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Lights Off. Game On. The 2011 Kukui Cup

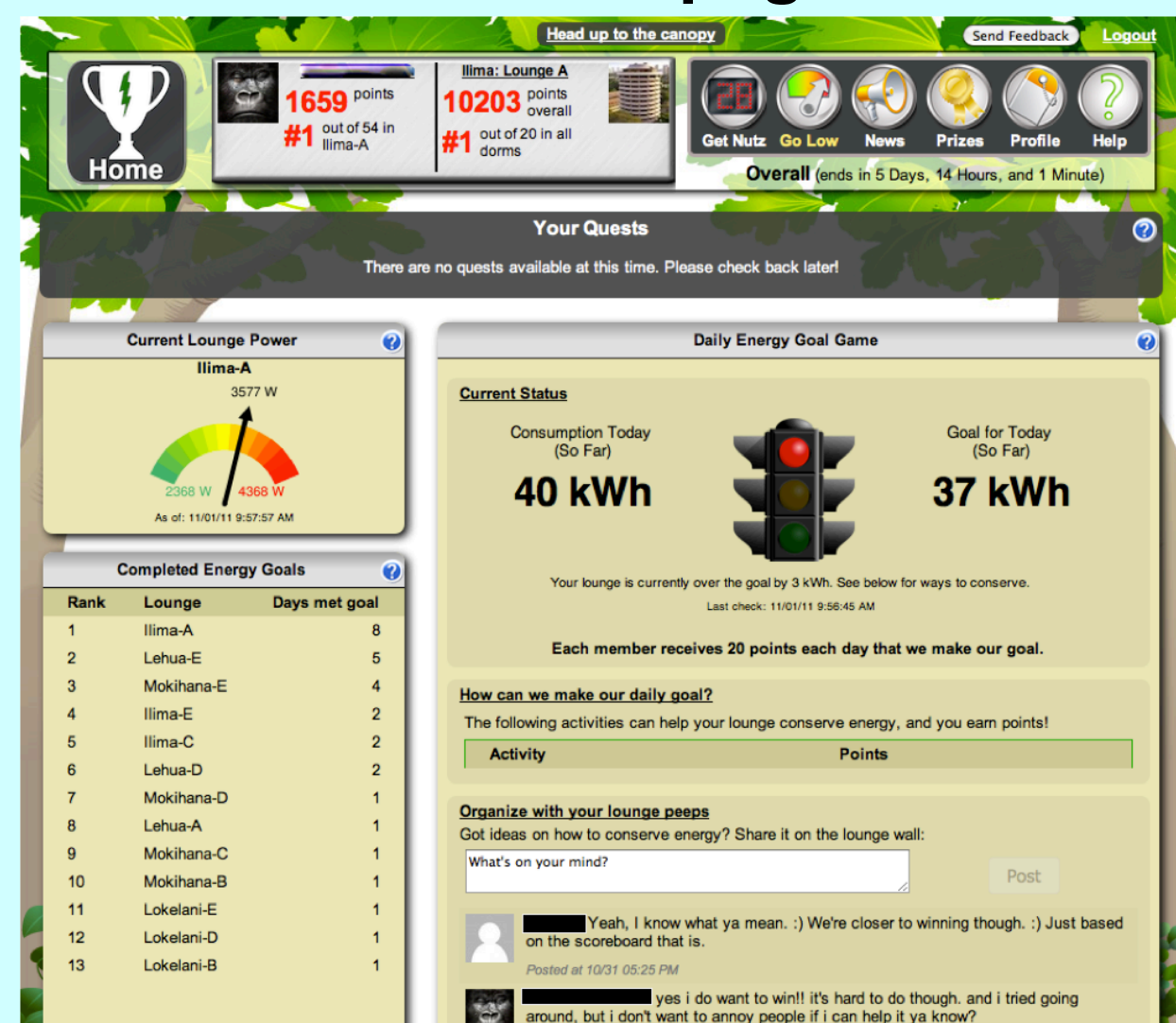


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The Virtual World

Online environment supporting education & competition

Go Low page



- Real-time power
