get points
- Links energy & point competitions



Point competition

- Who can learn the most about energy?
- Earn points by learning about energy
 - Watch short educational videos (10 available)
 - Make public commitments (21 possible)
 - Attend events & excursions (24 available)
 - 52 other activities
- Earned by individuals, aggregated by lounge

Other ways to earn points

- Social bonus for completing activities with others
- Referral bonus for getting others to play
- Creative activities: writing poems, painting & more

Raffle Game: motivating non-elite players

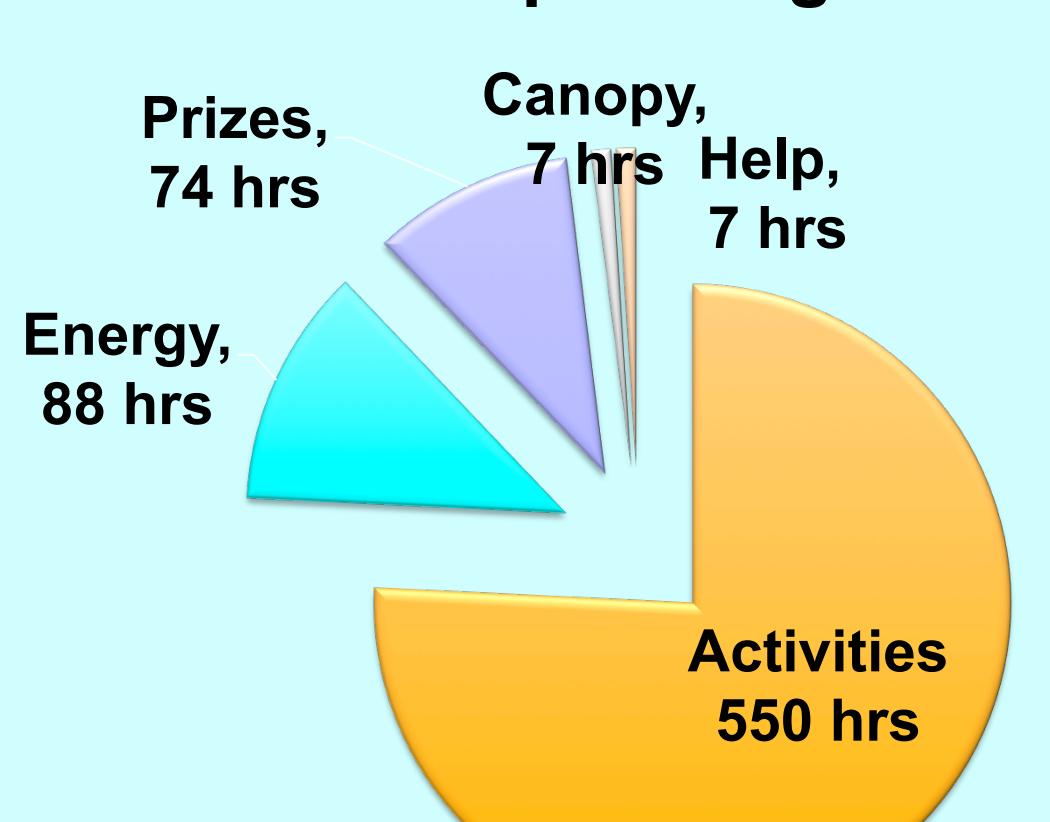
- Every 25 points earns virtual raffle ticket
- Dynamically assign tickets to prizes
- Anyone has chance of winning

Early Results from 2011 Kukui Cup

Participation

- 415 residents earned points (38.6%)
- 3 of 20 lounges had participation > 50%
- but 10 lounges had participation ≤ 16%
- Most time spent on activities