- Energy scoreboard

- Energy goal visualization

- “Wall” for player discussion

Get Nutz page



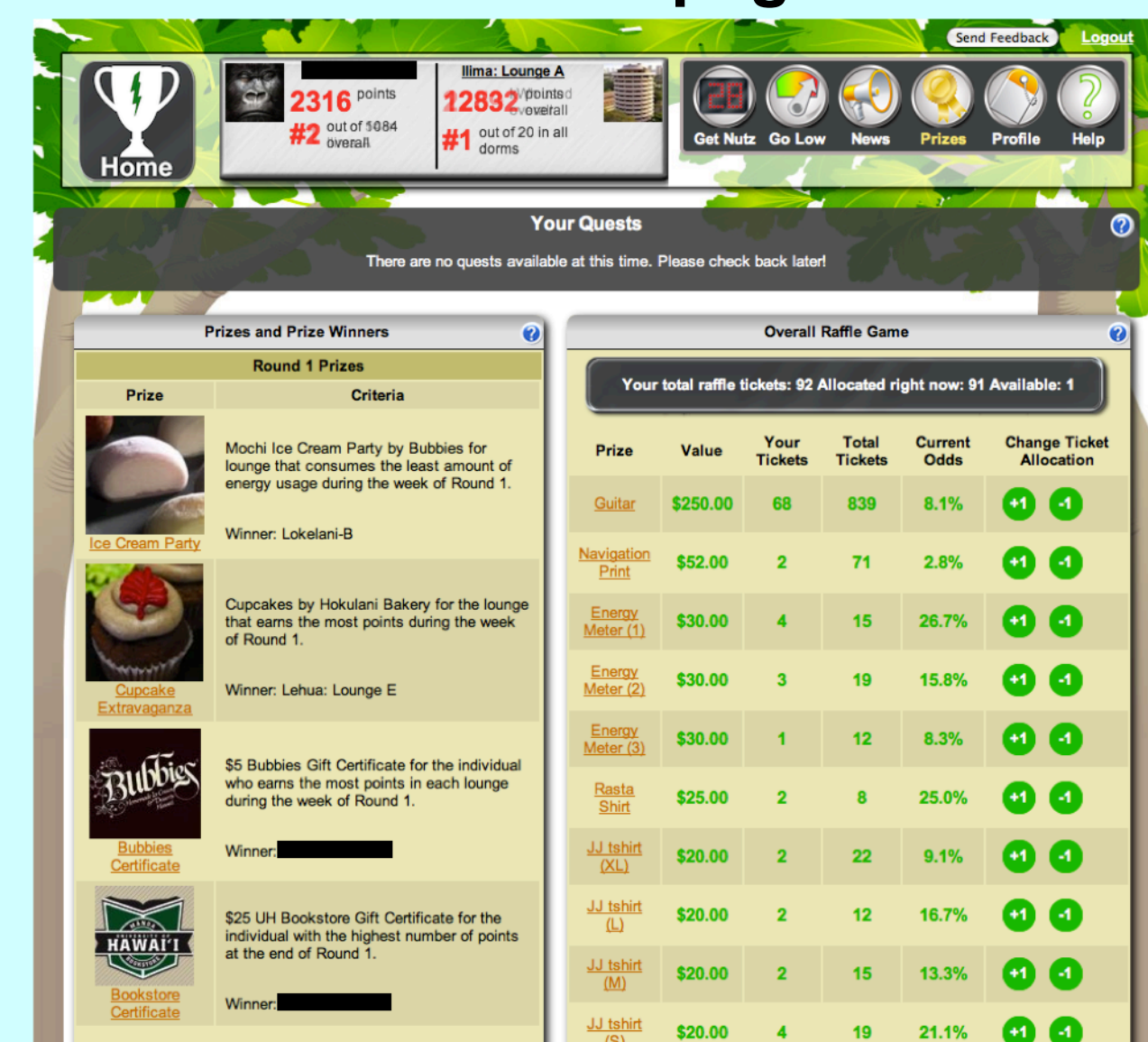
- Smart Grid Game

- Earn points by completing activities

- Point scoreboard

- List of upcoming events

Prizes page

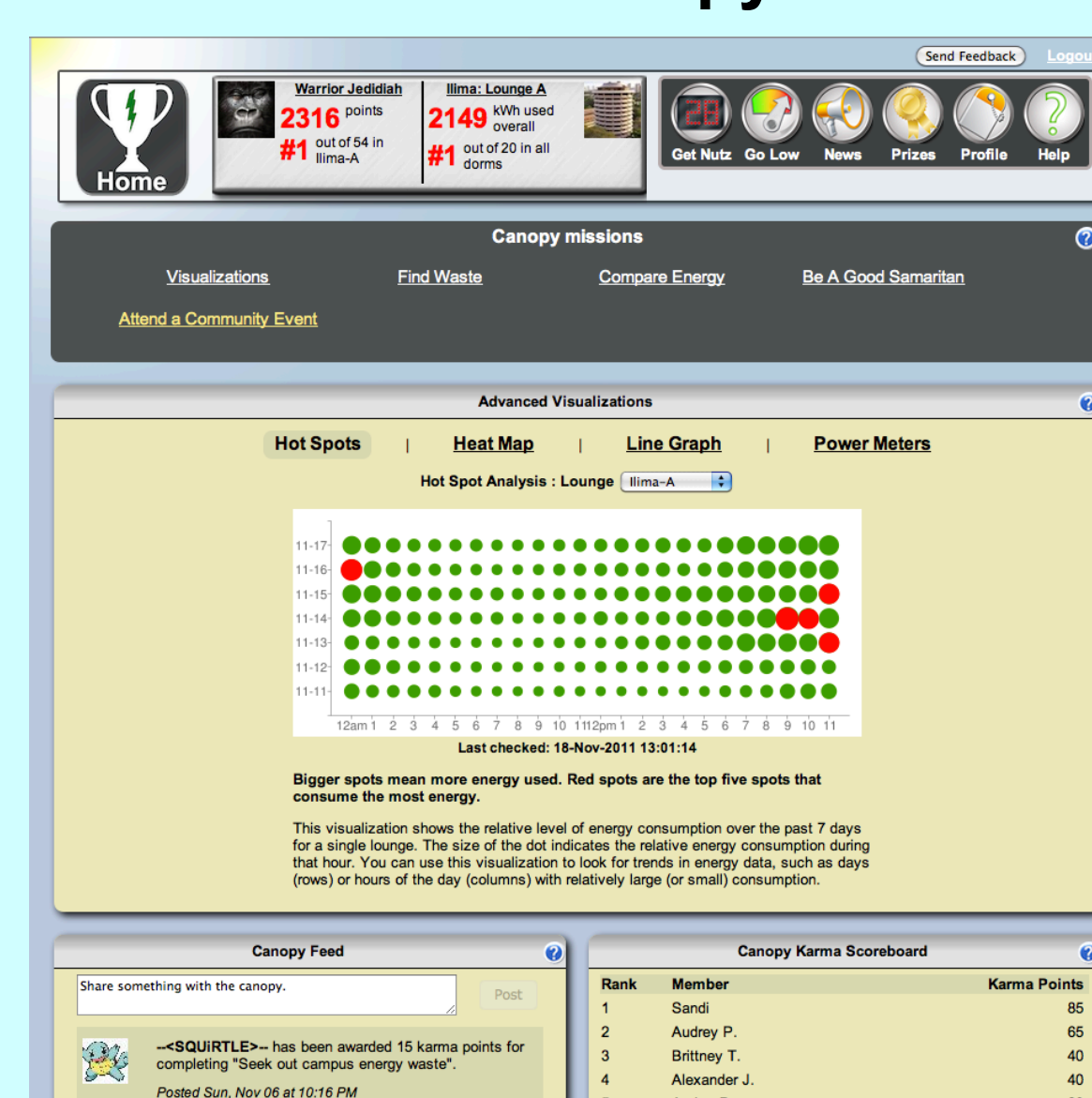


- Prizes for top players

- 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

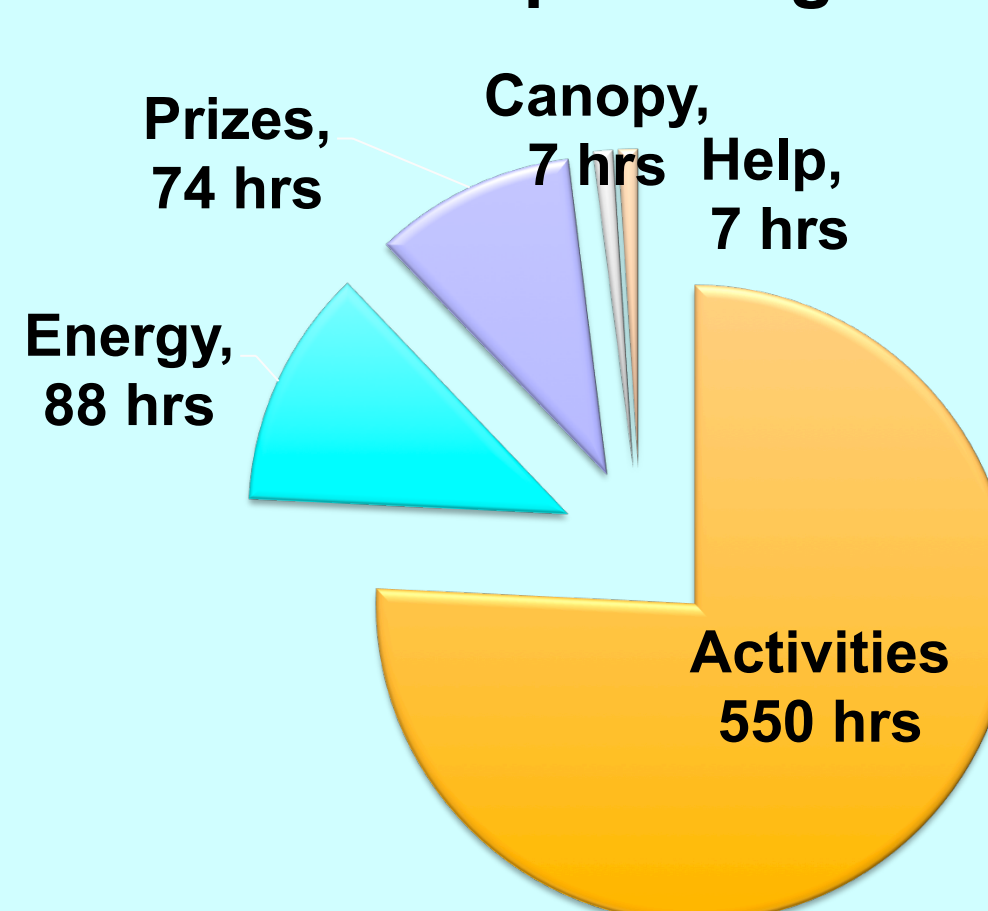
Energy conservation

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

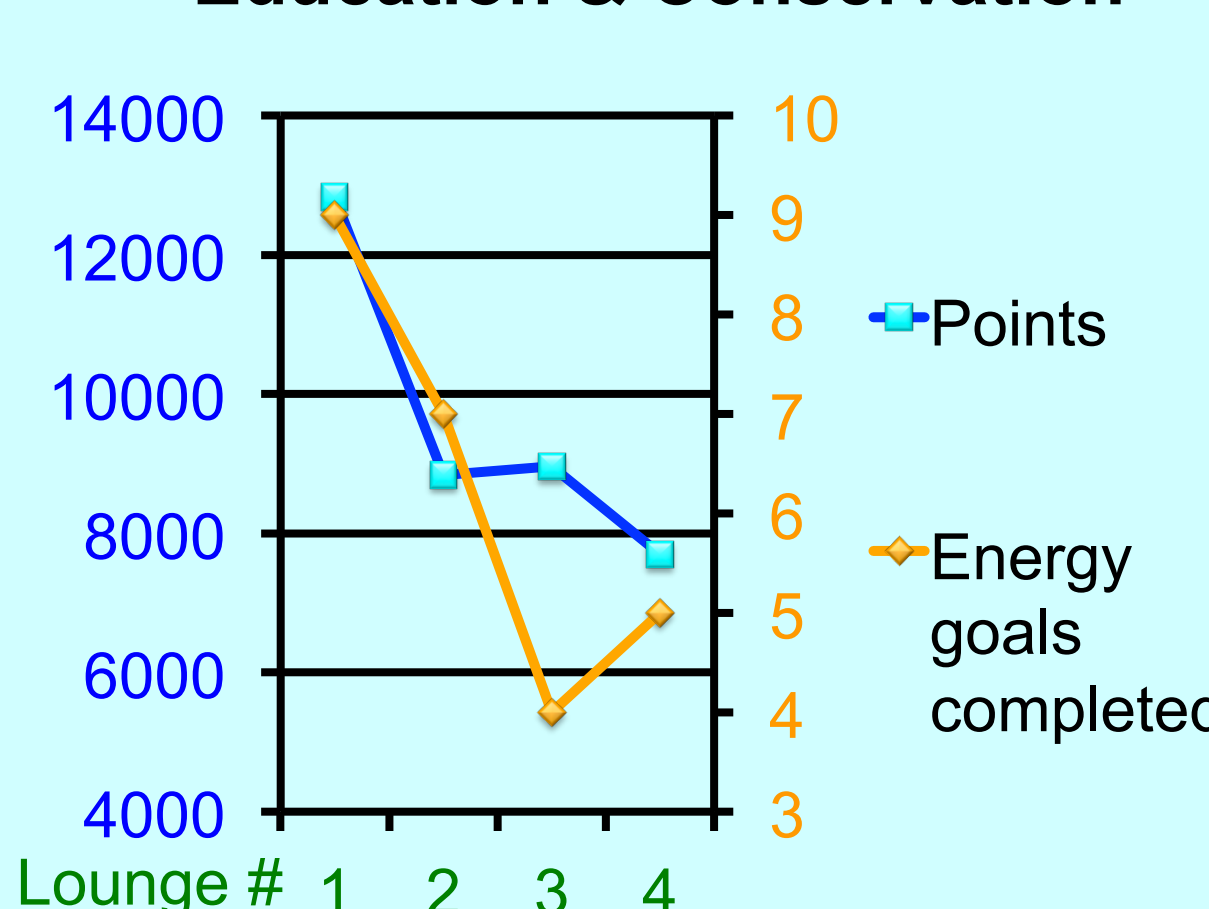
Energy education

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

Time spent in game



Education & Conservation



Overall Energy Scoreboard		
Rank	Lounge	kWh used
1	Ilima-A	2284
2	Mokihana-B	2368
3	Lehua-E	2424
4	Lehua-A	2507
5	Ilima-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	Ilima-D	2899
13	Lokelani-B	3061
14	Ilima-B	3241
15	Ilima-C	3255
16	Mokihana-E	3259
17	Mokihana-D	3345
18	Lokelani-A	3559
19	Lehua-B	3560
20	Lokelani-C	4878

Overall Points Scoreboard		
Rank	Name	Points
1	A.J.	2316
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



- 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