Time spent in game



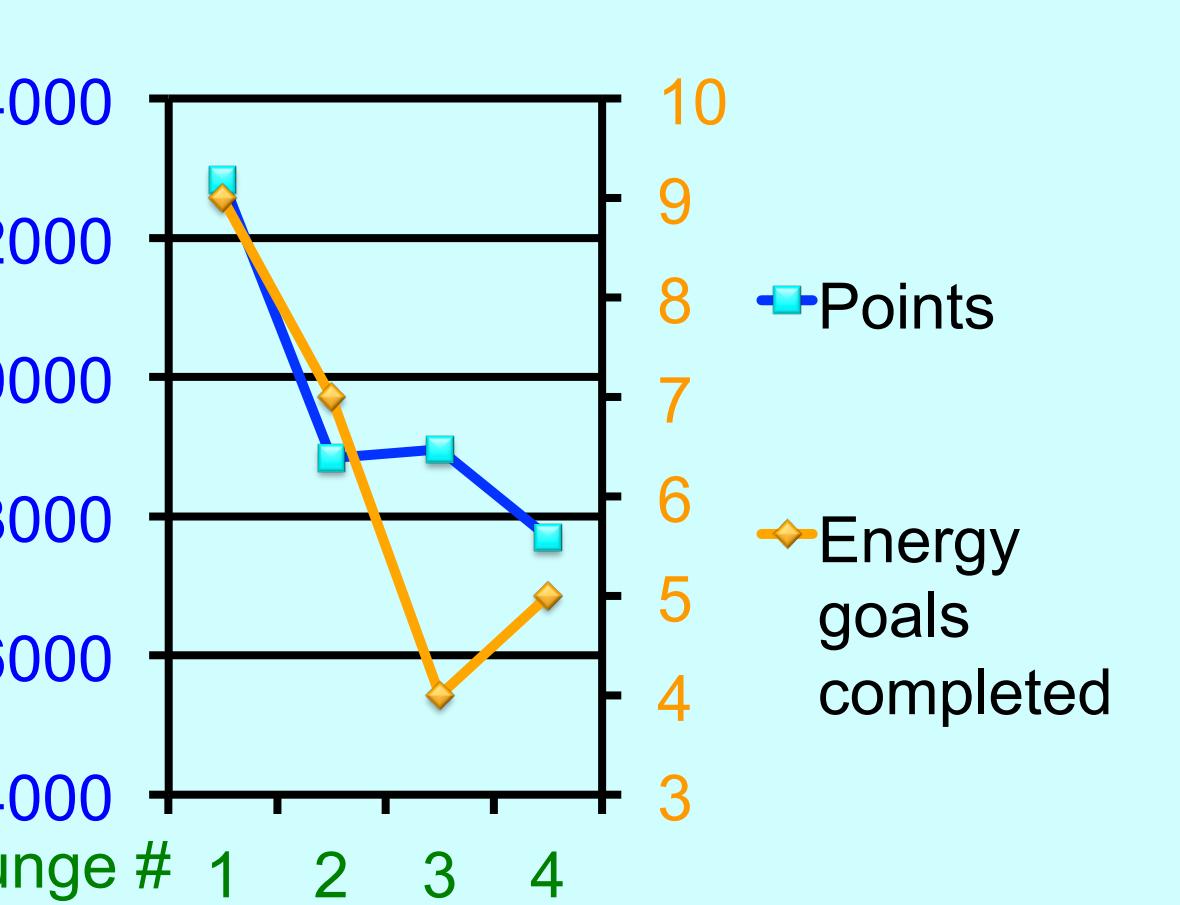
Energy conservation

- Best lounge reduced by ~15%
- Further analysis required
- Collecting base load data in Dec 2011

Energy education

- Points correlated with conservation?
- Based on lounges with > 40% participation
- Anecdotal evidence of improvement
- Before/after assessment in progress

Education & Conservation



Overall Energy Scoreboard		
Rank	Lounge	kWh used
1	Ilma-A	2284
2	Mokihana-B	2368
3	Lehua-E	2424
4	Lehua-A	2507
5	Ilma-E	2600
6	Mokihana-A	2604
7	Lehua-D	2655
8	Lehua-C	2719
9	Mokihana-C	2757
10	Lokelani-E	2790
11	Lokelani-D	2795
12	Ilma-D	2899
13	Lokelani-B	3061
14	Ilma-B	3241
15	Mokihana-E	3255
16	Mokihana-D	3259
17	Lokelani-A	3345
18	Lehua-B	3559
19	Lokelani-C	3560
20	Lehua-A	4878

Overall Points Scoreboard		
Rank	Name	Points
1	A.J.	2318
2	W.J.	2316
3	F.B.	1279
4	Y.N.	1268
5	D.T.	1164
6	P.S.	1154
7	C.L.	1096
8	M.M.	1064
9	J.W.	1043
10	R.T.	990

The Real World

Auditing energy use



- How much power does my stuff use?
- Developing energy intuition

Changing energy behaviors



- Turning off lights
- Turning off fans when not in use
- Configuring laptop sleep settings

Excursions



- Visit to 30 MW Kahuku wind farm
- Beach cleanup
- Visit to Reppun farm powered by PV & hydro

Workshops



- Recycled Fashion Design
- Energy efficient eating
- Slam poetry

Parties



- Kickoff party
- Round 1, 2, 3 awards parties
- Lounge awards (energy & points)

Support

- Center for Renewable Energy and Island Sustainability, University of Hawai’i
- National Science Foundation grant IIS-1017126
- University of Hawai’i Housing Services
- University of Hawai’i Facilities Management
- Hawai’i State Department of Business, Economic Development, and Tourism
- University of Hawai’i Dept. of Information and Computer Sciences